Logic in the Talmud

A Thematic Compilation

Avi Sion, Ph.D.

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Abstract

Logic in the Talmud is a 'thematic compilation' by Avi Sion. It collects in one volume essays that he has written on this subject in *Judaic Logic* (1995) and *A Fortiori Logic* (2013), in which traces of logic in the Talmud (the Mishna and Gemara) are identified and analyzed. A new essay, *The Logic of Analogy*, was added in 2022. While this book does not constitute an exhaustive study of logic in the Talmud, it is a ground-breaking and extensive study.

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FOREWORD

The present volume, *Logic in the Talmud*, is a 'thematic compilation'; that is, it is a collection of essays previously published in some of my primary works. Such collections allow me to increase the visibility of scattered writings over many years on a specific subject. In the present case, the essays are drawn from only two past works, *Judaic Logic* (1995)[1] and *A Fortiori Logic* (2013). A new essay, *The Logic of Analogy*, was added in 2022.

What do I mean by 'logic in the Talmud'? This term differs somewhat from the commonly used term 'Talmudic logic'. Research on logic in the Talmud (including both the Mishna and the Gemara) aims at uncovering and evaluating all logical processes actually in use, consciously or not, in Talmudic literature; it is an empirical and analytical study, devoid of preconceptions or prejudice. It is scientific observation comparable to, say, observation of animals in the wild or to electrons in an accelerator. Talmudic logic, on the other hand, as commonly understood, is an account of the way the participants in the Talmud, and later Talmudists, perceived their own logic (whether rightly or wrongly). That is, it is an account of accepted 'principles', rather than of actual practice. Talmudic logic is thus part of the larger investigation of logic in the Talmud; but not co-extensive with it.

There is a big difference between authentic logic studies, aimed at uncovering the facts of the case, whatever they happen to be; and make-believe studies, aimed at defending some religious or other ideological doctrine. The one is methodologically fully scientific; the other is essentially biased and apologetic. The results of these two pursuits, naturally, differ considerably. The former throws light on all relevant issues and findings, impartially; the latter emphasizes positive aspects and ignores or

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[1] Plus some addenda and diagrams for JL published first online, then in *Ruminations* (2005).

conceals negative aspects. The researcher in this field must consciously decide at the outset which of these two approaches he (or she) will adopt; whether his loyalty is ultimately to reality or to some given doctrine.

Research on logic in the Torah (and more broadly, the Tanakh) is, of course, a necessary preliminary to research on logic in the Talmud (and more broadly, all Rabbinic literature). The scientific study of logic in the Talmud is, obviously, a very broad field, requiring very attentive examination and critical assessment of every thought-process occurring in this massive document. Patience is required, to collect and sift through large amounts of information; and then, to meticulously examine each item found in great detail. Obviously, this work can best be done by someone (or many people) expert in both Talmudic discussions and general logic. Such double expertise is rarely found, if ever – which is partly why relatively little work has been done in this pregnant field. Yet such research is important for both Talmudic studies and general logic studies. Both domains are sure to benefit from it, in both their breadth and depth, in theory and in practice.

A major reason why such research has lagged far behind where it should be by now is that there is strong ideological resistance against its potential results on both left and right, i.e. by both modern atheistic secularists and orthodox Jewish Talmudists; though of course for different reasons. As regards the secularists, they are suspicious, antipathetic and antagonistic towards any work and anyone that may possibly give any credence or value to religious documents or thought. As regards the Talmudists, they are full of fear and loathing towards any work and anyone that may possibly put in doubt their cherished beliefs. Both the secular and religious camps steer well clear of any study of logic in the Torah and the Talmud, dogmatically refusing to even glance at such work, let alone to consider and discuss its findings, let alone contribute to it. Both parties are, therefore, unscientific in their spirit and approach.

My own work in this field has been, I believe, consistently objective and conscientious. In my early work, *Judaic Logic*, I analyze and appraise the hermeneutic principles traditionally alleged to characterize Talmudic halakhic (i.e. legal) discourse,

including the Thirteen *Midot* of Rabbi Ishmael and the distinct techniques favored by Rabbi Akiva, in a critical yet fair manner; and in my later work, *A Fortiori Logic*, I push the investigation of Talmudic logic to unprecedented heights, subjecting certain crucial texts to very searching and penetrating scrutiny and assessment. Yet, I must say that all this work, much of which is reproduced in the present volume, constitutes just a small fraction of the work that needs to be done in the vast field concerning us. There is a lot of work still to be done; and it is to encourage others to join in this interesting and valuable research work that I publish the present book.

The following pages are, to repeat, drawn mainly from my two past books, *Judaic Logic* (abbr. JL) and *A Fortiori Logic* (abbr. AFL). The chapters are not placed in the chronological order in which they were written. Rather, the selections from AFL are placed first; and those from JL, last. This order is logical, in that a fortiori argument is the mainstay of Talmudic logic; and deserves and has traditionally received the most attention. Thus, in the present volume, we first thoroughly examine a fortiori argument in the Talmud, from a multitude of angles. This includes: a historical survey; a theoretical primer, describing and explaining the varieties of a fortiori argument; detailed analyses of certain crucial Biblical, Mishnaic and Gemara arguments; explicating the rabbinical *dayo* (sufficiency) principle; philosophical discussions on related issues; and comparison between a fortiori argument and other forms of reasoning in the Talmud, notably the analogical and the syllogistic; and more issues yet needing to be dealt with are highlighted.

Then comes an exhaustive listing of a fortiori arguments found in the Mishna; followed by an attempted estimate of the number of a fortiori arguments in the Gemara. Unfortunately, I have not yet developed an exhaustive list of a fortiori arguments in the Gemara; I only here show the way to one. After that, I examine the input of various post-Talmudic commentators, issues raised by them and solutions proposed by them. Although most such commentaries are of later date, they constitute an integral part of Talmud studies; no Talmudist would dare engage in such study today without referring to such authorities. I also here take a look at what three standard lexicons say on the subject. On the other

hand, I have left out of the present volume the large part of AFL where I deal with a great many, more modern, commentators in much detail.

It is only after having thus dealt with a fortiori argument in great detail that I insert, in the present volume, relevant chapters from JL. This provides our study with a wider perspective. Here, I closely examine various other argument forms traditionally thought to be part of Talmudic logic, with reference to both theoretical and practical data. Some of these arguments appear to be invalid; but this conclusion is admittedly only tentative, being based on a limited sample of applications. Moreover, it is not clear how often these alleged arguments are actually used in the Talmud; many seem to be pretty rarely, if at all, used. In short, much myth seems to be involved in the traditional account of Talmudic logic. In conclusion, the rabbis have evidently been mostly competent practitioners of logic; but their theoretical capacities in this field left (and continue to leave) much to be desired.

To repeat, the present book does not constitute an exhaustive study of logic in the Talmud; but it is a ground-breaking and extensive study. Anyone who takes the trouble to read it carefully will find it intellectually very challenging and rich in information. It is hoped that other competent individuals, upon reading it, will be inspired to get involved in this important field of research.

1. A FORTIORI IN THE TALMUD

Drawn from A Fortiori Logic *(2013), chapter 7.*

1. Brief history of a fortiori

There is credible written evidence that a fortiori argument was *in use* in very early times thanks to the Jewish Bible. Five instances are apparent in the Torah proper (the Five Books of Moses, or Pentateuch) and about forty more are scattered throughout the Nakh (the other books of the Bible). According to Jewish tradition, the Torah dates from about 1300 BCE (the time of the Exodus from Egypt and wanderings in the Sinai desert)[2], and subsequent Biblical books range in age from that time to about the 4th century BCE (the period of the return from Babylon of some of the captives after the destruction of the first Temple). The oldest apparent a fortiori (actually, a crescendo) argument in the Torah is the one formulated in Gen. 4:24 by Lamekh (before the deluge); while the oldest purely a fortiori argument is the one formulated in Gen. 44:8 by Joseph's brothers (patriarchal era). A fortiori arguments are also found in some of the latest books of the Bible (first exile period).

Of the 46 or so instances of a fortiori argument in the Tanakh (see AFL, Appendix 1), at least 10 were known to (i.e. were consciously *identified as such* by) the rabbis of the Talmud – so it is not surprising that this form of argument came to play such an important role in the development of Jewish law. The *qal vachomer* argument, as it is called in Hebrew, is mentioned in several lists of Talmudic hermeneutic principles. It is the first rule in the list of 7 attributed to **Hillel** (the Elder, Babylonia and Eretz Israel, c. 110 BCE-10 CE) and the first rule in the list of

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[2] Some historians, on the basis of debatable evidence or lack of evidence, claim the Torah to date from as late as the 8th cent. BCE. Even if this were true, it would signify a very early date for the a fortiori arguments present in it.

13 attributed to **R. Ishmael** (ben Elisha, Eretz Israel, 90-135 CE), both of which are given at the beginning of the *Sifra* (a halakhic midrash, attributed by many to Rab, i.e. Abba Arika, 175–247 CE). It is also found (as rules 5 and 6) in the slightly later list of 32 rules of **R. Eliezer b. Jose ha-Gelili** (Eretz Israel, ca. 2nd cent. CE)[3], and among the much later 613 rules of the Malbim (Meïr Leibush ben Yechiel Michel Weiser, Ukraine, 1809-1879) in his work *Ayelet haShachar,* the introduction to his commentary on the *Sifra*.[4]

As regards historical source, there can be little doubt that the rabbis learned a fortiori argument from its use in the Tanakh – and not (as some commentators have suggested) from surrounding cultures (Greek, Roman, or whatever). We can be sure of that, knowing that the Talmudic rabbis' attention was wholly turned towards Jewish Scriptures and oral tradition; and a fortiori arguments were clearly in use in these sources; and moreover, everyone agrees that the Torah, at least, antedates by several centuries the historical appearance of a fortiori argument in other cultures. This does not, of course, imply that the Greeks and other early users of a fortiori argument learned this form of reasoning from the Torah or other Jewish sources. There is no doubt that a fortiori argument arose independently in different cultures at different times, simply due to its being a natural form of human reasoning[5].

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[3] R. Eliezer's list is known indirectly from later texts. See en.wikipedia.org/wiki/R._Eliezer_ben_Jose_ha-Gelili. Jacobs (in his *Rabbinic Thought in the Talmud*, p. 78, fn. 9) characterizes this list as "a post-Talmudic work". It is however a very significant work in that it includes the hermeneutic principles of **R. Akiva**, which rivaled those of R. Ishmael and yet were not (to my knowledge) collected in a list bearing his name. You can find all three lists in the Appendix to A. Schumann's Introduction to the *Judaic Logic* collection he edited.

[4] You can easily find additional information on the various lists in a number of Wikipedia articles. Note that Hillel, R. Ishmael and R. Eliezer b. Jose ha-Gelili were all three Tannaim, i.e. Mishnaic rabbis. (More accurately, Hillel is classified as pre-Tannaic, forming together with Shammai the last of the *zugot*, i.e. "pairs" of religious leaders.)

[5] It would perhaps be more accurate to postulate that a fortiori argument was first formulated far in prehistory, soon after language and

In the lists of Hillel and R. Ishmael, all that is offered is a title or heading: "***qal vachomer***," which is variously translated as light and heavy, easy and difficult, lenient and stringent, or minor and major. It should be said that the language of a fortiori argument in the Tanakh, though very varied (but not always distinctive, i.e. not always specifically reserved for such argument), does not include the words *qal vachomer*. This expression is presumably therefore of rabbinical origin. Two other expressions indicative of a fortiori discourse are also found in rabbinic literature: *kol she ken* (which seems to be the Hebrew equivalent of 'all the more so') and *al achat kama vekama* (which seems to be the Hebrew equivalent of 'how much the more').[6]

The term *qal vachomer* is somewhat descriptive, in the way of a hint – but note well that it is certainly *not a description of a fortiori argument in formal terms*, and it *does not validate* or even discuss the validity of the argument (but, obviously, takes it for granted). The list of R. Eliezer b. Jose ha-Gelili is not much more informative in that respect than those of its predecessors, since it only adds that *qal vachomer* may be *meforash* (i.e. explicit) or *satum* (i.e. implicit)[7]. Other early rabbinic literature does not go much further in elucidating the definition and more theoretical aspects of *qal vachomer*; it is all taken for granted.

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logic first formed in the cognitive apparatus of the human species; but it stood out as a recognizable meme at different times in different cultures during the historic period.

[6] Feigenbaum, in his *Understanding the Talmud* (pp. 88-90), explains the terminology more precisely as follows. The expression *qal vachomer* is Tannaic. The premise is introduced by them saying *mah* or *umah* and the conclusion is signaled by *eino din she*, or *al achat kama vekama*, or *lo kol she ken*. Amoraim on the other hand, use *tashta* before the premise and *mibaya* or *tserikha lemeimar* before the conclusion. R. Nosson Dovid Rabinovich, in his *M. Mielziner's Talmudic Terminology* (pp. 69-70), presents the matter slightly differently.

[7] This is of course an important distinction to note, because it indicates that rabbis were already aware quite early that a fortiori argument is in practice not always as fully verbalized as it could and ought to be. Indeed, the Biblical examples of such argument are typically not fully verbalized (to various degrees), so they did not need to look far to realize the fact.

Rather, the form and operation of a fortiori argument are taught through concrete examples. Ten Biblical examples of the argument, four in the Torah and six elsewhere[8], are listed in *Genesis Rabbah* (in Heb. *Bereshith Rabbah*), a midrashic work (closed ca. 400-450 CE) attributed by tradition to R. Oshia Rabba (d. ca. 350 CE). This just says: "R. Ishmael taught: [There are] ten a fortiori arguments recorded in the Torah" (92:7), and lists the ten cases without further comment. But of course, the main teaching of such argumentation is through the practice of the rabbis. There are a great many concrete examples of a fortiori reasoning in the Talmud and other rabbinic literature[9], which incidentally serve to clarify the form for future generations.

There is, however, one passage of the Talmud which is very instructive as to how the rabbis theoretically understood the *qal vachomer* (a fortiori type) argument and **the *dayo* (sufficiency) principle** related to it – and that is pp. 24b-25a and further on pp. 25b-26a of the tractate Baba Qama (meaning: 'first gate'), which is part of the order of *Neziqin* ('damages'). For the time being we shall concentrate on this important passage. We shall

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[8] I list and analyze these ten examples in detail in JL (chapters 4, 5 and 6). I show there that one of the cases listed, viz. Esther 9:12, is doubtfully a fortiori. More important, I show there that there are at least another twenty cases of a fortiori in the Bible, one of which is in the Torah, Genesis 4:24. See summary of these and more recent findings in AFL, Appendix 1.

[9] Precisely how many concrete cases of *qal vachomer* argument there are in the Talmud and related documents has never, to my knowledge, been researched. This gigantic task should imperatively be done by someone – not just anyone, but someone with the needed logical knowhow. Indeed, the precise location and form of all rabbinic use of all explicit and implicit hermeneutic principles needs to be researched, so that a fully scientific assessment of Talmudic logic can be effected. The Babylonian and Jerusalem Talmuds should also be compared in this respect, though the latter contains much less commentary than the former. Although I unfortunately have never learned Hebrew and Aramaic well enough to take up the task in the original languages, I hope one day to at least try and draw up a rough list in English based on perusal of the Soncino Talmud.

have occasion further on in the present volume to consider and explore some other significant Talmudic a fortiori arguments.

However, this book makes no claim to constituting an exhaustive study of this subject. Nonetheless, while I must confess being largely ignorant of the 'Sea of the Talmud', I believe the present contribution will be found very valuable due to the considerable extent and depth of new logical insight it contains. We shall in the present chapter, further on, describe in detail just what the said passage of the Talmud reveals. But first permit me to prepare you, the reader, with some background information and analysis, so that you come properly armed to the crux of the matter.

The Talmud (meaning: the teaching) in general consists of a series of rabbinical discussions on various legal and other topics stretching over centuries, roughly from about the 1st century BCE to about the 5th century CE. It has two essential components: the first and historically earliest stratum (ca. 200 CE) is the **Mishna** (meaning: repetition) and the second and later stratum is the **Gemara** (meaning: completion)[10]. The Gemara is a commentary (in Aramaic) on the Mishna (which is in Hebrew), clarifying, explaining and amplifying it[11].

The compiling and editing of the Mishna (whose participants are known as **Tannaim**, teachers) is traditionally attributed to R. Yehudah HaNassi (d. 219 CE), while the redaction of the Gemara (whose participants are known as **Amoraim**, expounders) took more time and was the work of many (until ca. 500 CE). This refers to the main, **Babylonian (*Bavli*)** Talmud, with which we are here concerned; there is an earlier, less

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[10] In between Mishna and Gemara is the **Tosefta** (ca. 300 CE), a later supplement to the Mishna that the Gemara sometimes refers to for additional information.

[11] The term Talmud is often taken as equivalent to the term Gemara, for whereas the Mishna is published separately, the Gemara is always published in conjunction with the Mishna since the Gemara's purpose is to comment on the Mishna. But I think the correct use is to say Talmud when referring to the conjunction, and Gemara when referring specifically to the commentary, as one says Mishna when referring to the older material.

authoritative compilation known as the **Jerusalem (*Yerushalmi*)** – or more precisely put, the Land of Israel[12] – Talmud (closed ca. 350-400 CE).[13]

The genesis of these various documents is an interesting historical issue, which has received much attention over time and more critical attention in modern times. Their redactors are thought to have been numerous and stretched out over centuries[14]. Some of the individuals involved are known by tradition, others remain anonymous. They should not, of course, be viewed as standing outside looking in on the collective discursive process they describe. Some of them were without doubt active or passive contemporary participants in some of the Talmudic discussions they report. But even those who do not fall in the category of eye-witnesses must be considered as effectively participants, albeit sometimes centuries after the fact, since by their selection, ordering and slanting of scattered material, their paraphrases and explanations, not to mention their outright interpolations, they necessarily affect our perceptions of the presumed original discussions. It would be a grave error to

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[12] Some call it the Palestinian Talmud, because the Land of Israel was, at the time of its formation, under Roman rule and the Romans chose to rename Judea "Palestine" (more precisely, the Roman emperor Hadrian so decreed after the Bar Kochba rebellion). But it is wise to stop using this name, because it has nowadays, after intense propaganda efforts by anti-Israeli journalists and revisionist "historians," become associated with current Arab inhabitants of the Jewish homeland, to make them seem like natives (or even aborigines).

[13] See Neusner for a more detailed exposition of these various documents and their interrelationships. I cannot here, of course, get into discussions about dating that emerge from the different modern theories of Talmudic formation, including those of Abraham Weiss and David Weiss-Halivni. This is not my field, though truly a fascinating one.

[14] According to some commentators, the Talmud, though mainly the work the Tannaim and the Amoraim, may have received some further editing by the hand of some Savoraim (ca. 500-600 CE) and perhaps even some Geonim (ca. 600-1000 CE). Abraham Weiss considers that some editing was done in almost every generation, while David Weiss-Halivni attributes most of this work to those he calls the Stammaim (ca. 427 to 501 or 520 CE). See the interesting essays on these subjects in *Essential Papers on the Talmud.*

regard such redactors as entirely self-effacing, perfectly objective and impartial, contemporary observers and stenographers.

The Mishna and the Gemara[15]were conceived as written records of past and present oral legal (**halakhic**) and to a lesser extent, non-legal (**haggadic**) traditions. The rabbis (as we shall here indifferently call all participants) mentioned or implied in them did not all live at the same time and in the same place, note well. Their discussions were rarely face to face; but were brought together in one continuous document by the redactors, who were therefore perforce (albeit often invisibly) themselves important participants in the discussions, by virtue of their work of selection, structuring and commentary. Keep in mind this scattering in time and place of participants, and also the constant presence of the redactors in the background of all discourse[16]. Too often, traditional students of the Talmud approach it naïvely and idealistically as an essentially indivisible unit, somehow transcending time and space, perfectly harmonious.

There were perforce long periods of time when the traditions that were eventually put down in writing were transmitted by word of mouth. It must be considered whether such transmission was always perfect, or whether some elements were lost, transformed or added along the way. While it is true that people in those days were more used to memorizing things than we are today, and that they used various mnemonic devices to do so, one may still

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[15] Individual sentences or topics in the Mishna are called *mishna* in the sing., *mishnayot* in the pl. Likewise for the Gemara: *gemara*, *gemarot*.

[16] Note that when in the coming pages I refer to the Gemara's "author," I intend this singular term as very vague. It could be taken to refer to some anonymous Amora(s) whose ideas the Gemara just reports, or it could refer to the later redactor(s) injecting his/their own ideas. It is by no means clear in either case whether one person was involved or many; and if they were many, it is not clear whether they cooperated as a team, or they simply succeeded each other, each modifying or adding to the work of his predecessor. Moreover, keep in mind that the author(s) of one *sugya* may be different from that/those of other *sugyas*, for all we know.

reasonably assume that some change in the information occurred over time if only unwittingly. Also, as Louis Jacobs has pointed out[17], in the name of I. H. Weiss, with reference to modern day scholars who are able to recite the whole of the Talmud by heart, it is surely easier to memorize a document one has read than to memorize information never seen in written form. It should also be considered that people naturally vary in intelligence, and students often do not understand all that their teachers do, and indeed sometimes students understand more than their teachers do. In short, the oral tradition should never be looked upon as some static solid phenomenon, but rather as a living mass subject to some change over time.

2. A brief course in the relevant logic

Before we examine any Talmudic text in detail, we need to briefly clarify the logical point of view on a fortiori argument. This clarification is a necessary propaedeutic, because many of the Talmudists and students of the Talmud who may choose to read this essay are probably not acquainted with any objective analysis of the underlying logic, having only been trained in rabbinical ways, which are rarely very formal. The treatment proposed in the present section is of course minimal – much more can be learned about the a fortiori argument in other chapters of the present volume; and in the rest of my past works, JL and AFL.

Formal validation of a fortiori argument. The paradigm of a fortiori argument, the simplest and most commonly used form of it, is the positive subjectal mood[18], in which the major and

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[17] In his *Studies*, in a footnote on p. 60. Moreover, note that Maimonides considers, in the introduction to his *Commentary on the Mishnah*, that “it is not possible for any person to remember the entire Talmud by heart” (p. 110).

[18] Note in passing: the Hebrew name of a fortiori argument, viz. *qal vachomer* (i.e. ‘minor and major’, suggesting minor *to* major, since the word ‘minor’ precedes the word ‘major’), is indicative that the rabbis

minor terms (here always labeled P and Q, respectively) are subjects and the middle and subsidiary terms (here always labeled R and S, respectively) are predicates. It proceeds as follows[19]:

P is R more than Q is R (major premise).

Q is R enough to be S (minor premise).

Therefore, P is R enough to be S (conclusion).

An example of such argument would be: "*If her father had but spit in her face, should she not hide in shame seven days? Let her be shut up without the camp seven days, and after that she shall be brought in again.*" (Num. 12:14). This can be read as: if offending one's father (Q) is bad (R) enough to deserve seven days isolation (S), then surely offending God (P) is bad (R) enough to deserve seven days isolation (S); the tacit major premise being: offending God (P) is worse (R) than offending one's father (Q).

This form of argument can be logically validated (briefly put) as follows. The major premise tells us that P and Q are both R, though to different measures or degrees. Let us suppose the measure or degree of R in P is Rp and that of R in Q is Rq – then the major premise tells us that: if P then Rp, and if Q then Rp, and Rp is greater than Rq (which in turn implies: if something is Rp then it is also Rq, since a larger number includes all numbers below it[20]). Similarly, the minor premise tells us that nothing can be S unless it has at least a certain measure or degree of R, call it Rs; this can be stated more formally as: if Rs then S and if not Rs then not S. Obviously, since Q is R, Q has the quantity Rq of R, i.e. if Q, then Rq; but here we learn additionally (from the

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likewise viewed this mood as the primary and most typical one. Otherwise, they might have called it *chomer veqal*!

19 I leave out *a pari* or egalitarian a fortiori argument here for the sake of simplicity. This has been mentioned and dealt with in AFL 1. But briefly put, this deals with cases where Rp = Rq.

20 This is known as the Talmudic rule of *bichlal maasaim maneh*, although I do not know who first formulated it, nor when and where he did so.

"enough" clause) that Rq is greater than or equal to Rs, so that if Rq then Rs; whence, the minor premise tells us that if Q then S. The putative conclusion simply brings some of the preceding elements together in a new compound proposition, namely: if P then Rp (from the major premise) and if Rs then S and if not Rs then not S (from the minor premise), and Rp is greater than Rs (since Rp > Rq in the major premise and Rq ≥ Rs in the minor premise), so that if Rp then Rs; whence, if P then S. The conclusion is thus proved by the two premises (together, not separately, as you can see). So, the argument as a whole is valid – i.e. *it cannot logically be contested*.

Having thus validated the positive subjectal mood of a fortiori argument, it is easy to validate the negative subjectal mood by *reductio ad absurdum* to the former. That is, keeping the former's major premise: "P is R more than Q is R," and denying its putative conclusion, i.e. saying: "P is R *not* enough to be S," we must now conclude with a denial of its minor premise, i.e. with: "Q is R *not* enough to be S." For, if we did not so conclude the negative argument, we would be denying the validity of the positive argument.

We can similarly demonstrate the validity of the positive, and then the negative, predicatal moods of a fortiori argument. In this form, the major, minor and middle terms (P, Q and R) are predicates and the subsidiary term (S) is a subject.

More R is required to be P than to be Q (major premise).

S is R enough to be P (minor premise).

Therefore, S is R enough to be Q (conclusion).

An example of such argument would be: "*Behold, the money, which we found in our sacks' mouths, we brought back unto thee out of the land of Canaan; how then should we steal out of thy lord's house silver or gold?*" (Gen. 44:8). This can be read as: if we (S) are honest (R) enough to return found valuables (P), then surely we (S) are honest (R) enough to not-steal (Q); the tacit major premise being: more honesty (R) is required to return found valuables (P) than to refrain from stealing (Q).

Here the validation proceeds (again briefly put) as follows. The major premise tells us that iff (i.e. if only if) Rp then P, and iff Rq then Q, and Rp is greater than Rq (whence if Rp then Rq).

The minor premise tells us additionally that if S then Rs, and (since it is "enough") Rs is greater than or equal to Rp (whence if Rs then Rp), from which it follows that if S then Rp; and since iff Rp then P, it follows that if S then P. From the preceding givens, we can construct the putative conclusion, using if S then Rs (from the minor premise), and Rs is greater than Rq (from both premises, whence if Rs then Rq); these together imply if S then Rq, and this together with iff Rq then Q (from the major premise) imply if S then Q. The conclusion is thus here again incontrovertibly proved by the two premises jointly. The negative predicatal mood can in turn be validated, using as before the method of *reductio ad absurdum*. That is, if the major premise remains unchanged and the putative conclusion is denied, then the minor premise will necessarily be denied; but since the minor premise is given and so cannot be denied, it follows that the conclusion cannot be denied.

Notice that the reasoning proceeds from minor to major (i.e. from the minor term (Q) in the minor premise, to the major term (P) in the conclusion) in the positive subjectal mood; from major to minor in the negative subjectal mood; from major to minor in the positive predicatal mood; and from minor to major in the negative predicatal mood. These are valid forms of reasoning. If, on the other hand, we proceeded from major to minor in the positive subjectal mood, from minor to major in the negative subjectal mood; from minor to major in the positive predicatal mood; or from major to minor in the negative predicatal mood – we would be engaged in fallacious reasoning. That is, in the latter four cases, the arguments cannot be validated and their putative conclusions do not logically follow from their given premises. To reason fallaciously is to invite immediate or eventual contradiction.

Note well that each of the four arguments we have just validated contains only four terms, here labeled P, Q, R, and S. Each of these terms appears two or more times in the argument. P and Q appear in the major premise, and in either the minor premise or the conclusion. R appears in both premises and in the conclusion. And S appears in the minor premise and in the conclusion. The argument as a whole may be said to be properly constructed if it has one of these four validated forms and it

contains *only four terms*. Obviously, if any one (or more) of the terms has even slightly different meanings in its various appearances in the argument, the argument cannot truly be said to be properly constructed. It may give the illusion of being a valid a fortiori, but it is not really one. It is fallacious reasoning.

The above described a fortiori arguments, labeled subjectal or predicatal, relate to terms, and may thus be called ‘copulative’. There are similar ‘implicational’ arguments, which relate to theses instead of terms, and so are labeled antecedental or consequental. To give one example of the latter, a positive antecedental argument might look like this:

Ap (A being p) implies Cr (r in C) more than Bq (B being q) does,

and Bq implies Cr enough for Ds (for D to be s);

therefore, Ap implies Cr enough for Ds.

Notice the use of ‘implies’ instead of ‘is’ to correlate the items concerned. I have here presented the theses as explicit propositions ‘A is p’, ‘B is q’, ‘C is r’ and ‘D is s’, although they could equally well be symbolized simply as P, Q, R, and S, respectively. The rules of inference are essentially the same in implicational argument as in copulative argument.

The principle of deduction. This forewarning concerning *the uniformity throughout an argument of the terms used* may be expressed as a law of logic. It is true not just of a fortiori argument, but of all deductive argument (for instances, syllogism or apodosis). We can call this fundamental rule ‘the principle of deduction’, and state it as: *no information may be claimed as a deductive conclusion which is not already given, explicitly or implicitly, in the premise(s)*. This is a very important principle, which helps us avoid fallacious reasoning. It may be viewed as an aspect of the law of identity, since it enjoins us to acknowledge the information we have, as it is, without fanciful additions. It may also be considered as *the fifth law of thought*,

to underscore the contrast between it and the principle of induction[21], which is the fourth law of thought.

Deduction must never be confused with induction. In inductive reasoning, the conclusion can indeed contain more information than the premises make available; for instance, when we generalize from some cases to all cases, the conclusion is inductively valid *provided and so long as* no cases are found that belie it. In deductive reasoning, on the other hand, the conclusion must be formally implied by the given premise(s), and no extrapolation from the given data is logically permitted. In induction, the conclusion is tentative, subject to change if additional information is found, *even if* such new data does not contradict the initial premise(s)[22]. In deduction, on the other hand, the conclusion is sure and immutable, so long as no new data contradicts the initial premise(s).

As regards the terms, if a term used in the conclusion of a deductive argument (such as a fortiori) differs *however slightly* in meaning or in scope from its meaning or scope in a premise, the conclusion is invalid. No equivocation or ambiguity is allowed. No creativity or extrapolation is allowed. If the terms are not exactly identical throughout the argument, it might still have some inductive value, but as regards its deductive value it has none. This rule of logic, then, we shall here refer to as 'the principle of deduction'.

The error of 'proportional' a fortiori argument. An error many people make when attempting to reason a fortiori is to suppose that the subsidiary term (S) is *generally* changed in magnitude in proportion (roughly) to the comparison between

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[21] In its most general form, this principle may be stated as: what in a given context of information appears to be true, may be taken to be effectively true, unless or until new information is found that puts in doubt the initial appearance. In the latter event, the changed context of information may generate a new appearance as to what is true; or it may result in some uncertainty until additional data comes into play.

[22] For example, having generalized from "some X are Y" to "all X are Y" – if it is thereafter discovered that "some X are not Y," the premise "some X are Y" is not contradicted, but the conclusion "all X are Y" is indeed contradicted and must be abandoned.

the major and minor terms (P and Q). The error of such 'proportional' a fortiori argument, as we shall henceforth call it, can be formally demonstrated as follows.

Consider the positive subjectal mood we have described above. Suppose instead of arguing as we just did above, we now argue as do the proponents of such fallacious reasoning that: *just as 'P is more R than S' (major premise), so S in the conclusion (which is about P) should be greater than it is in the minor premise (which is about Q)*. If we adhered to this 'reasoning', we would have *two different subsidiary terms*, say S1 for the minor premise and S2 for the conclusion, with S2 > S1, perhaps in the same proportion as P is to Q, or more precisely as the R value for P (Rp) is to the R value for Q (Rq), so that S1 and S2 could be referred to more specifically as Sq and Sp. In that case, our argument would read as follows:

P is R more than Q is R (major premise).

Q is R enough to be S1 (minor premise).

Therefore, P is R enough to be S2 (conclusion).

The problem now is that this argument would be difficult to validate, since it contains *five terms* instead of only four as before. Previously, the value of R sufficient to qualify as S was *the same* (viz. R ≥ Rs) in the conclusion (for P) as in the minor premise (for Q). Now, we have two threshold values of R for S, say Rs1 (in the minor premise, for Q) and Rs2 (in the conclusion, for P). Clearly, if Rs2 is assumed to be greater than Rs1 (just as Rp is greater than Rq), we cannot conclude that Rp > Rs2, for although we still know that Rp > Rq and Rq ≥ Rs1, we now have: Rp > Rs1 < Rs2, so that the relative sizes of Rp and Rs2 remain undecidable. Furthermore, although previously we inferred the "If Rs then S" component of the conclusion from the minor premise, now we have no basis for the "If Rs2 then S2" component of the conclusion, since our minor premise has a different component "If Rs1 then S1" (and the latter proposition certainly does not formally imply the former).[23]

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[23] Of course, if Rs1 was assumed as greater than Rs2, we would be able to infer that Rp > Rs2. But this is not the thrust of those who try

It follows that the desired conclusion “P is R enough to be S2” of the proposed ‘proportional’ version of a fortiori argument is simply invalid[24]. That is to say, *its putative conclusion does not logically follow from its premises*. The reason, to repeat, is that we have effectively a *new* term (S2) in the conclusion that is not explicitly or implicitly given in the premises (where only S1 appears, in the minor premise). Yet deduction can never produce *new* information of any sort, as we have already emphasized. Many people find this result unpalatable. They refuse to accept that the subsidiary term S has to remain unchanged in the conclusion. They insist on seeing in a fortiori argument a profitable argument, where the value of S (and the underlying Rs) is greater for P than it is for Q. They want to ‘quantify’ the argument more thoroughly than the standard version allows.

We can similarly show that ‘proportionality’ cannot be inferred by positive predicatal a fortiori argument. In such case, the subsidiary term (S) is the subject (instead of the predicate) of the minor premise and conclusion. If that term is different (as S1 and S2) in these two propositions, we again obviously do not have a valid a fortiori argument, since our argument effectively involves five terms instead of four as required. We might have reason to believe or just imagine that the subject (S) is diminished in some sense in proportion to its predicates (greater with P, lesser with Q), but such change real or imagined has nothing to do with the a fortiori argument as such. S may well vary in meaning or scope, but if it does so it is not *due to* a fortiori argument as such. Formal logic teaches generalities, but this does not mean that it teaches uniformity; it allows for variations

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to “quantify” a fortiori argument, since the proportion between P and Q would be inversed between Rs1 and Rs2. Moreover, the next objection, viz. that “If Rs2 then S2” cannot be deduced from “If Rs1 then S1,” would still be pertinent.

[24] I put the adjective ‘proportional’ in inverted commas because the proportion of S2 to S1 is usually not exactly equal to that of P to Q. But whether this expression is intended literally or roughly makes no difference to the invalidity of the argument, note well. If it is invalid when exact, as here demonstrated, then it is all the more so when approximate!

in particular cases, even as it identifies properties common to all cases.

People who believe in 'proportional' a fortiori argument do not grasp the difference between knowledge by a specific deductive means and knowledge by other means. *By purely a fortiori deduction*, we can only conclude that P relates to precisely S, just as Q relates to S in the minor premise. But this does not exclude the possibility that *by other means*, such as observation or induction, or even a subsequent deductive act, we may find out and prove that the value of S relative to Q (S1) and the value of S relative to P (S2) are different. If it so happens that we *separately* know for a fact that S varies in proportion to the comparison of P and Q through R, we can *after* the a fortiori deduction *further process* its conclusion in accord with such additional knowledge[25]. But we cannot claim such further process as part and parcel of the a fortiori argument as such – it simply is not, as already demonstrated in quite formal terms.

Formal logic cuts up our long chains of reasoning into distinguishable units – called arguments – each of which has a particular logic, particular rules it has to abide by. Syllogism has certain rules, a fortiori argument has certain rules, generalization has certain rules, adduction has certain rules, and so on. When such arguments, whether deductive or inductive, and of whatever diverse forms, are joined together to constitute a chain of reasoning (the technical term for which is *enthymeme*), it may look like the final conclusion is the product of all preceding stages, but in fact it is the product of only the last stage. Each stage has its own conclusion, which then becomes a premise in the next stage. The stages never blend, but remain logically

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[25] A neutral example would be: suppose we know that product A is more expensive than product B; knowing a certain quantity of product B to cost $1000, we could only predict by purely a fortiori argument that the same quantity of product A will cost 'at least $1000'. But this would not prevent us from looking at a price list and finding the actual price of that quantity of product A to be $1250. However, such price adjustment would be an *after the fact* calculation based on the price list rates, and not an inference based on the a fortiori argument. In fact, once we obtained the price list we would not need the a fortiori argument at all.

distinct. In this way, we can clearly distinguish the conclusion of a purely a fortiori argument from that of any other argument that may be constructed subsequently using the a fortiori conclusion as a premise.

Some of the people who believe that a fortiori argument yields a 'proportional' conclusion are misled by the wording of such conclusion. We say: "since so and so, therefore, *all the more*, this and that." The expression "all the more" seems to imply that the conclusion (if it concerns the major term) is *quantitatively more* than the minor premise (concerning the minor term). Otherwise, what is "more" about it? But the fact is, we use that expression in cases of major to minor, as well as minor to major. Although we can say "how much more" and "how much less," we rarely use the expression "all the less"[26] to balance "all the more" – the latter is usually used in both contexts. Thus, "all the more" is rather perhaps to be viewed as a statement that the conclusion is *more certain* than the minor premise[27]. But even though this is often our intention, it is not logically correct. In truth, the conclusion is always (if valid) *as* certain as the minor premise, neither more nor less. Therefore, we should not take this expression "all the more" too literally – it in fact adds nothing to the usual signals of conclusion like "therefore" or "so." It is just rhetorical emphasis, or a signal that the form of reasoning is 'a fortiori'.

The argument *a crescendo*. Although 'proportional' a fortiori argument is not formally valid, it is in truth *sometimes* valid. It is valid under certain conditions, which we will now proceed to specify. When these conditions are indeed satisfied, we should (I suggest) name the argument differently, and rather speak of 'a crescendo' argument'[28], so as to distinguish it from strict 'a fortiori' argument. We could also say (based on the common form of the conclusions of both arguments) that 'a crescendo'

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[26] Not to be confused with "none the less".

[27] This is evident in the Latin expression *a fortiori ratione*, meaning 'with stronger reason'.

[28] The term is of Italian origin, and used in musicology to denote gradual increase in volume.

argument is a particular type of a fortiori argument, to be contrasted to the 'purely a fortiori' species of a fortiori argument. More precisely, a crescendo argument is *a compound* of strictly a fortiori argument and 'pro rata' argument. It combines premises of both arguments, to yield a special, 'proportional' conclusion.

The **positive subjectal** mood of a crescendo argument has three premises and five terms:

P is more R than Q is R (major premise);

and Q is R enough to be Sq (minor premise);

and S varies in proportion to R (additional premise).

Therefore, P is R enough to be Sp (a crescendo conclusion).

The 'additional premise' tells us there is proportionality between S and R. Note that the subsidiary term (Sp) in the conclusion differs from that (Sq) given in the minor premise, although they are two measures or degrees of one thing (S). This mood can be validated as follows:

The purely a fortiori element is:

P is more R than Q is R,

and Q is R enough to be Sq.

(Therefore, P is R enough to be Sq.)

To this must be added on the pro rata element:

Moreover, if we are given that S varies in direct proportion to R, then:

since the above minor premise implies that: if R = Rq, then S = Sq,

it follows that: if R = more than Rq = Rp, then S = more than Sq = Sp.

Whence the a crescendo conclusion is:

Therefore, P is R enough to be Sp.

If the proportion of S to R is direct, then Sp > Sq; but if S is inversely proportional to R, then Sp < Sq. The **negative** subjectal mood is similar, having the same major and additional premise, except that it has as minor premise "P is R not enough to be Sp" and as a crescendo conclusion "Q is R not enough to be Sq."

The **positive predicatal** mood of a crescendo argument has three premises and five terms:

More R is required to be P than to be Q (major premise);

and Sp is R enough to be P (minor premise);

and S varies in proportion to R (additional premise).

Therefore, Sq is R enough to be Q (a crescendo conclusion).

As before, the ‘additional premise’ tells us there is proportionality between S and R. Note that the subsidiary term (Sq) in the conclusion differs from that (Sp) given in the minor premise, although they are two measures or degrees of one thing (S). This mood can be validated as follows:

The purely a fortiori element is:

More R is required to be P than to be Q,

and Sp is R enough to be P.

(Therefore, Sp is R enough to be Q.)

To this must be added on the pro rata element:

Moreover, if we are given that R varies in direct proportion to S, then:

since the above minor premise implies that: if S = Sp, then R = Rp,

it follows that: if S = less than Sp = Sq, then R = less than Rp = Rq.

Whence the a crescendo conclusion is:

therefore, Sq is R enough to be Q.

If the proportion of R to S is direct, then Rq < Rp; but if R inversely proportional to S, then Rq > Rp. The **negative** predicatal mood is similar, having the same major and additional premise, except that it has as minor premise “Sq is R not enough to be Q” and as a crescendo conclusion “Sp is R not enough to be P.”

In practice, we are more likely to encounter subjectal than predicatal a crescendo arguments, since the subsidiary terms in the former are predicates, whereas those in the latter are subjects, and subjects are difficult to quantify. We can similarly construct four implicational moods of a crescendo argument, although

things get more complicated in such cases, because it is not really the middle and subsidiary theses which are being compared but terms within them. These matters are dealt with more thoroughly in earlier chapters of AFL; and will not be treated here.

From this formal presentation, we see that purely a fortiori argument and a crescendo argument are quite distinct forms of reasoning. The latter has the same premises as the former, *plus* an additional premise about proportion, which makes possible the 'proportional' conclusion. Without the said 'additional premise', i.e. with only the two premises (the major and the minor) of a fortiori argument, we cannot legitimately draw the a crescendo conclusion.

Thus, people who claim to draw a 'proportional' conclusion from merely a fortiori premises are engaged in fallacy. They are of course justified to do so, if they explicitly acknowledge, or at least tacitly have in mind, the required additional premise about proportion. But if they are unaware of the need for such additional information, they are definitely reasoning incorrectly. The issue here is not one of names, i.e. whether an argument is called a fortiori or a crescendo or whatever, but one of information on which the inference is based.

To summarize: Formal logic can indubitably validate properly constructed a fortiori argument. The concluding predication (more precisely, the subsidiary item, S) in such cases is identical to that given in the minor premise. It is not some larger or lesser quantity, reflecting the direct or inverse proportion between the major and minor items. Such 'proportional' conclusion is formally invalid, if all it is based on are the *two* premises of a fortiori argument. To draw an a crescendo conclusion, it is necessary to have *an additional* premise regarding proportionality between the subsidiary and middle items.

Regarding the rabbis' *dayo* (sufficiency) principle. It is evident from what we have just seen and said that there is no formal need for a "*dayo* (sufficiency) principle" to justify a fortiori argument as distinct from a crescendo argument. It is incorrect to conceive, as some commentators do (notably the Gemara, as we shall see), a fortiori argument as a crescendo

argument artificially circumvented by the *dayo* principle; for this would imply that the natural conclusion from the two premises of a fortiori is a crescendo, whereas the truth is that a fortiori premises can only logically yield an a fortiori conclusion. The rule to adopt is that to draw an a crescendo conclusion an additional (i.e. third) premise about proportionality is needed – it is *not* that proportionality may be assumed (from two premises) unless the proportionality is specifically denied by a *dayo* objection.

In fact, the *dayo* principle can conceivably 'artificially' (i.e. by Divine fiat or rabbinic convention) restrain only a crescendo argument. In such case, the additional premise about proportion is disregarded, and the conclusion is limited to its a fortiori dimension (where the subsidiary term is identical in the minor premise and conclusion) and denied its a crescendo dimension (where the subsidiary term is greater or lesser in the minor premise than in the conclusion). Obviously, if the premise about proportionality is a natural fact, it cannot logically ever be disregarded; but if that premise is already 'artificial' (i.e. a Divine fiat or rabbinic convention), then it can indeed conceivably be disregarded in selected cases. For example, though reward and punishment are usually subject to the principle of 'measure for measure', the strict justice of that law might conceivably be discarded in exceptional circumstances in the interest of mercy, and the reward might be greater than it anticipates or the punishment less than it anticipates.

Some commentators (for instance, Maccoby) have equated the *dayo* principle to the principle of deduction. However, this is inaccurate, for several reasons. For a start, according to logic, as we have seen, an a fortiori argument whose conclusion can be formally validated is necessarily in accord with the principle of deduction. In truth, there is no need to refer to the principle of deduction in order to validate the conclusion – the conclusion is validated by formal means, and the principle of deduction is just an ex post facto observation, a statement of something found in common to all valid arguments. Although useful as a philosophical abstraction and as a teaching tool, it is not necessary for validation purposes.

Nevertheless, if a conclusion was found not to be in accord with the principle of deduction, it could of course be forthwith declared invalid. For the principle of deduction is also reasonable by itself: we obviously cannot produce new information by purely rational means; we must needs get that information from somewhere else, either by deduction from some already established premise(s) or by induction from some empirical data or, perhaps, by more mystical means like revelation, prophecy or meditative insight. So obvious is this caveat that we do not really need to express it as a maxim, though there is no harm in doing so.

For the science of logic, and more broadly for epistemology and ontology, then, a fortiori argument and the 'limitation' set upon it by the principle of deduction are (abstract) natural phenomena. The emphasis here is on the word natural. They are neither Divinely-ordained (except insofar as all natural phenomena may be considered by believers to be Divine creations), nor imposed by individual or collective authority, whether religious or secular, rabbinical or academic, nor commonly agreed artificial constructs or arbitrary choices. They are universal rational insights, apodictic tools of pure reason, in accord with the '**laws of thought**' which serve to optimize our knowledge.

The first three of these laws are that we ***admit facts as they are*** (the law of identity), ***in a consistent manner*** (the law of non-contradiction) ***and without leaving out relevant data pro or con*** (the law of the excluded middle); the fourth is the principle of induction and the fifth is that of deduction.

To repeat: for logic as an independent and impartial scientific enterprise, there is no ambiguity or doubt that an a fortiori argument that is indeed properly constructed, with a conclusion that exactly mirrors the minor premise, is valid reasoning. Given its two premises, its (non-'proportional') conclusion follows of necessity; that is to say, if the two premises are admitted as true, the said conclusion must also be admitted as true. Moreover, to obtain an a crescendo conclusion additional information is required; without such information a 'proportional' conclusion would be fallacious. A principle of deduction can be formulated to remind people that such new information is not producible *ex*

nihilo; but such a principle is not really needed by the cognoscenti.

This may all seem obvious to many people, but Talmudists or students of the Talmud trained exclusively in the traditional manner may not be aware of it. That is why it was necessary for us here to first clarify the purely logical issues, before we take a look at what the Talmud says. To understand the full significance of what it says and to be able to evaluate its claims, the reader has to have a certain baggage of logical knowledge.

The understanding of *qal vachomer* as a natural phenomenon of logic seems, explicitly or implicitly, accepted by most commentators. Rabbi Adin Steinsaltz, for instance, in his lexicon of Talmudic hermeneutic principles, describes *qal vachomer* as "essentially logical reasoning"[29]. Rabbi J. Immanuel Schochet says it more forcefully: "*Qal vachomer* is a self-evident logical argument"[30]. The equation of the *dayo* principle to the principle of deduction is also adopted by many commentators, especially logicians. For instance, after quoting the rabbinical statement "it is sufficient if the law in respect of the thing inferred be equivalent to that from which it is derived," Ventura writes very explicitly: "We are resting here within the limits of formal logic, according to which the conclusion of a syllogism must not be more extensive than its premises"[31].

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[29] P. 139. My translation from the French (unfortunately, I only have a French edition on hand at time of writing).

[30] In a video lecture online at: www.chabad.org/multimedia/media_cdo/aid/1158797/jewish/Rules-One-and-Two-of-Torah-Elucidation.htm; note, however, that he accepts the Gemara's idea that the argument in Num. 12:14 would logically yield the conclusion of "fourteen days" instead of "seven days," were it not for the *dayo* principle. Another online commentary states: "Unlike a Gezeirah Shavah, the Kal va'Chomer inference need not be received as a tradition from one's teacher, since it is based upon logic;" see this at: www.dafyomi.shemayisrael.co.il/bkama/backgrnd/bk-in-025.htm.

[31] In the Appendix to chapter 8 of *Terminologie Logique* (Maimonides' book on logic, p. 77). Ventura is translator and commentator (in French). The translation into English is mine. He is

However, as we shall discover further on, the main reason the proposed equation of the *dayo* principle to the principle of deduction is ill-advised is that it incorrect. There are indeed applications where the *dayo* imperative happens to correspond to the principle of deduction; but there are also applications where the two diverge in meaning. Commentators who thought of them as equal only had the former cases in mind when they did so; when we consider the latter cases, we must admit that the two principles are very different.

3. A fresh analysis of Mishna Baba Qama 2:5

In the Mishna Baba Qama 2:5, there is a debate between **the Sages** and **R. Tarfon** about the concrete issue of the financial liability of the owner of an ox which causes damages by goring on private property. This debate has logical importance, in that it reveals to a considerable extent skills and views of Talmudic rabbis with regard to the a fortiori argument. The Sages consider that he must pay for half the damages, whereas R. Tarfon advocates payment for all the damages[32].

The Sages (*hachakhamim*) are unnamed rabbis of Mishnaic times (Tannaim) and R. Tarfon is one of their colleagues (of the 3rd generation), who lived in Eretz Israel roughly in the late 1st – early 2nd century CE. We are not told how many were the Sages referred to in this Mishna (presumably there were at least two), nor who they were. The contemporaries of R. Tarfon include R. Eleazar b. Azariah, R. Ishmael b. Elisha, R. Akiva, and R. Jose haGelili; it is conceivable that these are the Sages involved in this debate. They are all big names, note; the latter three, as we have seen, produced hermeneutic principles. R. Tarfon, too, was

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obviously using the word syllogism in a general sense (i.e. as representative of any sort of deduction, not just the syllogistic form).

[32] R. Tarfon's pursuit of a more stringent legal conclusion might be imputed to his belonging to the School of Shammai, although he is personally reputed to be inclined to leniency. This said in passing.

an important and respected figure. So, the debate between them should be viewed as one between equals.[33]

The Mishna (BQ 2:5) is as follows[34]:

> "What is meant by 'ox doing damage on the plaintiff's premises'? In case of goring, pushing, biting, lying down or kicking, if on public ground the payment is half, but if on the plaintiff's premises R. Tarfon orders payment in full whereas the Sages order only half damages.
>
> R. Tarfon there upon said to them: seeing that, while the law was lenient to tooth and foot in the case of public ground allowing total exemption, it was nevertheless strict with them regarding [damage done on] the plaintiff's premises where it imposed payment in full, in the case of horn, where the law was strict regarding [damage done on] public ground imposing at least the payment of half damages, does it not stand to reason that we should make it equally strict with reference to the plaintiffs premises so as to require compensation in full?
>
> Their answer was: it is quite sufficient that the law in respect of the thing inferred should be equivalent to that from which it is derived: just as for damage done on public ground the compensation [in the case of horn] is half, so also for damage done on the plaintiff's premises the compensation should not be more than half.
>
> R. Tarfon, however, rejoined: but neither do I infer horn [doing damage on the plaintiff's premises] from horn

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[33] Although in some contexts the word "sage" (*hakham*) is intended to refer to someone of lesser rank than a "rabbi," I use the terms as equivalent in my works.

[34] The extracts from the Talmud quoted in the present chapter were found on the Internet at: www.halakhah.com/pdf/nezikin/Baba_Kama.pdf. I have made minor modifications to the text, such as changing the spelling of Kal wa-homer and Dayyo. All explanations in square brackets in the Gemara are as in the original, unless otherwise stated.

> [doing damage on public ground]; I infer horn from foot: seeing that in the case of public ground the law, though lenient with reference to tooth and foot, is nevertheless strict regarding horn, in the case of the plaintiff's premises, where the law is strict with reference to tooth and foot, does it not stand to reason that we should apply the same strictness to horn?
>
> They, however, still argued: it is quite sufficient if the law in respect of the thing inferred is equivalent to that from which it is derived. Just as for damage done on public ground the compensation [in the case of horn] is half, so also for damage done on the plaintiff's premises, the compensation should not be more than half."

This discussion may be paraphrased as follows. Note that only three amounts of compensation for damages are considered as relevant in the present context: nil, half or full; there are no amounts in between or beyond these three, because the Torah never mentions any such other amounts.

(a) R. Tarfon argues that in the case of damages caused by "tooth and foot," the (Torah based) law was lenient (requiring no payment) if they occurred on public ground and strict (requiring full payment) if they occurred on private ground – "*does it not stand to reason that*" in the case of damages caused by "horn," since the (Torah based) law is median (requiring half payment) if they occurred on public ground, then the law (i.e. the rabbis' ruling in this case) ought to likewise be strict (requiring full payment) if they occurred on private ground? Presented more briefly, and in a nested manner, this *first argument* reads as follows:

If tooth & foot, then:

if public then lenient, and

if private then strict.

If horn, then:

if public then median, and

if private then strict

(R. Tarfon's putative conclusion).

R. Tarfon thus advocates full payment for damage on private property. The Sages disagree with him, advocating half payment only, saying "*dayo*—it is enough."

(b) R. Tarfon then tries another tack, using the same data in a different order, this time starting from the laws relating to public ground, where that concerning "tooth and foot" is lenient (requiring no payment) and that concerning "horn" is median (requiring half payment), and continuing: "*does it not stand to reason that*" with regard to private ground, since the law for "tooth and foot" damage is strict (requiring full payment), the law (i.e. the rabbis' ruling in this case) for "horn" damage ought to likewise be strict (requiring full payment)? Presented more briefly and in a nested manner, this *second argument* reads as follows:

If public, then:

if tooth & foot then lenient, and

if horn then median.

If private, then:

if tooth & foot then strict, and

if horn then strict

(R. Tarfon's putative conclusion).

R. Tarfon thus advocates full payment for damage on private property. The Sages disagree with him again, advocating half payment only, saying "*dayo*—it is enough."

More precisely, they reply to him both times: "*it is quite sufficient that the law in respect of the thing inferred should be equivalent to that from which it is derived*" – meaning that only half payment should be required in the case under consideration (viz. damages by "horn" on private grounds). In Hebrew, their

words are: דיו לבא מן הדין להיות כנדון (*dayo lavo min hadin lihiot kenidon*) – whence the name *dayo* principle[35].

Now, the first thing to notice is that these two arguments of R. Tarfon's contain the exact same given premises and aim at the exact same conclusion, so that to present them both might seem like mere rhetoric (either to mislead or out of incomprehension). The two sets of four propositions derived from the above two arguments (by removing the nesting) are obviously identical. All he has done is to switch the positions of the terms in the antecedents and transpose premises (ii) and (iii). The logical outcome seems bound to be the same:

(a) If tooth & foot and public, then lenient (i).

If tooth & foot and private, then strict (ii).

If horn and public, then median (iii).

If horn and private, then strict (R. Tarfon's putative conclusion).

(b) If public and tooth & foot, then lenient (same as (i)).

If public and horn, then median (same as (iii)).

If private and tooth & foot, then strict (same as (ii)).

If private and horn, then strict (same putative conclusion).

However, as we shall soon realize, *the ordering of the terms and propositions does make a significant difference*. And we shall see precisely why that is so.

(a) What is R. Tarfon's logic in **the first argument**? Well, it seems obvious that he is making some sort of argument *by analogy*; he is saying (note the identity of the two sentences in italics):

Just as, in one case (that of tooth & foot), *damage in the private domain implies more legal liability than damage in the public domain* (since strict is more stringent than lenient).

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35 A comparable statement of the *dayo* principle is found in *Pesachim* 18b, whence we can say that it is intended as a statement of principle and not just as an *ad hoc* position.

> So, in the other case (viz. horn), we can likewise say that *damage in the private domain implies more legal liability than damage in the public domain* (i.e. given median in the latter, conclude with strict, i.e. full payment, in the former, since strict is more stringent than median).

Just as in one case we pass from lenient to strict, *so* in the other case we may well pass from median to strict[36]. Of course, as with all analogy, a generalization is involved here from the first case (tooth & foot being more stringent for private than for public) up to "all cases" (i.e. the generality in italics), and then an application of that generality to the second case (horn, thusly concluded to be more stringent for private than for public). But of course, this is an inductive act, since it is not inconceivable that there might be specific reasons why the two cases should behave differently. Nevertheless, if no such specific reasons are found, we might well reason that way. That is to say, R. Tarfon does have a point, because his proposed reasoning can well be upheld as an ordinary analogical argument. This might even be classified under the heading of *gezerah shavah* or maybe *binyan av* (the second or third rule in R. Ishmael's list of thirteen)[37].

The above is a rather intuitive representation of R. Tarfon's first argument by analogy. Upon reflection, this argument should be

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[36] Indeed, R. Tarfon could buttress his argument by pointing out that the latter transition is only half the distance, as it were, compared to the former. Alternatively, we could insist on 'proportionality' and say: from lenient (zero) to strict (full) the change is 100%, therefore from moderate (half) we should infer not just strict (full), which is only 50%, but 'stricter than strict', i.e. 150% payment! This is just pointed out by me to show that R. Tarfon's argument by analogy was more restrained than it could have been. Evidently, 100% is considered the maximum penalty by both parties; no punitive charges are anticipated.

[37] I am here just suggesting a possibility, without any intent to make a big issue out of it. The advantage of this suggestion is that it legitimates R. Tarfon's line of reasoning as an application of *another* rabbinic hermeneutic principle. The format would be: 'just as private is stricter in the known case, so private should be stricter in the case to be determined'.

classified more precisely as a quantitative analogy or *pro rata* argument:

> The degree of legal liability for damage is 'proportional' to the status of the property the damage is made on, with *damage in the private domain implying more legal liability than damage in the public domain*.
>
> This is true of tooth and foot damage, for which liability is known to be nil (lenient) in the public domain and full (strict) in the private domain.
>
> Therefore, with regard to horn damage, for which liability is known to be half (median) in the public domain, liability may be inferred to be full (strict) in the private domain.

This argument, as can be seen, consists of three propositions: a general major premise, a particular (to tooth and foot) minor premise and a particular (to horn) conclusion. The major premise is, in fact, known by induction – a generalization of the minor premise, for all damage in relation to property status. But once obtained, it serves to justify drawing the conclusion from the minor premise. The pro rata argument as such is essentially deductive, note, even though its major premise is based on an inductive act. But its conclusion is nevertheless a mere rough estimate, since the 'proportionality' it is based on is very loosely formulated. Notice how the minor premise goes from zero to 100%, whereas the conclusion goes from 50% to 100%[38].

The Sages, on the other hand, seem to have in mind, instead of this ordinary argument by analogy or pro rata argument, a more elaborate and subtle *a fortiori* argument of positive subjectal form. They do not explicitly present this argument, note well; but it is suggested in their reactions to their colleague's challenge. Their thinking can be construed as follows:

> Private domain damage (P) implies more legal liability (R) than public domain damage (Q) [as we know by extrapolation from the case of tooth & foot].

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[38] Because, to repeat, judging by Torah practice, it can go no further – i.e. there is no "150%" penalty.

For horn, public domain damage (Q) implies legal liability (R) enough to make the payment half (median) (S).

Therefore, for horn, private domain damage (P) implies legal liability (R) enough to make the payment half (median) (S).

We see that the subsidiary term (S) is the same (viz. 'median', i.e. half payment) in the Sages' minor premise and conclusion, in accord with a fortiori logic; and they stress that conclusion in reply to R. Tarfon's counterarguments by formulating their *dayo* principle, viz. "it is quite sufficient that the law in respect of the thing inferred should be equivalent to that from which it is derived," to which they add: "just as for damage [by horn] done on public ground the compensation is half, so also for damage [by horn] done on the plaintiff's premises the compensation should not be more than half."[39]

We see also that the major premise of the Sages' *qal vachomer* is identical to the statements in italics of R. Tarfon's argument by analogy, i.e. to the major premise of his pro rata argument. In both R. Tarfon and the Sages' arguments, this sentence "private damage implies more legal liability than public damage" is based on the same generalization (from tooth & foot, in original premises (i) and (ii), as already seen) and thence applicable to the case under scrutiny (horn, for which proposition (iii) is already given)[40]. So, both their arguments are equally based on induction (they disagreeing only as to whether to draw the conclusion (iv) or its contrary).

But the most important thing to note here is that the *same* premises (viz. (i), (ii) and (iii)) can be used to draw *contrary* conclusions (viz. full payment vs. half payment, respectively, for damage by horn on private grounds), according as we use a mere

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[39] The words "by horn" in square brackets added by me; but they are in accord with the interpolation in the Soncino edition.

[40] Note that the general major premise of the Sages' *qal vachomer* can be stated more specifically as "for horn" – in which case, since the minor premise and conclusion are both specified as "for horn," the whole a fortiori argument can be considered as conditioned by "for horn" and this condition need not be specified as here done for each proposition in it.

analogical or pro rata argument, like R. Tarfon, or a more sophisticated strictly a fortiori argument, like the Sages. This discrepancy obviously requires explanation. Since both arguments are built on the same major premise, produced by the same inductive act of generalization, we cannot explain the difference by referring to the inductive preliminaries.

The way to rationalize the difference is rather to say that the argument by analogy or pro rata is more approximate, being a mere projection of the *likely* conclusion; whereas the a fortiori argument is more accurate, distilling the *precise* conclusion inherent in the premises. That is to say, though both arguments use the same preliminary induction, the argument of R. Tarfon is in itself *effectively a further act of induction*, whereas the argument of the Sages is in itself *an act of pure deduction*. Thus, the Sages' conclusion is to be logically preferred to the conclusion proposed by R. Tarfon.

Note well that we have here assumed that R. Tarfon's first argument was merely analogical/pro rata, and that the Sages proposed a purely a fortiori argument in response to it. It is also possible to imagine that R. Tarfon *intended* a purely a fortiori argument, but erroneously drew a 'proportional' conclusion from it; in which case, the Sages' *dayo* objection would have been to reprove him for not knowing or forgetting (or even maybe deliberately ignoring) the principle of deduction, i.e. that such argument can only yield a conclusion of the same magnitude as the minor premise. However, I would not support this alternative hypothesis, which supposes R. Tarfon to have made a serious error of reasoning (or even intentionally engaged in fallacy), because it is too far-fetched. For a start, R. Tarfon is an important player throughout the Mishna, someone with in general proven logical skills; moreover, more favorable readings of this particular argument are available, so we have no reason to assume the worst.

Another possible reading is that R. Tarfon's first argument was not merely analogical/pro rata but was *intended as a crescendo*, i.e. as a combination of a fortiori argument with pro rata argument, which can be briefly presented as follows:

> Private domain damage (P) implies more legal liability (R) than public domain damage (Q) [as we know by extrapolation from the case of tooth & foot].
>
> For horn, public domain damage (Q) implies legal liability (Rq) enough to make the payment half (median) (Sq).
>
> The payment due (S) is 'proportional' to the degree of legal liability (R).
>
> Therefore, for horn, private domain damage (P) implies legal liability (Rp) enough to make the payment full (strict) (Sp = more than Sq).

In that case, the *dayo* statement by the Sages may be viewed as *a rejection of the additional premise about 'proportionality'* between S (the subsidiary term) and R (the middle term) in the case at hand. That would represent them as saying: while proportionality might seem reasonable in other contexts, in the present situation it ought not to be appealed to, and we must rest content with a purely a fortiori argument. The advantage of this reading is that it conceives R. Tarfon as from the start of the debate resorting to the more sophisticated a fortiori type of argument, even though he conceives it as specifically a crescendo (i.e. as combined with a pro rata premise). The Sages prefer a purely a fortiori conclusion to his more ambitious a crescendo one, perhaps because it is easier to defend (i.e. relies on less assumptions), but more probably for some other motive (as we shall see).

(b) So much for the first argument; now let us examine **the second argument**. This, as many later commentators noticed, and as we shall now demonstrate, differs significantly from the preceding. The most important difference is that, here, the mere argument by analogy (or argument pro rata, to be more precise), the purely a fortiori argument and the a crescendo argument (i.e. a fortiori and pro rata combo), *all three yield the same conclusion*. Note this well – it is crucial. The second analogical argument proceeds as follows:

> Just as, in one case (that of the public domain), *damage by horn implies more legal liability than damage by tooth & foot* (since median is more stringent than lenient).

> So, in the other case (viz. the private domain), we can likewise say that *damage by horn implies more legal liability than damage by tooth & foot* (i.e. given strict in the latter, conclude with strict, i.e. full payment, in the former, since strict is 'more stringent than' [here, as stringent as[41]] strict).

This argument is, as before, more accurately represented as a pro rata argument:

> The degree of legal liability for damage is 'proportional' to the intentionality of the cause of damage, with *damage by horn implying more legal liability than damage by tooth & foot*.
>
> This is true of the public domain, for which liability is known to be nil (lenient) for damage by tooth and foot and half (median) for damage by horn.
>
> Therefore, with regard to the private domain, for which liability is known to be full (strict) for damage by tooth and foot, liability may be inferred to be full (strict) for damage by horn.

This argument visibly consists of three propositions: a general major premise, a particular (to the public domain) minor premise and a particular (to the private domain) conclusion. The major premise is, in fact, inductive – a generalization of the minor premise, for all damage in relation to intentionality (in horn damage the ox intends to hurt or destroy, whereas in tooth and foot damage the negative consequences are incidental or accidental). But once obtained, the major premise serves to justify drawing the conclusion from the minor premise. Here again, the 'proportionality' is only rough; but in a different way.

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[41] Note that whereas in the first argument by analogy the movement is 'from median to strict', in the second argument by analogy the movement is 'from strict to strict'. Assuming here again that 100% payment is the maximum allowed. Otherwise, if we insisted on 'proportionality', arguing that just as the increase from lenient (zero) to median (half) is 50%, so the increase from strict (full) ought to be 50%, we would have to conclude an 'even stricter' penalty of 150%!

Notice how the minor premise goes from 0% to 50%, whereas the conclusion goes from 100% to 100%.

The purely a fortiori reading of this second argument would be as follows:

> Horn damage (P) implies more legal liability (R) than tooth & foot damage (Q) [as we know by extrapolation from the case of public domain].
>
> For private domain, tooth & foot damage (Q) implies legal liability (R) enough to make the payment full (strict) (S).
>
> Therefore, for private domain, horn damage (P) implies legal liability (R) enough to make the payment full (strict) (S).

Note that *the conclusion would be the same if this argument was constructed as a more elaborate a crescendo argument*, i.e. with the additional pro rata premise "The payment due (S) is 'proportional' to the degree of legal liability (R)." The latter specification makes no difference here (unlike in the previous case), because (as we are told in the minor premise) the minimum payment is full and (as regards the conclusion) no payment greater than full is admitted (by the Torah or rabbis) as in the realm of possibility anyway. Thus, whether we conceive R. Tarfon's second argument as purely a fortiori or as a crescendo, its conclusion is the same. Which means that the argument, if it is not analogical/pro rata, is essentially a fortiori rather than a crescendo.

Observe here the great logical skill of R. Tarfon. His initial proposal, as we have seen, was an argument by analogy or pro rata, which the Sages managed to neutralize by means of a logically more powerful a fortiori argument; or alternatively, it was an a crescendo argument that the Sages (for reasons to be determined) limited to purely a fortiori. This time, R. Tarfon takes no chances, as it were, and after judicious reshuffling of the given premises offers an argument which yields the same strict conclusion whether it is read as an argument by analogy (pro rata) or a more elaborate a crescendo – or as a purely a fortiori argument. A brilliant move! It looks like he has now won the debate; but, surprisingly, the Sages again reject his conclusion and insist on a lighter sentence.

Note well *why* R. Tarfon tried a second argument. Here, the stringency of the target law (viz. horn in the private domain) is *equal to* (and not, as in his first argument, greater than) the stringency of the source law (viz. tooth & foot in the private domain); i.e. both are here ‘strict’. This makes R. Tarfon’s second argument consistent with a fortiori logic and with the *dayo* principle that the Sages previously appealed to, since now “the law in respect of the thing inferred” is apparently “equivalent to that from which it is derived.” Yet, the Sages reiterate the *dayo* principle and thus reject his second try. How can they do so?

What is odd, moreover, is that the Sages answer both of R. Tarfon arguments *in exactly the same words*, as if they did not notice or grasp the evident differences in his arguments. The following is their identical full reply in *both* cases:

> “It is quite sufficient that the law in respect of the thing inferred should be equivalent to that from which it is derived: just as for damage done on public ground the compensation is half, so also for damage done on the plaintiff's premises the compensation should not be more than half.”
>
> אמרו לו דיו לבא מן הדין להיות כנדון מה ברה"ר חצי נזק אף ברשות הניזק חצי נזק

One might well initially wonder if the Sages did not perchance fail to hear or to understand R. Tarfon’s second argument; or maybe some error occurred during the redaction of the Mishna or some later copying (this sure does look like a ‘copy and paste’ job!). For if the Sages were imputing a failure of *dayo* to R. Tarfon’s second argument, in the same sense as for the first argument, they would not have again mentioned the previous terms “public ground” for the minor premise and “the plaintiff's premises” for the conclusion, but instead referred to the new terms “tooth and foot” and “horn.” But of course, we have no reason to distrust the Sages and must therefore assume that they know what they are talking about and mean what they say.

Whence, we must infer that *the Sages' second dayo remark does not mean exactly the same as their first one*. In the first instance, their objection to R. Tarfon was apparently that if the argument is construed as strictly a fortiori, the conclusion's predicate must not surpass the minor premise's predicate; in this sense, the *dayo* principle simply corresponds to the principle of deduction, as it naturally applies to purely a fortiori argument. Alternatively, if R. Tarfon's first argument is construed as pro rata or as a crescendo, the Sages' first *dayo* objection can be viewed as rejecting the presumption of 'proportionality'. However, such readings are obviously inappropriate for the Sages' *dayo* objection to R. Tarfon's second argument, since the latter however construed is fully consistent with the *dayo* principle in either of these senses.

How the second *dayo* differs from the first. An explanation we can propose, which seems to correspond to a post-Talmudic traditional explanation[42], is that the Sages are focusing on *the generalization* that precedes R. Tarfon's second argument. The major premise of that argument, viz. "Horn damage implies more legal liability than tooth & foot damage" was derived from two propositions, remember, one of which was "In the public domain, *horn* damage entails *half* payment" (and the other was "In the public domain, tooth & foot damage entails no payment"). R. Tarfon's putative conclusion after generalization of this comparison (from the public domain to all domains), and a further deduction (from "In the private domain, tooth & foot damage entails full payment"), was "In the private domain, *horn* damage entails *full* payment." Clearly, in this case, the Sages cannot reject the proposed deduction, since it is faultless however conceived (as analogy/pro rata/a crescendo or even purely a fortiori). What they are saying, rather, is that *the*

[42] In the notes in the Artscroll Mishnah Series, Seder Nezikin Vol. I(a), Tractate Bava Kamma (New York: Mesorah, 1986), the following comment is made regarding 2:5 in the name of Rav: "Even in this [second] *kal vachomer*, we must resort to the fact that keren [i.e.horn] is liable in a public domain; otherwise, we would have no *kal vachomer*." Other commentators mentioned in this context are: Tos. Yom Tov, Nemmukei Yosef, Rosh and Rambam.

predicate of its conclusion cannot exceed the predicate (viz. half payment) *of the given premise involving the same subject* (viz. horn) *on which its major premise was based.*

We can test this idea by applying it to R. Tarfon's first argument. There, the major premise was "Private domain damage implies more legal liability than public domain damage," and this was based on two propositions, one of which was "For tooth & foot, *private* domain damage entails *full* payment" (and the other was "For tooth & foot, public domain damage entails no payment"). R. Tarfon's putative conclusion after generalization of this comparison (from tooth & foot to all causes), and a further deduction (from "For horn, public domain damage entails half payment"), was "For horn, *private* domain damage entails *full* payment." Clearly, in this case, the Sages cannot object that the predicate of its conclusion exceeds the predicate of the given premise *involving the same subject* (viz. private domain, though more specifically for tooth & foot) on which its major premise was based, since they are the same (viz. full payment). Their only possible objection is that, conceiving the argument as purely a fortiori, the predicate of the conclusion cannot exceed the predicate (viz. half payment) *of the minor premise* (i.e. "For horn, public domain damage entails half payment"). Alternatively, conceiving the argument as pro rata or a crescendo, they for some external reason (which we shall look into) reject the implied proportionality.

Thus, the Sages' second objection may be regarded as introducing an extension of the *dayo* principle they initially decreed or appealed to, applicable to any generalization preceding purely a fortiori argument (or possibly, pro rata or a crescendo arguments, which as we have seen are preceded by the same generalization). The use and significance of generalization before a fortiori argument (or eventually, other forms of argument) are thereby taken into consideration and emphasized by the Sages. This does not directly concern the a fortiori deduction (or the two other possible arguments), note well, but only concerns an inductive *preliminary* to such inference. However, without an appropriate major premise, no such argument can be formed; in other words, the argument is effectively blocked from taking shape.

The question arises: how is it possible that by merely reshuffling the given premises we could obtain two different, indeed conflicting, a fortiori (or other) conclusions? The answer is that the two major premises were constructed on the basis of *different directions of* generalization[43]. In the first argument, the major premise is based *entirely* on tooth & foot data, and we learn something about horn *only* in the minor premise. In the second argument, the major premise relies *in part* on horn data, and the minor premise tells us *nothing* about horn. Thus, the two preliminary generalizations in fact cover quite different ground. This explains why the two a fortiori processes diverge significantly, even though the original data they were based on was the same.

The first *dayo* objection by the Sages effectively states that, if R. Tarfon's first argument is construed as purely a fortiori, the conclusion must logically (i.e. by the principle of deduction) mirror the minor premise; alternatively, construing it as pro rata or a crescendo, the needed 'proportionality' is decreed to be forbidden (for some reason yet to be dug up). For the second argument, which has one and the same conclusion however construed (whether a fortiori or other in form), the Sages' *dayo* objection cannot in the same manner refer to the minor or additional premise, but must instead refer to the inductive antecedents of the major premise, and constitute a rule that the conclusion cannot exceed in magnitude such antecedents. This explains the Sages' repetition of the exact same sentence in relation to both of R. Tarfon's arguments.

A problem and its solution. There is yet one difficulty in our above presentation of the Sages' second *dayo* objection that we need to deal with.

As you may recall, the first dialogue between R. Tarfon and the Sages could be described as follows: R. Tarfon proposes an a

[43] To give a simpler example, for the reader's assistance: suppose we are given that 'Some X are Y'; this is equivalent to 'Some Y are X'. In such case we have two possible directions of generalization: to 'All X are Y', or to 'All Y are X'. Clearly, while the sources of these two results are logically identical, the two results are quite different.

crescendo argument concluding with full payment for damage by horn on private property, whereas the Sages conclude with half payment through the purely a fortiori argument leftover after his tacit premise of 'proportionality' is rejected by their *dayo*. That is, they effectively say: "The payment due (S) is *not* 'proportional' to the degree of legal liability (R)." Thus, the first exchange remains entirely within the sphere of a fortiori logic, despite the *dayo* application.

But the second dialogue between these parties cannot likewise be entirely included in the sphere of a fortiori logic, because the final conclusion of the Sages here is not obtained by a fortiori argument. Since the effect of their second *dayo* objection is to block the formation by generalization of the major premise of R. Tarfon's second a fortiori argument, it follows that once this objection is admitted his argument cannot proceed at all; for without a general major premise such argument cannot yield, regarding horn damage on private property, a conclusion of half compensation any more than a conclusion of full compensation. Yet the Sages do wish to conclude with half compensation. How can they do so?

The answer to the question is, traditionally, to refer back to the Torah passage on which the argument is based, namely Exodus 21:35: "And if one man's ox hurt another's, so that it dieth; then they shall sell the live ox, and divide the price of it; and the dead also they shall divide". This signifies half compensation for horn damage without specifying the domain (public or private) in which such damage may occur – thus suggesting that the compensation may be the same for both domains. In the above two a fortiori arguments, it has been assumed that the half compensation for horn damage applies to the public domain, and as regards the private domain the compensation is unknown – indeed, the two a fortiori arguments and the objections to them were intended to settle the private domain issue.

This assumption is logically that of R. Tarfon. Although the said Torah passage seems to make no distinction between domains with regard to damage by horn, R. Tarfon suspects that there is a distinction between domains by analogy to the distinction implied by Exodus 22:4 with regard to damage by tooth and foot

(since in that context, only the private domain is mentioned[44]). His thinking seems to be that the owner of an ox has additional responsibility if he failed to preempt his animal from trespassing on private property and hurting other animals in there. So, he tries to prove this idea using two arguments.

The Sages, for their part, read Exodus 21:35 concerning horn damage as a general statement, which does not distinguish between the public and private domains; and so, they resist their colleague's attempt to particularize it. For them, effectively, what matters is that two oxen belonging to two owners have fought, and one happened to kill the other; it does not matter who started the fight, or where it occurred or which ox killed which – the result is the same: equal division of the remaining assets between the owners, as the Torah prescribes. Effectively, they treat the matter as an accident, where both parties are equally faultless, and the only thing that can be done for them is to divide the leftovers between them.

Clearly, if compensation for horn damage on public grounds could be more than half (i.e. if half meant at least half), R. Tarfon could still (and with more force) obtain his two 'full compensation' conclusions (by two purely a fortiori arguments), but the Sages' two *dayo* objections would become irrelevant. In that event, the conclusion regarding horn damage would be full compensation on *both* the public and private domains. But if so, why did the Torah specify *half* compensation ("division" in two)? Therefore, the compensation must at the outset be only half *in at least one domain*. That this would be the public domain rather than the private may be supposed by analogy from the case of tooth and foot[45]. This is a role played by the major

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[44] "If a man cause a field or vineyard to be eaten, and shall let his beast loose, and it feed in another man's field; of the best of his own field, and of the best of his own vineyard, shall he make restitution."

[45] Note that although Ex. 22:4 only mentions the private domain, it is taken to imply the opposite penalty for the public domain. That is to say, if we take it to mean that damage by tooth & foot in the private domain must be compensated in full, then we can infer *from the non-mention* here or elsewhere of the public domain that this level of compensation does not apply. This is called a *davka* (literal) reading of

premise of the first argument. This means that the first argument (or at least, its major premise) is needed *before* the formulation of the second. They are therefore not independent arguments, but form (in part) a chain of reasoning (a sorites) – and their order of appearance is not as accidental as we might initially have thought.

It should be realized that the assumption that the liability for horn damage on private property is equal to or greater than same on public grounds is not an *a priori* truth. It is *not unthinkable* that the liability might be less (i.e. zero) in the former case than in the latter. Someone might, say, have argued that the owner of the private property, whose animal was gored there, was responsible to prevent other people's oxen from entering his property (e.g. by fencing it off), and therefore does not deserve any compensation! In that case, it would be argued that on public grounds he deserves half compensation because he has no control over the presence of other people's oxen thereon. In this perspective, the onus would be on the property owner, rather than on the owner of the trespassing ox.

Given this very theoretical scenario, it would no longer be logically acceptable to generalize from the liability for damage by tooth & foot, which is less (zero) on public ground and more (full) on private ground, and to say that liability for damage of any sort (including by horn) is greater in a private domain than in the public domain. However, this scenario is not admitted by the rabbis (I do not know if they even discuss it; probably they do not because it does not look very equitable[46]). Therefore, the

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the text. Although strictly speaking the denial of 'full' may mean either 'only half' or 'zero' compensation, the rabbis here opt for an extreme inversion, i.e. for zero compensation for tooth & foot damage in the public domain. Presumably, their thinking is that if half compensation was intended in this case, the Torah would have said so explicitly, since there is no way to arrive at that precise figure by inference.

[46] Another very theoretical possibility is that the compensation, which as we have argued must be only half in at least one domain (since the Torah specifies equal division of remains), is half in the private domain and either nil or full in public domain. It could be argued that it is nil in the public domain because the owner of the killed ox should

said generalization is accepted, and serves to determine the compensation for damage by horn on private property in both arguments. In the first argument, this generalization (from tooth & foot damage to all damage) produces the major premise. In the second argument, it serves only to eliminate in advance the possibility of zero compensation in such circumstance.

Thus, we can interpret the Torah as teaching that compensation for horn damage is generally *at least* half – and more specifically, *no more than* half on public grounds and *no less than* half on private property. Thereafter, the issue debated in the Mishna is whether the latter quantity is, in the last analysis, 'only half' or 'more than half (i.e. full)' compensation. Both parties in the Mishna take it for granted that the half minimum is a maximum as regards public grounds; but they leave the matter open to debate as regards its value on private property. R. Tarfon tries, in his second argument, to prove that the compensation in such circumstance ought to be full, by comparison to the law relating to tooth & foot damage in the same circumstance. But the Sages, interdict his major premise by saying *dayo*, in view of the textual data that premise was based on, and thus opt for only half compensation.

Following this *dayo*, note well, the Sages' conclusion is not obtained by a modified a fortiori argument, since (as already mentioned) such an argument cannot be formulated without an appropriate major premise, but is obtained by mere *elimination*. Their form of reasoning here is negative disjunctive apodosis (*modus tollens*):

> The appropriate compensation for horn damage on private property is, according to the Torah, at least (*lav davka*) half, i.e. *either* only half *or* full.

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have watched over his animal, or that it is full in the public domain because the owner of the killing ox should have watched over his animal. These logical possibilities are also ignored no doubt because they do not look equitable: they make one party seem more responsible than the other.

But it cannot be proved to be full (since the major premise of R. Tarfon's attempt to do so by a fortiori cannot be sustained due to a *dayo* objection).

Therefore, it must be assumed to be only (*davka*) half (as the Sages conclude).

It should be said that this reasoning is not purely deductive, but contains an inductive movement of thought – namely, the generalization *from* the failure to prove full compensation specifically through R. Tarfon's a fortiori argument in the light of the Sages' renewed *dayo* objection *to* the impossibility henceforth to prove full compensation by any means whatever. This is a reasonable assumption, since we cannot perceive any way that the *dayo* might be avoided (i.e. a way not based on the given of half compensation for damage by horn on public grounds[47]); but it is still a generalization. Therefore, the apodosis is somewhat inductive; this means that further support for the Sages' conclusion of only half compensation for damage by horn on private property would be welcome.

Thus, strictly speaking, in the last analysis, although a fortiori argument is attempted in the second dialogue, it is not finally used, but what is instead used and what provides us with the final conclusion is a disjunctive argument.

The essence of the *dayo* principle. We can thenceforth propose a more inclusive formulation of the Sages' *dayo* principle, which merges together the said two different cases, as follows. ***Whenever (as in the present debate) the same original propositions can, via different directions of preparatory induction and/or via different forms of deduction, construct two or more alternative, equally cogent arguments, the chain of reasoning with the less stringent final result should be***

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[47] Actually, I believe I have found such a way. We could use the *kol zeh assim* argument proposed by Tosafot to put the Sages' *dayo* principle in doubt, at least in the present context. See my analysis of this possibility in chapter 4.6 of the present volume. Even though I do there decide that the *dayo* principle trumps the *kol zeh assim* argument, it remains true that this at least proves the Sages' conclusion to be inductive rather than deductive.

preferred. This, I submit, is to date the most accurate, all-inclusive statement of the *dayo* principle formulated on the basis of this Mishnaic *sugya*.

In the light of this broader statement of the *dayo* principle, we can read the two applications given in the present debate as follows. In the first argument, where there was a choice between a pro rata or a crescendo argument with a stringent conclusion, and a purely a fortiori argument with a median conclusion, the Sages chose the latter argument, with the less stringent conclusion, as operative. In the second argument, where all three forms of argument yielded the same stringent conclusion, the Sages referred instead to the preliminary generalization; in this case they found that, since the terms of one of the original propositions generalized into the major premise corresponded to the terms of the putative final conclusion, and the former proposition was less stringent than the latter, one could not, in fact, perform the generalization, but had to rest content with the original proposition's degree of stringency in the final one.

In the first instance, the *dayo* principle cannot refer to the inductive antecedent of the argument, because that original proposition does not have the same terms as the final conclusion, however obtained; so, we must look at the form of the deductive argument. In the second instance, the *dayo* principle cannot refer to the deductive argument, since whatever its form it results in the same the final conclusion; so, we must look at the preliminary generalization preceding such argument. Thus, one and the same *dayo* principle guides both of the Sages' *dayo* objections. Their teaching can thus be formulated as follows: 'Given, in a certain context, an array of equally cogent alternative arguments, the one with the less stringent conclusion should be adopted'.

In other words, the *dayo* principle is a *general* guideline to opt for the less stringent option whenever inference leaves us a choice. It is a principle of *prudence*, the underlying motive of which seems to be moral – *to avoid any risk of injustice in ethical or legal or religious pronouncements based on inference*. We could view this as a guideline of inductive logic, insofar as it is a safeguard against possible human errors of judgment. It is a reasonable injunction, which could be argued (somewhat,

though not strictly) to have universal value. But in practice it is probably specific to Judaic logic; it is doubtful that in other religions, let alone in secular ethical or legal contexts, the same restraint on inference is practiced.

An alternative translation of the Sages' *dayo* principle that I have seen, "*It is sufficient that the derivative equal the source of its derivation*," is to my mind very well put, because it highlights and leaves open the variety of ways that the "derivation" may occur in practice. The *dayo* principle, as we have seen, does not have one single expression, but is expressed differently in different contexts. The common denominator being apparently an imperative of caution, preventing too ready extrapolation from given Scriptural data. In the last analysis, then, the *dayo* principle is essentially not a logical principle, but rather a moral one. It is a Torah or rabbinical decree, rather than a law of logic. As such, it may conceivably have other expressions than those here uncovered. For the same reason, it could also be found to have exceptions that do not breach any laws of logic. Traditionally, it is deemed as applicable in particular to *qal vachomer* argument; but upon reflection, in view of its above stated essential underlying motive or purpose, it is evident that it could equally well in principle apply to other forms of argument. Such issues can only be definitely settled empirically, with reference to the whole Talmudic enterprise and subsequent developments in Jewish law.

Alternative scenarios. Our proposed scenario for the Mishna debate is thus as follows. R. Tarfon starts the discussion by proposing a first argument, whose form may be analogical/pro rata or a crescendo, which concludes with the imperative of full payment in the case of horn damage in the private domain. The Sages, appealing to a *dayo* principle, interdict the attempted 'proportionality' in his argument, thus effectively trumping it with a purely a fortiori argument, which concludes with a ruling of half payment. In response, R. Tarfon proposes a second argument, based on the very same data, which, whether conceived as analogical/pro rata or a crescendo, *or as purely a fortiori*, yields the very same conclusion, viz. full payment. This time, however, the Sages cannot rebut him by blocking an attempt at 'proportionality', since (to repeat) a non-

'proportional' argument yields the very same conclusion as 'proportional' ones. So, the Sages are obliged to propose an extension or enlargement of the initial *dayo* principle that focuses instead on the generalization before deduction. In this way, they again rule half payment.

This scenario is obvious, provided we assume the Sages' two *dayo* objections are expressions of a *dayo* principle. It is also conceivable, however, that they have no such general *principle* in mind, but merely intend these objections to be *ad hoc decisions* in the two cases at hand. In that case the *dayo* principle is a "principle," not in the strict sense of a universal principle that must be applied in *every* case of the sort, but in the looser sense of a guiding principle that may *on occasion*, for a variety of unspecified motives, be applied[48]. In fact, if we look at the Mishna passage in question, we see that nowhere is there any mention of a *dayo* "principle." There is just statement "It is quite sufficient that the law in respect of the thing inferred should be equivalent to that from which it is derived," which was presumably labeled "the *dayo* principle" by later commentators. This statement could be interpreted equally well as having a general or particular intent.

If we adopt the latter assumption, the scenario for the Mishna debate would be as follows: when R. Tarfon proposes his first argument, whether it is construed as pro rata or a crescendo, the Sages merely refuse his inherent 'proportional' premise *in this particular case*, without implying that they would automatically refuse it in other eventual cases. Similarly, when he proposes his second argument, whether it is construed as pro rata, a crescendo, or purely a fortiori, they merely refuse his preparatory generalization *in this particular case*, without implying that they would automatically refuse it in other eventual cases. Thus, the Sages might be said to making 'ad hoc'

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[48] Thus, for instance, we speak in philosophy of the uniformity principle, not meaning that everything is uniform, but that there is considerable uniformity in the universe. Or again, in physics there is the uncertainty principle, which is applicable not in all systems but only in the subatomic domain.

dayo objections, rather than appealing to a *dayo* 'principle' in the strict sense. Why would the Sages raise a *dayo* objection in this particular case, and not raise it in other cases? Conceivably, they perceive some unspecified danger in the present case that may be absent in other cases.

Granting this alternative view of the *dayo* principle, be it said in passing, there is conceivably no need to mention *qal vachomer* argument at all in this Mishna debate! In this view, it is possible that neither R. Tarfon nor the Sages intended any genuine a fortiori type of reasoning, but were entirely focused on mere analogy. As we shall see, although the Gemara probably does intend an a crescendo interpretation of the two arguments of R. Tarfon, it is not inconceivable that its author simply had in mind analogical/pro rata argument. Although the expression *qal vachomer* does appear in the Gemara, it does not necessarily have to be taken as referring to a fortiori or a crescendo argument, but could be read as referring to pro rata. It is anyhow worthwhile stating that another viewpoint is possible, because this allows us to conceptually uncouple the *dayo* principle from *qal vachomer*.

But the main value of our proposing alternative scenarios is that these provide us with different explanations of the disagreement between R. Tarfon and the Sages. Where, precisely, did they disagree? Given the primary scenario, where the *dayo* principle is *a hard and fast principle* in the eyes of the Sages, the question arises: how come R. Tarfon forgot or did not know or chose to ignore this principle? If the Sages claim it as a Divine decree, i.e. an ancient tradition dating "from the Sinai revelation," whether inferred from Scripture or orally transmitted, it is unthinkable that a man of R. Tarfon's caliber would be ignorant of it or refuse to accept it. Thus, the primary scenario contains a difficulty, a *kushia*.

One possible resolution of this difficulty is to say that the Sages were here legislating, i.e. the *dayo* principle was here *in the process of* being decided by the rabbis collectively, there being one dissenting voice, viz. that of R. Tarfon, at least temporarily till the decision was declared law. In that event, the conflict between the two parties dissolves in time. Another possible resolution is to say that the Sages did not intend their *dayo*

statement as a hard and fast principle, but as *a loose guideline* that they considered ought to be applied in the present context, whereas their colleague R. Tarfon considered it ought not to be applied in the present context. In that event, the two parties agree that the *dayo* principle is not universal, but merely conditional, and their conflict here is only as to whether or not its actual application is appropriate in the case at hand.

This would explain why R. Tarfon can put forward his first and second arguments failing each time to anticipate that the Sages would disagree with him. He could not offhand be expected to predict what their collective judgment would be, and so proposed his opinion in good faith. That they disagreed with him is not a reflection on his knowledge of Torah or his logical powers; there was place for legitimate dissent. Thus, while the hypothesis that the Sages' *dayo* objections signify a hard and fast rule of Sinaitic origin is problematic, there are two viable alternative hypotheses: namely, that the Sages' *dayo* objections constituted a general rabbinical ruling in the making; or that they were intended as ad hoc, particular and conditional statements, rather than as reflections of a general unbreakable rule. The problem with the former hypothesis is explaining away R. Tarfon's implied ignorance or disagreement; this problem is solved satisfactorily with either of the latter two hypotheses.

The Gemara commentary revolves around this issue, since its first and main query is: "Does R. Tarfon really ignore the principle of *dayo*? Is not *dayo* of Biblical origin?" The Gemara's thesis thus seems to be that *dayo* is a principle of Biblical origin and that therefore R. Tarfon knew about it and essentially agreed with it. We shall presently see where it takes this assumption.

About method. An issue arising from this Mishnaic discussion is whether it is based on revelation or on reason. If we examine R. Tarfon's discourse, we see that he repeatedly appeals to reason. Twice he says: "does it not stand to reason?" (*eino din*) and twice he claims to "infer" (*edon*)[49]. This language (the

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[49] See the sentences: "does it not *stand to reason* that we should make it equally strict with reference to the plaintiffs premises?" and "does it not *stand to reason* that we should apply the same strictness to

translations are those in the Soncino edition) suggests he is not appealing to Divine revelation, but to ordinary human reason. And, significantly, the Sages do not oppose him by *explicitly* claiming that their *dayo* principle is Divinely-ordained (as the Gemara later claims) and thus overrides his merely rational argument – no, they just affirm and reaffirm it as something intuitively self-evident, on moral if not logical grounds. Thus, from such positive and negative evidence, it is possible to suppose that both R. Tarfon and the Sages regard their methodological means as essentially rational.

Concerning the logical skills of R. Tarfon and the Sages, neither party to the debate commits any error of logic, even though their approaches and opinions differ. All arguments used by them are formally valid. At no stage do the Sages deny R. Tarfon's reasoning powers or vice versa. The two parties understand each other well and react appropriately. There is no rhetorical manipulation, but logic is used throughout. Nevertheless, a pertinent question to ask is: why did R. Tarfon and the Sages not clarify all the logical issues involved, and leave their successors with unanswered questions? Why, if these people were fully conscious of what they were doing, did they not spell their intentions out clearly to prevent all possible error? The most likely answer is that they functioned 'intuitively' (in a pejorative sense of the term), without awareness of all the formalities involved. They were skillful practitioners of logic, but evidently not theoreticians of it. They did not even realize the importance of theory.

4. A logician's reading of Numbers 12:14-15

We have thus far analyzed the Mishnaic part of Baba Qama 24b-25a. Before we turn to the corresponding Gemara, it is wise for us – in the way of a preparatory study – to look at a Torah passage which plays an important role in that Gemara, as an

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horn?" Also: "R. Tarfon, however, rejoined: but neither do I *infer* horn from horn; I *infer* horn from foot." (My italics throughout.)

illustration of the rabbinical hermeneutic rule of *qal vachomer* (a fortiori argument) and as a justification of its attendant *dayo* (sufficiency) principle.

The Torah passage in question is Numbers 12:14-15. The reason why this passage was specifically focused on by the Gemara should be obvious. This is *the only* a fortiori argument in the whole Tanakh that is both spoken by God and has to do with inferring a penalty for a specific crime. None of the other four a fortiori arguments in the Torah are spoken by God[50]. And of the nine other a fortiori arguments in the Tanakh spoken by God, two do concern punishment for sins but not specifically enough to guide legal judgment[51]. Clearly, the Mishna BQ 2:5 could only be grounded in the Torah through Num. 12:14-15.

Num. 12:14-15 reads: "14. *If her father had but spit in her face, should she not hide in shame seven days? Let her be shut up without the camp seven days, and after that she shall be brought in again.* 15. *And Miriam was shut up without the camp seven days; and the people journeyed not till she was brought in again.*" Verse 14 may be construed as a *qal vachomer* as follows:

> Causing Divine disapproval (P) is a greater offense (R) than causing paternal disapproval (Q). (Major premise.)
>
> Causing paternal disapproval (Q) is offensive (R) enough to merit isolation for seven days (S). (Minor premise.)

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[50] One is by Lemekh (Gen. 4:24), one is by Joseph's brothers (Gen. 44:8), and two are by Moses (Ex. 6:12 and Deut. 31:27). The argument by Lemekh could be construed as concerning a penalty, but the speaker is morally reprehensible and his statement is more of a hopeful boast than a reliable legal dictum.

[51] The two arguments are in Jeremiah 25:29 and 49:12. The tenor of both is: if the relatively innocent are bad enough to be punished, then the relatively guilty are bad enough to be punished. The other seven a fortiori arguments in the Nakh spoken by God are: Isaiah 66:1, Jer. 12:5 (2 inst.) and 45:4-5, Ezek. 14:13-21 and 15:5, Jonah 4:10-11. Note that, though Ezek. 33:24 is also spoken by God, the (fallacious) argument He describes is not His own – He is merely quoting certain people.

Therefore, causing Divine disapproval (P) is offensive (R) enough to merit isolation for seven days (S). (Conclusion.)

This argument, as I have here rephrased it a bit, is a valid purely a fortiori of the positive subjectal type (minor to major)[52]. Some interpretation on my part was necessary to formulate it in this standard format[53]. I took the image of her father spitting in her face (12:14) as indicative of "paternal disapproval" caused presumably, by analogy to the context, by some hypothetical misbehavior on her part[54]. Nothing is said here about "Divine disapproval;" this too is inferred by me from the context, viz. Miriam being suddenly afflicted with "leprosy" (12:10) by God, visibly angered (12:9) by her speaking ill of Moses (12:1). The latter is her "offense" in the present situation, this term (or another like it) being needed as middle term of the argument.

The major premise, about causing Divine disapproval being a "more serious" offense than causing paternal disapproval, is an interpolation – it is obviously not given in the text. It is constructed in accord with available materials with the express purpose of making possible the inference of the conclusion from the minor premise. The sentence in the minor premise of "isolation" for seven days due to causing paternal disapproval may be inferred from the phrase "should she not hide in shame seven days?" The corresponding sentence in the putative conclusion of "isolation" for seven days due to causing Divine

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[52] Actually, it would be more accurate to classify this argument as positive antecedental, since the predicate S (meriting isolation for seven days) is not applied to Q or P (causing disapproval), but to the subject of the latter (i.e. the person who caused disapproval). That is, causing disapproval *implies* meriting isolation. But I leave things as they are here for simplicity's sake.

[53] I say 'on my part' to acknowledge responsibility – but of course, much of the present reading is not very original.

[54] The Hebrew text reads 'and her father, etc.'; the translation to 'if her father, etc.' is, apparently, due to Rashi's interpretation "to indicate that the spitting never actually occurred, but is purely hypothetical" (Metsudah Chumash w/Rashi at: www.tachash.org/metsudah/m03n.html#fn342).

disapproval may be viewed as an inference made possible by a fortiori reasoning.

With regard to the term “isolation,” the reason I have chosen it is because it is *the conceptual common ground* between “hiding in shame” and “being shut up without the camp.” But a more critical approach would question this term, because “hiding in shame” is a voluntary act that can be done within the camp, whereas “being shut up without the camp” seems to refer to involuntary imprisonment by the authorities outside the camp. If, however, we stick to the significant distinctions between those two consequences, we cannot claim the alleged purely a fortiori argument to be valid. For, according to strict logic, we cannot have more information in the conclusion of a deductive argument (be it a fortiori, syllogistic or whatever) than was already given in its premise(s).

That is to say, although we can, logically, from “hiding in shame” infer “isolation” (since the former is a species the latter), we cannot thereafter from “isolation” infer “being shut up without the camp” (since the former is a genus of the latter). To do so would be illicit process according to the rules of syllogistic reasoning, i.e. it would be fallacious. It follows that the strictly *correct* purely a fortiori conclusion is either specifically “she shall hide in shame seven days” or more generically put “she shall suffer isolation seven days.” In any case, then, the sentence “she shall be shut up without the camp seven days” cannot logically be claimed as an a fortiori conclusion, but must be regarded as a *separate and additional* Divine decree that even if she does not voluntarily hide away, she should be made to do so against her will (i.e. imprisoned).

We might of course alternatively claim that the argument is intended as a crescendo rather than purely a fortiori. That is to say, it may be that the conclusion of “she should be shut up without the camp seven days” is indeed *inferred* from the minor premise “she would hide in shame seven days” – in ‘proportion’ to the severity of the wrongdoing, comparing that against a father and that against God. For this to be admitted, we must assume a tacit *additional premise* that enjoins a pro rata relationship between the importance of the victim of wrongdoing (a father, God) and the ensuing punishment on the

culprit (voluntary isolation, forced banishment and incarceration).

Another point worth highlighting is the punishment of leprosy. Everyone focuses on Miriam's punishment of expulsion from the community for a week, but that is surely not her only punishment. She is in the meantime afflicted by God with a frightening disease, whereas the hypothetical daughter who has angered her father does not have an analogous affliction. So, the two punishments are not as close to identical as they may seem judging only with reference to the seven days of isolation. Here again, we may doubt the validity of the strictly a fortiori argument. This objection could be countered by pointing out that the father's spit is the required analogue of leprosy. But of course, the two afflictions are of different orders of magnitude; so, a doubt remains.

We must therefore here again admit that this difference of punishment between the two cases is not established by the purely a fortiori argument, but by a separate and additional Divine decree. Or, alternatively, by an appropriate a crescendo argument, to which no *dayo* is thereafter applied. We may also deal with this difficulty by saying that the punishment of leprosy was *already* a fact, produced by God's hand, before the a fortiori argument is formulated; whereas the latter only concerns the punishment that is *yet to be* applied, by human intervention – namely, the seven days' isolation. Thus, the argument *intentionally* concerns only the later part of Miriam's punishment, and cannot be faulted for ignoring the earlier part.

It is perhaps possible to deny that an a fortiori argument of any sort is intended here. We could equally well view the sentence "Let her be shut up without the camp seven days" as an independent decree. But, if so, of what use is the rhetorical exclamation "If her father had but spit in her face, should she not hide in shame seven days?" and moreover how to explain to coincidence of "seven days" isolation in both cases? Some sort of analogy between those two clauses is clearly intended, and the a fortiori or a crescendo argument serves to bind them together convincingly. Thus, although various objections can be raised regarding the a fortiori format or validity of the Torah argument, we can say that all things considered the traditional

reading of the text as a *qal vachomer* is reasonable. This reading can be further justified if it is taken as in some respects a crescendo, and not purely a fortiori.

What, then, is the utility of the clause: "And after that she shall be brought in again"? Notice that it is not mentioned in my above a fortiori construct. Should we simply read it as making explicit something implied in the words "Let her be shut up without the camp seven days"? Well, these words do not strictly imply that after seven days she should be brought back into the camp; it could be that after seven days she is to be released from prison (where she has been "shut up"), but not necessarily brought back from "without the camp." So, the clause in question adds information. At the end of seven days, Miriam is to be both released from jail *and* from banishment from the tribal camp.

Another possible interpretation of these clauses is to read "Let her be shut up without the camp seven days" as signifying a sentence of *at least* seven days, while "And after that she shall be brought in again" means that the sentence should *not exceed* seven days (i.e. "after that" is taken to mean "immediately after that"). They respectively set a minimum and a maximum, so that *exactly* seven days is imposed. What is clear in any case is that "seven days isolation" is stated and implied in both the proposed minor premise and conclusion; ***no other quantity, such as fourteen days, is at all mentioned***, note well. This is a positive indication that we are indeed dealing essentially with a purely a fortiori argument, since the logical rule of the continuity between the given and inferred information is (to that extent) obeyed.

As we shall see when we turn to the Gemara's treatment, although there is no explicit mention of fourteen days in the Torah conclusion, it is not unthinkable that fourteen days were implicitly intended (implying an a crescendo argument from seven to fourteen days) but that this harsher sentence was subsequently mitigated (brought back to seven days) by means of an additional Divine decree (the *dayo* principle, to be exact) which is also left tacit in the Torah. In other words, while the Torah apparently concludes with a seven-day sentence, this could well be a final conclusion (with unreported things happening in between) rather than an immediate one. Nothing

stated in the Torah implies this a crescendo reading, but nothing denies it either. So much for our analysis of verse 14.

Let us now briefly look at verse 15: "And Miriam was shut up without the camp seven days; and the people journeyed not till she was brought in again." The obvious reading of this verse is that it tells us that the sentence in verse 14 was duly executed – Miriam was indeed shut away outside the camp for exactly seven days, after which she was released and returned to the camp, as prescribed. We can also view it as a confirmation of the reasoning in the previous verse – i.e. as a way to tell us that the apparent conclusion was the conclusion Moses' court adopted and carried out. We shall presently move on, and see how the Gemara variously interpreted or used all this material.

But first let us summarize our findings. Num. 12:14-15 may, with some interpolation and manipulation, be construed as an a fortiori argument of some sort. If this passage of the Torah is indeed a *qal vachomer*, it is not an entirely explicit (*meforash*) one, but partly implicit (*satum*). In some respects, it would be more appropriate to take it as a crescendo, rather than purely a fortiori. It could even be read as not a *qal vachomer* at all; but some elements of the text would then be difficult to explain.

It is therefore reasonable to read an a fortiori argument into the text, as we have done above and as traditionally done in Judaism. It must however still be stressed that this reading is somewhat forced if taken too strictly, because there are asymmetrical elements in the minor premise and conclusion. We cannot produce a valid purely a fortiori inference without glossing over these technical difficulties. Nevertheless, there is enough underlying symmetry between these elements to suggest a significant overriding a fortiori argument that accords with the logical requirement of continuity (i.e. with the principle of deduction). The elements not explained by a fortiori argument can and must be regarded as separate and additional decrees. Alternatively, they can be explained by means of a crescendo arguments.

In the present section, we have engaged in a frank and free textual analysis of Num. 12:14-15. This was intentionally done from a secular logician's perspective. We sought to determine

objectively (irrespective of its religious charge) just what the text under scrutiny is saying, what its parts are and how they relate to each other, what role they play in the whole statement. Moreover, most importantly, the purpose of this analysis was to find out what relation this passage of the Torah might have to a fortiori argument and the principle of *dayo*: does the text clearly and indubitably contain that form of argument and its attendant principle, or are we reading them into it? Is the proposed reasoning valid, or is it somewhat forced?

We answered the questions as truthfully as we could, without prejudice pro or con, concluding that, albeit various difficulties, a case could reasonably be made for reading a valid a fortiori argument into the text. These questions all had to be asked and answered before we consider and discuss the Gemara's exegesis of Num. 12:14-15, because the latter is in some respects surprisingly different from the simple reading. We cannot appreciate the full implications of what it says if we do not have a more impartial, scientific viewpoint to compare it to. What we have been doing so far, then, is just preparing the ground, so as to facilitate and deepen our understanding of the Gemara approach to the *qal vachomer* argument and the *dayo* principle when we get to it.

One more point needs to be made here. As earlier said, the reason why the Gemara drew attention in particular to Num. 12:14-15 is simply that this passage is the only one that could possibly be used to ground the Mishna BQ 2:5 in the Torah. However, though as we have been showing Num. 12:14-15 can indeed be used for this purpose, the analogy is not perfect. For whereas the Mishnaic *dayo* principle concerns inference by a rabbinical court from a law (a penalty for a crime, to be precise) explicit in the Torah to a law *not* explicit in the Torah (sticking to the same penalty, rather than deciding a proportional penalty), the *dayo* principle implied (according to most readings) in Num. 12:14-15 relates to an argument whose premises and conclusion are all in the Torah, and moreover it infers the penalty (for Miriam's *lèse-majesté*) for the court to execute by derivation from a penalty (for a daughter offending her father) which may be characterized as intuitively-obvious morality or more sociologically as a pre-Torah cultural tradition.

For if we regard (as we could) both penalties (for a daughter and for Miriam) mentioned in Num. 12:14-15 as Divinely decreed, we could not credibly also say that the latter (for Miriam) is *inferred* a fortiori from the former (for a daughter). So, the premise in the Miriam case is not as inherently authoritative as it would need to be to serve as a perfect analogy for the Torah premise in the Mishnaic case. For the essence of the Mishnaic sufficiency principle is that the court must be content with condemning a greater culprit with the same penalty as the Torah condemns a lesser culprit, rather than a proportionately greater penalty, on the grounds that the only penalty explicitly justified in the Torah and thus *inferable* with certainty is the same penalty. That is, the point of the Mishnaic *dayo* is that the premise is *more authoritative* than the conclusion, whereas in the Num. 12:14-15 example this is not exactly the case. What this means is that although the Mishnaic *dayo* can be somewhat grounded on Num. 12:14-15, such grounding depends on our reading certain aspects of the Mishna *into* the Torah example. That is to say, the conceptual dependence of the two is mutual rather than unidirectional.

5. A critique of the Gemara in Baba Qama 25a

As regards the Gemara of the Jerusalem Talmud, all it contains relative to the Mishna Baba Qama 2:5 is a brief comment in the name of R. Yochanan[55] that R. Tarfon advocates full payment for damages in the private domain, whereas the Sages advocate half payment[56]. This is typical of this Talmud, which rarely indulges in discussion[57]. On the other hand, the Gemara of the Babylonian Talmud has quite a bit to say on this topic (see p. 25a there), though perhaps less than could be expected. When

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[55] I presume offhand this refers to R. Yochanan bar Nafcha, d. ca. 279 CE.

[56] See page 11b, chapter 2, law 7.

[57] This Talmud (closed in Eretz Israel, ca. 400 CE) may of course contain significant comments about *qal vachomer* and the *dayo* principle elsewhere; I have not looked into the matter further.

exactly that commentary on our Mishna was formulated, and by whom, is not there specified; but keep in mind that the Gemara as a whole was redacted in Babylonia ca. 500 CE, i.e. some three centuries after the Mishna was closed, so these two texts are far from contemporaneous[58]. It begins as follows:

> "Does R. Tarfon really ignore the principle of *dayo*? Is not *dayo* of Biblical origin? As taught: How does the rule of *qal vachomer* work? And the Lord said unto Moses: 'If her father had but spit in her face, should she not be ashamed seven days?' How much the more so then in the case of divine [reproof] should she be ashamed fourteen days? Yet the number of days remains seven, for it is sufficient if the law in respect of the thing inferred be equivalent to that from which it is derived!"

The a crescendo reading. Reading this passage, it would appear that the Gemara conceives *qal vachomer* as a crescendo rather than purely a fortiori argument; and the *dayo* principle as a limitation externally imposed on it. It takes the story of Miriam (i.e. Numbers 12:14-15) as an illustration and justification of its view, claiming that the punishment due to Miriam would be fourteen days by *qal vachomer* were it not restricted to seven days by the *dayo* principle. The *dayo* principle is here formulated exactly as in the Mishna (as "It is sufficient, etc."); but the rest of the Gemara's above statement is not found there.

In fact, the Gemara claims that the thesis here presented is a *baraita* – i.e. a tradition of more authoritative, Tannaic origin,

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[58] Since R. Tarfon flourished in 70-135 CE, and the Mishna was redacted about 220 CE, the Gemara under examination here must have been developed somewhere in between, i.e. in the interval from c. 220 CE to c. 500 CE. The thesis upheld in this particular anonymous Gemara may have existed some time before the final redaction, or may have been composed at the final redaction (or possibly even later, if some modern scholars are to be believed).

even though it is not part of the Mishna[59]. This is conventionally signaled in the Gemara by the expression 'as taught': דתניא (*detania*)[60]. The *baraita* may be taken as the Hebrew portion following this, i.e. stretching from "How does the rule of *qal vachomer* work?" to "…from which it is derived." Note well that *baraita* thesis is clearly delimited: the preceding questions posed by the Gemara – viz. "Does R. Tarfon really ignore the principle of *dayo*? Is not *dayo* of Biblical origin?" – are *not* part of it; we shall return to these two questions further on.

As we have shown in our earlier analysis, Num. 12:14-15 could be read as devoid of any argument; but then we would be hard put to explain the function of the first sentence: "If her father had but spit in her face, etc.," and its relation to the second: "Let her be shut up without the camp, etc.". It is therefore a reasonable assumption that an argument is indeed intended. This argument can be construed as purely a fortiori; in that event, its conclusion is simply seven days isolation, the same number of days as mentioned in the minor premise; and if the *dayo* principle have any role to play here it is simply that of the principle of deduction, i.e. a reminder that the conclusion must reflect the minor premise. It is also possible to interpret the argument as a crescendo, as the Gemara proposes to do; in that event, its conclusion is a greater number of days of isolation (say, fourteen

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[59] According to a note in *Talmud Bavli*, this *baraita* first "appears at the beginning of *Toras Kohanim*," by which they presumably mean the introduction to *Sifra* listing the thirteen hermeneutic principles of R. Ishmael and some Biblical illustrations of them.

[60] According to the *Introduction to the Talmud* of R. Shmuel Ha-Nagid (Spain, 993-1060 – or maybe Egypt, mid-12th cent.), a *tosefta* (addition) is a form of *baraita* (outside material) "usually introduced by the word *tanya*;" so, the use of this word here could be indicative of a *tosefta*. Further on in the same work, it is said that "an anonymous statement in the Tosefta is according to R. Nechemia;" so, the statement here cited by the Gemara might have been made by the Tanna R. Nechemia (Israel, fl. c. 150 CE). This is just speculation on my part, note well. An English translation of the book by R. Shmuel Ha-Nagid can be found in Aryeh Carmell's *Aiding Talmud Study*; see there, pp. 70, 74.

days); and the *dayo* principle plays the crucial role of resetting the number of days to seven.

The latter is a conceivable hypothesis, but by no means a certainty, note well. There is clearly no mention of "fourteen days" in the Torah passage referred to, i.e. no concrete evidence of an a crescendo argument, let alone of a *dayo* principle which cuts back the fourteen days to seven. The proposed scenario is entirely read into the Biblical text, rather than drawn from it, by the *baraita* and then the Gemara; it is an interpolation on their part. They are saying: though the Torah does not explicitly mention fourteen days, etc., it tacitly intends them. This is not inconceivable; but it must be admitted to be speculative, since other readings are equally possible.

The *baraita* apparently proposes to read, not only the particular *qal vachomer* about Miriam, but *qal vachomer* in general as a crescendo argument, since it says "How does the rule of *qal vachomer* work?" rather than "how does the following example of *qal vachomer* work?" Thus, the Tanna responsible for it may be assumed to believe unconditionally in the 'proportionality' of a fortiori argument. Likewise, the Gemara – since it accepts this view without objection or explanation. If it is true that this Gemara (and the *baraita* it is based on – but I won't keep mentioning that) regards a fortiori argument to always be a crescendo argument, it is way off course, of course.

As we have seen, as far as formal logic is concerned a fortiori argument is essentially not a crescendo, even though its premises can with the help of an additional premise about proportionality be made to yield an a crescendo conclusion. It is conceivable that the particular argument concerning Miriam is in fact not only a fortiori but a crescendo (assuming the premise of proportionality is tacitly intended, which is a reasonable assumption); but it is certainly *not* conceivable that *all* a fortiori arguments are a crescendo. The Gemara's identification of a fortiori argument with a crescendo is nowhere justified by it. The Gemara has not analyzed a fortiori argument in general and found its logical conclusion to be a crescendo (i.e. 'proportional'); it merely asserts this to be so in the case at hand and, apparently, in general.

While it is true that, empirically, within the Talmud as well as outside it, convincing examples of seemingly a fortiori argument yielding a (roughly or exactly) proportional conclusion can be adduced, it is also true that examples of a fortiori argument yielding a *non*-proportional conclusion can be adduced. This needs to be explained – i.e. commentators are duty-bound to account for this variation in behavior, by specifying under what logical conditions a 'proportional' conclusion is justified and when it is not justified. The answer to that is (to repeat) that a fortiori argument as such does not have a 'proportional' conclusion and that such a conclusion is only logically permissible if an additional premise is put forward that justifies the 'proportionality'. The Gemara does not demonstrate its awareness of these theoretical conditions, but functions 'intuitively'. Its thesis is thus essential dogmatic – an argument by authority, rather than through logical justification.

Thus, for the Gemara, or at least this here Gemara, the words "*qal vachomer*," or their English equivalent "a fortiori argument," refer to what we have called a crescendo argument, rather than to purely a fortiori argument. There is nothing wrong with that – except that the Gemara does not demonstrate awareness of alternative hypotheses.

A surprising lacuna. Furthermore, it should imperatively be remarked that the Gemara's above explanation of the Mishna debate, by means of the Miriam story, is only relevant to the first exchange between R. Tarfon and the Sages; *it does not address* the issues raised by the second exchange between them.

For in the first exchange, as we have seen, R. Tarfon tries by means of a possible pro rata argument, or alternatively an a crescendo argument (as the Gemara apparently proposes), to justify a 'proportional' conclusion (i.e. a conclusion whose predicate is greater than the predicate of the minor premise, in proportion to the relative magnitudes implied in the major premise); and here the Sages' *dayo* objection limits the predicate of conclusion to that of the minor premise; so the analogy to the Miriam case is possible. But in the second exchange, the situation is *quite* different! Here, as we earlier demonstrated, the *dayo* objection refers, not to the information in the minor premise, but to the information that was generalized into the

major premise. That is to say, whereas the first objection is aimed at the attempted pro rata or a crescendo deduction, the second one concerns the inductive preliminary to the attempted pro rata or a fortiori or a crescendo deduction.

The Gemara makes no mention of this crucial distinction between the two cases. It does not anywhere explicitly show that it has noticed that R. Tarfon's *second* argument draws the same conclusion whether it is considered as pro rata, a crescendo, or even purely a fortiori, so that it formally does *not* contravene the Sages' first objection. The Gemara does not, either, marvel at the fact that the Sages' second objection is made in *exactly the same terms*, instead of referring to the actual terms of the new argument of R. Tarfon. It does not remark that the Miriam story (as the Gemara interprets it) is therefore *irrelevant* to the second case, since it does not resemble it, and some other explanation must be sought for it. This lacuna is of course a serious weakness in the Gemara's whole hypothesis, since it does not fit in with all the data at hand.

To be sure, the distinction between the two cases does appear in rabbinic literature. This distinction is solidified by means of the labels *dayo aresh dina* and *dayo assof dina* given to the two versions of the *dayo* principle. But I do not think the distinction is Talmudic (certainly, it is absent here, where it is most needed). Rather, it seems to date from much later on (probably to the time of Tosafot). These expressions mean, respectively, applying the *dayo* "to the first term (or law)" and applying it "to the last term (or law)." In my opinion, *assof dina* must refer to the *dayo* used on the first *qal vachomer*, while *aresh dina* refers to the *dayo* used on the second *qal vachomer*[61].

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[61] The reason I say "in my opinion," is that the text where I found this distinction, namely *La mishna* (Tome 8, Baba Kama. Tr. Robert Weill. Paris: Keren hasefer ve-halimoud, 1973), posits the reverse, i.e. *aresh dina* for the first argument and *assof dina* for the second. But that would not make sense in my view. Either there was a typing error, or (less likely) whoever originally formulated this distinction did not really understand how the two *dayo* applications differ. For it is clear from the analysis presented in the present volume that, in the first argument *dayo* is applied to the premise about proportionality (which is relatively

Be that as it may, what concerns us here is the Gemara, which evidently makes no such distinction (even if later commentators try to ex post facto give the impression that everything they say was tacitly intended in the Gemara). What this inattentiveness of the Gemara means is that even if it manages to prove whatever it is trying to prove (we shall presently see just what) – it will not succeed, since it has not taken into account all the relevant information. Its theory will be too simple, insufficiently broad – inadequate to the task. The Gemara's failure of observation is of course also not very reassuring.

The claim that *dayo* is of Biblical origin. Let us now return to the initial questions posed by the Gemara, viz. "Does R. Tarfon really ignore the principle of *dayo*? Is not *dayo* of Biblical origin?" (ור"ט לית ליה דיו והא דיו דאורייתא הוא). As already remarked, it is important to notice that these questions are *not* part of the *baraita*. They are therefore the Gemara's own thesis (or an anonymous thesis it defends as its own) – indeed, as we shall see, they are the crux of its commentary. The *baraita* with the a crescendo reading is relatively a side-issue. What the Gemara is out to prove is that R. Tarfon "does *not* ignore" the *dayo* principle, because "it *is* of Biblical origin." What is not of Biblical origin may conceivably be unknown to a rabbi of Tarfon's level; but what is of Biblical origin must be assumed as known by him.

The question of course arises what does "of Biblical origin" (*deoraita*) here mean exactly? It cannot literally mean that the principle of *dayo* is *explicitly* promulgated and explicated in the Torah. Certainly, it is nowhere to be found in the Torah passage here referred to, or anywhere else in that document. Thus, this expression can only truly refer to an *implicit* presence in the

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downstream, whence "at the end"), while in the second argument it is applied before the formation of the major premise (thus, well upstream, i.e. "at the beginning"). Moreover, my view seems to be confirmed by the following comment in the Artscroll Mishnah: "it is easier to apply the principle of *dayyo* to the first *kal vachomer*, because in that instance it applies to the end of the *kal vachomer*." It also seems to be confirmed by the article on the *dayo* principle in ET (reviewed in chapter 5.3 of the present volume).

Torah. And indeed, the Torah passage about Miriam, brought to bear by the Gemara, seems to be indicated by it as the needed *source and justification* of the principle, rather than as a mere illustration of it. However, as we shall see further on, there is considerable circularity in such a claim. So, claiming the *dayo* principle to have "Biblical origin" is in the final analysis just *say-so*, i.e. a hypothesis – it does not solidly ground the principle and make it immune to all challenge, as the Gemara is suggesting.

It could well be thought, reading the Mishna, that R. Tarfon was *not* previously aware of the Sages' alleged *dayo* principle, since he did not preempt their two *dayo* objections. Had he known their thinking beforehand, he would surely not have wasted his time trying out his two arguments, since he would expect them to be summarily rejected by the Sages. Since he did try, and try again, the Sages must have been, in his view, either unearthing some ancient principle unknown to him, or deciding a new principle, or proposing ad hoc decisions. It is this overall reasonable conclusion from the Mishna that the Gemara seeks to combat, with its claim that the *dayo* principle was of Biblical origin and therefore R. Tarfon must have known it. Note this well.

I do not know why the Gemara is not content with the perfectly legal possibilities that the *dayo* principle might be either a tradition not known to R. Tarfon, or a new general or particular decision by the Sages (*derabbanan*). For some reason, it seeks to impose a more fundamentalist agenda, even though the alternative approaches are considered acceptable in other Talmudic contexts. The Gemara does not say why it is here unacceptable for the Sages to have referred to a relatively esoteric tradition or made a collegial ruling (by majority, *rov*)[62]. It seems that the Gemara is driven by a desire to establish that R. Tarfon and the Sages are more in harmony than they at first seem; but it is not clear why it has chosen the path it has, which is fraught with difficulties.

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[62] And I have found no explanation by later commentators.

The claim that *dayo* is conditional. The Gemara shifts the debate between R. Tarfon and the Sages from one as to *if* the *dayo* principle is applicable to one as to *when* it is applicable. The two parties, according to the Gemara, agree that the *dayo* principle is "of Biblical origin," and thus that there is a *dayo* principle; but they disagree on whether or not it is applicable unconditionally. In this view, whereas the Sages consider the *dayo* principle as universally applicable, R. Tarfon considers it as only conditionally applicable. Thus, the parties agree in principle, and their disagreement is only in a matter of detail. The Gemara then proceeds to clarify R. Tarfon's alleged conditions[63]:

> "The principle of *dayo* is ignored by him [R. Tarfon] only when it would defeat the purpose of the a fortiori, but where it does not defeat the purpose of the a fortiori, even he maintains the principle of *dayo*. In the instance quoted there is no mention made at all of seven days in the case of divine reproof; nevertheless, by the working of the a fortiori, fourteen days may be suggested: there follows, however, the principle of *dayo* so that the additional seven days are excluded, whilst the original seven are retained. Whereas in the case before us the payment of not less than half damages has been explicitly ordained [in all kinds of grounds]. When therefore an a fortiori is employed, another half-payment is added [for damage on the plaintiff's premises], making thus the compensation complete. If [however] you apply the principle of *dayo*, the sole purpose of the a fortiori would thereby be defeated."

Let us try and understand what the Gemara is saying here. It is proposing a distinction (allegedly by R. Tarfon) between two

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[63] In truth, the Gemara's explanations are not entirely clear; it is only by referring to later commentaries (paraphrased in *Talmud Bavli* ad loc) that I was personally able to fathom them.

obscure conditions: when applying the *dayo* principle "would defeat the purpose of the *qal vachomer*," it is *not* applied; whereas where applying the *dayo* principle "would *not* defeat the purpose of the *qal vachomer*," it is applied. What does this "defeating the purpose of the a fortiori argument" condition refer to? The Gemara clarifies it by comparing R. Tarfon's (alleged) different reactions to two cases: that concerning Miriam and the (first) argument in the Mishna (the Gemara has apparently not noticed the second argument at all, remember).

The Gemara here reaffirms its theory that, although the Torah ("the instance quoted" – i.e. Num. 12:14-15) does not mention an initial or an additional seven days[64], "nevertheless, by the working of the a fortiori" (as conceived by the Gemara, meaning a crescendo) fourteen days in all (i.e. seven plus seven) are intended, and the *dayo* principle serves after that to "exclude" the additional seven days, admitting only the "original" seven days. In this case, then, the *dayo* principle *is* to be applied. The Gemara then turns to R. Tarfon's (first) argument, claiming that in its case the *dayo* principle is *not* to be applied. Why? Because "the payment of not less than half damages has been explicitly ordained [in all kinds of grounds]." This is taken by commentators (Rashi is mentioned) to mean that since the Torah does not make a distinction between public and private property when it specifies half liability for damage by horn[65], it may be

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[64] It is not clear which seven days the Gemara intends to refer to, when it says "there is no mention made at all of seven days in the case of divine reproof." It could be referring to the initial seven days (the minor premise of the a fortiori argument), which as we shall later see the Gemara considers as tacit. Or it could be referring to "the additional seven days" mentioned a bit further on in the same paragraph, i.e. the seven days added on to the presumed initial seven to make a total of fourteen (the a crescendo conclusion of the argument), which the Gemara also takes for granted though absent in the text. In any case, the Gemara's explicit admission that information is lacking is worth underlining.

[65] Here reference is made to Ex. 21:35, which concerns an ox killing (by goring or other such means) another's ox, in which case the live ox is sold and the price of it divided between the two owners. And this situation is contrasted to Ex. 22:4, which does specify private

considered as intending this penalty to be (the minimum[66]) applicable to both locations.

The Gemara goes on to tell us that through "a fortiori" inference "another half-payment is added, making thus the compensation complete." The implication is that, whereas the Sages would at this stage apply the *dayo* principle and conclude with *only* half payment, R. Tarfon (according to the Gemara) considered that doing so would "defeat the purpose of the a fortiori" and he concluded instead with full payment. In the Miriam case, we go from *no* information to fourteen days and back to seven; so, we still end up with new information (seven) after the *dayo* application to the *qal vachomer* increase. Whereas in the Mishna case, we go from half to full payment and back to half; so that *dayo* application here would altogether cancel out the *qal vachomer* increase. Thus, R. Tarfon is presented by the Gemara

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property with regard to tooth & foot damage. However, this comparison seems a bit forced to me, because though it is true that there is no mention of where the ox was killed, that is because the damage done has nothing to do with location; whereas in the case of someone's beast feeding in another's field, it is the field that has been damaged. In any event, the rabbis are evidently making a generalization, from the case of an ox goring another ox (i.e. Ex. 21:35), to an ox goring or similarly damaging *anything* found on public or private property. Just as in the first case, the oxen are split between the owners, so the minimum for any *other* such damage by an ox is half liability. This is at least true for damage on public property, and the question asked is whether more than that can be charged for damage on private property.

66 If we did not say "the minimum," and instead interpreted the "half damages" on private property as *davka*, we would be suggesting that this penalty is Torah-given, and therefore no greater penalty can be inferred. If the latter were assumed, the Sages' *dayo* objections would only be *ad hoc* Scriptural stipulations and not expressions of a broad principle. In that event, R. Tarfon's two arguments were not rejected by the Sages because of any technical fault in them, but simply because the conclusion was *already settled* by Scriptural decree, so that there was no sense in his trying to *infer* anything else. But this does not seem to be the intent of the Mishna or the Gemara.

as knowing and accepting the *dayo* principle, but applying it *more conditionally* than the Sages do[67].

But I would certainly challenge the underlying claim that the a fortiori argument used by R. Tarfon (which concludes with full payment for damage by horn on private property) is "nullified" by the Sages' objection to it (which limits the payment to half). What is given in the Torah is that such damage (on whatever domain) is liable to half payment. This "half" is indefinite, and must be interpreted as at least half (i.e. a minimum of half, *no less than* half), which leaves open whether only half (i.e. a maximum of half, *no more than* half) or full (i.e. *more than* half) is intended. R. Tarfon's argues (through a crescendo, i.e. 'proportional' a fortiori argument) in favor of the conclusion "full," whereas the Sages argue (through *dayo*, or purely a fortiori argument) in favor of the alternative conclusion "only half." R. Tarfon's argument is certainly *not made logically useless* by the Sages' dismissal of it, but constitutes a needed acknowledgment of one of the two possible interpretations of "half," just as the Sages' *dayo* duly acknowledges the other possibility. If the Mishna had directly interpreted "half" as "only half," without regard to the possibility of "full," the interpretation would have seemed unjustified.[68]

An argument *ex machina*. But let us dig deeper into the alleged conditionality of *dayo* application. Why, more precisely, does

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[67] Obviously, this more specific difference of opinion between the parties does not disturb the Gemara authorship. The implication is that the viewpoint attributed to R. Tarfon (about the conditionality of *dayo*) is not "of Biblical origin" – or, of course, it would be known to and agreed by the Sages! What credence does it have, then? Why hang on to it, if it is just one man's opinion? One senses a double standard in the Gemara's approach.

[68] Thus, the comment in *Talmud Bavli* that "applying *dayyo* in this case would leave the *kal vachomer* teaching us absolutely nothing" is not correct. The Mishna does *not* go from 'half' to 'full' and *back to* 'half' – it goes from 'at least half' to 'full' and thence to '*only* half'. We could similarly interpret the Miriam argument as going from 'at least 7 days' to '14 days' to 'only 7 days', and thus show the two cases are logically quite similar, contrary to the Gemara's claim.

the Gemara's R. Tarfon consider that applying the *dayo* principle in the case of the Miriam argument does not "defeat the sole purpose of the a fortiori," yet would do so in the case of his formally similar (first) argument? What is the significant difference between these two cases? And what sense are we to make of the Gemara's further explanations, viz.:

> "And the Rabbis? — They argue that also in the case of divine [reproof] the minimum of seven days has been decreed in the words: Let her be shut out from the camp seven days. And R. Tarfon? — He maintains that the ruling in the words, 'Let her be shut out etc.', is but the result of the application of the principle of *dayo* [decreasing the number of days to seven]. And the Rabbis? — They argue that this is expressed in the further verse: And Miriam was shut out from the camp. And R. Tarfon? — He maintains that the additional statement was intended to introduce the principle of *dayo* for general application so that you should not suggest limiting its working only to that case where the dignity of Moses was involved, excluding thus its acceptance for general application: it has therefore been made known to us [by the additional statement] that this is not the case."[69]

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[69] The Gemara goes on and on, the next sentence being "R. Papa said to Abaye: Behold, there is a Tanna who does not employ the principle of dayo even when the a fortiori would thereby not be defeated…" (note the two negations, implying there may be yet *other* exceptions to *dayo* application). But this much later comment (dating from the late 3rd cent. CE) goes somewhat against the theory the Gemara attributes to R. Tarfon. So, it is safe to stop where we have. Incidentally, if the sequence of events was really as implied in the Gemara, then the anonymous thesis that R. Tarfon "did not ignore" that the *dayo* principle "is of Biblical origin" would be dated roughly somewhere in the 3rd cent. CE – that is, one or two centuries after the fact, rather than three or more. But it is also possible that the said anonymous thesis was composed after the "R. Papa said to Abaye" part, the latter being adapted by the redactors to "fit in" – as modern scholars say often happens in the Talmud.

It seems[70] that R. Tarfon's thought (still according to the Gemara, note well) is that, with regard to Miriam, *no part of the penalty for offence against God is explicitly mentioned in the Torah* (Num. 12:14-15), so that all fourteen days must be inferred by "a fortiori" (i.e. a crescendo); after which the *dayo* principle is used to revoke seven of those days, leaving seven. Whereas, in the case of horn damage on private property, the minimum liability of half payment is *already explicitly given in the Torah* (Ex. 21:35), so that the "a fortiori" (i.e. a crescendo) argument only serves to add on half payment; in which case, applying the *dayo* principle here would completely nullify the effect of the *qal vachomer*.

Thus, it is implied, the *dayo* principle is applicable in the Miriam case, but inappropriate in the case of a goring ox. The Sages (allegedly) then object that the initial seven days are indeed given in the Torah, in the sentence "Let her be shut out from the camp seven days." To which R. Tarfon (allegedly) retorts that this sentence refers to the *dayo* principle's "decreasing the number of days to seven." The Sages reply that that function is fulfilled by the sentence "And Miriam was shut out from the camp." To which R. Tarfon retorts that the latter rather has a generalizing function from the present case to all others. As far as I am concerned, most of this explanation by the Gemara is artificial construct and beside the point. It is chicanery, *pilpul* (in the most pejorative sense of that term).

The claim it makes (on R. Tarfon's behalf) that *all fourteen days* for offence against God must be inferred is untrue – for the fourteen days are not inferred *from nothing*, as it suggests; they are inferred from the seven days for offence *against a father*. The inference of the conclusion, whether it is a crescendo or purely a fortiori, depends on this minor premise. The seven days for a father are indeed a given minimum, *also* applicable to God; *otherwise, there would be no a crescendo or a fortiori inference*

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[70] I base this interpretation on explanations given in *Talmud Bavli* ad loc.

at all. The Gemara is claiming an "a fortiori" (i.e. a crescendo) argument to be present in the text, and yet denying the relevance of the textual indicators for such an assumption. Its alleged "a fortiori" argument is therefore injected into the discussion *ex machina*, out of the blue, without any textual justification whatsoever. This is not logic, but rhetoric.

The situation in the argument about Miriam is thus in fact technically exactly identical to the (first) argument relating to liability for damages by horn in the Mishna. Both arguments do, in fact, have the minor premise needed to draw the conclusion. Whence the Gemara's concept of "defeating the sole purpose of the a fortiori" is a red herring; it is just a convenient verbal artifice, to give the impression that there is a difference where there is none. The Gemara has evidently tried to entangle us in an imaginary argument. For, always remember, it is the Gemara's reading which is at stake here, and not R. Tarfon's actual position as it appears in the Mishna, which is something quite distinct.

The roles of the verses in Num. 12:14-15. What is evident is that neither of the readings of the said Torah portion that the Gemara attributes to R. Tarfon and the Sages fully corresponds to the simple reading (*peshat*). They are both awkward inventions[71] designed to justify the Gemara's own strange thesis. The Gemara's thesis is not something necessary, without which the Mishna is incomprehensible; on the contrary, it clouds the issues and misleads. Whatever the author's authority, it is unconvincing.

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[71] I call this 'pegging' – this sort of arbitrary association of rabbinical claims with Torah passages irrespective of content. When meaningful reasons are not available, the rabbis sometimes unfortunately engage in such lame excuses to give the impression that they have some Scriptural basis. The conclusions of such arguments are foregone – there is no process of logical inference. Such interpretations would supposedly be classed as ***asmakhta*** by the rabbis.

The simple reading of Num. 12:14-15 is, as we saw earlier[72], that the sentence "If her father had but spit in her face, should she not hide in shame seven days?" (first part of v. 14, call it 14a) provides the minor premise of a possible a fortiori argument (whether strict or a crescendo), while the sentence "Let her be shut up without the camp seven days, and after that she shall be brought in again" (second part of v. 14, call it 14b) provides its immediate conclusion. Note well that it is from these two sentences (i.e. v. 14a & 14b) that we in the first place surmise that there is an a fortiori argument in the text; *to speak of an a fortiori argument without referring to both these indices would be concept stealing*. The further sentence "And Miriam was shut up without the camp seven days; and the people journeyed not till she was brought in again" (v. 15) plays no part in the a fortiori argument as such, but serves to confirm that the sentence was carried out by Moses' court as prescribed by God.

The Gemara's R. Tarfon makes no mention of the role of v. 14a in building a *qal vachomer*, and regards v. 14b as the final conclusion of the argument, *after* the operation of an *entirely tacit* a crescendo inference to fourteen days and an *also tacit* application of *dayo* back to seven days; as regards v. 15, it effectively plays no role within the argument in his view, having only the function of confirming that the *dayo* application is a general principle and not an exceptional favor[73]. The Gemara's Sages, on the other hand, regard v. 14b (not 14a, note well) as the minor premise of the *qal vachomer*, and v. 15 its final conclusion, after the operation of an a crescendo inference to fourteen days and an application of *dayo* back to seven days.

Both parties make serious errors. The first of these is that neither of them accounts for v. 14a – why is it mentioned here if as both

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[72] See the previous section, on Num. 12:14-15, for a fuller exposé.

[73] If Miriam was spared the extra seven days incarceration due to the exceptional circumstance that Moses prayed for her, then it was not due to application of a *dayo* principle but to an ad hoc special favor. Note that there is nothing in v. 15 that suggests either interpretation – all it says is that Miriam was indeed shut up for seven days.

parties suppose it plays no role? No a fortiori argument can at all be claimed without reference to this information. The R. Tarfon thesis here is largely imaginary, since he ignores the role of v. 14a in justifying a *qal vachomer*; there is no trace in the Torah text of the a crescendo argument he claims, other than v. 14b. On the basis of only the latter textual given of seven days, he *projects into the text* a minor premise of seven days, an intermediate a crescendo conclusion of fourteen days and a *dayo* principle application, yielding a final conclusion of seven days (v. 14b). But if all the textual evidence we rely on is v. 14b, on what basis can we claim any a crescendo reasoning has at all occurred before it, let alone a *dayo* application, with this verse as the final conclusion? The whole process becomes a patent fabrication.

Nowhere in the proof text, note well, are the words *qal vachomer* or *dayo* used, or any verbal signal to the same effect. And this being so, what credence can be assigned to the Gemara's central claim, viz. that the *dayo* principle is "of Biblical origin?" It is surely paradoxical that it is able to support this ambitious claim only by means of a very debatable mental projection of information into the Torah, like a magician pulling a rabbit out of a hat after showing us it was empty. This means that the Gemara's proposed argument in favor of this claim is circular: it assumes X in order to prove X. This is of course made possible through the use of complicated discourse; but the bottom line is still the same.

The Sages' thesis is a bit more credible in that, even if they also grant no role to v. 14 a, they at least do propose a minor premise (v. 14b), as well as a final conclusion (v. 15). However, it is hard to see how "Let her be shut up without the camp seven days" (v. 14b) could be the minor premise of *qal vachomer* yielding the conclusion "And Miriam was shut up without the camp seven days" (v. 15)! These two propositions have the same subject (as well as the same explicit predicates), so where is the *qal vachomer*? Moreover, the Sages thereby subscribe to R. Tarfon's strange misconception regarding a fortiori argument.

A fortiori argument with a single subject. I am referring here to the bizarre notion that (in the *qal vachomer* argument under consideration, which is positive subjectal) the subject of the

minor premise must be repeated in the conclusion, while the subsidiary terms (i.e. the predicates of these propositions) go from less to more (implicitly). In fact, positive subjectal argument, whether a fortiori or a crescendo, *formally* has different subjects (the minor and the major terms, respectively) in the minor premise and conclusion (as for the predicate, i.e. the subsidiary term, it remains constant in pure a fortiori, while it increases in a crescendo). *There has to be* two subjects for the argument to logically function. The bizarre notion in the Gemara of a single subject argument is *the reason why* both parties in it ignore v. 14a and look for some other proposition to use as minor premise.

It should be stressed that there is *no allusion whatsoever* to such an idea in the Mishna. The Mishna's R. Tarfon and Sages manifestly have an entirely different dialogue than the one the Gemara attributes to them. The discussion in the Mishna is much more credible than that in the Gemara. The Gemara makes up this notion solely in order to create a distinction between the Miriam case and the Mishna's (first) argument. It needs to do this, remember, in order to justify its theory that R. Tarfon and the Sages agree on the *dayo* principle, although R. Tarfon applies it conditionally whereas the Sages apply it universally. But as we shall demonstrate formally, this notion is logically untenable. Buying the Gemara's scenario is like buying Brooklyn Bridge from someone who doesn't own it.

The thesis of R. Tarfon in the Gemara is that, in the Miriam case, we *must have* a minor premise that offending *God* (rather than merely one's father) justifies a minimum of seven days of punishment, in order to be able to infer *qal vachomer* (i.e. a crescendo) that offending God justifies fourteen days of punishment – just as with regard to an ox, we (allegedly) reason from half liability for damage done on *private* (rather than public) property to full liability on private property. The Sages do not object to this claim. But this claim is simply not true – there is no such technical requirement for positive subjectal a crescendo (or a fortiori) inference. We can very well, and normally do, reason with a change of subject, i.e. from the penalty for offence to one's father to that for offence to God, or from the liability for damage on public grounds to that on private

grounds. This is precisely the power and utility of a fortiori (and a crescendo) inference.

Moreover, we in fact can, by purely a fortiori argument, infer the needed minor premise about seven days penalty for offending God (from the same penalty for offending one's father), and likewise the half liability on private property (from the same liability on public property)[74]. One cannot claim an a crescendo argument to be valid without admitting the validity of the purely a fortiori argument (and pro rata argument) underlying it. Obtaining the minor premise demanded by the Gemara's R. Tarfon is thus not the issue, in either case. The issue is whether such a minor premise will allow us to draw the desired 'proportional' conclusion. And the answer to that, as we show further on, is: No!

Furthermore, if we carefully compare the Gemara's argument here to the first argument laid out in the Mishna, we notice a significant difference. As we just saw, the Gemara concludes with full liability for horn damage on private property on the basis of half liability for horn damage on *private* property. As earlier explained, it bases this minor premise on the fact that Ex. 21:35 does not make a distinction between public and private property when it prescribes half liability for damage by horn, so that this may be taken as a minimum in either case. Thus, for the Gemara, half liability for horn damage on private property is a Torah given, which does not need to be deduced. On the other hand, in the Mishna, the minor premise of the first argument refers to the public domain rather than to private property.

In his first argument, R. Tarfon argues thus (italics mine): "…in the case of horn, where the law was strict regarding [damage done on] *public* ground imposing at least the payment of half damages, does it not stand to reason that we should make it equally strict with reference to the plaintiffs premises so as to require compensation in full?" And to justify his second argument he argues thus: "but neither do I infer horn [doing

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[74] These two a fortiori arguments are given in full in previous sections of the present chapter.

damage on the plaintiff's premises] from horn [doing damage on *public* ground]; I infer horn from foot, etc."[75] Thus, his first argument is clearly intended as an inference from the penalty for horn damage in the *public* domain (half) to that in the private domain (full). The Gemara's construct is thus quite different from the Mishna's, and cannot be rightly said to represent it.

As regards the rule here apparently proposed by the Gemara (which it attributes to R. Tarfon), viz. that the subject must be the same in minor premise and conclusion, as already stated there is no such rule in formal logic for positive subjectal argument[76]. Such argument generally has the minor and major terms as subjects of the minor premise and conclusion respectively, even if the subsidiary term sometimes (as is the case in a crescendo argument) varies in magnitude 'proportionately'. In the case of a crescendo argument, where the predicate (subsidiary term) changes, *there absolutely must be a change of subject, since otherwise we would have no explanation for the change of predicate*. That is, we would have no logical argument, but only a very doubtful 'if–then' statement. The proposed rule is therefore fanciful nonsense, a dishonest pretext.

We can examine this issue in more formal terms. A positive subjectal a fortiori argument generally has the form: "P is more R than Q is; and Q is R enough to be S; therefore, P is R enough to be S" (two premises, four terms). If the argument is construed as a crescendo, it has the form: "P is more R than Q is; and Q is R enough to be Sq; and S is 'proportional' to R; therefore, P is

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[75] The explanations in square brackets are given in the Soncino edition.

[76] Perhaps, then, the Gemara's authorship rather has in mind predicatal argument? For in the latter, the subject is normally constant while the predicates vary. But the difference is that in predicatal argument, the subject of the minor premise and conclusion is the subsidiary term, while the predicates are the major and minor terms; and the major premise differs in form, too. However, this schema does not accord with the form of the Miriam argument, so it is unlikely to be intended by the Gemara for R. Tarfon's first argument, which it considers formally analogous to the Miriam argument.

R enough to be Sp" (three premises, five terms). The argument form attributed by the Gemara to R. Tarfon simply has the form: "If X is S1, then X is S2" (where X is the sole subject, and S1 and S2 the subsidiary terms, S2 being greater than S1); that is, in the Miriam sample: "if offending God merits seven days penalty, then offending Him merits fourteen days penalty," and again in the Mishna's first dialogue: "If liability for horn damage on private property is half payment, then liability for same on private property is full payment." This is manifestly not a fortiori or a crescendo argument, but mere if–then assertion; it could conceivably happen to be true, but it is not a valid inference.

It is clear that the latter inference, proposed by the Gemara in the name of R. Tarfon, has no logical leg to stand on. It has *no major premise* comparing the subjects (P and Q); and no need or possibility of one, since there is only one subject (X). Having no major premise, it has no middle term (R); and therefore, *no additional premise* in which the subsidiary term (S) is presented as 'proportional' to it. Thus, *no justification or explanation* is given why S should go from Sq in the minor premise to Sp in the conclusion. It is therefore not an a fortiori or a crescendo argument in form, even if it is arbitrarily so *labeled* by the Gemara. You cannot credibly reason a fortiori or a crescendo, or any other way, if you cannot produce the requisite premises. There is no such animal as "argument" *ex nihilo*.

The Gemara's proposed if–then statement is certainly not universal, since that would mean that if any subject X has any predicate Y then it has a greater predicate Y+, and if Y+ then Y++, and so forth ad infinitum – which would be an utter absurdity[77]. From this we see that not only has the Gemara's argument no textual bases (as we saw earlier), but it has no logical standing. There is in fact no "argument," just arbitrary assertion on the Gemara's part. For both the Miriam sample and the (first) Mishna sample, the Gemara starts with the convenient

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[77] It is of course possible that in a specific case of Y, "all Y1 are Y2" is true; so that predicating the value Y1 entails predicating the value Y2. But this cannot be proposed as a general truth without absurd infinite reiteration.

premise that "there is a *qal vachomer* here," which it considers as given (since it is traditionally assumed present, on the basis of *other* readings of these texts), and then draws its desired conclusion without recourse to any other proposition, i.e. *without premises*![78]

If this requirement for a single subject is not a rule of logic, is it perhaps a hermeneutic principle, i.e. a rule prescribed by religion? If so, where (else) is it mentioned in the oral tradition or what proof-text is it drawn from? Is it practiced in other contexts, or only in the present one, where it happens to be oh-so-convenient for the Gemara's interpretative hypothesis? If it is an established rule, how come the Sages do not agree to it? The answers to these questions are pretty obvious: there is no such hermeneutic rule and no basis for it. It was unconsciously fabricated by the Gemara author in the process of developing the foolish scenario just discussed. It is not a general necessity (or even a possibility, really), but just an ad hoc palliative.

Unfortunately, when people use complex arguments (such as the a fortiori or the a crescendo) without prior theoretical reflection about them, they are more or less bound to eventually try to arbitrarily tailor them to their discursive needs.

To sum up. We have seen that the Gemara introduces a number of innovations relative to the Mishna it comments on. The first we noted was that the Gemara, in the name of an anonymous Tanna, reads the *qal vachomer* in Num. 12:14-15, and apparently all a fortiori argument in general, as a crescendo argument. Next we noted a surprising lacuna in the Gemara's treatment, which was that while it dealt with R. Tarfon's first argument, it completely ignored his second, and failed to notice the curious verbatim repetition in the Sages' two *dayo* objections. Third, we showed that the thesis that *dayo* is "of Biblical origin," so that R. Tarfon must have been aware of it,

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[78] This is very much the mentality of a conventional mind – what Ayn Rand has called a "second-hander" in her novel *The Fountainhead*. Such a person takes the say-so of 'authorities' for granted, and makes no effort at independent verification. It builds buildings without foundations. It disregards the natural order of things.

was the Gemara's main goal in the present *sugya*. In the attempt to flesh out this viewpoint, the Gemara proceeds to portray R. Tarfon as regarding the *dayo* principle as being applicable only conditionally, in contrast to the universal *dayo* principle seemingly advocated by the Sages.

To buttress this thesis, the Gemara is forced to resort to an argument *ex machina* – that is, although vehemently denying the role of both parts of Num. 12:14 in the formation of a *qal vachomer*, the Gemara's R. Tarfon nevertheless assumes one (i.e. a phantom a fortiori argument) to be somehow manifest between the lines of the proof-text. Moreover, in order to make a distinction between the Miriam example and the (first) Mishna argument, so as to present the *dayo* principle as applicable to the former and inapplicable to the latter, the Gemara's R. Tarfon invents a preposterous rule of inference for *qal vachomer*, according to which the subject must be the same in the minor premise and the conclusion. In the Miriam example, the absence of a minor premise with the required subject (offending God) means that *dayo* is applicable, for applying it would not "defeat the purpose of the *qal vachomer*;" whereas in the (first) Mishna argument, the presence of a minor premise with the required subject (damage by ox on private property) means that *dayo* is inapplicable, for applying it would "defeat the purpose of the *qal vachomer*."

This all looks well and good, if you happen to be sound asleep as the Gemara dishes it out. For the truth is that at this stage the whole structure proposed by the Gemara comes crashing down.

The trouble is, there is no such thing as an a fortiori argument (or a crescendo argument) that takes you *from no information to a conclusion*, whether maximal or minimal. If the proposed *qal vachomer* "argument" has no minor premise (since v. 14a is explicitly not admitted as one) and no major premise (since the subject of the conclusion must, according to this theory, be the same in the minor premise as in the conclusion), then there is *no* argument. You cannot just declare, arbitrarily, that there is an argument, while cheerfully denying that it has any premises. And if you have no argument with a maximum conclusion, then you have no occasion to apply the *dayo* principle, anyway.

Moreover, there is no such one-subject rule in a fortiori logic; indeed, if such a rule were instituted, the argument would not function, since it would have no major premise, and no major, minor or middle term; consequently, if it was intended as ‘proportional’ (as the Gemara claims), it would imply an inexplicable and absurd increase in magnitude of the subsidiary term. Thus, even if the Gemara’s textually absent argument about Miriam were generously granted as being at least ‘imaginable’ (in the sense that one might today imagine, without any concrete evidence, Mars to be inhabited by little green men), the subsequent demand that a *qal vachomer* have only one subject would make the proposed solution formally impossible anyway.

The Gemara’s explanation is thus so much smoke in our eyes, a mere charade; it has no substance. We need not, of course, think of the Gemara as engaging in these shenanigans cynically; we can well just assume that the author of this particular commentary was unconscious. In fine, the Gemara’s scenario, in support of its claim that the *dayo* principle is “of Biblical origin” and so R. Tarfon did not ignore it—is logically unsustainable.

6. A slightly different reading of the Gemara

As we saw previously, the two arguments featured in Mishna BQ 2:5 may objectively be variously interpreted. R. Tarfon’s first argument may be read as pro rata or as a crescendo, though not as purely a fortiori (since his conclusion is ‘proportional’), while his second argument may be read in all three ways. As regards the Sages’ first *dayo* objection, if R. Tarfon’s first argument is supposed to be intended as a pure a fortiori, the objection to it would simply be that such argument cannot logically yield a ‘proportional’ conclusion; this reading is very unlikely. Rather, the first *dayo* objection may be taken as a refusal of the ‘proportionality’ of the pro rata or a crescendo arguments, and possibly the proposal of a purely a fortiori counterargument, i.e. one without a ‘proportional’ conclusion. The Sages’ second *dayo* objection, on the other hand, cannot have the same intent, since in this case all three forms of argument yield the very same ‘proportional’ conclusion; so, it

must be aimed at the inductive processes preceding these arguments.

In our above analysis of the corresponding Gemara, we have mostly represented it as conceiving of one possible scenario for both[79] arguments of the Mishna, that of a crescendo argument moderated by a *dayo* principle. This is the traditional and most probable interpretation, but it should be said that an alternative reading is quite possible. Certainly, the Gemara here does not accept, *or even consider*, the alternative hypothesis that purely a fortiori argument may be involved in the second argument of R. Tarfon, since it clearly assumes that the conclusion's predicate is bound to be greater than the minor premise's predicate. However, it would be quite consistent to suppose that the Gemara is in fact not talking of two a crescendo arguments, but of two analogical/pro rata arguments. There is some uncertainty as to the Gemara's real intent, since it does not explicitly acknowledge the various alternative hypotheses and eliminate all but one of them for whatever reasons.

Looking at the Mishna and Gemara discourses throughout the Talmud, it is obvious that the people involved use purely a fortiori argument, a crescendo argument, and argument pro rata in various locations. But it is not obvious that there is a clear distinction in their minds between these three forms of argument. It is therefore not impossible that when they say "*qal vachomer*," they might indiscriminately mean any of these three forms of argument. It should be clear to the reader that the issue I am raising here is not a verbal one. I am not reproaching the Talmud for using the words "*qal vachomer*" in a generic or vague sense. I certainly cannot reproach it for not using the expressions 'a crescendo' or 'pro rata', as against 'a fortiori', since these names were not in its vocabulary.

What I am drawing attention to is the Talmud's failure to demonstrate its theoretical awareness of the difference between

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[79] Although, as already remarked, the Gemara does not in fact pay any heed to the second argument or at all take it into consideration in its theorizing.

the three forms of argument, whatever they are called. How could such awareness be demonstrated? It would have sufficed to state (if only by means of concrete examples, without abstract explanations) that the two premises of a fortiori per se do not allow a ‘proportional’ conclusion to be drawn, but must be combined with a third, pro rata premise for such a conclusion (i.e. a crescendo) to be justified; and that it is also possible to arrive at a ‘proportional’ conclusion without a fortiori reasoning, through merely analogical (i.e. pro rata) reasoning.

That is to say, for instance in the positive subjectal mood, the major premise “P is more R than Q is” and the minor premise “Q is R enough to be S” do not suffice to draw the conclusion “P is R enough to be *more than* S.” To deduce the latter a crescendo conclusion, an additional premise must be given, which says that “S is proportional to R.” Given all three said premises, we can legitimately conclude that “P is R enough to be (proportionately) *more than* S;” but without the third one, we can only conclude “P is R enough to be S.” Alternatively, we might infer from “S is in general proportional to R,” combined with “a given value of S is proportional to a given value of R,” that “a greater value of S is proportional to a greater value of R” (this is pro rata without a fortiori).

Thus, although we have taken for granted in our above analysis the traditional view that when the Gemara of Baba Qama 25a speaks of *qal vachomer*, it is referring to a fortiori argument, i.e. more precisely put to a crescendo argument (since it advocates ‘proportional’ conclusions), it is quite conceivable that it was unconsciously referring to mere pro rata argument. The *dayo* principle is not something conceptually, even if halakhically, tied to a fortiori (or a crescendo) argument, but could equally well concern pro rata argument (or even other forms of reasoning). And what I have above called the “bizarre notion,” which the Gemara credits to R. Tarfon, that the minor premise and conclusion of a positive subjectal argument must have the same subject for the argument to work, could equally be applied to pro rata argument as to a crescendo, since it is an arbitrary rule of Judaic logic without formal support in generic logic. Therefore, our above analysis of the Gemara would not be greatly affected if we assume it to refer to pro rata instead of to

a crescendo argument. This is not a very important issue, but said in passing.

2. MORE ON A FORTIORI IN THE TALMUD

Drawn from A Fortiori Logic *(2013), chapter 8.*

The present chapter is a continuation of the preceding, aimed at further clarifying some details.

1. Natural, conventional or revealed?

Our above critique of the Gemara was based to some extent on the assumption that it considers *dayo* as a principle, which the Sages regard as a hard and fast rule and R. Tarfon views as a conditional rule, depending on whether or not its application "defeats the purpose of the *qal vachomer*." But in truth, the idea of *dayo* as a "principle" may be an interpolation, because the original Aramaic text (viz. "ור"ט לית ליה דיו והא דיו דאורייתא הוא") does not use the word "principle" in conjunction with the word "*dayo*."

The translation given in the *Soncino Babylonian Talmud* (viz. "Does R. Tarfon really ignore the principle of *dayo*? Is not *dayo* of Biblical origin?") does of course use this word. But if we look at the *Talmud Bavli* translation (with their running commentary here put in square brackets), viz. "And does R' Tarfon not subscribe to [the principle of] 'It is sufficient…' – Why, [the principle of] 'It is sufficient…' is contained in the [Written] Torah, [and R' Tarfon must therefore certainly accept it!]" – it becomes evident that the word "principle" is an add-on. This of course does not mean that it is unjustified, but it opens possibilities.

If we do accept the translations, it is clear that the word "principle" is here equivocal, anyway – granting that for the Sages it means a universal proposition whereas for R. Tarfon it means a merely conditional one. This equivocation implies that the positions of the two parties are not as harmonious as the

Gemara tries to suggest. They do not agree on principle and merely differ on matters of detail, as it were. On one side, there is a hard and fast rule; and on the other, one that is subject to adaptation in different situations. This is a radical difference, which is hardly diminished by assuming the "principle" to be of Biblical origin.

In view of this, it is difficult to guess what might be the Gemara's purpose in positing that the *dayo* principle is *deoraita* (of Biblical origin – as against *derabbanan*, of rabbinic origin) and is known and essentially accepted by R. Tarfon. Moreover, as we have exposed, the Gemara's scenario for R. Tarfon's thesis is forced and untenable, being based on doubtful readings of the Torah and Mishna texts it refers to and, worst of all, on a parody of logic. Certainly, the Gemara's scenario does not prove the claim of Biblical origin. If anything, that claim is weakened by virtue of having been supported by such rhetoric. But is the claim now disproved, or can it be supported by other means?

The Gemara is, of course, correct is in linking the issue of Biblical origin with that of R. Tarfon's knowledge and acceptance. If the principle is of Biblical origin – i.e. is given in the Written Torah, or (since it is not manifest in the Pentateuch) at least the Oral Torah – it must be assumed to be known and accepted by him, as well as by the Sages. If he did not know and accept it, but only the Sages did, it cannot be of Biblical origin. However, I do not see how the Gemara can claim a different understanding of the *dayo* principle of Biblical origin for R. Tarfon than for the Sages. What would be the common factor between their views, which would be a "principle" of Biblical origin? The difference between universal and only-conditional applicability is too radical; these two theses are logically contrary. Their only possible intersection is that valid *dayo* objections may occur. This is hardly enough to constitute a "principle," although we might in the limit grant it such status.

On the other hand, it would be quite consistent to say that the Sages and R. Tarfon *both* believe in a *dayo* principle of Biblical origin that is *only conditionally* applicable, but only differ with regard to the precise conditions of its application. Thus, the Biblical origin hypothesis remains conceivable, provided the word "principle" is understood in its softer sense, in such a way

that debate is logically possible in particular cases, so that R. Tarfon might win in some cases and the Sages in other cases. The *dayo* principle would then consist in the bare fact that "some *dayo* objections are justifiable, though some are not;" and its being of Biblical origin would mean that this vague, contingent prediction was given at Sinai. Such conceivability does not of course prove that this much-reduced *dayo* principle was indeed of Biblical origin. Nor does it explain why the Gemara tried so hard to establish it as such. But it at least leaves the hypothesis in the running, so long as no other plausible reasons are found to discard it.

As mentioned at the end of our analysis of the Mishna, there are yet other equally viable hypotheses. We can still uphold the conflict between the Sages and R. Tarfon to be one between a hard and fast view of the *dayo* principle and an only-conditional view of it, *provided* we do not claim this principle to be of Biblical origin, but only of rabbinic origin (*derabbanan*). In the latter case, the Sages are collectively in the process of legislating the *dayo* principle in our Mishna, and though R. Tarfon initially tries to argue against this innovation by means of his two arguments, at the end he is forced to accept the majority decision. This scenario is equally consistent, and to my knowledge the Gemara offers no reason for dismissing it.

In this context, we could suggest that the *dayo* principle being "of Biblical origin" means, not that is was explicitly mentioned in or logically deduced from the Torah, but simply that something to be found in the Torah *inspired* the rabbis to formulate and adopt this principle. We might even propose (this is pure speculation on my part) the inspiration to have come specifically from Deuteronomy 4:2[80], which reads: "Ye shall not add unto the word which I command you, neither shall ye diminish from it." It could well be that the rabbis, consciously or otherwise, saw in this warning of the Torah a justification for the cautiousness called for by their *dayo* principle. In that event, both R. Tarfon and the Sages obviously agreed regarding the

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80 Likewise, Deut. 13:1.

truth of the inspiring Torah passage, but they differed as to how far the inspiration should be allowed to go. The *dayo* principle is not, in either case, precisely deducible from the said Torah passage, but a relation of sorts between the two can be claimed. The rabbinical principle, however broadly understood, is not in ‘the letter of the law’, but it is surely in ‘the spirit of the law’.

Another possibility is that there is no *dayo* principle, whether universal or conditional, at all, but each recorded *dayo* objection stands on its own as an *individual* rabbinical decree, for whatever reason the rabbis consider fit. This too can be used to explain the disagreements between R. Tarfon and the Sages in a consistent manner. This hypothesis logically differs very little from the above mentioned one of a conditional *dayo* principle, except in that the conditional *dayo* principle scenario implies an explicit Divine prediction at Sinai, whereas the no *dayo* principle scenario assumes no specific Sinaitic transmission on this topic (even if the general authority of the rabbis to judge and maybe innovate may have there been explicitly established). Here again, then, we have a consistent alternative hypothesis that the Gemara did not take into consideration and eliminate, before affirming its own thesis.

The methodology of the Talmud is of course essentially dogmatic. It engages in discussions and arguments, usually genuinely logical; but it does not go all the way with logic, systematically applying its techniques and referring to its results. It accepts some arbitrary ideas. This here seems to be a case in point, where the Gemara seeks to prove some preconceived notion and does everything it can to give the impression that it has. But we must always consider alternatives and evaluate them fairly.

The issue we will explore now is whether the *dayo* principle is to be regarded as natural, conventional or revealed. By ‘natural’ I mean that it is a law of nature, i.e. more specifically of logic or perhaps of natural ethics. By ‘conventional’ I mean that it is a collective decision of the rabbis, or more generally of human authorities, for whatever motive. And by ‘revealed’ I mean here that it is Divinely-decreed, handed down to us through prophecy or other supernatural means; i.e. more specifically, primarily at

the Sinai revelation through Moses, and then written in the Torah or passed on orally through an unbroken tradition.

We have, I believe, definitely established in our above treatment that the *dayo* principle is not a law of logic. Many people have thought of it – and for a long time, I must confess, I too did so – as signifying that the (predicate of the) conclusion of (purely) a fortiori argument cannot quantitatively surpass the (predicate of the) minor premise. The *dayo* principle, in that view, corresponds to the principle of deduction, i.e. to a reminder that you cannot get more out of it than you put into it. In that perspective, I used to think the rabbis collectively instituted the *dayo* principle in order to prevent *other people* from erroneously drawing a 'proportional' conclusion from purely a fortiori premises. I was misled into this belief, perhaps, by the fact that rabbinical a fortiori reasoning is *in practice* usually correct, and also by the fact that the mentions of *qal vachomer* in the lists of Hillel and R. Ishmael do not mention the *dayo* principle as a separate hermeneutic rule, and therefore apparently consider the latter as an integral part of the former's structure, which though it can be distinguished from it cannot correctly be dissociated from it.[81]

But as we have demonstrated in the present study the *dayo* principle is something much more complex than that. However, although this principle is not a natural principle in the sense of a law of logic, it might still be considered as a natural principle in the sense of a truth of ethics in a secular perspective. If we were to consider it as such, we would have to say that when the rabbis apply it, they are merely expressing their moral sensibilities as ordinary human beings. In that event, we would have to say that the *dayo* principle is applicable not only in legal contexts peculiar to the Jewish religion, but in all legal contexts, whether Jewish or non-Jewish, religious or secular. But the latter does not seem true – certainly, if we look at legal rulings in other

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[81] To tell the truth, I had inexcusably, at the time I wrote JL, not actually studied this Talmudic *sugya*, but instead took for accurate what other commentators said about it. I was at the time much more naïvely trusting than I am today!

traditions, the idea of *dayo* hardly if at all arises. So, this idea seems to be a particularly Jewish (indeed, rabbinical) sensibility.

Thus, the *dayo* principle should rather be viewed as either conventional or revealed. As we have seen, contrary to what the Gemara insists, there is no incontrovertible proof that it is revealed. It may be "of Torah origin" in a broad sense, in the sense of "of Sinaitic origin." But it is clearly (for any honest observer) not explicitly stated in the Written Torah; so, it must be assumed to be part of the Oral Torah. Of course, the Gemara does seem to be claiming this principle to be logically derived from Num. 12:14-15 – but as we have seen, this 'proof' is unfortunately circular: it is read into the text rather than out of it. This means that the only way we know that the principle is "of Torah origin" is because the rabbis (led by the Gemara) *tell* us that it is. Such assertion is considered by the rabbis as sufficient proof that the alleged tradition is indeed Sinaitic. But scientifically it is surely not sufficient, as all sorts of things could have happened in the millennia in between.

Thus, while in the first instance (*lehatchila*) the rabbis would affirm the principle as derived from the Written Torah, if they are pressed hard enough they would probably as a last resort (*bedieved*) opt instead for the Oral Torah explanation. But, to my mind at least, this is logically equivalent to saying that the rabbis are the effective source of the principle. That is, it is *derabbanan*, and not at all *deoraita*. For we only have their say-so as proof of their assertion. Of course, it is still conceivable that the principle was indeed handed down at Sinai – we have not disproved that, and have no way to do so. But, as there is no way (short of a new revelation) to prove it, either, this conceivable scenario remains a mere speculation. So that the logical status of the principle is pretty much exactly the same as if the rabbis had simply conventionally decided to adopt it. This is the conclusion I adopt as a result of the present study: the *dayo* principle is of rabbinical origin.

To conclude, it is not clear why the Gemara makes such a big thing about the "Biblical origin" of the *dayo* principle, even going so far as to construct fictitious inference rules and arguments to prove its point. Did the Gemara have some halakhic purposes in mind, or was it just engaging in idle chatter

(*pilpul*)? As we have seen, the Mishna can well be understood – indeed, in a number of ways – without pressing need to resolve the issue of the origin of the *dayo* principle. Why then is the Gemara's commentary so focused on this specific issue, ignoring all other aspects? Perhaps it needs the proposition that the *dayo* principle is "of Biblical origin" for some other purpose(s), elsewhere. Not being a Talmudic scholar, I cannot answer this question. But in any event, to my mind, whatever the Gemara's motives may have been, it failed miserably in this particular discourse.

Moreover – let us not forget this fact – when the Gemara refers to the *dayo* principle, it means just the first expression of that principle, as it is applicable to R. Tarfon's first argument. The Gemara has not shown any awareness of the existence and significance of R. Tarfon's second argument, and therefore of the difference in the Sages' *dayo* objection to it. Thus, even if it had succeeded to prove somehow that the Sages' first *dayo* objection was "of Biblical origin," it would not have proven that their second objection was of equally elevated origin. This, too, is a disappointment concerning the Gemara: its powers of observation and analytic powers were here also less acute than they ought to have been.

We have thus far considered the issue of the origin of the *dayo* principle, but now let us look into that of *qal vachomer*. It is worth noting for a start that *qal vachomer* and the *dayo* principle are viewed by the Gemara as two distinct thought processes. The *dayo* principle is applied ex post facto, to the conclusion of a preexisting *qal vachomer*. The *dayo* principle (presumably) cannot be invoked until and unless a *qal vachomer* is formulated. If the *dayo* principle is not applied (as is possible in R. Tarfon's view, according to the Gemara), the *qal vachomer* stands on its own. Thus, *qal vachomer* inference is independent of the *dayo* principle, even if the latter process is not independent of the former. Therefore, claiming that the *dayo* principle is "of Biblical origin" does not necessarily imply a claim that *qal vachomer* inference is also so justified. It may thus well be a natural process, if not a rabbinical convention.

In this context it is interesting to note that, in the lists of hermeneutic principles of Hillel and R. Ishmael, the *dayo*

principle is nowhere mentioned, but only *qal vachomer* is mentioned. Since *qal vachomer* can occur, according to the Gemara, without the *dayo* principle, why is the latter not mentioned also as a separate hermeneutic principle? And if the *dayo* principle is "of Biblical origin," as the Gemara has it, should it not all the more be mentioned in such lists? Conversely, if *qal vachomer* is a natural thought process, why does it need to be mentioned is such lists? Perhaps the answer to these questions is simply that the term "*qal vachomer*" in these lists is intended as an all-inclusive title, meaning "anything to do with *qal vachomer*, including on occasion application of the *dayo* principle." Since, whatever the source of *qal vachomer*, whenever it is mentioned the question arises as to whether or not the *dayo* principle is applicable to it, the former always brings to mind the latter. Moreover, the traditional view seems to be that the *dayo* principle is only applicable to *qal vachomer*, so this question will not arise in other contexts.

In the Mishna, there is no explicit reference to the issue of the origin of the inference processes used. No explicit claim is made by anyone there that the *dayo* principle is "of Biblical origin" or any other origin; and nothing of this sort is said of *qal vachomer*. If we look at R. Tarfon's wording, we are tempted to say that he regards his reasoning as natural. When he says: "I infer horn from foot" and "does it not stand to reason that we should apply the same strictness to horn?" – he seems to be appealing to logic rather than to some dogmatic given; and furthermore, by saying "I" and "we," he seems to suggest that the decision process is in human hands. The Sages do not in their replies reprove him for this naturalistic approach; but they merely, it seems, say what they for their part consider to be a wiser ruling.

For the Gemara (i.e. the particular Gemara commentary that concerns us here, and not necessarily the Gemara in general), as we have seen, "*qal vachomer*" is understood as referring specifically to a crescendo argument, i.e. to a fortiori argument with a 'proportional' conclusion. The Gemara bases this understanding on the *baraita* it quotes. It does not mention purely a fortiori argument, which suggests that it is not aware of such form of argument. This is of course an important error on its part, because without awareness of the difference between

purely a fortiori argument and a crescendo argument it cannot realize the logical skill of R. Tarfon's second argument and the challenge it posed to the Sages' first formulation of the *dayo* principle. The Gemara's blindness to purely a fortiori argument explains its blindness to R. Tarfon's second argument.

Even so, it is safe to say that the Gemara considers *qal vachomer* as natural in origin. Certainly, it does not explicitly state it to be "of Biblical origin," as it does for the *dayo* principle. Although the Gemara's assumption that Num. 12:14-15 contains an example of *qal vachomer* is reasonable, this Torah passage certainly does not use any verbal expression indicative of it, like "*qal vachomer*" or "all the more;" so, human insight is needed to see the implicit *qal vachomer*. The Gemara cannot be said to regard *qal vachomer* as a conventional construct by the rabbis, since the argument is in its view already found in the Torah. Since the Gemara does not even raise the issue (though it could and should have), it may be supposed to regard *qal vachomer* as ordinary human reasoning.

We might, however, suppose that the Gemara considers that the Miriam example is also given in the Torah to teach us that the correct conclusion of *qal vachomer* is 'proportional' – i.e. that this rule of inference was Divinely-ordained together with the *dayo* principle. But such a supposition is objectively nonsensical, since a fortiori argument is in fact *not* universally 'proportional'. It would suggest that God, well after the Creation, may tell us to disregard logic and judge contrary to its laws. Yet, the laws of logic are not arbitrary dictates that can be discarded at will – even at Divine will – they are inextricably tied to the world as it is and our rational cognition of it. Therefore, to attribute such opinion to the Gemara would be to its discredit.

If we look at the three other a fortiori arguments in the Pentateuch listed in *Genesis Rabbah*, there is as in the Miriam instance no explicit 'proportionality', but we could in two of them at least similarly assume implicit 'proportionality', namely Ex. 6:12 and Deut. 31:27. Moreover, there is one passage in the Pentateuch that is explicitly 'proportional', namely Gen. 4.24: "If Cain shall be avenged sevenfold, truly Lamekh seventy and

seven-fold"[82] — but the speaker of this statement being Lamekh, someone apparently not regarded as exemplary, it can hardly be considered as halakhically authoritative. There are also many passages in the rest of the Bible that seem either explicitly or implicitly 'proportional', and so could be brought to bear in the present context. But the Gemara does not (at least, not here) find it necessary to mention any of them.

Thus, it is reasonable to suppose that the Gemara views *qal vachomer* (or at least its 'proportional' version) as natural argumentation – i.e. as not needing a special Divine dispensation to be credible. In other words, it is purely logical. In Talmudic terminology, this would qualify *qal vachomer* as a sort of *svara*, an inference naturally obvious to human reason. This seems to be the way most rabbis throughout history would characterize the argument. Certainly, most of the exceptional rules and dispensations they have enacted in relation to this argument form suggest it; although the fact that some have tried to interdict its free use suggests a doubt in their mind in this regard.

But even though *svara* refers to natural and universal logical insight, *qal vachomer* is always counted as one of the "*midot*," i.e. of the rabbinical hermeneutic principles. There is a difficulty in this fact, because a hermeneutic principle is thought of as a discursive tool (ordained directly by God or indirectly by rabbinical decision) for use specifically in Torah interpretation. Such principles being essentially non-natural, they may well be *not* rationally evident or even perhaps *contrary to* logic. Not so in the case of *qal vachomer*. So, there is a problem with its inclusion in the lists of *midot*. The solution of this paradox, I would say, is simply that the rabbis themselves did not make such fine distinctions between natural and conventional logic. Or equally well: they could lump *qal vachomer* with more

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[82] This passage is not included in the *Genesis Rabbah* listing of ten cases of *qal vachomer*, but is mentioned in Rashi's commentary. According to Jacobs in his *Rabbinic Thought in the Talmud* (p. 116) this instance is mentioned in much earlier rabbinic texts: "*Avot de-Rabbi Nathan* (version B) 44; Gen. Rabbah 4:24 (ed. Theodor-Albeck, p. 225) and the Jerusalem Talmud *Sank.* 10:1 (27d)."

uncommon forms of reasoning, because in their minds all are "logical." This is indeed suggested in many rabbinical texts in English, where the word "*midot*" is translated as "principles of logic."

2. Measure for measure

The Gemara perhaps sought to justify the *dayo* principle by claiming it to be "of Biblical origin" – but there was no pressing need for it to do so, since other explanations were readily available and perhaps less problematic. It seems that the Gemara, not having previously analyzed *qal vachomer* reasoning in formal terms, was unable to precisely perceive its constituent premises, and under what conditions they resulted in this or that conclusion; and thence, how such an argument could be rebutted. In the Gemara author's mind, therefore, apparently, the status of a Divine decree ("Biblical origin") was necessary for the *dayo* principle to have the power to rebut the *qal vachomer* argument (as he saw it).

As we have shown, the two arguments proposed by R. Tarfon and the *dayo* objections to them put forward by the Sages can be interpreted in a number of ways. R. Tarfon's two arguments could have been (1) intended as two mere arguments by analogy (more precisely, pro rata); or (2) the first one may have been pro rata, while the second was (purely) a fortiori; or (3) they could (as the Gemara did) both be construed as having been a crescendo. The Sages' *dayo* statements, could be viewed as (a) particular ad hoc objections, decided by the rabbis collegially; or (b) as general objections, either (i) clearly given in the Written Torah or deduced from it (as the Gemara wrongly claims); or (ii) inductively or rhetorically derived from it (as the Gemara actually attempted); or (iii) known from the Oral Torah (i.e. by unbroken tradition since the Sinai revelation); or again (iv) decided by the rabbis.

If we said that R. Tarfon's first argument was purely a fortiori, we would thereby imply that he did not know how to reason correctly in the a fortiori mode; nevertheless, if he did so reason incorrectly, the Sages' *dayo* objection to his argument would in

that event be equivalent to the principle of deduction, interdicting a 'proportional' conclusion from the given premises. Many commentators have so interpreted the debate, but in truth they did so without paying attention to R. Tarfon's second argument, which could also be considered as purely a fortiori and yet be free of the Sages' same objection. So, this hypothesis is farfetched and unconvincing, and best brushed aside.

More probably, R. Tarfon put forward his first argument in pro rata or a crescendo form; and the Sages objected "*dayo*" to it in particular or in general, as already said. The purpose of this objection was to annul the premise of 'proportionality' inherent in R. Tarfon first argument. R. Tarfon, being an intelligent man, got the message and proposed instead a neat second argument, which was not subject to the same rebuttal, for the simple reason that whatever its form (pro rata, a crescendo *or purely a fortiori*) it yielded one and the same seemingly 'proportional' conclusion. Nevertheless, the Sages again objected "*dayo*" to it, in particular or in general, in exactly the same terms. By so doing, the Sages enlarged the meaning of their *dayo* objection, since it could here only refer to the generalization process preceding the deduction, since annulling the premise of 'proportionality' was useless.

As earlier explained, the principle of deduction is that the putative conclusion of any deductive argument whatsoever must in its entirety follow necessarily from (i.e. be logically implied by) the given premise(s), and therefore cannot contain any information not found explicitly or implicitly in the said premise(s). If a putative conclusion contains *additional* information and *yet seems true*, that information must be proved or corroborated from some *other* deductive or inductive source(s). This principle is true not only of valid a fortiori argument, but of all other valid forms of deductive argument, such as for instances syllogism or dilemma. Inference in accord with this principle is truly deductive. Inference not in accord with this principle may still be inductively valid, but is certainly not deductively valid.

It seems evident that when the Gemara says "a fortiori" (*qal vachomer*) it means a crescendo. Yet the Gemara does not clearly acknowledge the implications of such an assumption (at least not in the *sugya* under scrutiny). To be fully credible, the

Gemara should have demonstrated its understanding that the arguments it characterized as a fortiori were not purely so, but involved an additional premise, one which establishes a pro rata relationship between the subsidiary and middle items. The issue is not merely verbal, note well, but depends on acknowledging a logical precondition for validity. Unfortunately, (to my knowledge) the Gemara nowhere explicitly acknowledges this crucial precondition. Nevertheless, we can generously suppose that the Gemara unconsciously or tacitly intends it, and move on. Our inquiry must now turn to the question: What is the required additional premise, in more concrete terms?

The tacit premise. It is a principle of justice (perhaps even the essence of it) that: *on the positive side, the reward ought to fit the good deed and be commensurate with it; and on the negative side, the punishment ought to fit the wrongdoing and be commensurate with it*. If these conditions are not fulfilled, justice has not been entirely served. This principle is in accord with our natural human 'sense of justice'. It is an insight which cannot be proved, but which expresses (at least in part, if not wholly) what we commonly mean by 'justice'. It is the basis of many laws legislated by mankind and guides many courts of law (namely, those that are characterized as 'just') in their deliberations and their rulings. For examples, a greater penalty is incurred by armed bank robbery than by shoplifting; or by premeditated murder than by murder in a moment of passion. In this negative guise, the principle of justice is known (in Latin) as the *lex talionis*, or law of retaliation.

Of course, the 'sense of justice' is not something literally 'sensory', but rather something 'intuitive', an insight of sorts. We know from within ourselves what is just and what is not. Of course, such knowledge is mere opinion that has to be confirmed over time using inductive techniques. We individually may see things differently at different times; and different people may see things differently. The sense of justice may be honed by use or blunted by disuse. It may be influenced by surrounding culture, whether incidentally or by deliberate propaganda. All the same, even though this faculty can be put to sleep or smothered, swayed or manipulated, each of us (as a being capable of

personally suffering in a similar situation) does have an underlying sense of justice.

Of course, it is not always easy to intuit, much less demonstrate indubitably, what is 'fitting' and 'commensurate' reward or punishment. Justice is not an exact science. In Judaism, where this principle is known as ***midah keneged midah*** (meaning: measure for measure), the right measure is determined either by Divine fiat or by rabbinical decision; in the latter case the wisdom of the rabbis being assumed to be above average. I have not seriously researched the issue as to when this principle began to play an explicit role in rabbinical decision making, but I assume it was very early in view of its implicit presence in many stories and commandments of the Jewish Bible (Torah and Nakh).

The story of Miriam's punishment for criticizing Moses, which the Gemara focuses on so insistently, is a case in point. In the Mishna debate, it is obvious that R. Tarfon's two arguments are motivated by the measure for measure principle, even though not in so many words, but in the background, pre-verbally. Some commentators see the statement by God in Gen. 9:6, "Whoso sheddeth man's blood, by man shall his blood be shed," as the Biblical precursor of the measure for measure principle, even though it is more specific, in view of its symmetrical format (shed blood justifies blood shedding). The value and importance of justice in Judaism may be seen, for instance, in the Deut. 16:20 injunction: "Justice, justice shalt thou pursue."

As regards stories, an illustration often appealed to, of God's *practice* of 'measure for measure', is the correspondence between the crimes of the Egyptians against the Israelites and the punishments that later befell them; for example: they wanted to drown the babies (Ex. 1:22) – their army was drowned in the sea (Ex. 14:28). In Joshua 7:25, "Why hast thou troubled us? Hashem shall trouble thee this day," a 'tit for tat' is clearly implied. The principle is well-nigh explicit in 2 Samuel 22:24-28; for instance, in v. 26, David says: "With the merciful Thou dost show Thyself merciful, with the upright man Thou dost show Thyself upright." Or compare Proverbs 1:11 and 1:18. Many examples of such reciprocity can also be found in the

Talmud; see for instance *Sotah* 8b-11b. The concept is certainly older than the name attached to it.

I have not to date managed to find out when and where the exact Hebrew phrase "*midah keneged midah*" first appears. But I found a Mishna (*Sotah* 1:7) with very similar words: "By the measure that a man measures, so is he measured (במדה שאדם מודד בה מודדין לו, *bemidah sheadam moded bah, modedin lo*)"[83]. The meaning is admittedly not literally identical, since 'measure for measure' is understood to mean more broadly that the way a man behaves determines his recompense. However, if we understand "the measure that a man measures" as signifying the thoughts which determine his behavior, and "so is he measured" as referring to the Divine judgment in consequence of his actions, which determines his recompense, the two ideas may be pretty well equated.[84]

On the basis of this equity principle, it appears reasonable to us (for instance) that someone who has offended God deserves *more* punishment than someone who has merely offended a human being even if the latter be one's own father. On this basis, then, it appears reasonable to us that, in the episode narrated in Num. 12:14-15, Miriam should indeed, as the Gemara suggests, theoretically *deserve* a penalty of (say) fourteen days isolation instead of just seven days. The fourteen is perhaps just an illustrative number, because surely offending God deserves

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[83] This concerns a suspected adulteress. The Mishna goes on, giving examples: "She adorned herself for a transgression; the Holy One, blessed be He, made her repulsive;" etc. And the corresponding Gemara starts with: "R. Joseph said: although the measure has ceased, [the principle] in the measure has not ceased." I found this passage thanks to Jacobs, who quotes it in his *Rabbinic Thought in the Talmud* (p. 78, fn. 1). I had previously by chance found this maxim in the *Mekhilta de Rabbi Ishmael* (*Beshallach,* 1); but this Midrash is a later document, thought to date from the 3rd century.

[84] In Oriental religions, of course, the 'measure for measure' principle is expressed as the 'law of karma'. This is a more mechanical version than the Judaic principle, which clearly involves Divine intervention and thus distinctively allows for eventual exceptions, i.e. reduced punishment or increased reward out of Divine love.

more than double the punishment due for offending one's father. Indeed, even the seven days penalty in the latter case is an arbitrary number – in this case, a Divine decree – so the fourteen days penalty is bound to be so too.[85]

Clearly, the Sages' *dayo* principle is *not* a redundant restatement of the principle of deduction for a fortiori argument, as it might sometimes appear to be; nor does it have any other purely logical purpose. Rather, it serves an important additional, more *moral* purpose. We could imagine that the Gemara tacitly agrees that, in the Miriam example, the *qal vachomer* by itself (*per se*) can only logically yield the conclusion of seven days. But in the present case, even though this is not explicitly said anywhere, the *qal vachomer* is not 'by itself': it happens (*per accidens*) to be accompanied by an expectation of fourteen days based, *not* on formal grounds relating to purely a fortiori inference, but on the principle of justice that we have just now enunciated.

The *dayo* principle then comes to teach us: ***even in a case like this, where a greater penalty is expected due to implications of the principle of justice, the rabbinical conclusion (i.e. the law, the halakha) should not diverge from the quantity given in the Torah-based premises, whether such premises are used to draw a conclusion by mere analogy or by a fortiori argument or any other inductive or deductive means.*** The use of inference should not end up concealing and exceeding the penalty amounts mentioned in the premises given by Scripture. Such quantities should be understood as *davka* (as is), and not used for extrapolations however just those might seem based on human reasoning. The *dayo* principle is then, as the Gemara suggests, "Biblical," if only in the sense that it advocates strict adherence to Biblical givens whenever penalties are to be inferred, whether by deduction or by induction.

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[85] Actually, there are explanations of these specific numbers in later commentaries, but I won't go into them here, so as not to complicate matters unduly. (E.g. one explanation refers to the fact that 7 days is the minimum period of quarantine in the event of leprosy, so that another 7 days is the least possible additional period of quarantine.)

The motive of the Sages seems obvious enough: the *dayo* principle is essentially a precautionary measure, enacted to avoid human errors of judgment in processes of inference in legal contexts. When a human court condemns an accused to some penalty, it is taking on a very serious responsibility. If that penalty is Divinely-ordained, i.e. explicitly written in the Torah, the responsibility of the human judges is limited to whether or not they correctly subsumed the case at hand to a given set of laws. Whereas, if the judges add something to the given penalty, on the basis of some 'proportional' reasoning, they are taking an additional risk of committing an injustice. So, it is best for them to stick to the Torah-given penalty.

It is interesting to note the comment by R. Obadiah Sforno (Italy, 1475-1550), regarding the principle of "an eye for eye" in Exodus 21:23-25, that "strict justice demanded the principle of measure for measure, but Jewish tradition mitigated it to [monetary] compensation to avoid the possibility of exceeding the exact measure."[86] This suggests that the idea of compensation was instituted in that context to prevent eventual *excess* in the application of physical retribution – which, of course, would not be justice, but injustice[87]. We may refer to this idea to perhaps better understand and justify the *dayo* principle. In instituting this principle, the rabbis were not merely "tempering justice with mercy," but also making sure that there would not be occasional occurrences of injustice, by mistake or

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[86] I am here quoting the paraphrase of Sforno's comment given in *The Soncino Chumash* (ad loc.), not Sforno directly.

[87] It is interesting that, in Shakespeare's *The Merchant of Venice* (Act IV, Scene 1), the Italian Jewish protagonist, Shylock, is refused the "pound of flesh" he had contracted for on the basis that he might inadvertently take more than that (namely, some blood with the flesh). So, it seems, ironically, that the legal principle Shakespeare appealed to might have been formulated a few decades before him by… an Italian Jew, i.e. Sforno! (Indeed, according to a Wikipedia article, Shakespeare's play was written in 1596-98, and this and other elements of it are based on a tale by Giovanni Fiorentino called *Il Pecorone,* published in Milan in 1558. Sforno died in 1550.)

due to excessive zeal. It was, at least in part, a precautionary measure.[88]

Viewed as a restraint on 'proportional' inference, the Sages' *dayo* principle is not a principle of logic, but a merely hermeneutic principle inclining rabbinical judgment to mercy. It is not intended to regulate the *qal vachomer* inference as such, but rather to restrict a parallel application of the principle of justice – or perhaps more accurately put, a parallel intuition from our 'sense of justice'. The Sages are telling us: although our human sense of justice produces in us an expectation that (to take the Gemara's example) Miriam deserves (say) a fourteen days penalty, nevertheless God mercifully decreed (in the Torah) only seven days penalty for her. On the basis of this exemplary decree in the Biblical story of Miriam, Jewish legislators and law courts must henceforth *always* judge with the same restraint and limit the concluding penalty to the penalty given in the premise, *even when* the principle of justice would suggest a more severe punishment.

This is surely the real sense of the Sages' *dayo* principle: they were not reiterating any law of logic, but setting a limitation on the principle of justice. And now, having perceived this, we can understand many things in this Talmudic *sugya*. We can understand why the Gemara would wish to establish that the *dayo* principle is Divinely-decreed. For it might seem unjust to restrict application of the principle of justice; it might be argued that the conclusion of a strict deduction is as reliable as its premises. Moreover, we can see how it is conceivable that, as the Gemara has it, R. Tarfon can differ from the Sages' view and

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[88] There is of course some tension between what I said a bit higher up, about the *dayo* principle being "Biblical," if only in the sense that it advocates strict adherence to Biblical givens etc., and Sforno's suggestion that "eye for eye" was mitigated to monetary compensation. But, in the latter case, the literal reading of the Biblical law is looked upon as metaphorical and is replaced by a less harsh reading; whereas, in cases of *dayo*, the literal reading is not discarded, but proportional inferences from it are disallowed, so as to prevent harsher practices. These are two clearly very different treatments of Biblical text by the rabbis.

ignore the *dayo* principle in some situations. For no law of logic is being ignored or breached thereby, but only a moral principle; and a moral principle is logically more flexible, i.e. it may apply differently to different situations.[89]

Other angles. The *dayo* principle as above presented is designed to prevent the rabbis from ruling too severely. What of rulings that are too lenient, we might ask? Surely, ruling too leniently can conceivably be a problem. Justice is not served if criminals are not punished as they deserve (as indeed unfortunately often happens in practice in present day society). Too much leniency can be a bad thing for society, just as too much severity often is. So, the *dayo* principle ought conceivably to forbid excessive mercy, as well as excessive justice.

If we think about it, measure for measure is essentially a principle of justice rather than one of mercy. By definition, mercy is intended to temper strict justice. It is not measure for measure, but beyond measurement. Justice is logical, while mercy is humane. Logically, the judgment should be so and so; mercy mitigates the conclusion. Mercy is surely desirable; but excessive mercy would obviously constitute injustice. Overdoing it would be negation of measure for measure! Thus, the right balance is needed. Arguing thus, we might easily advocate that the *dayo* principle is applicable to inferences that increase leniency, as well as to those that increase severity.

But my impression from rabbinic discourse generally is that the *dayo* principle is always intended as a principle of justice, and not occasionally as a principle of mercy. The rabbis are not so

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[89] For my part, I must confess that I originally believed the *dayo* principle to be a rabbinical statement of the principle of deduction, proposed specifically for *qal vachomer* only because such argument was for the rabbis the very essence of deductive reasoning. This is essentially the position I took in JL, although I also there considered that proportionality was still possible though a separate act of reasoning (whether deductive or inductive). But now, having realized this more accurate interpretation of the *dayo* principle, as applicable to *any* extrapolation attempted on the basis of *midah keneged midah* on the products or preliminaries of *qal vachomer* (or any type of reasoning with similar effect), I definitely opt for this latter hypothesis.

worried about irrational bursts of magnanimity; they are worried about inflicting undeserved punishment.

There is another objection that can be raised to our moral interpretation of the *dayo* principle. It seems reasonable enough in the present *negative* legal context, where the *qal vachomer* has as its conclusion a punishment for a wrongdoing. But what of equivalent *positive* legal contexts, where the *qal vachomer* has as its conclusion a reward for a good deed? Surely, the rabbis cannot here say that it is merciful to diminish the reward's proportionality. Also, what of non-legal contexts, when the *qal vachomer* is constructed in pursuit of a factual conclusion – do the rabbis simply ignore the *dayo* principle in such cases? The question is, then: how general is the Sages' *dayo* principle, or rather: what are the limits of its application?

The answers to these questions are, I think, broadly speaking, as follows. Jewish law, like most law systems, is essentially concerned with sanctions for wrongdoing rather than with rewarding good deeds. For this reason, only the negative side of the measure for measure principle is relevant to the rabbinical legislative process, and applications of the *dayo* principle occur only in relation to penalties. I doubt that any legalistic a fortiori argument with a conclusion of reward occurs in Jewish law; but if any indeed does, and the principle of measure for measure seems applicable, I very much doubt that the rabbis would block, on the basis of the *dayo* principle, the inference of increased or decreased rewards.

As regards a fortiori arguments in homiletic and other non-legal contexts, I do believe the *dayo* principle is indeed ignored in practice. It is admittedly sometimes apparently used – but such use is rhetorical. In other contexts, maintaining the a crescendo conclusion may be preferred. Since the principle has no binding legal impact either way, the decision to use or not-use it depends entirely on what the speaker wishes to communicate.

All the above comments circumscribing use of the *dayo* principle are of course mere personal impressions and educated guesses; they are open to discussion. They would have to be justified empirically, by thorough systematic research through the whole Talmud and indeed all Jewish law literature. Until

such data is gathered by scholars, and fully analyzed by competent logicians, we cannot answer the said questions with much greater precision and certainty than just done. Nevertheless, by asking questions and proposing answers, we have at least raised issues and sketched possible results. It would, of course, be interesting and valuable to find rabbinical statements that clearly justify what has been said.

3. The dayo principle in formal terms

We shall here review our new interpretation of the *dayo* principle in more formal terms. This is done with reference to Mishna Baba Qama 2:5, where the principle is traditionally given pride of place, first dealing with the Sages' objection to R. Tarfon's first argument, and then with their objection to his second argument. As already seen, these are two distinct expressions of the *dayo* principle, although they have a common motive. The corresponding Gemara in Baba Qama 25a, as we saw, only seems to have noticed the first version of the *dayo* principle; but later commentators (notably, it seems, Rashi and Tosafot) did notice the second[90]. We shall show here more precisely why the Gemara's view is inadequate.

A further reason why we wish to now investigate the *dayo* principle in more formal terms is because both formulations in the Mishna relate specifically to the positive subjectal form of a crescendo argument. Nothing is there said of eventual applications to the negative subjectal form, or to the positive or negative predicatal forms. Our purpose here is to consider theoretically what such other applications would look like. Whether such other applications actually occur or not in the Talmud (or other rabbinic literature) is not the main issue, here; but it is abstractly conceivable that they might occur. In any case,

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[90] These later commentators generously project their insights onto the Gemara; but this is of course anachronism, motivated by their wish to claim a continuity of tradition.

we are sure to clarify our concept of the *dayo* principle by this enlarged research.

Let us to begin with deal with **the Sages' *dayo* objection to the first argument of R. Tarfon**. Here, R. Tarfon tried to infer a liability of full payment for damage by horn on private property (conclusion), from a liability of half payment for damage by horn on public property (minor premise). He was thus presumably using a crescendo argument, of positive subjectal form, as follows:

> Action P is a more serious breach of a certain law (R) than another action Q is.
>
> Action Q is a breach of that law (R) enough to merit a certain penalty (S).
>
> The magnitude of penalty S is 'proportional' to the seriousness of the breach of law R.
>
> Therefore, action P is a breach of that law (R) enough to merit a *greater* penalty (S+).

The Sages' *dayo* objection to this attempt can be stated as: if the minor premise predicates a certain penalty (S) for a certain action (Q), then the conclusion cannot predicate a *greater* penalty (S+) for a more illegal action (P). This objection can be perceived as neutralizing the additional premise concerning 'proportionality'. The Sages are saying: although by commonsense such 'proportionality' seems just, by Jewish law it is not to be applied, and we can only predicate the same penalty (S) in the conclusion as was previously given (in the minor premise).

What the *dayo* objection does here is to block, or *switch off*, as it were, the operation of the additional premise regarding 'proportionality': though that moral premise might usually be granted credibility, it is rendered inoperative in the present context, to avoid any possible excess of penalization (as earlier explained). This means that *the a crescendo argument is effectively abolished and replaced with a purely a fortiori argument*. Evidently, then, the Gemara's view, according to which the a crescendo argument is allowed to proceed, and then

the *dayo* principle reverses its action[91], is technically incorrect. The action of *dayo* is preventive, rather than curative; it takes place before the 'proportional' conclusion is drawn, and not after.

We can easily, by formal analogy, extend this principle to other forms of a crescendo argument, if only out of theoretical curiosity. The analogous positive predicatal argument would have the following form:

> A more serious breach of a certain law (R) is required to merit penalty P than to merit another penalty Q.
>
> Action S is a breach of that law (R) enough to merit penalty P.
>
> The seriousness of the breach of law R is 'proportional' to the magnitude of action S.
>
> Therefore, a lesser action (S–) is a breach of that law (R) enough to merit penalty Q.

Notice that the additional premise about 'proportionality' is different in subjectal and predicatal arguments. The order is reversed. In the former, the subsidiary term S, being a predicate, is proportional to the middle term R; whereas in the latter, it is the middle term R that is proportional to the subsidiary term S, which is a subject. This is due to the order of things in the minor premise, which the conclusion naturally reflects, where predication is made possible only if the value of R for the subject matches or exceeds the minimum value of R necessary for the predicate.

In this context, the Sages' *dayo* objection would be stated as: if the minor premise predicates a certain penalty (P) for a certain action (S), then the conclusion cannot predicate a lesser penalty (Q) for a *less* illegal action (S–). This objection can be perceived

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[91] Notice the sequence of events in the following sentence in the Gemara: "nevertheless, by the working of the a fortiori, fourteen days may be suggested: there follows, however, the principle of *dayo* so that the additional seven days are excluded." This means that: first, fourteen days are inferred using *qal vachomer*, and *after that* ("there follows"), the number of days is reduced by *dayo* to seven.

as a denial of the additional premise concerning 'proportionality'. Here, the Sages might say: although by commonsense such 'proportionality' seems just, by Jewish law it is not to be applied, and we can only address the same action S in the conclusion as was given (in the minor premise). This statement, to repeat, is formulated by analogy, merely for theoretical purposes; it is not given in the original Mishna debate.

There is admittedly a difficulty in the latter extension of the *dayo* principle. For whereas applying *dayo* to a positive subjectal argument results in preventing potentially excessive justice, by mechanically attributing a greater penalty to a more serious breach of law, the application of *dayo* to a positive predicatal argument results in the prevention of increasing leniency, which is what attributing a lesser penalty to a less serious breach of law would constitute. We shall return to this issue further on.

As regards the corresponding negative arguments, they can easily be determined using the method of *ad absurdum*. In each case, the major premise and the additional premise about 'proportionality' remain the same, while the negation of the conclusion becomes the new minor premise and the negation of the minor premise becomes the new conclusion. Application of the (first) *dayo* principle to them would have the effect of inhibiting the deduction of the putative negative a crescendo conclusion from the given negative minor premise, through rejection of the additional premise.

As for implicational arguments, they can be dealt with in comparable ways.

Let us now deal with the **Sages' *dayo* objection to the second argument of R. Tarfon**. Here, R. Tarfon tried to infer a liability of full payment for damage by horn on private property (conclusion), from a liability of full payment for damage by tooth & foot on private property (minor premise). He was thus using an argument, again of positive subjectal form, that yields the same conclusion whether construed as a crescendo argument or as purely a fortiori. This means that the first version of the Sages' *dayo* principle would be useless in this second case, for the minor premise and conclusion naturally have the exact same

predicate (full payment). Therefore, since the Sages nevertheless declared *dayo* applicable, they must have been referring to some *other* feature of the argument.

The only other logical operation they could have been referring to is the inductive formation of the major premise, by generalization from the liability of half payment for damage by horn on public property and the liability of no payment for damage by tooth & foot on public property. That is, the major premise that 'liability for damage by horn is *generally* greater than liability for damage by tooth & foot' was derived from the same given concerning horn as before, namely that 'liability for damage by horn on public property is half payment'. Here, then, the *dayo* principle must be stated in such a way as to interdict this preliminary generalization.

The Sages apparently hint at this solution to the problem by restating their second objection in exactly the same terms as the first. There is no other explanation for their using the exact same words. In this context, then, the Sages' *dayo* objection would be stated as: if the major premise is inductively based on information about a certain action (P) meriting a certain penalty (S), in one set of circumstances, then the conclusion drawn from it cannot be that the same action (P) in another set of circumstances merits a greater penalty (S+). That is, under the *dayo* principle, we can only conclude that 'P is S', not that 'P is S+'. Note well how this second version of the *dayo* principle is very different from the previous.

It is important to realize that, unlike the preceding one, this *dayo* objection cannot be perceived as neutralizing the additional premise concerning 'proportionality'. For here, a crescendo and purely a fortiori argument have *the exact same* conclusion; so that whether or not we 'switch off' this third premise *makes no difference whatever* to the result. This means that, in the present case, the argument is necessarily purely a fortiori, i.e. devoid of an additional premise. No a crescendo argument can usefully be proposed here, since the conclusion is already maximal through purely a fortiori argument. Therefore, in such case, we must prevent the unwanted conclusion *further upstream* in the reasoning process; that is, at the stage where the major premise is getting formed by means of a generalization.

We can easily, by formal analogy, formulate a similar principle with regard to positive predicatal argument. In this context, the Sages' *dayo* objection would be stated as: if the major premise is inductively based on information about a certain action (S) meriting a certain penalty (Q), in certain circumstances, then the conclusion drawn from it cannot be that a lesser action (S–) in whatever other circumstances merits the same penalty (Q). That is, under the *dayo* principle, we can only conclude that 'S is Q', not that 'S– is Q'. This statement, to repeat, is formulated by analogy, merely for theoretical purposes; it is not given in the original Mishna debate.

Admittedly, our formal extension of the second *dayo* principle from positive subjectal argument to positive predicatal argument is open to debate. For whereas in the former case *dayo* serves to prevent increased severity, in the latter case it seems to have the opposite effect of preventing increased leniency. This issue will have to be addressed, further on.

Returning now to the Gemara, we can see from the above formal treatment, that it was wrong in considering the *dayo* principle as concerned essentially with a crescendo argument. In the first case, which the Gemara did try to analyze, the Sages' *dayo* objection effectively advocated a purely a fortiori argument instead of R. Tarfon's apparent attempt at a crescendo argument. But in the second case, which was unfortunately ignored by the Gemara, the Sages' *dayo* objection couldn't function in a like manner, by blocking the usual velleity of 'proportionality', since this would be without effect on the conclusion. It had to apply to a presupposition of R. Tarfon's argument, however construed – namely the generalization earlier used to construct its major premise.[92]

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[92] It should be said that R. Tarfon's first argument could conceivably be inhibited by the second type of *dayo* objection (viz. blocking formation of the major premise by generalization), as well as by the first type (viz. blocking operation of the third premise about proportionality). But this does not seem to be the thrust of the Sages' rebuttal of the first argument; they seem rather to adopt a purely a fortiori stance in opposition to their colleague's a crescendo approach.

Let us now return to the issue glimpsed above, as to whether or not the *dayo* principle is only meaningful in relation to positive subjectal a crescendo argument, which proceeds from a lesser penalty for a lesser infraction to a greater penalty for a greater infraction. We have seen that we can formally enlarge the idea of preventing proportionality implied in *dayo* application to positive subjectal argument, to negative subjectal, and to positive and negative predicatal arguments – but is such analogy meaningful when more concretely examined? We shall here try to answer this question.

Remember our earlier determination that the *dayo* principle is not a logical principle, but a "moral" one, i.e. it has to do with ethics or law in the context of the Jewish religion. It is not logically necessitated by the principle of deduction or by the use of a fortiori argument or any other purely logical consideration; no contradiction would arise if we simply ignored it. It is, rather, something Divinely or rabbinically prescribed, to lawmakers and courts of law, for cases where a *qal vachomer* is being attempted in order *to infer a greater penalty for some wrongdoing*. It is an artificial injection into the Jewish legislative process apparently motivated by mercy, i.e. to temper justice. There is no reason to apply it in contexts other than the sort just specified, or for that matter in other religions or outside religion.

We could eventually expect the same idea to be extended from penalties to *duties*. Such conceptual extrapolation might well be found exemplified in the Talmud or other Jewish literature (I have not looked for examples). That is conceivable if we think of penalties and duties as having in common the character of *burdens* on the individual or community subjected to them. If we look on increased duties (*mitzvoth*) as positive rewards, in the way that a servant might rejoice at receiving increased responsibilities, the analogy of course fails. But if we look on duties as burdens, an analogy is possible. It that case, the *dayo* principle could be taken to mean more broadly that burdens in general must not be increased on the basis of a *qal vachomer* argument from the Torah.

Granting the above clarifications of the *dayo* principle, the first question to ask is: is its function limited to contexts of positive subjectal *qal vachomer* – or can this definition be extended to other a fortiori argument formats? The format focused on by the rabbis is, to repeat, positive subjectal, which means that it is minor to major (*miqal lechomer*), whence the appropriateness of the name *qal vachomer*. Let us now consider what *dayo* application to the negative subjectal format would mean. Such argument is, of course, major to minor (*michomer leqal*) in orientation. It would look as follows:

Action P is a more serious breach of a certain law (R) than another action Q is.

Action P is a breach of that law (R) *not* enough to merit a certain penalty (S).

The magnitude of penalty S is 'proportional' to the seriousness of the breach of law R.

Whence, action Q is a breach of that law (R) *not* enough to merit a *lesser* penalty (S–).

The major premise and the additional premise about 'proportionality', which (as we saw earlier) is in practice derived from the principle of *midah keneged midah* (measure for measure), both remain the same, here. What changes is that the minor premise and conclusion are now negative propositions and the major term (P) appears in the former and the minor term (Q) appears in the latter. It remains true that the value of S associated with P is greater than that associated with Q; however, note that here the greater value appears in the minor premise and the lesser in the conclusion.

Our question is: what would be the significance of the *dayo* principle, in either of its senses, in such negative subjectal context? Note that above argument is formally valid. The question is thus not whether its conclusion follows from its said premises. The question is whether to reject its additional premise (first type of *dayo* application) or its major premise (second type of *dayo* application).

At first sight the answer is that the *dayo* principle would not be called for – because there is no velleity in such a context to use the principle of measure for measure, and *dayo* is intended as a

restraint on such velleities. Since the minor premise and conclusion are negative, we can say that no actual penalty, small or large, is claimed in either of these propositions; in that case, we are not naturally inclined to engage in measure-for-measure reasoning, and therefore no *dayo* principle is needed to block such reasoning. It would appear, then, that the *dayo* principle is not useable in such negative context.

However, we could also look upon such negative argument as tacitly positive. *Assuming that all law-breaking merits some penalty*, we could argue that where an illegal action is not sufficiently illegal to merit a certain penalty we may infer it to positively merit a *lesser* penalty, though we cannot predict *how much* less. In that case, the negative subjectal argument would be interpreted as saying that P is illegal enough to positively merit a penalty of magnitude 'somewhat less than S', and therefore Q is illegal enough to positively merit a penalty of magnitude even smaller than 'somewhat less than S'. This thought clearly involves measure-for-measure reasoning; so, the *dayo* principle ought to now be applicable.

But of course it is not in fact applicable, because this new argument infers a decrease in penalty, whereas the *dayo* principle is essentially aimed at preventing inferences of increase in penalty. It is intended as a principle of mercy, pushing towards leniency rather severity of judgment; therefore, its application here would be inappropriate. In other words, we would not normally try to interdict the conclusion of a negative subjectal argument (even one recast in more positive form), whether by denial of the additional premise or of the major premise, for the simple reason that such reaction would not be in accord with the spirit and intent of the *dayo* principle.

We can argue in much the same way with respect to positive predicatal a crescendo argument:

A more serious breach of a certain law (R) is required to merit penalty P than to merit another penalty Q.

Action S is a breach of that law (R) enough to merit penalty P.

The seriousness of the breach of law R is 'proportional' to the magnitude of action S.

Therefore, a lesser action (S–) is a breach of that law (R) enough to merit penalty Q.

Here again, we have reasoning from major to minor – specifically, from a more illegal action (S) with a greater penalty (P) to a less illegal action (S–) with a smaller penalty (Q) – so, there would be no sense in applying (in either way) the *dayo* principle to it. Such an argument would, if our analysis of the moral motives of this principle has been correct, be allowed to proceed unhindered.

However, things get more complicated when we turn to negative predicatal argument, since the orientation is again from minor to major, while the minor premise and conclusion are negative in polarity:

A more serious breach of a certain law (R) is required to merit penalty P than to merit another penalty Q.

Action S is a breach of that law (R) not enough to merit penalty Q.

The seriousness of the breach of law R is 'proportional' to the magnitude of action S.

Therefore, a greater action (S+) is a breach of that law (R) not enough to merit penalty P.

In view of the negative polarities involved, we are tempted to say that there is no call for the *dayo* principle since no actual penalties are claimed. However, if we recast the argument in more positive form, following the idea that *all law-breaking merits some penalty*, we could say that the minor premise concerns some positive penalty of magnitude 'somewhat less than Q' (for action S) and likewise the conclusion concerns some positive penalty of magnitude 'somewhat less than P' (for action S+). Assuming that 'somewhat less than P' is greater than 'somewhat less than Q', which seems reasonable granting the additional premise, we can say that this argument is indeed from minor to major in a positive sense. In that case, the *dayo* principle ought to be applied to it, to prevent justification of the increased penalty advocated by the conclusion. Thus, either the additional premise about 'proportionality' or the generalization leading to the major premise will be interdicted.

Thus, to sum up, whereas when we think in bare formalities the four forms of a crescendo argument might seem liable to *dayo* principle interference, upon reflection it is only the positive subjectal and negative predicatal forms which are concerned, because they go from minor to major. The other two forms, the negative subjectal and the positive predicatal, are not concerned, because they go from major to minor. So, the issue is not so much the polarity of the argument as its orientation. All the above can be repeated regarding implicational arguments, of course.

What we have said here, of course, refers to arguments that predicate penalties[93]. Arguments that predicate rewards are not to be treated in an analogous manner, because (as we have seen earlier) the *dayo* principle is only aimed at preventing increased punishment, not increased reward. But, one might ask, what of decreased rewards? Is not a decrease in reward comparable to an increase in punishment? The answer to that I would suggest is again practical rather than formal: Jewish law is not concerned with rewarding good deeds, but in penalizing bad ones. Furthermore, it does not address all bad deeds, but only some of them – namely, those subject to judgment by rabbinical courts. The purpose of Jewish law, as indeed most law systems, is to ensure at least social peace; it is not to control everything. Accordingly, the *dayo* principle is not intended to deal with changes in magnitude relating to rewards. It will simply not be invoked in such contexts; and indeed, such contexts are not expected to arise.

This is all assuming, of course, that my understanding of the matter is correct. It is not unthinkable that the empirical truth is a bit different from what I have assumed; and for instance, there are in fact occasional applications of the *dayo* principle in situations where I have just said it is logically inapplicable. In that event, needless to say, the above account would have to be modified in accord with actual facts. This should not be too difficult, since the formal issues are already transparent. It is not

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[93] Or eventually, maybe, duties – viewed as burdens, as earlier explained.

unthinkable that over time the original intent of the Sages' *dayo* (given in Mishna Baba Qama 2:5) has been misunderstood, forgotten or intentionally ignored, and the concept of *dayo* was eventually used more broadly. This is in fact suggested by the broad or vague way that the *dayo* principle is usually presented in rabbinical literature.

Judging by the study of Mishnaic *qal vachomer* presented further on [in chapter 3.1], we cannot resolve the empirical issue with reference to the Mishna. For, surprisingly, of the 46 arguments found there, only the famous two in Mishna Baba Qama 2:5 involve the *dayo* principle! This is an important finding. There are nine other arguments which are possibly a crescendo, and therefore could be subject to *dayo*; but there is no mention of *dayo* in relation to them – either because they are not really a crescendo or because they do not serve to infer a penalty from the Torah.

Therefore, we must look to the Gemara (and indeed, later rabbinic literature), to find out whether the *dayo* principle is consistently applied in practice as here postulated. Only after all a fortiori arguments in the whole rabbinic corpus have been identified and properly analyzed will this question be scientifically answered. Further on [in chapter 3.2], I try to at least partly answer the question, using the Rodkinson English edition of the Talmud. My finding in this pilot study is that there are only six Talmudic contexts where the *dayo* principle is explicitly appealed to! In five of these cases, the *dayo* principle may be said to be used as I have predicted, i.e. to prevent increase in legal responsibility through a fortiori argument. In the remaining case, this is partly true (see fuller explanation there).

Considering the prime position given to *qal vachomer* in the rabbinic lists of *middot* (hermeneutic principles), and the great attention accorded by rabbinical commentators to the Mishna Baba Qama 2:5 which introduces the *dayo* principle, one would expect the Tannaim (the rabbis of the Mishnaic period) to resort to *dayo* objections quite often. That this is statistically not the case is, to repeat, quite surprising. It may well be that more instances of *dayo* use by Tannaim will be found in some *baraitot* (statements attributed by Tannaim not included in the Mishna),

many (maybe most) of which are quoted by Amoraim (the rabbis of the Gemara period) in different passages of the Talmud. This matter deserves systematic research, if we want to get a realistic idea of the quantity of *dayo* use by the Tannaim[94].

Besides that, we of course need to further research independent *dayo* use by the later rabbis, i.e. the Amoraim and their successors, respectively. Its use also in the early and late Midrashic literature deserves close study too. As regards the Amoraim, it is also quite surprising how little they appeal to the principle, at least explicitly, at least in the Rodkinson edition. However, my expectation is that, though some more use of the *dayo* principle by the Tannaim and the Amoraim may well be found, it will not be significantly much more.

I would like now to deal with a couple of further details, before closing this topic.

To begin with, let us reflect on the fact that rabbinical formulations (apparently of more recent vintage historically) usually describe a fortiori argument as an instrument of legal reasoning that can proceed *in both directions*, i.e. both from minor to major and from major to minor. For instance, consider the following formulation by R. Feigenbaum:

> "Any stringent ruling with regard to the lenient issue must be true of the stringent issue as well; [and] any lenient ruling regarding the stringent issue must be true with regard to the lenient matter as well."[95]

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[94] I have read that there are separate collections of *baraitot*. These would, of course, have to be consulted too to resolve the issue once and for all.

[95] *Understanding the Talmud*, p. 88-90. Feigenbaum rightly characterizes *qal vachomer* as "a particular logical structure," but he introduces the above formula by saying: "it is logical to assume that…." This is a sort of contradiction: if the structure is truly logical, the argument is not a mere assumption, but a thought process that can be validated. Feigenbaum evidently has not attempted to logically validate his formula. He does, however, describe two ways in which the Gemara may "refute" such argument – either by showing that the proposed ruling

According to this statement, given that a stringent ruling (S) applies to the lenient issue (Q), it must also apply to the stringent issue (P); and given that a lenient ruling (S) applies to the stringent issue (P), it must also apply to the lenient issue (Q). The first part of that statement matches positive subjectal a fortiori (minor to major). The second part of it presumably refers to the negative subjectal form, since it is major to minor (and obviously not predicatal). Indeed, that is how I interpreted it in JL[96]. My thinking there was that: Given that there has been some breach of law (R), then some penalty is deserved; in that event, "not-deserving a stringent penalty" implies "deserving a lenient penalty"! The terms stringent and lenient being understood as relative to each other, not as absolute.

Thus, a formulation such as R. Feigenbaum's tacitly assumes that "all law-breaking merits some penalty." It is only on this basis that we can indeed logically transfer a lenient ruling from a stringent issue to a lenient matter, as he and others postulate. Although his above formula is stated entirely in positive terms, it in fact refers to both positive and negative arguments. Note in passing that the *dayo* principle is not mentioned in that writer's formula. That is because he is here thinking in purely a fortiori terms, and not a crescendo like the Gemara. He is not saying that the inferred ruling is to be *more* stringent or *more* lenient, but only *as much* so. The same stringency or leniency is passed on.

Not having R. Feigenbaum's book in my possession any longer, I do not know what, if anything, he said in it about the *dayo* principle. I doubt offhand that he distinguished between purely a fortiori and a crescendo argument, and that he related that

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is found inapplicable in relation to another relatively stringent (or, respectively, relatively lenient) issue, or by showing that the lenient issue is in some respects more stringent (or, respectively, that the stringent issue is in some respects more lenient). But the latter "refutations" are, of course, material rather than formal: they effectively deny the truth of the minor or major premise in a given case, not the validity of the argument properly formulated.

[96] See chapter 4.5 there.

principle exclusively to the latter form and limited *dayo* use to increased stringencies. But, using at the language of his above statement, I would say it ought to be amplified as follows. In cases where purely a fortiori inference is appropriate, the same degree of stringency or leniency is concluded, and the *dayo* principle is irrelevant. But in cases where a crescendo inference is appropriate, the natural conclusion would be more stringency or more leniency. In such cases, if the conclusion is a more stringent penalty than the one proposed in the Torah, *dayo* should be applied; whereas if it is more lenient it need not be.

Another point I would like to clarify is the idea emitted above that in predicatal a crescendo argument the subsidiary term (the subject of the minor premise and conclusion) is decreased (in the positive mood) or increased (in the negative mood). What does it mean to say, as we did, that *an action* is lesser or greater? This is best clarified by giving an example. We might, for instance, conceive two kinds of killing: intentional killing and unintentional killing, and argue thus: More badness (middle term, R) is required to merit a more severe penalty (major term, P) than to merit a less severe penalty (minor term, Q); so if, under the law relating to killing, intentional killing (S1) is bad enough to merit a more severe penalty, then unintentional killing (S2) is bad enough to merit a less severe penalty. This is a positive predicatal a crescendo argument.

Formal application of the *dayo* principle to this reasoning would mean that it is forbidden to here follow the principle of measure for measure and infer a lesser penalty for the less serious crime. Intuitively, such interdiction is obviously contrary to reason: we would rather let the ‘proportional’ conclusion stand since it is more indulgent. Neither justice nor mercy would be well served by applying the *dayo* principle to such cases. To punish a less serious crime the same way as a more serious one would be contrary to both justice and mercy. To punish a less serious crime less severely than a more serious one is in accord with both our sense of justice and our sense of mercy.

Clearly, then, the *dayo* principle should remain inoperative in cases of positive predicatal a crescendo argument concerning retribution for crime. Similar reasoning, as we have seen, applies to negative subjectal a crescendo argument. It is only with regard

to positive subjectal or negative predicatal a crescendo arguments that the *dayo* principle makes sense and has relevance, for only in their case may there be an over-enthusiastic upsurge of justice, so that mercy requires a more cautious and temperate approach. In other words, *dayo* is potentially relevant only to a crescendo arguments that go from minor to major; it plays no role in such arguments that go from major to minor. *Dayo* is also, of course, irrelevant to purely a fortiori arguments (whether *a minori* or *a majori*), since the subsidiary term (whether it is a subject or a predicate) remains unchanged in them.[97]

This is spoken entirely from a theoretical perspective. It does not mean that the rabbis have all always been as conscious as that of the various possibilities. But I suspect they at least subconsciously have indeed reasoned in this way and limited *dayo* in the ways above described. Exceptions might conceivably be found in the mass of Talmudic and other rabbinic literature. This is an empirical question that must be answered empirically. If examples of upside down application of *dayo* are found, they would need to be rationalized somehow ad hoc – or, alternatively, they could be viewed as occasional errors of reasoning.

To conclude our formal exposition, we can say that the *dayo* principle is much leaner than what we may have originally imagined. It is not a formal law of a fortiori logic, but a very specific religiously-inspired rule for Jewish legislators and judges. Moreover, it is not a rule to be applied indiscriminately, but specifically with regard to attempts at increasing penalties on the basis of proportional *qal vachomer* reasoning. I should add: since a crescendo argument as such, i.e. as distinct from the *dayo* principle used to freeze its conclusions as just explained, is purely logical – it is inaccurate to call *qal vachomer* a hermeneutic rule! The first hermeneutic rule in Hillel's list or in

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[97] The same can of course be said of the implicational equivalents of those various arguments. *Dayo* will only apply to positive antecedental or negative consequental a crescendo arguments concerning punishment for illegal acts.

R. Ishmael's list is, strictly speaking, not the *qal vachomer* argument, but the *dayo* principle applied in the context of such argument. We may nevertheless maintain the use of "*qal vachomer*" as the title of the first rule on the basis that the *dayo* principle is called for solely in that specific context, *because it is only in such context that a quantitative increase (in penalty) might be inferred*.

One might unthinkingly assume that the *dayo* principle might equally well be used in conjunction with other forms of analogical reasoning (e.g. *gezerah shavah* or *binyan av*). Indeed, one might argue that if *dayo* is applicable in such a maximally deductive context as *qal vachomer*, then it should all the more be applicable in more inductive contexts like *gezerah shavah* or *binyan av*. But further reflection should convince that what distinguishes *qal vachomer* is that it deals with quantities and the *dayo* principle is a restriction of increase in quantity (of the subsidiary term, to be exact) when inferring a penalty from the Torah. Since *gezerah shavah*, *binyan av* and other hermeneutic principles do not prescribe quantitative changes, the *dayo* principle does not concern them.

It remains conceivable, however, that yet other forms of reasoning could result in quantitative changes that would call for application of *dayo*. Come to think of it, it does seem like the rabbis "temper justice with mercy" even in situations that do not involve *qal vachomer* or any other hermeneutic principle. But of course such judgments might not be characterized as based on the *dayo* principle, since they are made more directly. What I am referring to here is the rabbinical interpretation of the *lex talionis* (the law of retaliation) found in Exodus 21:23–25 and Leviticus 24:19–21 – the famous "an eye for an eye, a tooth for a tooth" principle. The rabbis do not read this Torah law literally, but as a call for monetary compensation in cases of injury; this is shown using various arguments, including a *qal vachomer*.[98]

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[98] See in AFL, in the chapter on Moses Mielziner, the section called 'Concerning the *jus talionis*' (13.3). Also see *Baba Qama*, 83b-84a.

4. The human element

Looking at rabbinical practices and principles, we can safely say that the rabbis were very careful to acknowledge the human element in reasoning a fortiori, or by means of any other of the listed hermeneutic principles (and by extension, even unlisted thought processes).

This is evident, first of all, in their practice of *teshuvah* (Heb.) or *pirka* (Aram.) – usually rendered in English as ‘objection’ or ‘challenge’ – consisting in retorting to or rebutting an argument, and in particular an a fortiori argument, by showing or at least pointing out that one (or more) of its premises is (wholly or partly) open to doubt or false, or that the putative conclusion cannot in fact be drawn from the given premises. This demonstrated their awareness, if only pre-verbally in some instances, of the *inductive* sources of many of the propositions used in their reasoning. In some cases, as well, such practice on their part demonstrated awareness of the relative artificiality of certain forms of argumentation they used and thence the tenuousness of their conclusions.

Such awareness of the human element in apparently deductive inference is also made evident in their setting a number of explicit restrictions on the use of a fortiori argument. Such argument could only be used for inferring laws by qualified rabbis involved with their peers in the development of Jewish law (meaning in principle members of the Sanhedrin, though in practice some participants were probably not officially members). Inferences made had to be accepted unanimously or by ruling of a majority. Inferences could be made only from written Torah laws, and not from oral Torah traditions, even if they were reputed to go all the way back to Moses, and all the more so if they were considered to be of more recent vintage. One could not infer a new ruling from a previously inferred ruling, i.e. use the conclusion of one a fortiori argument as a premise in the next.

I would additionally suggest, *an a fortiori inference from a Torah law would be considered questionable if it was found to*

conflict with another Torah law. This seems reasonable on the general understanding that written Torah law carries more weight in Judaism than any human inference. An example is apparently given by Louis Jacobs in his *The Jewish Religion: A Companion* with reference to a responsum of the Radbaz (Spain-Israel, R. David ben Zimra, 1479-1573) to the question why the Torah does not forbid a man's marriage to his own grandmother, and yet forbids him his wife's grandmother (who is a more remote relative), although we would expect by a fortiori argument from the prohibition in the latter case that the former case would also be prohibited. Jacobs explains: "Typical of Radbaz's attitude to the limited role of human reasoning in Judaism is his reply that the *a fortiori* argument is based on human reasoning, whereas the forbidden degrees of marriage are a divine decree, so that human reasoning is inoperative there. All we can say is that God has so ordained. One degree of relationship is forbidden, the other permitted."

The a fortiori argument here is: a man's own grandmother (P) is more closely related (R) to him than his wife's grandmother (Q); if his wife's grandmother (Q) is closely related (R) enough to be forbidden in marriage to him (S), then a man's own grandmother (P) is closely related (R) enough to be forbidden in marriage to him (S). The difficulty is that, although the former is forbidden, the latter is *not* forbidden. However, I do not see why the rabbis do not accept this a fortiori argument, as they do many others, and simply prohibit marriage to one's own grandma, since there is no written permission to contend with. The answer given by the Radbaz, and before him by Menahem Meiri (France, 1249-1316), is that there is no need for the inferred prohibition as no one would be likely to do such a thing anyway in view of age differences. That is, more precisely put, while a man might be attracted to his wife's grandmother (e.g. if his wife is thirteen years old, and her mother twenty-six and her grandmother thirty-nine, and he is forty), he is unlikely to be attracted to his own grandmother (who would be in her mid-sixties at least). But this

argument may seem a bit weak, as some men are attracted by much older women, even if rarely.[99]

Another restriction was that a ruling based on a fortiori argument could not take precedence over a Torah law from which it was inferred, if the two happened to come into conflict. For example, it is inferable from the Torah law (Ex. 23:4) that one should return one's enemy's lost ox or ass that one should likewise, a fortiori, return one's friend's lost ox or ass. One might think that, having thus made a deductive inference, it would follow that when simultaneously encountering two lost animals, one from each of these people, one could legally prefer to return that belonging to one's friend rather than (or at least before) returning that belonging to one's enemy. But no: the premise remains more binding than the conclusion, and one must therefore give precedence to the enemy's animal[100]. Yet another important restriction was that a rabbinical law court could not sentence someone to corporeal punishment on the basis of a legal ruling derived by a fortiori argument. Meaning that, however reliable the justifying deduction might well have been,

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[99] In any case, this is not a very good example of the above stated restriction on a fortiori inference, because the conflict here is between an inferred prohibition and a Torah 'permission' (presumed merely due to *absence of* written prohibition, note well), and not between an inferred permission (or exemption) and a written Torah prohibition (or imperative). But, even though I cannot here adduce a fully appropriate example, I think the said restriction does exist and is quite reasonable. Even if I turn out to be wrong, the issue is worth investigating.

[100] This example and its explication are given by R. Schochet in the already cited online video. However, I have not found the Talmudic reference for it (though it is one of the five examples given by Saadia Gaon in his commentary on the 13 *midot*). Moreover, elsewhere, namely here: www.come-and-hear.com/supplement/so-daat-emet/en_gentiles3.html, it is pointed out that returning a lost animal to a brother is based on Deut. 22:2 – in which case, I do not see the need for a *qal vachomer* from Ex. 23:4 (unless a 'friend' and a 'brother' mean different things). Nevertheless, I will not get into a discussion of this concrete issue, nor look for a less controversial example – an illustration of the rabbinic restriction was all that was needed here and this perhaps hypothetical one will suffice.

there was still a drop of doubt in it sufficient to preclude such drastic penalties.

Some of these restrictions were perhaps more theoretical than practical, because if we look at Talmudic discussions (Mishna, Gemara and later commentaries and super-commentaries all included) one is struck by the ease and frequency with which the rabbis engaged in a fortiori argument if only rhetorically. One would have to examine all rabbinic literature in great detail to determine whether these theoretical restrictions have all in fact been consistently adhered to in practice (this is certainly a worthwhile research project for someone). Nevertheless, on the whole, these restrictions show the rabbis' acute awareness of the natural limits of the human powers of experience and reason.[101]

The *dayo* principle as I have above described it falls right into this pattern of restricting excessive reliance on logical means. A ruling based on *qal vachomer* argumentation remains somewhat doubtful, even though the conclusion (if correct) follows the premises with absolute certainty, because there is inevitably some human element in the induction of the premises. These premises may be in part or even largely Torah-based, but still some part(s) of them were inevitably based on human insight or convention, so it is wise to remain a bit open-minded concerning their conclusion[102]. But this is nothing to do with the *dayo* principle, as we have latterly discovered. This principle is not designed to throw doubt on *qal vachomer* argumentation as

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[101] This is the general point I want to make here. In fact, rabbinic restrictions on use of *qal vachomer* (and/or the *dayo* principle) and other hermeneutic principles are far more numerous and intricate than here suggested (indeed, sometimes they seem to me *ad hoc*, i.e. tailored for the convenience of a particular discussion only). But I do not want to get bogged down in this special field of study. You can find some further details and clarifications in Steinsaltz or Mielziner, for instances.

[102] Francis Bacon, in his *The Advancement of Learning*, expresses a similar thought: "As in nature, the more you remove yourself from particulars, the greater peril of error you do incur; so much more in divinity, the more you recede from the Scriptures by inferences and consequences, the more weak and dilute are your positions" (2:25:12).

such, but to prevent extrapolation from Torah-based premises by means of the principle of justice.

A question we could ask is: why is the *dayo* (sufficiency) principle not *directly and always* applied to the *midah keneged midah* (measure for measure) principle? In my above treatment of these principles, I have identified the latter as inserting an additional premise of ‘proportionality’ between the minor premise and conclusion, and the former as either blocking the operation of this additional premise or preventing the formation of the major premise through generalization. Thus, we may view the measure for measure principle as tending to turn a purely a fortiori conclusion into an a crescendo one, and the sufficiency principle as on the contrary tending to restrain (in one way or another) such proportionality. The two balance each other out, and the result is that the purely a fortiori conclusion stands unchanged.

The question is: could we not say, more generally: *whenever* we encounter a *midah keneged midah*, we must apply *dayo*? Why does the *qal vachomer* need to be mentioned at all? Obviously, if such a general rule was promulgated, the two said principles would effectively cancel each other out and cease to exist! Obviously, too, this is not the intent of the *dayo* principle; i.e. it is not meant to altogether neutralize the *midah keneged midah* principle. So, it is reasonable to suppose the *dayo* principle to be intended for a specific context; namely, for when a *qal vachomer* is formulated and we are tempted to extrapolate its conclusion by a thought of measure for measure. And more specifically still, for when the speaker (like R. Tarfon in mBQ 2:5) attempts to infer a larger penalty from a lesser penalty prescribed in the Torah.

If there were no *qal vachomer*, or other deductive inference, the measure for measure principle might conceivably have been applied without restriction. Why then, we might well ask, was the *dayo* principle needed in the context of *qal vachomer*? Perhaps the answer to that important question is that if the measure for measure extrapolation occurs in a non-deductive context, we naturally remain aware of the human element in it and maintain a healthy measure of skepticism. Whereas *in a deductive context*, especially where the powerful logic of *qal*

vachomer is used, since we have already *proved* part of the quantity, we are more likely to view its measure for measure extrapolation as also 'proved'. The *dayo* principle comes to remind us that the proposed extrapolation does *not* have the same degree of reliability as the more limited conclusion of the *qal vachomer* has. Indeed, the *dayo* principle precludes any temptation to extrapolate rather than let us run the risk wrongful extrapolation.

This may conceivably have been the justification of the *dayo* principle in the rabbis' minds. Even if they did not fully realize that it concerned a thought of *midah keneged midah* accompanying a *qal vachomer*, rather than the latter argument *per se*, they would have sensed the danger of unbridled extrapolation. And according to the Gemara, as we have seen, the preemptive measure against such extrapolation (viz. the *dayo* principle) was not a mere rabbinical ruling (by the Sages), but a Divine decree (through Num. 12:14-15). It perhaps had to be a Torah-based hermeneutic rule, so that it could not in turn be open to doubt as a human construct. Even so, as we have seen, R. Tarfon and others did (according to the Gemara) claim the *dayo* principle could in some situations be bypassed or even ignored. But, for the most part, the Sages' posture has prevailed.

It is worth noting lastly that, according to later authorities (at least some of them), *qal vachomer* argument (or more precisely the *dayo* principle associated with it) could only be used in the *Talmudic* law-making process. After the closure of this process, it was considered illegal to use this hermeneutic principle, or any other of the thirteen rules of R. Ishmael for that matter, to interpret the written Torah for legislative purposes. The references for this sweeping ruling are given by R. Bergman[103] as: "*Maharik Shoresh* 139; *Ra'ah* to *Ketubos* cited in *Yad Malachi* 144." This limitation in time is additional evidence that Judaism does not view the *dayo* principle as a law of logic but as a revealed *ad hoc* religious law. Laws of logic cannot be

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[103] See his chapter 13.

abrogated; decrees can. Similarly for the other hermeneutic principles.

Why this limitation in time? Because, I presume, the hermeneutic rules were a prerogative of the Sanhedrin, the Jewish Supreme Court; when its deliberations were interrupted due to foreign conquest and rule, rabbis were no longer empowered to use these interpretative principles. An implication of this explanation is that if – or when – the Sanhedrin is reinstituted (presumably by the Messiah) the *dayo* principle and other such guidelines will again be useable by its members. This is a neat answer to the question, except that most of the Babylonian Talmud's deliberations took place in Babylon, far from the traditional seat of the Sanhedrin in the Land of Israel. Presumably, the Babylonian rabbis involved were considered to be worthy successors to the Sanhedrin. The reason for the time limitation would then simply be that the Talmud was 'closed' in about 500 CE (say), and subsequent rabbis were considered as at a lower spiritual level than their teachers.

5. Qal vachomer without dayo

It should be pointed out that Talmudic use of *qal vachomer* does not always require application of the *dayo* principle, for the simple reason that the conclusion sometimes naturally lacks the required quantitative aspect, i.e. there is no propensity to 'proportionality' that needs to be interdicted. In other words, the argument is purely a fortiori rather than a crescendo. Consider the following argument:

> "All these things they [the rabbis] prescribed [as culpable] on a Festival, how much more [are they culpable] on Sabbath. The Festival differs from the Sabbath only in respect of the preparation of food." (Mishna *Beitzah*, 5:2.)[104]

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[104] See www.halakhah.com/pdf/moed/Beitzah.pdf.

There is, surprisingly, no remark in the corresponding Gemara (*Yom Tov*, 37a) on this significantly different use of a fortiori reasoning. Here, unlike in the Miriam example and cognate cases, there is no appeal to the *dayo* principle. Does the Talmud notice and discuss this difference anywhere else? I do not know. In any case, this example is very interesting and worth analyzing further.

The Mishna here clearly teaches that: *what is **forbidden** (*assur*) on a Festival is, a fortiori, also forbidden on the Sabbath*. We can express this in a standard form of a fortiori argument (namely, the positive subjectal, from minor to major) as follows:

> The Sabbath (P) is more religiously important (R) than any Festival (Q); whence:
>
> if a certain action on a Festival (Q) is important (R) enough to be forbidden (S),
>
> it follows that the same action on the Sabbath (P) is important (R) enough to be forbidden (S).

This is a passable representation of the argument. However, if we ask what we mean here by more "religiously important," we might reply that the Sabbath is more "demanding" (or strictly regulated) than any Festival. In that perspective, the argument would seem to be, though still 'minor to major', more precisely negative predicatal in form, and we should preferably formulate it as follows[105]:

> More holiness (R) is required to observe the Sabbath (P) than to observe any Festival (Q).
>
> If some action (S) is *not* sufficiently holy (R) to be *compatible with* observance of a Festival (and thus must be forbidden on it) (Q),

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[105] I call the subsidiary term S an "action" to stress that it is something that the people towards whom the law is addressed have a choice to do or not do. No law is possible or meaningful if not addressed to humans with freewill; and no law can be made about something which it is outside their control.

> then that action (S) is not sufficiently holy (R) to be compatible with observance of the Sabbath (and thus must be forbidden on it) (P).[106]

Note that I have inserted "holiness" (of an action) as this argument's operative middle term (R) on the basis of rabbinical explanatory statements in the present context that the holiness of the Sabbath is greater than that of any Festival day. The way I have used this word is a bit awkward, I'll admit; but it does the job anyway.

More fully expressed the argument has three components: (a) Given that (in the minor premise) S implies not-Q, it follows by contraposition that if Q is prescribed, S must be forbidden. (b) And given that S implies not-Q, it follows by a fortiori that S implies not-P. Finally, (c) since (in the conclusion) S implies not-P, it follows by contraposition that if P is prescribed, S must be forbidden. The two 'contrapositions' used are simple ethical logic: anything that interferes with achievement of a set goal is obviously to be prohibited; the means must be compatible with the ends.

We can present the corresponding positive predicatal (major to minor) as follows:

> More holiness (R) is required to observe the Sabbath (P) than to observe any Festival (Q).
>
> If some action (S) is sufficiently holy (R) to be compatible with observance of the Sabbath (and thus may be permitted on it) (P).
>
> then that action (S) is sufficiently holy (R) to be compatible with observance of a Festival (and thus may be permitted on it) (Q),

This follows from the negative form by *reductio ad absurdum*, of course. The meaning of this new argument is: *what is **permitted** (i.e. not forbidden) (*mutar*) on the Sabbath is, a*

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[106] The injunction "must be forbidden" is addressed to the judges who will legislate and implement the law, whereas the law which says that "S is forbidden, etc." is addressed to the people.

fortiori, also permitted on a Festival. That is, the argument could as well be put in negative subjectal form, as follows:

The Sabbath (P) is more religiously important (R) than any Festival (Q); whence:

if a certain action on the Sabbath (P) is important (R) *not* enough to be forbidden (S),

it follows that the same action on a Festival (Q) is important (R) *not* enough to be forbidden (S).

The expression "not enough to be forbidden" may be taken to imply that the action in in fact "permitted."

Obviously, we cannot reverse these two statements, viz. that what is forbidden on a Festival must be forbidden on the Sabbath, and what is permitted on the latter must be permitted on the former. Obviously, something forbidden on the Sabbath (e.g. cooking food) is not necessarily also forbidden on a Festival. Something permitted on a Festival (e.g. cooking food) is not necessarily also permitted on the Sabbath. Reasoning of the latter sort would be fallacious by the ordinary rules of a fortiori logic.

Note also: although I have above classified the two arguments as predicatal (i.e. copulative), it might be more accurate to call them consequental (i.e. implicational). For, what the negative form tells us is that a certain action (S) *by a Jew* causes some deficiency of, let us say, holiness (R) *in him* and thus causes *him* to fail to observe a Festival (Q) or the Sabbath (P); similarly for the positive form, *mutatis mutandis*. In other words, while it is true that P, Q, R, S are terms, there is an unstated underlying subject (a Jewish man, or woman) in relation to which they are all predicates, so that theses (rather than terms) are in fact tacitly intended here.

Furthermore, according to formal logic, if the above two arguments are true, the following two (in which the negative term not-S replaces the positive term S) must also be true:

More holiness (R) is required to observe the Sabbath (P) than to observe any Festival (Q).

> If some inaction (not-S) is *not* sufficiently holy (R) to be *compatible with* observance of a Festival (and thus must be forbidden on it) (Q),
>
> then that inaction (not-S) is not sufficiently holy (R) to be compatible with observance of the Sabbath (and thus must be forbidden on it) (P).[107]

This is a negative predicatal (minor to major) argument. The meaning of this new argument is, clearly: *what is* ***imperative*** *(*chayav*) on a Festival is, a fortiori, also imperative on the Sabbath*. In this form, it is positive subjectal.

More fully expressed the argument has three components: (a) Given that (in the minor premise) not-S implies not-Q, it follows by contraposition that if Q is prescribed, S must be prescribed. (b) And given that not-S implies not-Q, it follows by a fortiori that not-S implies not-P. (c) Finally, since (in the conclusion) not-S implies not-P, it follows by contraposition that if P is prescribed, S must be prescribed. The two 'contrapositions' used are simple ethical logic: anything without which a set goal cannot be achieved is obviously to be prescribed; the means necessary for an end are indispensable.

We can present the corresponding positive predicatal (major to minor) as follows:

> More holiness (R) is required to observe the Sabbath (P) than to observe any Festival (Q).
>
> If some inaction (not-S) is sufficiently holy (R) to be compatible with observance of the Sabbath (and thus may be permitted on it) (P).
>
> then that inaction (not-S) is sufficiently holy (R) to be compatible with observance of a Festival (and thus may be permitted on it) (Q),

This follows from the negative form by *reductio ad absurdum*, of course. The meaning of this new argument is: *what is*

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[107] Note that I here call S an action and not-S an inaction merely for convenience – it may be that S is an inaction and not-S is an action. The important thing is that they be contradictories.

exempted *(i.e. not prescribed) (*patur*) on the Sabbath is, a fortiori, also exempted on a Festival*. In this form, it is negative subjectal.

Obviously, here again, we cannot reverse these two statements, viz. that what is imperative on a Festival must be imperative on the Sabbath, and what is exempted on the latter must be exempted on the former. Something imperative on the Sabbath (e.g. the additional sacrifices on it) is not necessarily also imperative on a Festival. Something exempted on a Festival (e.g. the said additional sacrifices) is not necessarily also exempted on the Sabbath. Reasoning of the latter sort would be fallacious by the ordinary rules of a fortiori logic.

Clearly, the Sabbath and the Festivals involve some distinctive practices; and Festivals are not all identical. The Festivals are not merely lighter forms of Sabbath, and the Sabbath is not merely a heavier form of Festival; and the various Festivals involve different rituals. We cannot deductively predict *all* features of one holy day from the other, or vice versa, but must refer to Biblical injunctions or hints for the special features of each. The above a fortiori arguments do not provide a complete set of relationships, which mechanically exclude innovations from the Biblical proof-text.

What can be inferred from the Sabbath to Festivals or vice versa is a product of two forces: (a) the major premise, which relates these two kinds of holy day *through a middle term* that we took to be 'holiness'; and (b) the minor premise, which links one of these holy days to a certain subsidiary term *through the same middle term*. This limits the possibilities of inference, insofar as the middle term does not have unlimited scope. For a start, 'holiness' is a vague abstraction, difficult to establish objectively; moreover, it does not provide links to any and all subsidiary terms, but only at best to a specified few.

Thus, much in these arguments depends on traditional understanding of the terms involved. That is to say, the arguments are descriptive propositions as much as deductive processes. They give verbal expression to pre-existing traditions or traditions taking shape, as well as assist in the inference of

information. They are formulas designed to enshrine traditional principles and facilitate logical access to them.

It is perhaps historically in this way, by development from the *Beitzah* 5:2 example of a fortiori argument, that **the more general rabbinic definition of *qal vachomer*** emerged (presumably later)[108]. To take a modern statement, R. Chavel defines the argument as follows:

> "A form of reasoning by which a certain stricture applying to a minor matter is established as applying all the more to a major matter. Conversely, if a certain leniency applies to a major matter, it must apply all the more to the minor matter."[109]

This seems to refer primarily to the first two of our above examples, where the "minor matter" is a Festival day and the "major matter" is the Sabbath, and the "stricture" is the proscribing of some action and the "leniency" is its permission. Stricture, of course, suggests restriction, a negative; but it can here be taken to mean *more broadly* strictness or stringency and thus also refer to a prescription, just as leniency can also refer to an exemption. This is evident in the similar but more accurately worded description of a fortiori reasoning by R. Feigenbaum:

> "Any stringent ruling with regard to the lenient issue must be true of the stringent issue as well; [and] any lenient ruling regarding the stringent issue must be true with regard to the lenient matter as well."[110]

A similar description may also be found in Steinsaltz's *Reference Guide* and many other books. What this tells us is that

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108 This is of course a historical question worth investigating empirically.

109 Encyclopedia of Torah Thoughts, p. 27, n. 106.

110 *Understanding the Talmud*, p. 88. (Already quoted earlier.)

although the examples traditionally drawn from *Beitzah* 5:2 initially refer to *qal vachomer* inferences from prohibition to prohibition and from permission to permission, the rabbis also eventually admit the inferences from imperative to imperative and from exemption to exemption that we have just logically demonstrated.

Mielziner, by the way, shows explicit awareness of all four moods, to the extent that where the conclusion is "*assur*" (forbidden) he adds in brackets the alternative of "*chayav*" (imperative), and where the conclusion "*eino din sheassur*" (permitted) he adds in brackets the alternative of "*[eino din] shechayav*" (exempt). That is, he makes allowance for both the negative and the positive interpretations. He additionally gives us Talmudic examples of an imperative implying an imperative by such *qal vachomer*: in *Baba Metzia* 95a, it is inferred that the borrower must restore what was stolen (from him the borrower by some third party) to the lender; or again, in *Baba Metzia* 94b, that the borrower must restore what he (the borrower) lost to the lender.[111]

However, I am not sure exactly when, in documented history, the transition occurred from the principle specifically concerning Festivals and Sabbaths given in Mishna *Beitzah* 5:2, and perhaps other passages of the Mishna with a similar thrust, to the general formulations that authors like Mielziner, Chavel, Feigenbaum or Steinsaltz, give nowadays. I suspect the general formulations are not that modern, and may be found in the Talmud or other early literature. It would be very interesting to discover exactly how the progression from material principle to formal principle occurred, i.e. thanks to whom and on what dates.

To conclude this section, what we need to note well is that *no application of the dayo principle is needed or even possible* in cases of the sort here considered, since obviously an action is either forbidden or permitted, either imperative or exempted,

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111 *Introduction to the Talmud*, pp. 132-4. "Must restore" is, of course, an imperative, a positive instruction.

and there are no degrees in between. Admittedly, as regards permitted actions, some may be more 'desirable' or 'to be preferred' or 'recommended' than others, but these are not degrees of permission as such. Observe that we have no inclination, in the above inference from permission on the Sabbath to permission on a Festival, to regard the latter permission as of a lesser (or greater) degree than the former. Similarly with regard to exemption: it has in itself no degrees. Very often, the conclusion of a fortiori argument is like that – *without degree*. This is clearly purely a fortiori inference, and not to be confused with a crescendo inference.

I do not know if the rabbis explicitly made this distinction, between *qal vachomer* use with appeal to *dayo* principle and *qal vachomer* without relevance of *dayo*. As I have explained, the *dayo* principle is needed to block reasoning through the *midah keneged midah* (measure for measure) principle or similar 'proportional' propositions. It is not directly related to a fortiori argument as such; it is only indirectly related, to prevent a common penchant for 'proportionality' in special cases. In many cases, if not in most, there is no such propensity, because there is no parallel principle like *midah keneged midah* pressing us towards 'proportionality', and therefore the issue of *dayo* does not even arise. In truth, a fortiori reasoning is always the same, irrespective of whether there is 'proportionality' or not and whether *dayo* is thereafter used or not.

In view of all this, it is hard to understand why the Gemara commentary in Baba Qama 25a is so categorical in its treatment, giving the impression that a fortiori argument is necessarily a crescendo, and failing to explicitly note that the *dayo* principle, whether it is applied to all a crescendo arguments (as the Sages apparently hold, in the Gemara's view) or only to some (as R. Tarfon holds, according to the Gemara), is not applicable to purely a fortiori arguments, i.e. those which do not involve (explicitly or implicitly) an additional premise about 'proportionality'. Surely, if the author of this Gemara was aware of the full sweep of Talmudic discourse, he would have noticed

these distinctions and taken them into consideration in his commentary.[112]

6. Three additional Gemara arguments

Further on in tractate Baba Qama, on pp. 25b-26a, the Gemara proposes three a fortiori arguments in which the previously used propositions, about damage by horn and by tooth & foot on public and private grounds, are recycled and reshuffled in various ways, and the resulting conclusions are tested. For this reason, I have dubbed them "experimental" arguments. It is not immediately clear what the purpose(s) of these additional arguments might be. At first sight, their insertion here looks like a process of consistency checking. Possibly, the Gemara is using them to settle some legal matter specified in the larger context. Alternatively, it is merely exploring theoretical possibilities, trying different permutations and seeing where they lead. Or again, perhaps the Gemara is simply engaged in intellectual exercise for its own sake. In any case, we shall here try to throw some light on these arguments by means of logical analysis.

Before we do so, however, let us briefly recall here **the original Mishna (BQ 2:5) arguments** to which they refer, for this will facilitate our work. *The first* Mishna argument can be presented in several ways. Its premises and conclusion can be laid out as a set of if-then propositions spelling out the legal liability for damage by different causes in different domains, as follows:

If tooth & foot and public, then no liability (by extreme inversion of Ex. 22:4).

If tooth & foot and private, then full liability (Ex. 22:4).

If horn and public, then half liability (Ex. 21:35).

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[112] I have not here resolved the question as to whether in the Talmud (Mishna and Gemara) the language of purely a fortiori argument is different from that of a crescendo argument. Probably not, but it is worth looking into the matter empirically. I do so with regard to the Mishna in chapter 3.1 of the present volume, but only in English translation (not in the original Hebrew).

If horn and private, then full liability (R. Tarfon's putative conclusion).

If horn and private, then half liability (the Sages' conclusion, after application of *dayo* type I).

As we saw in our earlier detailed treatment, this basic argument can be recast in analogical, pro rata, a crescendo or purely a fortiori forms, as follows:

Analogy:

Just as, in the case of tooth & foot, damage in the private domain implies *more* legal liability than damage in the public domain (since the former implies full liability and the latter none).

Likewise, in the case of horn, damage in the private domain implies more legal liability than damage in the public domain (i.e. given half liability in the latter, conclude with full in the former).

Pro rata:

The degree of legal liability for damage is 'proportional' to the status of the property the damage is made on, with damage in the private domain implying more legal liability than damage in the public domain.

This is true of tooth and foot damage, for which liability is known to be nil in the public domain and full in the private domain.

Therefore, with regard to horn damage, for which liability is known to be half in the public domain, liability may be inferred to be full in the private domain.

A crescendo:

Private domain damage (P) is more important (R) than public domain damage (Q) [as we infer by extrapolation from tooth & foot damage (where liability is respectively full and half in the two domains) to all causes of damage, including horn].

Horn damage in the public domain (Q) is important (Rq) enough to make the payment half (Sq).

The payment due (S) is 'proportional' to the degree of legal liability (R).

Therefore, horn damage in the private domain (P) is important (Rp) enough to make the payment full (Sp = more than Sq).

Pure a fortiori:

Private domain damage (P) is more important (R) than public domain damage (Q) [as we infer by extrapolation from tooth & foot damage, to repeat].

Horn damage in the public domain (Q) is important (R) enough to make the payment half (S).

Therefore, horn damage in the private domain (P) is important (R) enough to make the payment half (S).

As we learned previously, the above analogical, pro rata or a crescendo arguments correspond to R. Tarfon's reasoning. The Mishna Sages reject his reasoning by means of a *dayo* objection of the first type, i.e. which denies the 'proportionality' assumed by their colleague. Effectively, then, the Sages advocate the purely a fortiori argument exclusively. *The second* Mishna argument can likewise be presented in several ways. As a set of if-then propositions, it looks as follows:

If tooth & foot and public, then no liability (by extreme inversion of Ex. 22:4).

If horn and public, then half liability (Ex. 21:35).

If tooth & foot and private, then full liability (Ex. 22:4).

If horn and private, then full liability (R. Tarfon's same putative conclusion).

If horn and private, then half liability (the Sages' conclusion, after application of *dayo* type II).

And here again, the basic argument can be recast in analogical, pro rata, a crescendo or purely a fortiori forms, as follows:

Analogy:

Just as, in the public domain, damage by horn implies *more* legal liability than damage by tooth & foot (since the former implies half liability and the latter none).

Likewise, in the private domain, damage by horn implies more legal liability than damage by tooth & foot (i.e. given full liability in the latter, conclude with full in the former).

Pro rata:

The degree of legal liability for damage is 'proportional' to the intentionality of the cause of damage, with damage by horn implying more legal liability than damage by tooth & foot.

This is true of the public domain, for which liability is known to be nil for damage by tooth and foot and half for damage by horn.

Therefore, with regard to the private domain, for which liability is known to be full for damage by tooth and foot, liability may be inferred to be full for damage by horn.

A crescendo:

Horn damage (P) is more important (R) than tooth & foot damage (Q) [as we infer by extrapolation from the public domain (where liability is respectively half and nil in the two cases) to all domains, including the private].

Tooth & foot damage in the private domain, (Q) is important (R) enough to make the payment full (S).

The payment due (S) is 'proportional' to the degree of legal liability (R).

Therefore, horn damage in the private domain (P) is important (R) enough to make the payment full (S).

Pure a fortiori:

Horn damage (P) is more important (R) than tooth & foot damage (Q) [as we infer by extrapolation from the public domain, to repeat].

Tooth & foot damage in the private domain, (Q) is important (R) enough to make the payment full (S).

Therefore, horn damage in the private domain (P) is important (R) enough to make the payment full (S).

As we found out previously, this time *all* of the above argument forms, including the purely a fortiori one, match R. Tarfon's reasoning. So, the Mishna Sages cannot reject his reasoning by means of a *dayo* objection of the first type, since 'proportionality' is not essential to its stringent conclusion of full liability. Nevertheless, they maintain their *dayo* objection, and again advocate a moderate conclusion of only half liability.

Therefore, the latter *dayo* objection must be of a second type. It is indeed, interdicting the inductive process of generalization through which the major premise of such argument is produced. We need not say more than that here, having already dealt with the issues involved at length.

Now, what is interesting is the way the Gemara takes the final conclusion of the Mishna Sages, namely that horn damage in the private domain implies half liability, and uses it as a constant premise in each of its three experimental arguments. This proposition is of course implied by Ex. 21:35, which specifies half liability for horn damage, without specifying a domain; but the Sages have effectively ruled that it is not a minimum but a maximum[113], i.e. it is to be read as *davka* half. Nevertheless, the Gemara here additionally uses a watered down version of Ex. 21:35 in two of its arguments (the first two).

Another proposition relevant to all three Gemara arguments is Ex. 22:4, which specifies full liability for tooth & foot damage in the private domain[114]. This proposition is repeated in two of the Gemara arguments (the first and last). In the Mishna, the liability for tooth & foot damage in the public domain is taken to be the extreme inverse of Ex. 22:4, i.e. no liability. And this is also assumed in two Gemara arguments (the last two); however, at the end of one Gemara argument (the first one), a moderate inversion is attempted, i.e. "not full" is taken to mean "half" rather than "nil."

Let us now examine **the three new arguments in the Gemara** more closely.

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[113] The Sages opinion is obviously accepted as henceforth binding.

[114] Which is taken to mean to the exclusion of the public domain. Such exclusion is based on *davka* interpretation of Scripture. That is, what is specified as applicable to private property is taken to include *only* private property, thus excluding public property. The thinking here is: 'Otherwise, why specifically mention private property?' In general, "If A and B, then C" does not formally exclude "If A and not B, then C"; taken together they imply "If A, then C." However, in the exclusive reading, "If A and B, then C" is taken to imply "If A and not B, then not C."

First experiment. The Gemara states:

> "But should we not let Tooth and Foot involve liability for damage done [even] on public ground because of the following a fortiori:
>
> If in the case of Horn, where [even] for damage done on the plaintiff's premises only half payment is involved, there is yet liability to pay for damage done on public ground,
>
> does it not necessarily follow that in the case of Tooth and Foot, where for damage done on the plaintiff's premises the payment is in full, there should be liability for damage done on public ground?
>
> — Scripture, however, says: And it shall feed in another man's field, excluding thus [damage done on] public ground. But have we ever suggested payment in full? It was only half payment that we were arguing for!"[115]

Note at the outset the sources of the premises in the Gemara's argument. One is the earlier conclusion of the Mishna Sages (via their *dayo* objections to R. Tarfon's claims) that for damage by horn on private property the ox owner's liability is half. The other two premises are more directly derived from the Torah (Ex. 22:4 and Ex. 21:35). The conclusion concerns damage by tooth & foot on public property.

Expressed as a set of brief if-then statements, this Gemara argument looks as follows. Note that the first two have in common the factor of private property.

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[115] Note that I have left out a sentence here, because I do not understand it and do not see its logical significance. This says: "*Scripture further says, And they shall divide the money of it [to indicate that this is confined to] 'the money of it' [i.e. the goring ox] but does not extend to compensation [for damage caused] by another ox.*" What has "another ox" got to do with it?

If horn and private, then half liability (ruling of the Mishna Sages).

If tooth & foot and private, then full liability (Ex. 22:4).

If horn and public, then *some* liability (from Ex. 21:35).

If tooth & foot and public, then *some* liability (putative conclusion).

Or in analogical format, as follows:

Just as, in the private domain, damage by tooth & foot implies more legal liability than damage by horn, since the former implies full and the latter half.

Likewise, in the public domain, damage by tooth & foot implies more legal liability than damage by horn; whence given that the latter implies *some* liability (note that although Ex. 21:35 implies a specific amount, the Gemara here deliberately avoids mentioning it in its premise), then the former implies *some* liability.

Or again, in purely a fortiori format, of positive antecedental form (minor to major), as follows[116]:

Tooth & foot damage (P) is more important (R) than horn damage (Q) [as we infer by extrapolation from their liabilities for damage in the private domain, respectively full and half, to all domains, including the public].

Horn damage in the public domain (Q) is important (R) enough to imply *some* liability (S).

Therefore, tooth & foot damage in the public domain (P) is important (R) enough to imply *some* liability (S).

The Gemara is thus justified in describing its argument here as *qal vachomer* (מקל וחומר), although this must be taken to refer to purely a fortiori argument and not a crescendo. We see clearly from the a fortiori formulation that the major premise is produced by a generalization, from the particular case of private property to all property, and its application to the particular case

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[116] Note that, to simplify, I here use "is more important" as equivalent to "implies more liability."

of public property. On this basis, the minor premise about unspecified liability for horn leads to the conclusion about unspecified liability for tooth & foot.

Now, the main question to ask here is: *why is the Gemara opting for such vague language?* There are actually two separate questions, here: (a) Why is its premise is deliberately vague, saying “there is yet liability” (חייבת), i.e. *some* liability, without specifying just how much liability even though the amount is already known from Ex. 21:35 to be precisely half? And (b) Why is its conclusion also vague, saying “there should be liability” (חייב), i.e. *some* liability, although the amount of this liability may be assumed by partial instead of full denial of Ex. 22:4 to be half? We shall now propose our answers.

The way to answer our question about the vagueness of the minor premise is to consider what would happen if more explicit language were to be used. To start with, had the Gemara used half liability as the consequent of the minor premise, and argued a crescendo instead of purely a fortiori, its conclusion would have been full liability for tooth & foot damage in the public domain, and thus contrary to Ex. 22:4, according to which full liability is reserved for tooth & foot damage in the private domain. This is evident in the following lines:

> Tooth & foot damage (P) is more important (R) than horn damage (Q) [as we infer by extrapolation, as before].
>
> Horn damage in the public domain (Q) is important (R) enough to imply half liability (S) (as specified in Ex. 21:35).
>
> The payment due (S) is ‘proportional’ to the degree of legal liability (R).
>
> Therefore, tooth & foot damage in the public domain (P) is important (R) enough to imply *full* liability (S) (contrary to the *davka* reading of Ex. 22:4).

Thus, the Gemara’s thinking (consciously or otherwise) in this respect was effectively as follows. Since the full liability conclusion is contrary to a Scriptural given (namely Ex. 22:4, which specifies full liability to be applicable only to private property) the argument must be rejected somehow. Since the major and minor premises are already accepted, and the inference process is clearly valid, the only way to reject the

argument is by denying the additional premise about 'proportionality' – or, in other words, by applying a *dayo* objection of type I. That is to say, the a crescendo argument is to be discarded, leaving only the underlying purely a fortiori argument. This leftover argument is similar to the Gemara's (previously mentioned), except that it infers half liability from half liability[117], instead of some liability from some liability.

Another route the Gemara may have tried is the following. As we learned from R. Tarfon, we can by judicious reshuffling of the premises obtain an alternative a fortiori argument. In the present case, this would be done as shown next. In terms of if-then statements, our competing argument would be as follows. Note that the first two statements, which we use to form our major premise, are both about horn damage.

If horn and private, then half liability (ruling of the Mishna Sages).

If horn and public, then half liability (Ex. 21:35).

If tooth & foot and private, then full liability (Ex. 22:4).

If tooth & foot and public, then full liability (putative conclusion, contrary to Ex. 22:4).

This can be recast in analogical form thusly:

Just as, in the case of horn, damage in the public domain implies *as much* legal liability as in the private domain (since both imply half liability).

Likewise, in the case of tooth & foot, damage in the public domain implies *as much* legal liability as in the private domain; whence given that the latter implies full liability, then the former implies full liability (contrary to Ex. 22:4, which specifies full liability to be applicable only to private property).

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[117] It is perhaps to this implicit a fortiori argument that the Soncino edition refers, when it explains (in a footnote) the Gemara's conclusion of half liability for tooth & foot damage in the public domain by saying: "On the analogy to Horn where the liability is only for half damages in the case of Tam. The Scriptural text may have been intended to exclude only full compensation."

More to the point, we can formulate it in purely a fortiori format as follows. Note that this argument is positive antecedental and *a pari* (i.e. egalitarian).

> Public domain damage (P) is as important (R) as private domain damage (Q) [as we infer by extrapolation from horn damage (where liability is half in both domains) to all causes of damage, including tooth & foot].
>
> Tooth & foot damage in the private domain (Q) is important (R) enough to imply full liability (S).
>
> Therefore, tooth & foot damage in the public domain (P) is important (R) enough to imply *full* liability (S) (contrary to Ex. 22:4).

Now, observe why this argument seems more secure than the preceding a crescendo. It also goes from minor to major; but since the minor premise predicates what is *already the maximum* amount allowable (namely, full liability), the conclusion has to predicate *the same maximum* amount (i.e. full liability). Yet here again the conclusion is contrary to a Scriptural given (Ex. 22:4, which specifies full liability to be applicable only to private property). Therefore, it must be rejected. The only way to do this is through a *dayo* objection of type II, i.e. by preventing the generalization that gave rise to its major premise from proceeding. The final conclusion will then again be half liability.

What the above suggests, then, is that the Gemara opted for vague language in the minor premise, speaking of liability indefinitely, because it knew or at least sensed that specifying half liability would in any event lead to a conclusion of full liability, contrary to Scripture; which conclusion would have to be prevented by application of *dayo* objections of both types. In the Judaic frame of reference, a conclusion contrary to what the Torah teaches is a conclusion contrary to 'fact', which must be prevented to avoid inconsistency. Apparently, then, rather than get involved in that long discussion, or *pilpul*, it opted for a vaguer statement of the minor premise, to arrive at its desired conclusion more directly.

As regards its vague conclusion, a minimum of reflection shows that the liability implied, though stated indefinitely, can only be half liability. This is evident already in the above two arguments

from the minor premise of half liability, since their conclusion of full liability is unacceptable because contrary to Scripture. However, we could arrive at the same result by working on the vague conclusion of the Gemara's own purely a fortiori argument (from some to some liability). Given the conclusion that tooth & foot damage on public property implies *some* liability, i.e. denies no liability, this *can only* mean half liability, since full liability is excluded by Ex. 22:4. This seemed so obvious to the Gemara that it did not even see any necessity to say it out loud.

As we have seen, according to the rabbis, based on Biblical practice, the variable "liability" allows in the present context for only three possible values; namely, no liability, half liability and full liability. Therefore, an indefinite amount of liability, i.e. *some* liability, which is the negation of no liability, means "half or full" liability. Therefore, to say "there is liability," meaning some liability, is not as open a statement as it might seem – it allows for only two possibilities, viz. half or full liability. So, if one of these is known to be false (in this case, with reference to the Torah), the other must be true. The latter argument is a disjunctive apodosis: "either this or that, but not this, therefore that."

Note well that the Gemara here proposes an alternative judgment on damage by tooth & foot on public property to that previously accepted (in the debate between R. Tarfon and the Sages). Previously, the Mishna and the Gemara interpreted Ex. 22:4 ("If a man… shall let his beast loose, and it feed in another man's field, etc."), which imposes full liability for tooth & foot damage on specifically private grounds, as implying that there is no liability for tooth & foot damage on public grounds. Here, the Gemara (logically enough) proposes an alternative reading for the latter case, such that "not full" is taken to mean "half" instead of the more extreme "nil," and it backs up this moderate reading by reasoning that so concludes.

Thus, the Gemara's use of vague language in its first argument was not some subterfuge relying on half-truths; it was just intended as a shortcut to a result that was in any case logically inevitable. The Gemara achieved its objective here, which was to establish that Ex. 22:4, which imposes full liability for tooth

& foot damage on private grounds, need not be taken to imply (as it was in the Mishna) that there is no liability for tooth & foot damage on public grounds; for the alternative of half liability is logically equally cogent. That the Gemara was consciously doing this is evident from its statement: "It was only half payment that we were arguing for!" At worst, the Gemara can be criticized for being too laconic; but its reasoning is sound.

Second experiment. The Gemara states:

> "But should we not let Tooth and Foot doing damage on the plaintiff's premises involve the liability for half damages only because of the following a fortiori:
>
> If in the case of Horn, where there is liability for damage done even on public ground, there is yet no more than half payment for damage done on the plaintiff's premises,
>
> does it not follow that in the case of Tooth and Foot, where there is exemption for damage done on public ground, the liability regarding damage done on the plaintiff's premises should be for half compensation [only]?[118]
>
> — Scripture says: He shall make restitution, meaning full compensation."

We should here again at the outset note that the Gemara's argument uses as a premise the earlier conclusion of the Mishna Sages (via their *dayo* objections to R. Tarfon's claims) that for damage by horn on private property the ox owner's liability is half. The other two premises are derived from the Torah as follows: one directly, from Ex. 21:35; and the other indirectly, by extreme inversion of Ex. 22:4 (by which I mean that "not full" is here taken to mean "nil" as in the Mishna, instead of "half" as

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[118] I have added the square brackets around this last "only," because it is not found in the original and therefore seems to be an interpolation by the Soncino edition translators.

proposed in the preceding experimental argument of the Gemara). The conclusion concerns damage by tooth & foot on private property. The Gemara demonstrates that a conclusion of half liability, contrary to the full liability given in Ex. 22:4, would follow from the said premises.

Expressed as a set of brief if-then statements, this Gemara argument looks as follows. Note that the first two have in common the factor of public property.

> If horn and public, then *some* liability (from Ex. 21:35).
>
> If tooth & foot and public, then no liability (by extreme inversion of Ex. 22:4).
>
> If horn and private, then only half liability (ruling of the Mishna Sages).
>
> If tooth & foot and private, then [only] half liability (putative conclusion, contrary to Ex. 22:4).

This can be expressed in analogical form, as follows. Note that I here use the term "exemption" in the sense of "freedom of liability," allowing for degrees of zero, half and total exemption; the term is thus intended as the reverse of the range of "liability."

> Just as, in the public domain, damage by tooth & foot implies more legal *exemption* than damage by horn, since the former implies no liability and the latter *some* liability (note that although we can infer from Ex. 21:35 the amount to be half, the Gemara here deliberately avoids specifying it in its premise).
>
> Likewise, in the private domain, damage by tooth & foot implies more legal exemption than damage by horn; whence given that the latter implies only half liability, then the former implies only half liability (contrary to Ex. 22:4, which imposes full liability for this).

We can represent the same argument in purely a fortiori form, as follows. Note the negative polarity of the middle term (R) used; this is necessary to ensure that tooth & foot damage emerge as the major term (P) and horn damage as the minor term (Q). The resulting argument is thus minor to major, positive antecedental.

> Tooth & foot damage (P) is more *un*important (R) than horn damage (Q) [as we infer by extrapolation from their liabilities

for damage in the public domain (respectively none and *some*) to all domains, including the private].

Horn damage in the private domain (Q) is unimportant (R) enough to imply only half liability (S).

Therefore, tooth & foot damage in the private domain (P) is unimportant (R) enough to imply only half liability (S) (contrary to Ex. 22:4, which imposes full liability for this).

The Gemara is thus justified in describing its argument here as *qal vachomer* (מק"ו), although again this should be understood to refer to purely a fortiori argument rather than a crescendo. We see clearly from the a fortiori formulation that the major premise is produced by a generalization, from the particular case of public property to all property, and its application to the particular case of private property. On this basis, the minor premise about half liability for horn leads to the conclusion about half liability for tooth & foot.

Thus, whether we reason analogically or purely a fortiori, we obtain a conclusion contrary to Scripture. Since the processes used are faultless, what this means is that one or more of the premises must be wrong. In order to try and understand where the problem lies, let us look again at the Gemara's formulation. The first question to ask (in view of what we learned in the previous case) is why does the Gemara say vaguely "there is liability" (חייבת) for damage by horn in the public domain, when it is known from Ex. 21:35 that the amount of liability is precisely half? Looking at the major premise of the above a fortiori argument, which is generalized from this information, it is clear that it would have made no difference to it if the Gemara had specified half liability. The argument by analogy would similarly be unaffected. So there seems to be no reason for the Gemara not to have said half[119].

Another question is why does the Gemara find it necessary to say "no more than" (אלא) half regarding the liability for damage by horn on private property? Until now, "half" has always meant

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119 Possibly it used vague language here simply to harmonize the language in this experiment with that in the preceding one.

precisely half, without need to specify that *only* half is intended. If more than half liability was possibly included in the term half, the meaning of it would have been "half or full," and this could be stated as before as indefinite "liability." Perhaps the answer is that if the liability for damage by horn on private property had been full, as R. Tarfon advocated, then the conclusion here would be full liability for damage by tooth and foot on private property. So, the Gemara is specifying "no more than half" merely to indicate that it is abiding by the ruling of the Mishna Sages, and not adopting the contrary opinion of R. Tarfon.

In fact, we could represent almost the same argument in a crescendo form, as follows. Note the similarities to the preceding purely a fortiori formulation, but also the totally different conclusion. Instead of half liability, the conclusion here is no liability. But the effect is the same, in that this is contrary to Ex. 22:4.

> Tooth & foot damage (P) is more *un*important (R) than horn damage (Q) [as we infer by extrapolation from their liabilities for damage in the public domain (respectively none and *some* (or more precisely half)) to all domains, including the private].
>
> Horn damage in the private domain (Q) is unimportant (R) enough to imply half liability (S).
>
> The payment due (S) is 'proportional' to the degree of legal liability (R).
>
> Therefore, tooth & foot damage in the private domain (P) is unimportant (R) enough to imply no liability (S) (contrary to Ex. 22:4, which imposes full liability for this).

If, in view of the conflict of this conclusion with Ex. 22:4, we interdicted the premise about 'proportionality' by means of a *dayo* objection of type I, we would obtain the same conclusion as the pure a fortiori argument above; namely, half liability. This would of course still leave us with a conclusion contrary to the Scriptural given of Ex. 22:4. Although the Gemara originally does not express this conclusion, however obtained, as "only half," it is interesting to note that the translator does add on the qualification of exclusion. This is no doubt to exclude "full" liability (rather than to exclude "no" liability), because this is the crux of the issue in this Gemara argument.

Now, this conclusion of half (i.e. not full) liability is especially troubling because the premises that give rise to it were previously regarded as quite acceptable. The major premise is based on Ex. 21:35 (whether we read it as half liability or more vaguely as some) and on the extreme inversion of Ex. 22:4 (i.e. reading not-full as nil, to the exclusion of half) taken for granted by all participants in the Mishna. And the minor premise is the ruling of the Sages in the Mishna, which is in any case implied in Ex. 21:35 (since this verse does not make an explicit distinction between public and private property). How then can these givens result in a conclusion contrary to Scripture, i.e. to Ex. 22:4? This is the difficulty.

Obviously, the problem must lie with the major premise of the a fortiori argument (whether non-proportional or proportional). The extrapolation of "Tooth & foot damage is more unimportant than horn damage" from public property to private property has to be interdicted by a *dayo* objection of type II, so as to avoid the antinomic conclusion. This could be considered as the intent of the final statement "Scripture says: He shall make restitution, meaning full compensation," although there is no explicit mention of *dayo* here. The Gemara is effectively saying: the conclusion cannot be right, therefore block it from happening. This is regular *reductio ad absurdum* reasoning.

We could also, by the way, obtain the conclusion of no liability by <u>purely a fortiori</u> argument (instead of a crescendo, as just shown), by imitating the Mishna's R. Tarfon and using another direction of generalization, as shown next. First, let us reshuffle the initial if-then statements, so that the ones we use to form our major premise are both about horn damage, as follows:

If horn and public, then half liability (Ex. 21:35).

If horn and private, then half liability (ruling of the Mishna Sages).

If tooth & foot and public, then no liability (by extreme inversion of Ex. 22:4).

If tooth & foot and private, then no liability (putative conclusion, contrary to Ex. 22:4).

Next, let us formulate the argument in analogical form, keeping to the language of exemption for symmetry with the previous formulation, as follows:

> Just as, in the case of horn, damage in the private domain implies *as much* legal exemption as in the public domain (since both imply half liability):
>
> So, in the case of tooth & foot, damage in the private domain implies as much legal exemption as damage in the public domain; whence given the latter implies no liability, then the former implies no liability (contrary to Ex. 22:4, which imposes full liability for this).

Lastly, we formulate the argument as a purely a fortiori one, of positive antecedental form (minor to major), as follows:

> Damage in the private domain (P) is as *un*important (R) as damage in the public domain (Q) [as we infer by extrapolation from horn damage (where liability is half in both domains) to all causes of damage, including tooth & foot].
>
> Tooth & foot damage in the public domain (Q) is unimportant (R) enough to imply no liability (S).
>
> Therefore, tooth & foot damage in the private domain (P) is unimportant (R) enough to imply no liability (S) (contrary to Ex. 22:4, which imposes full liability for this).

This argument seems more solid than the preceding a crescendo argument because it argues from no liability to no liability, rather than from half to none. So, it cannot be prevented by means of a *dayo* objection of type I. And yet its conclusion is the same, viz. no liability. Which poses a problem, since it is inconsistent with the Scriptural imposition of full liability (in Ex. 22:4). Here, then, we must resort to a *dayo* objection of type II, interdicting the generalization that led to the major premise. We might then be tempted to accept the next amount of half liability as the final result – but no, this is still contrary to Ex. 22:4, and so must be avoided too.

To sum up, the initial premises used in different ways in the various arguments we considered representing the Gemara's second experiment cannot readily be rejected, yet they lead to a conclusion contrary to Scripture. To prevent such paradoxical

result, we had to again resort to *dayo* objections of both types. This means that the initial premises are together viable provided we do not indulge in proportional thinking or in generalizations in relation to them. Our room for maneuver with them is severely limited; we must proceed with caution.

Third experiment. The Gemara states:

> "But should we not [on the other hand] let Horn doing damage on public ground involve no liability at all, because of the following a fortiori:
>
> If in the case of Tooth and Foot, where the payment for damage done on the plaintiff's premises is in full there is exemption for damage done on public ground.
>
> does it not follow that, in the case of Horn, where the payment for damage done on the plaintiff's premises is [only][120] half, there should be exemption for damage done on public ground?
>
> — Said R. Johanan: Scripture says. [And the dead also] they shall divide, to emphasise that in respect of half payment there is no distinction between public ground and private premises."

We can here again at the outset note that the Gemara's argument uses as a premise the earlier conclusion of the Mishna Sages (via their *dayo* objections to R. Tarfon's claims) that for damage by horn on private property the ox owner's liability is half. The other two premises are derived from the Torah as follows: one directly, from Ex. 22:4; and the other indirectly, by extreme inversion of Ex. 22:4 (by which I mean that "not full" is here taken to mean "nil" as in the Mishna, instead of "half" as proposed in the first experimental argument of the Gemara). The conclusion concerns damage by horn on public property. The

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[120] I have added the square brackets around this last "only," because it is not found in the original and therefore seems to be an interpolation by the Soncino edition translators.

Gemara demonstrates that a conclusion of no liability, contrary to the half liability given in Ex. 21:35, would follow from the said premises.

Expressed as a set of brief if-then statements, this Gemara argument looks as follows. Note that the first two have in common the factor of private property.

> If tooth & foot and private, then full liability (Ex. 22:4).
>
> If horn and private, then [only] half liability (ruling of the Mishna Sages).
>
> If tooth & foot and public, then no liability (by extreme inversion of Ex. 22:4).
>
> If horn and public, then no liability (putative conclusion, contrary to Ex. 21:35).

This can be expressed in analogical form, as follows. Note that I here use the term "exemption" in the sense of "freedom of liability," allowing for degrees of zero, half and total exemption; the term is thus intended as the reverse of the range of "liability."

> Just as, in the private domain, damage by horn implies more legal *exemption* than damage by tooth & foot, since the former implies [only] half liability and the latter full liability.
>
> Likewise, in the public domain, damage by horn implies more legal exemption than damage by tooth & foot; whence given that the latter implies no liability, then the former implies no liability (contrary to Ex. 21:35, which imposes half liability).

We can represent the same argument in purely a fortiori form, as follows. Note the negative polarity of the middle term (R) used; this is necessary to ensure that horn damage emerge as the major term (P) and tooth & foot damage as the minor term (Q). The resulting argument is thus minor to major, positive antecedental.

> Horn damage (P) is more *un*important (R) than tooth & foot damage (Q) [as we infer by extrapolation from private domain damage (for which the liabilities are half and full respectively) to all domains, including the public].
>
> Tooth & foot damage in the public domain (Q) is unimportant (R) enough to imply no liability (S).

> Therefore, horn damage in the public domain (P) is unimportant (R) enough to imply no liability (S) (contrary to Ex. 21:35, which imposes half liability).

The Gemara is thus justified in describing its argument here as *qal vachomer* (מק"ו), although again this should be understood to refer to purely a fortiori argument rather than a crescendo. We see clearly from the a fortiori formulation that the major premise is produced by a generalization, from the particular case of private property to all property, and its application to the particular case of public property. On this basis, the minor premise about no liability for tooth & foot leads to the conclusion about no liability for horn.

No 'proportionality' can be presumed here, for the simple reason that the minor premise and conclusion are already an extreme value (namely, no liability). Thus, an a crescendo argument with the same terms would be identical with the above purely a fortiori argument.

Manifestly, whether we reason analogically or purely a fortiori, we obtain a conclusion contrary to Scripture. Since the processes used are faultless, what this means is that one or more of the premises must be wrong. Examining the Gemara's formulation, we see that in the present case, unlike the preceding two, there is no ambiguous language. The word exemption (פטורה) is clearly intended here, in both its occurrences, in the sense of full exemption, i.e. zero liability.

It is noteworthy that, although the Gemara originally does not express the liability for damage by horn as "only half," the translator adds on the qualification of exclusion. But this is no doubt simply to exclude the "full" liability here due according to the dissenting opinion of R. Tarfon; and it does not seriously affect the argument, since if full were adopted instead of half, the major premise would become egalitarian, but the minor premise and conclusion would remain the same.

Now, this conclusion of no liability (instead of half) is obviously problematic, since the premises that give rise to it were previously regarded as quite acceptable. The major premise is based on Ex. 22:4 and on the ruling of the Sages in the Mishna, which is in any case implied in Ex. 21:35 (since this verse does

not make an explicit distinction between public and private property, as R. Johanan reminds us[121]). And the minor premise is based on the extreme inversion of Ex. 22:4 (i.e. reading not-full as nil, to the exclusion of half) taken for granted by all participants in the Mishna. How then can these givens result in a conclusion contrary to Scripture, i.e. to Ex. 21:35? This is the difficulty.

Obviously, the problem must lie with the major premise of the a fortiori argument. The extrapolation of "Horn damage is more unimportant than tooth & foot damage" from private property to public property has to be interdicted by a *dayo* objection of type II, so as to avoid the antinomic conclusion. This could be considered as the intent of the final statement concerning damage by horn that "in respect of half payment there is no distinction between public ground and private premises," although there is no explicit mention of *dayo* here. The Gemara is effectively saying: the conclusion cannot be right, therefore block it from happening. This is regular *reductio ad absurdum* reasoning.

Our next obvious move would be to investigate if a conclusion consistent with Scripture would be obtained by imitating the Mishna's R. Tarfon, and judiciously reshuffling the given information so as to attempt another direction of generalization. This would proceed as follows. First, we reshuffle the initial if-then statements, so that the ones we use to form our major premise are both about tooth & foot damage, as follows:

If tooth & foot and private, then full liability (Ex. 22:4).

If tooth & foot and public, then no liability (by extreme inversion of Ex. 22:4).

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[121] More precisely, R. Johanan, an early authority, interprets the Scriptural verse "[And the dead also] they shall divide," which is the last sentence of Ex. 21:35, to mean that half liability applies to the public domain as well as to the private domain. Taken literally, of course, this verse does not have exactly that meaning (i.e. another reading is conceivable); but it is reasonable to suppose that Ex. 21:35 as a whole applies to both domains, since neither is explicitly specified or excluded.

If horn and private, then [only] half liability (ruling of the Mishna Sages).

If horn and public, then [only] half liability (conclusion in accord with Ex. 21:35).

Next, we formulate the argument in analogical form, keeping to the language of exemption for symmetry with the previous formulation, as follows:

Just as, in the case of tooth & foot, damage in the public domain implies more legal exemption than in the private domain (since these respectively imply no and full liability):

So, in the case of horn, damage in the public domain implies more legal exemption than damage in the private domain; whence given the latter implies only half liability, then the former implies only half liability (in accord with Ex. 21:35).

Lastly, we formulate the argument as a purely a fortiori one, of positive antecedental form (minor to major), as follows:

Damage in the public domain (P) is more *un*important (R) than damage in the private domain (Q) [as we infer by extrapolation from tooth & foot damage (for which liability is respectively nil and full) to all causes of damage, including horn].

Horn damage in the private domain (Q) is unimportant (R) enough to imply only half liability (S).

Therefore, horn damage in the public domain (P) is unimportant (R) enough to imply only half liability (S) (in accord with Ex. 21:35).

However, before we can adopt this purely a fortiori argument we must look into the corresponding a crescendo argument. The latter is as follows:

Damage in the public domain (P) is more *un*important (R) than damage in the private domain (Q) [as we infer by extrapolation from tooth & foot damage (for which liability is respectively nil and full) to all causes of damage, including horn].

Horn damage in the private domain (Q) is unimportant (R) enough to imply half liability (S).

> The payment due (S) is 'proportional' to the degree of legal liability (R).
>
> Therefore, horn damage in the public domain (P) is unimportant (R) enough to imply no liability (S) (contrary to Ex. 21:35, which imposes half liability).

Evidently, arguing a crescendo with these premise results in the undesirable conclusion of no liability for horn damage in the public domain, which is contrary to Scripture (Ex. 21:35). This being the case, such a crescendo argument has to be interdicted by means of a *dayo* objection of type I. So doing, we return to the purely a fortiori argument formulated just before, which yields the conclusion of half liability. Since the latter conclusion is consistent with Scripture (Ex. 31.35), we have no need to interdict it by means of a *dayo* objection of type II. We can therefore adopt the said a fortiori argument as a viable alternative to the third one proposed by the Gemara, which yielded an unacceptable conclusion.

From this we see that, while the Gemara's third experiment is in many ways similar to its second, they are ultimately quite different, in that while the second experiment leaves us without a viable a fortiori counter-argument, the third one does have a viable a fortiori counter-argument. It is surprising that the Gemara did not remark on this significant difference, but remained content with simply listing two arguments with conclusions inconsistent with Scriptural givens.

To sum up. The Gemara's three experimental arguments have in common as a premise the conclusion of the Sages in the Mishna that damage by horn in the private domain implies half liability. The arguments then seek to determine what conclusion can be drawn from that constant premise about the other situations, viz. tooth & foot damage in the public and private domains, and horn damage in the public domain, respectively. The purpose of the exercise is apparently to compare such conclusions to, respectively, an assumption in the Mishna (viz. that tooth & foot damage on public property implies no liability, based on extreme inversion of Ex. 22:4) and to certain Scriptural givens (viz. Ex. 22:4, which imposes full liability for tooth &

foot damage on private property, and Ex. 21:35, which imposes half liability for horn damage on public property).

The Gemara's logical virtuosity in proposing these three arguments is rather impressive, considering its lack of formal tools. Although the above proposed explicit logical analyses of the three arguments are absent in the Gemara, similar analyses may be reasonably be supposed to have consciously or subconsciously colored the Gemara's thinking, for otherwise it would be difficult to explain its intent in presenting these arguments. Note in particular that though the *dayo* principle is nowhere here mentioned by the Gemara, both versions of it are very present in the background of its discourse.[122]

7. Assessment of the Talmud's logic

We have in the preceding pages examined in great detail, using up to date methods of formal logic, the a fortiori reasoning of both the Mishna and the Gemara, or at least their reasoning in the immediate vicinity of the present *sugya*[123] (i.e. mBQ 2:5 and bBQ 25a). We judged these texts on their own merits, note well, and not through the prism of later commentaries. Our general conclusion may well be that both the earlier and later Talmudic sages, the Tannaim and the Amoraim, were amazingly powerful logic practitioners, even if they were not great theoreticians. Judging by the Talmudic material we have looked at here, their reasoning seems on the whole sound, even if too often much is left unstated.

What is amazing is precisely that, albeit the brevity of their statements, the people involved were able to reason with such accuracy. I am amazed because, with my pedestrian mind,

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[122] It should be noted in passing that all the a fortiori arguments explicitly formulated by the Gemara in the present context are pure; none are a crescendo. This implies that the Gemara does (unconsciously if not consciously) admit that some a fortiori arguments are not a crescendo (unlike the *baraita* it quotes earlier on, which seems to suggest that a fortiori argument is always a crescendo).

[123] A *sugya* is a portion of the Talmud dealing with a specific topic.

without reference to formal methods and without full exposition of all implicit discourse, I would be unable to arrive at similar results with equal aplomb. Nevertheless, it must be said and admitted that self-assurance, however esthetically impressive, is not enough. Logic is not just an art; it is first of all a science. To reason correctly is good; but to know just why one's reasoning is correct is much better. To reason correctly based only on intuition, i.e. on immediate logical insight, is not as convincing as to do so based on broad theoretical understanding, i.e. on abstract study of the exact conditions for correct reasoning (even if, to be sure, such study is also based on the same faculty of logical insight). In the former case, there is some reliance on luck; in the latter, nothing is left to chance.

Comparing now the logic in the Mishna to that in the Gemara, certain trends are evident. The Mishna's thinking is more straightforward; the Gemara's thinking is more tortuous. In the Mishna, R. Tarfon puts forward an argument in support of his contention that the legal liability for damage by an ox on private property ought to be full compensation. This argument is not accepted by his colleagues, the Sages, apparently because it relies on proportionality. R. Tarfon then very skillfully proposes an alternative argument, which is not open to such objection. The Sages nevertheless reject the latter argument, apparently by resorting to another kind of objection.

R. Tarfon's two arguments are traditionally presumed to be *qal vachomer*, i.e. a fortiori arguments, although just what that means (besides the descriptive name) is nowhere defined. In fact, looking at these arguments very objectively, they could be interpreted as arguments by analogy or more precisely as arguments pro rata, or as arguments a crescendo (i.e. proportional a fortiori) or as purely a fortiori arguments. Moreover, there is no attempt to theoretically validate these arguments. But in any event, they are intuitively quite reasonable; and it seems from the text that it is on this logical basis that R. Tarfon advocates them.

The Sages' objections, labeled *dayo* (from their opening word, which means "it is enough") are not likewise justified by any theoretical discussion. What is clear after our detailed analysis is that they are not essentially logical objections; they are not

indicative of breaches of deductive logic, though they might be postulated to signify some inductive restraint. They should rather be viewed as arbitrary decisions (I here use the term 'arbitrary' non-pejoratively, in the sense of 'resorting to arbitration') by the Sages themselves, based on certain ethical considerations. It can reasonably be doubted that the Sages are here evoking some ancient tradition, perhaps a teaching dating back from Sinai, because R. Tarfon, their colleague and equal, evidently does not preemptively take it into consideration in his two arguments.

Turning now to the Gemara, i.e. the later Talmudic commentary on this passage of the Mishna, we find a very different frame of mind. One would expect the Gemara to initiate a thorough theoretical reflection on R. Tarfon's two lines of reasoning and the difference in the Sages' *dayo* objections to them. But no; the Gemara ignores these burning issues and goes off on a tangent, focusing on the relatively not very relevant issue of the distance between R. Tarfon's and the Sages' positions. Apparently, the Gemara's only concern here is whether R. Tarfon knew and agreed with the Sages' *dayo* considerations. Obviously, he could not have fully agreed with them, since his conclusions differ from theirs; so, the question is how far their views on the *dayo* principle differ.

In pursuit of the answer to that question, the Gemara engages is a very complicated scenario of its own, according to which R. Tarfon advocated a more conditional *dayo* principle than the Sages did. Briefly put, it proposes a distinction (which it attributes to R. Tarfon ex post facto) between applications of the *dayo* principle that "would defeat the purpose of" the *qal vachomer* and those that "would *not* defeat" it. In the former case, the 'proportional' gain made possible by an a fortiori argument (taken by the Gemara, on the authority of a *baraita*, to mean a crescendo argument) would be wiped out by *dayo*, so it should not be applied; whereas in the latter case, it would not by wiped out by *dayo*, so it may be applied.

In defense of this fanciful scenario, the Gemara proposes different readings of a Torah text, viz. Num. 12:14-15, by R. Tarfon and the Sages. However, both these readings are far removed from the plain meaning of the text, in that they do not

take all of it into consideration. Most important, the view attributed by the Gemara to R. Tarfon assumes an a fortiori argument to be intended in the text while discarding the verses that would justify such assumption! It thus mendaciously infers an a crescendo conclusion of fourteen days ex nihilo, instead of with reference to the textual given of seven days. This means that the Gemara's whole idea, of a distinction between applications of the *dayo* principle that "would defeat the purpose of" the *qal vachomer* and those that "would *not* defeat" it, is an outright deception. The bottom line is that the Gemara in fact fails to achieve its stated goal of harmonizing the opinions of the Mishna contestants.

Now, this is a bit of a shock, but not too astonishing. Anyone who has studied the Gemara to any extent can see for himself that its thinking, though based on the Mishna to some extent, is often more convoluted and open to doubt. Of course, more fundamentalist readers would never agree with such an assessment, but instead insist that in such cases the Gemara has intellectual intentions and ways too sublime for us ornery folk to grasp. But we, while making no claim to infallibility or omniscience, do claim to be honest and lucid, and stand by what is evident to the senses and to reason. In the present case, the Gemara's ideas must obviously not be confused with the discourses found in the Mishna. With regard to this, the following general comment of Louis Jacobs in *Rabbinic Thought in the Talmud* (pp. 17-18) is apropos:

> "A much discussed question is whether the interpretations of the Mishnah found in the Gemara are really a reading of ideas into the Mishnah or whether they are authentic accounts of what the Mishnah itself intended. Now students of the Mishnah in the Middle Ages noted that some, at least, of the Gemara's interpretations of the Mishnah are so far-fetched and artificial that they cannot possibly be accepted as real interpretations of what the Mishnah intends to say, which is why Maimonides and other early commentators were prepared to disregard the Gemara to interpret the Mishnah on its own terms. To conclude

> from this that the Gemara has, at times, 'misunderstood' the Mishnah is precarious. It is possible that the Gemara, at times, consciously departs from the plain meaning of the Mishnah in order to produce its own original work…."

There is no harm, in our view, in producing original work, provided it is openly acknowledged as such. Unfortunately, the traditionalist's way of thinking is that what he reads into a text must have been intended in the original; to him, interpretation is a sort of deduction. This is applicable at all levels – from the Mishna reading meanings into the Torah, to the Gemara reading them into the Mishna, to later commentators reading them into the Talmud[124]. And this applies to both halakhic and haggadic material. What is sorely needed to cure this serious intellectual malady is to understand *the inductive nature of interpretation*. An interpretation is a theory designed to fit the 'facts' that the given text constitutes. Its logical status is that of a hypothesis, which may and probably does have competing hypotheses. Rarely is an explanation the only conceivable hypothesis, though this happens occasionally. Therefore, a reading should always be acknowledged to be *one possible* interpretation, even if it fits the given data.

But in the case under consideration, as we have definitely shown, the Gemara's proposed interpretation of the Mishna simply does not convince. It is not a credible theory, because it is built on illusion, on make-believe. Furthermore, the Gemara does not demonstrate its having noticed and understood the differences between R. Tarfon's two arguments and between the Sages' two *dayo* objections to them. That later commentators have projected such understanding into the Gemara does not prove that the Gemara in fact had it, only at best that it might have. Such ex post facto attribution of knowledge to the Gemara is only evidence of the faith later commentators had in it. The

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124 Not to mention the Bible writer(s) interpreting empirical givens.

Gemara itself does not explicitly remark on these crucial issues, nor even implicitly suggest them.

It is interesting to note that, whereas the Mishna participants are involved in a purely legal debate, without stepping aside and reflecting on the methodological issues it implies, the Gemara does, in an attempt to clarify the primary, legal discussion, initiate a secondary, more methodological reflection. The latter discourse is intended as an accessory to the former, in that the legal conclusions that might be drawn depend on the methodological lessons learned. Thus, we can say that there is in the Gemara a *sugya* within a *sugya*, or there are two intertwined layers of discussion – the main one being legalistic in content, whereas the accessory one is methodological in content. The problem is that, although the Gemara could have used this opportunity to develop a deep reflection on the methodological issues involved, it disappointingly engaged in a very tangential and artificial discourse, driven by quite ideological considerations.

The present work being a treatise on logic, with an emphasis on a fortiori logic, our concern is naturally with the methodological topic of conversation; we are not really interested in the legal topic except possibly as an example. I personally have no legal axe to grind; I am not out to modify or overturn any halakhah. I certainly have no desire to put down anyone, either. Our interest in this research is relatively abstract, and certainly impartial. Our present study is aimed at logic theory and history; it is not essentially Talmudic in orientation, in contradistinction to the rabbis, whose main interest is always legal rather than logical. Nevertheless, we had to consider the legal debate in some detail, since it houses information we needed for historical purposes and to empirically judge the level of rabbinical understanding of a fortiori reasoning.

The author of the Gemara commentary we have studied is obviously someone with an intelligent, imaginative and logically sharp mind. But it is not an entirely scientific mind, which frankly considers all alternatives, lays out all the pros and cons, and judges the matter fairly in accord with objective standards. It is an authoritarian mind, which therefore functions to some extent manipulatively. The Gemara's author does not derive a

conclusion from given premises in an unbiased manner; he starts with a desired conclusion and proceeds to give the impression of having proven it by intricate argument. He is satisfied with the result, even though he in fact did not prove it, either because he fools himself or because he assumes no one would notice the logical trickery involved in his argument and dare cry foul. In the latter event, he relies on the psychology denounced in H. C. Anderson's *The Emperor's New Clothes*.

What is evident looking at Baba Qama 25a is that *the Mishna's narrative and that of the Gemara are quite distinct*. The Gemara presents itself as a mere conduit, authoritatively clarifying and explaining the Mishna – but it speaks for itself alone. There is no evidence that it truly represents the views of R. Tarfon and the Sages. When the Gemara speaks in their names, it is just telling us what it thinks they said or meant. The thesis the Gemara presents must be treated as just a hypothesis, even as a mere speculation, since there is no way to establish its historicity. The dialogues it puts forward are imaginary. Its argument is rhetorical and not logical.

The Gemara's doctrinal goal seems to be to reconcile the seemingly antagonistic positions of the participants in the Mishna, i.e. R. Tarfon and the Sages. This is in accord, we may remark in passing, with the general rabbinical dogma that everything a Talmudic rabbi (or indeed an important later rabbi) says is essentially right, even if it seems to conflict with what others say. This doctrine that "the Torah has seventy facets" presumably arose ex post facto, first implicitly and then explicitly, perhaps somewhere mid-course in the Talmud, maybe only in the Gemara (when exactly, I do not know[125]). In any case,

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[125] The explicit sentence is found in *Bamidbar (Numbers) Rabbah* 13:15, an 11th or 12th century CE midrash. But the implicit concept is no doubt much earlier. I would guess that it is a viewpoint of the Amoraim with regard to the Tannaim. It is essentially an expression of absolute faith in the tradition as handed down. The philosophic (logical, epistemological, ontological) significance of such a doctrine needs to be reflected on. Can conflicting viewpoints all be true?

it clearly plays an active role in the present portion of the Gemara, and this is important to keep in mind.

To repeat, the Gemara's treatment of the Mishna is quite superficial, failing to spot and take into consideration important details in the proof-text. The Gemara cheerfully refers to the Miriam story as its model for understanding the Mishna, failing to notice that though this passage of the Torah can be used to throw light on the first argument of the Mishna, it is useless with regard to the second. Moreover, the Gemara not having even tried to make a preparatory theoretical analysis of *qal vachomer*, fails to realize the different possibilities of interpretation inherent in the Mishna. It takes for granted without reflection that the *qal vachomer* inferences in the Mishna are all 'proportional', and does not see the possibility in it of purely a fortiori arguments or even *non* a fortiori arguments.

The Gemara then embarks on a quite abstruse theory of *qal vachomer*, which it attributes to R. Tarfon, according to which (in positive subjectal a fortiori argument) a conclusion can only be drawn from a minor premise with the same subject. The Gemara does not notice that this imagined narrative is not in accord with what is explicitly given in the Mishna, let alone realize that it has no basis in formal logic. It does this to justify making a distinction between the argument implied in the Miriam story and the argument (it only perceives one, the first) given in the Mishna, so as to explain the difference of opinion there between R. Tarfon and the Sages in relation to a presumed *dayo* principle. Furthermore, in attempting to depict this theory, the Gemara has R. Tarfon drawing an alleged *qal vachomer* conclusion from no premises at all when he applies it to the Miriam story.

The Gemara's general idea that the Miriam story contains an a crescendo conclusion of fourteen days restricted by a *dayo* principle to seven days (rather than a straight a fortiori argument with a conclusion of seven days) is still *not unthinkable*, note well. Even though the Gemara does not admit v. 14a (about offending one's father) as a premise of this argument, and takes v. 14b (about seven days quarantine) as its final conclusion, the argument can be *imagined* as occurring in between these verses. It must however be stressed that, contrary to what the Gemara

claims, there is no actual concrete hint of this scenario in the Biblical text. Even a purely (i.e. non-proportional) a fortiori reading is open to debate; all the more so an a crescendo one. Consequently, any claim that the passage points to a *dayo* principle is also open to debate.

The a fortiori reading is not inevitable; but it is a reasonable assumption, provided it is made to explain the connection between the first and second part of v. 14. Note well that the a fortiori argument is not just used to infer a number of days, but especially the punishment of isolation away from the community. The seven days prescribed are only a qualification of this predicate, serving to quantify the penalty; they are not the main issue of the argument. Thus, the final exchange in the Gemara between R. Tarfon and the Sages, regarding where in the Biblical text the alleged two sets of "seven days" come into play focuses on a side issue, diverting attention from the main one. The Gemara gives the impression that the *qal vachomer* is all about numbers of days; this is misleading.

Our wisest course is to blame the Gemara alone for these various rationalizations. The Gemara is plainly indulging in sophistry, masquerading as rational discourse. Its narrative is an obvious and absurd invention, which has little to do with the Mishna's. If we accept the scenario the Gemara advocates, we would be unfairly imputing the errors of reasoning it commits to R. Tarfon and the Sages. We cannot justify lumping together the players in the Mishna with those perhaps two or three centuries later (and some five hundred miles away) in the Gemara, just out of some ideological desire to make them appear to all speak with one voice. It is better to blame the author of this Gemara in particular for them than to insist they are true and embarrass everyone else! These very critical remarks of mine are sure to revolt traditional Talmudists, but they are unavoidable.[126]

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[126] It is not unthinkable that the Mishna and Gemara under scrutiny have the same views, but the data at hand phenomenologically does not justify such an extreme judgment. We are duty bound to look at the matter more subtly, and keep track of who said what and when, so that we can pinpoint more precisely who is in error and where, and

I am, of course, well aware that such statements *undermine rabbinical authority*. We can say, having found such casuistry, that the rabbis are *not always* right, i.e. that their logic is not infallible. But I knew this already, having uncovered much problematic reasoning by them in the course of my earlier research on rabbinic hermeneutics, as detailed in my JL[127]. Many more instances are uncovered in AFL; see for examples the fallacies discussed in chapters 3.4, 9.7, and especially 18.2.

The issue is *how often* do they reason incorrectly? This question cannot be answered offhand but requires systematic and thorough research throughout Talmudic literature – by competent researchers, I might add (for someone who does not know logic much better than them cannot judge theirs). If errors are only occasional, that is surely not too serious, since we are all human beings with limitations; if they are very frequent, that is certainly quite serious, since some inexcusable negligence is involved. It might be possible to lay the blame for all or most errors found on some specific rabbis. This would somewhat improve the logical credibility of the rabbis collectively, although we could still wonder why the errors were not spotted and corrected by other rabbis.

In any case, our approach as logicians must be objective and impartial, and not swayed by any imagined or actual threat of hostility and rejection. From a metaphysical point of view, if God is the ultimate reality of the world we experience, and the meaning of human life is to tend towards Him, then truth is a paramount value and honesty is an indispensable virtue. There is no rational excuse for evading or stonewalling, let alone opposing and denigrating, just criticism. It would be unrealistic to expect utter perfection from any human being, even if he is an

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judge with greater accuracy. This is the scientifically sound approach, and it is also more favorable to the honor of the rabbis. It is preferable by far, and is the policy I have adopted.

[127] See chapter 8 of the present volume. See for instance my doubts regarding the ‘freedom’ of terms (*mufneh*) doctrine relative to *gezerah shavah*; this issue arises in the present Gemara on p. 25b, by the way.

important rabbi. When we come across logical faults, we should not deny them, but humbly admit them and try to correct them. While some might consider criticism of rabbinical arguments as cause for condemnation, we should rather view such events as welcome opportunities for improvement.

By this I mean that once we realize and admit that Talmudic and more broadly rabbinic logic is not inerrant – but sometimes debatable, contrived or erroneous – we open a safe door to halakhic review and revision. This of course cannot be taken as a blanket license for general change in Judaism as convenient; but there may be circumscribed opportunities for evolution based on ad hoc logical analysis. For the law must surely be in accord not only with empirical scientific knowledge of nature and history, but also with logic. Just as ignorance of the former is bound to lead to error in law, so is faulty logic also bound to lead to such error.

One of the major rabbinical authorities of modern times, R. Moses Sofer (Germany, 1762-1839) wrote this about logic (*higayon*): "whoever mixes words of logic with matters of Torah offends against the law of: 'Thou shalt not plough with an ox and an ass together' [Deut. 22:10]."[128] But logic is not, as this farfetched statement suggests, something arbitrary that we have a choice about using or not. Mentally, we are of course able disregard it; but intellectually, if we are honest, we cannot do that, because logic is our main means for verifying and certifying the truthfulness and consistency of our judgments. If any verse of the Torah is to be brought to bear in this matter, it is rather this: "Thou shalt not have in thy bag diverse weights" (Deut. 25:13). But there is no need for that; it is obvious.

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[128] In *Hatam Sofer, OH*, No. 51. Quoted by Louis Jacobs, in *A Tree of Life: Diversity, Flexibility and Creativity in Jewish Law*, p. 8. It is true that earlier authorities like Maimonides or Nachmanides defended the use of logic in Torah related contexts – but they lived in a period when the dangers to religion inherent in strict logical scrutiny were not yet known. R. Sofer was contending with the *Haskalah*, the modern Jewish Enlightenment critics.

Apologists for religion reproach secular scientific knowledge of nature and history for varying in time. They suggest that such variation is proof of its unreliability. But this is of course a spurious argument. Scientific knowledge varies because it is essentially inductive, freely and dynamically adapting to new empirical discovery and rational review. This is not a fault or weakness – it is the very virtue of science. The truly scientific view[129] at any point in time is comparatively *the best* hypothesis human beings as a group have to offer. That it may later change does not make it any the less 'the best' at the time concerned. Certainly, it is always better than a static hypothesis based on religious dogma that is out of touch with empirical fact and rational scrutiny.

Browbeating is not a form of proof. Religion must learn to humbly adapt to scientific change. This would certainly not be the end of religion, because religion is a necessary expression and instrument of human spirituality. See how those who lost it suffer, from the lack of direction in their lives. Just as science makes possible the accumulation and transmission of human knowledge of nature and history, so religion makes possible the accumulation and transmission of human knowledge of spirituality. Of course, the latter tends to be more plural than the former, because spirituality allows for many paths. But in any case, whatever the chosen path, empirical science and logic must be taken into consideration to ensure its full truth.

8. The syllogistic Midot

As regards syllogism, it is also naturally found in rabbinic thinking and even within many of their hermeneutic techniques (*midot*). This is said to contradict the claim of many

[129] Of course, by scientific, I mean strictly scientific – and not pseudo-scientific pronouncements by scientists (in physics, biology or psychology) about having 'proved' the non-existence of God or of soul or of volition or even of consciousness.

commentators that none of the rabbinical hermeneutic techniques are syllogistic.

This position, for instance, is to some extent found in Louis Jacobs' treatment, insofar as the only rabbinic argument he sees as syllogistic is the one referred to as *ha-kol.* In his *Studies* (1961), he says: "There is a form of Talmudic reasoning which has no connection with the *qal wa-chomer* but bears a remarkable affinity to the Syllogism;" and he goes further in a footnote, saying: "the '*ha-kol*' formula… is identical with the Syllogism," and giving as example the following argument implied in *Avot* 6:3:

"He who learns from his fellow has to pay him honour;

I have learned from my fellow;

Therefore, I am obliged to pay him honour."

Michael Avraham, for his part, asserts categorically (in the English abstract of a 1992 Hebrew paper) that none of the 13 principles of R. Ishmael are syllogistic; as he puts it: "the Kal Vachomer – *like the rest of the 13 'Middot'* – is not a syllogism" (my italics). This opinion is apparently not new, judging by a statement made by Aviram Ravitsky (my italics):

> "Maimonides viewed most of the halakhic world as conventional, and this view enabled him to treat the halakhic arguments as dialectical ones, although *he did not think that halakhic arguments could be reduced to syllogistic figures*."[130]

But in my *Judaic Logic* (1995), I show that many of the thirteen *midot* of R. Ishmael involve syllogistic thought processes. For a start, a fortiori argument is in part based on hypothetical syllogism. Syllogistic reasoning is implicit in the *midot* dealing with the scope of terms, collectively called *klalim uphratim*

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[130] See his essay: "Halakhic Arguments as Dialectical Arguments and Exegetical Principles as Aristotelian Topoi in Maimonides' Philosophy." In *Tarbits*, 73 (2004), p. 219.

(rules 4-7), insofar as these have to do with subsumption and exclusion of cases in classes[131]. But more to the point, most of the *midot* dealing with harmonization (specifically the rules 8-11) are clearly syllogistic, so much so that they can be represented and resolved diagrammatically. While my work on a fortiori argument has attracted some attention, my work on these harmonization *midot* has apparently not been noticed. For this reason, I think it useful to reiterate some of these findings in the present context, to show how a lot of rabbinic thinking is syllogistic.

The first three (actually, four) of the principles of R. Ishmael concerned with harmonization begin with the phrase ***kol davar shehayah bikhlal veyatsa...***, meaning literally "anything which was in a generality and came out...". Broadly put, in formal terms, these rules are concerned with the following exegetic situation:

Given the three premises (#s 1, 2, 3), common to the four harmonization rules 8a, 8b, 9, 10:

All S1 are P1(common **major** premise, #1),

and All S2 are P2 (common **minor** premise, #2),

where All S2 are S1, but not all S1 are S2 (common **subjectal** premise, #3),

and the fourth premise (#4), as applicable in each of these rules:

P1 and P2 are in some relation *f*{P1, P2} (d) (distinctive **predicatal** premise, #4):

- *In rule No. 8a*, P2 implies but is not implied by P1; that is:

  All P2 are P1, but not all P1 are P2.

- *In rule No. 8b*, P1 implies P2 (and P2 may or not imply P1); that is:

  All P1 are P2 (whether All P2 are P1 or some P2 are not P1).

- *In rule No. 9*, P1 and P2 are otherwise compatible; that is:

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[131] R. Akiva's competing principles of *ribbui umiut* could also be argued to suggest syllogistic reasoning. For interesting examples, see Nissan Mendel, pp. 100-102.

Some P1 are P2 and some P1 are not P2; some P2 are P1 and some P2 are not P1.[132]

- *In rule No. 10*, P1 and P2 are incompatible; that is:

  No P1 is P2 and No P2 is P1.[133]

What, other than the above given, are resulting relations (conclusions)?

Between S1 and P2 (this is the primary issue, #5);

and (secondarily) between S2 and P1, and between S1 and P1, and between S2 and P2.

We can for a start, by means of syllogism, draw the following conclusions, common to all four rules, from the first three premises, without reference to the fourth premise:

- From the minor and subjectal premises, Some S1 are P2 (mood 3/AAI).
- From the major and subjectal premises, All S2 are P1 (mood 1/AAA).
- From the major and subjectal premises, Some P1 are not S2 (mood 3/OAO).

What this means is that, no matter which predicatal premise is used, it cannot logically yield a conclusion incompatible with 'Some S1 are P2'. The following specifies what can additionally be said in each of the four rules under scrutiny (the sources and discussion of the examples here proposed are given ad loc in JL):

- *In rule No. 8a*, nothing further about S1 and P2 can be deductively inferred; yet R. Ishmael apparently claims 'All S1 are P2' (which is too much). *For example*: A sorceress (or by extension, a sorcerer) is liable to the death penalty (#1); a male or female medium or necromancer is liable to death by stoning (#2); a male or female medium or necromancer is a sorcerer or sorceress (#3); death by stoning

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[132] Of course, 'some P1 are P2' and 'some P2 are P1' imply each other.

[133] Of course,' no P1 is P2' and 'no P2 is P1' imply each other.

is a species of death penalty (#4); therefore, all sorts of sorcerers or sorceresses are liable to be stoned (#5).

- *In rule No. 8b*, we can syllogistically infer (mood 1/AAA) that 'All S1 are P2'; yet R. Ishmael apparently claims 'Some S1 are not P2' (which is inconsistent). *For example*: whoever approaches holy offerings while impure is liable to the penalty of excision (#1); anyone who eats peace-offerings while impure is liable to the penalty of excision (#2); peace-offerings are holy offerings (#3); the penalty is the same in both cases, viz. excision (#4); therefore, the consumption of offerings of lesser holiness than peace-offerings is *not* subject to the penalty of excision (#5).
- *In rule No. 9*, we can syllogistically infer (mood 2/AOO) that 'Some P2 are not S1'; it is not clear how R. Ishmael's proposed conclusion here should be presented in formal terms (such lack of clarity being of course a deficiency). I have not found a sufficiently informative example of application of this rule[134].
- *In rule No. 10*, the predicatal premise is logically incompatible with the other three premises, so no syllogistic inference is possible; R. Ishmael apparently resolved the conflict by modifying the major premise to read 'Some, but not all, S1 are P1' (which is logically acceptable, though not the only option open to us). *For example*: the release of a Hebrew slave is subject to a certain set of laws (#1); the release of a daughter sold as maid-servant is subject to another set of laws (#2); a daughter sold as maid-servant is nominally a subcategory of Hebrew slave (#3); yet, the laws for the maid-servant and those for the Hebrew slave in general are very different (#4); therefore, the category of Hebrew slave intended here is in fact not so broad as to subsume such maid-servants (#5).

From these reflections, we learn that at least four of the rules of R. Ishmael (as I have tentatively interpreted them, *based on a*

[134] An example is given in *Sifra* on Lev. 13, but I have not so far found a way to formalize it. See Mendel Nissan, pp. 104-105. There may also be useful examples in Mielziner's book.

small number of examples) are syllogistic in form. These four all include at least the syllogism: 'All S2 are S1 and All S2 are P2, therefore Some S1 are P2' (3/AAI). Two of the four involve an additional syllogism (of form 1/AAA in rule 8b, and of form 2/AOO in rule 9); one rule involves no additional syllogism (rule 8a); and the fourth rule involves inconsistent premises. It is interesting to note that R. Ishmael's apparent solutions to these four syllogistic problems are in some way or other deficient. Nevertheless, it does not change the fact that these four rules are essentially of a syllogistic nature.[135]

I have also demonstrated, in an earlier chapter of AFL, in the section on analogical argument (5.1), the presence of syllogistic thinking in rabbinic analogical arguments, namely in rule 2 (*gezerah shavah*), rule 3 (*binyan av*) and rule 12 (*meinyano* and *misofo*) in R. Ishmael's list. These arguments are not solely syllogistic – they involve inductive processes too – but they definitely do include syllogism. These findings are indubitable, and they put to rest once and for all the rather widespread notion in some quarters that the rabbinic hermeneutic principles do not depend on syllogistic reasoning.

Syllogism can, I suspect, be discerned in yet other *midot*, if we examine them closely enough. I would go much further than that, and assert that these examples drawn from the 13 *midot* are only the tip of the iceberg. The *midot* are by far not a full listing of the reasoning processes actually used by the rabbis; it is certain many of their actual reasoning processes are not included in their listings. The listings only bring together certain forms of thought which the rabbis considered worthy of notice and emphasis for some reason. But like all human beings, they used many thought processes unconsciously – including the process of syllogism. It is impossible for anyone to reason without certain basic thought forms; and the syllogism is definitely one

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[135] The fifth rule which begins with the phrase *kol davar shehayah bikhlal veyatsa...* (rule 11) is somewhat different but also syllogistic. See my analysis of it in chapter 8.

of these unavoidable thought forms, since it is required for all mental acts of inclusion or exclusion.

9. Historical questions

There is, I would say, a significant difference between a fortiori use in Talmudic contexts its use in other ancient literature, such as in Platonic or Aristotelian texts[136]. In the latter, it is probably more accurate to speak of a fortiori *discourse* rather than a fortiori *argument*, because it is used more as a rhetorical device than as a form of reasoning. The author in such cases could well have rephrased his text in such a way as to pass the same message without using a fortiori language. Whereas, in Talmudic contexts, the use of a fortiori is definitely argumentative; it is necessary to prove something that has a legal impact and that could not be arrived at by other means. So, when we speak of a fortiori use in the Talmud, we are referring to something much more serious.

When we speak of Talmudic and rabbinic logic, we must have in mind and look for both *explicit* theories and *implicit* practices by people concerned. Theorizing has different levels: just being aware that one is engaged in an argument is one level; the next higher level is awareness that the argument is of a certain peculiar type, and a name is assigned to it (such as 'a fortiori argument'); the third level consists in attempting to give form to such argument, using symbols in the place of terms; and the highest level is wondering at the argument's validity and seeking to establish it once and for all. Study of the history of an argument is also theory, though of a more intellectual-cultural

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[136] For example, in one of Plato's Dialogues, Socrates says: "I am not a match for one of you; and *a fortiori* I must run away from two." In truth, Aristotle does often use a fortiori argument with a more scientific intent; but even then his argument as a whole does not depend so heavily on such argument as it does in Talmudic literature. And of course, Aristotle must be acknowledged for his early reflections on a fortiori argument in the *Topics* (2:10) and the *Rhetoric* (2:23), even if such reflections were scant.

sort. As regards practice, it may be far ahead of theory. Theory can improve further practice; but is generally based on prior 'intuitive' practice. Therefore, any investigation that aims to understand the logic of some group of people or humanity in general must focus strongly on actual practices.

Even if much conscious research has been carried out on Talmudic and rabbinic logic (including hermeneutics), I wager that there is still a lot to discover in this field. We shall never arrive at an accurate, scientific history – or indeed, theory – of Talmudic logic, and in particular of Talmudic a fortiori logic, without a thorough, systematic listing and competent analysis of all the arguments in the Talmud and related texts. Someone has to do this major work some day; or else we shall always be dealing in rough hypotheses based on limited samples.

Take for instance a fortiori argument, which is our object of study here. What we need, for a start, is a table listing all the apparent cases of a fortiori argument. In each case, we should note its location in the Talmud, and who (named or unnamed) is apparently formulating it, so that the best estimate of its date can later to be put forward. We must distinguish the person(s) formulating it from the person(s) commenting upon it in subsequent developments of the Talmud (by which I mean here, the two Talmuds, that of the Land of Israel and the Babylonian, and related contemporary literature).

Each argument must be analyzed, first by classifying it, i.e. identifying which of the eight standard moods it fits into. Is it copulative or implicational? Label the major term (or thesis) P, the minor term (or thesis) Q, the middle term (or thesis) R and the subsidiary term (or thesis) S. Is the argument subjectal (or antecedental) or predicatal (or consequental)? Is it positive or negative? Moreover, is the argument purely a fortiori or a crescendo? Was *dayo* applied? Very often, some creative work will be necessary, insofar as the a fortiori argument is not entirely explicit. It may, for instance, be necessary to construct an appropriate major premise, and the operative middle term (or thesis) may have to be suggested by the researcher. Obviously, any such contributions to the argument made by the researcher must be noted as such and not confused with the raw data. That

is to say, the fact that the original argument is in some way incompletely formulated is a significant detail of the analysis.

Once we have such an exhaustive database of the a fortiori arguments in the Talmud, we can begin to develop a truly scientific account of this argument form in that document. We can say with certainty what moods (if not all) of the argument were known to the named participants and anonymous redactors, and how well they understood them. We can compare the logical skills in this domain of the different players involved. We can find out more precisely what their theoretical understanding of a fortiori forms were and what terminology they used for them. We must not forget that the Talmud is a document built-up over centuries, by hundreds of people. The Talmud is not a monolith, but has many temporal and geographical layers[137]. Therefore, research must also try to trace the development of skills and understanding of a fortiori and other argumentation across time and place.

We can also more accurately compare Talmudic use and knowledge of the a fortiori argument to use and knowledge in surrounding cultures – notably the Greek and Roman as regards the Mishna and the Jerusalem Talmud, and possibly further afield as regards the Gemara of the Babylonian Talmud, since it was developed in Babylon where perhaps some Indian influences might have occurred. This too, of course, has a long timeline. Take for example the distinction between *miqal le chomer* (from minor to major) and *michomer leqal* (from major to minor). This distinction is taken for granted today – but it surely has a rich history. Does it appear anywhere in the Talmud, or is it a later discovery? It is found in later rabbinic literature – but the question is when and where did it first appear? Was this an independent Jewish discovery, or can Greek or Roman or other ancient influence, or later on Christian or Moslem

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[137] I must draw attention, here, to the different theories of Talmudic formation, including those of Abraham Weiss and David Weiss-Halivni. They are of course very relevant to attempts at dating specific passages of the Talmud.

influence, be traced? If the distinction is made in the Talmud, just when and by whom, in what context(s)?

This distinction, note well, signifies some level of conceptual analysis of a fortiori reasoning. But it is still relatively vague or equivocal, insofar as ‘minor to major’ can signify either positive subjectal or negative predicatal argument, while ‘major to minor’ can signify either negative subjectal or positive predicatal argument[138]. A question to ask is, therefore: what was the original intent of this distinction – was it meant as a distinction between positive and negative moods of subjectal a fortiori argument, or was it a distinction between positive subjectal and positive predicatal arguments, or was there awareness of all four possibilities, or did it remain vague? Indeed, granting that positive subjectal argument is the most obvious and widespread form, when were negative subjectal and positive and negative predicatal argument forms first realized in Judaic logic (or elsewhere, for that matter)?

And so on. There are evidently many questions worth asking and the answers cannot be settled till we have a thorough database, as already said. It should be noted that today, with the digitalization of most ancient texts well on the way if not already completed, the job is immensely facilitated, since exhaustive searches of different verbal strings are possible in a jiffy and information can be cut and pasted without difficulty! The historical work and the logical analysis involved may or may not be done by the same person(s). The ideal scholar would be a good wide-ranging historical researcher, knowledgeable and at ease in the Talmud and other significant texts in the original languages, and a good logician to boot. These qualities are not necessarily all found in the same person, but a multi-disciplinary team might be constituted by a university. I do hope some people someday realize the need and value of such research and organize a determined effort in that direction.

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[138] And similarly with implicational moods. I doubt however that the distinction between copulative and implicational moods is to be found anywhere outside my book JL – so it is no use asking that question.

3. ENUMERATION OF A FORTIORI DISCOURSE

Drawn from A Fortiori Logic *(2013), appendices 2-3.*

1. A fortiori discourse in the Mishna

If we wish to enumerate the use of a fortiori argument in the Talmud, we must first make a census of its use in the Mishna (closed ca. 200 CE) – and perhaps also the Tosefta (closed ca. 300 CE), if any – since the Mishna is a document found in both the Jerusalem and Babylonian Talmuds. Alternatively, when we list all the a fortiori arguments in each Talmud, we shall have to specify which of those arguments are Mishnaic and there will be overlap equal to that set. In any case, the two Talmuds do not cover the same Mishna divisions: the Jerusalem treats the first four and the Babylonian treats the second to fifth. Also, neither of them treats the last (sixth) division; so, the Mishna must in any case be researched separately[139].

In truth, even though the Mishna is habitually mostly looked at and seen through the prism of Gemara commentary, it is historically a separate document and should be treated as such. Three sorts of listing are possible. The simplest is just a list of locations where the argument can be found. A more thorough listing includes the relevant extract without comment. The best listing must include a full analysis of each case found (this of course requires acquaintance with traditional commentaries, notably the Gemara, but also Rashi, Tosafot and others). Ideally, this research should be done with reference to the original Hebrew and Aramaic texts; but English translations would be a good start. All this is of course a very big job, but it is feasible today with relative ease and speed thanks to the possibilities of

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[139] In this regard, see Neusner, p. 34.

computer assisted search for key words and phrases (although these should not be considered as yielding exhaustive results).

Alexander Samely, in about 2002, made a valiant and apparently original attempt to list and analyze all the a fortiori arguments in the Mishna, posting the results of his work on the Internet, in a database[140]. As we saw in the main text, some of the cases he listed are not credible, and a few more cases need to be added to the list. On this basis, I propose the following tentative list of *qal vachomer* arguments in the Mishna, which includes 46 attempted cases of a fortiori argument, of which 42 are valid and 4 are invalid.

There is no guarantee that Samely's collection of cases is exhaustive, as he has found additional cases over time; and moreover he apparently missed, or for some reason disregarded, 4 cases, viz.: 2 in *Avot*, 1 in *Kelaim*, and 1 in *Pesahim* (6:5). Some of his analyses are essentially retained, though rewritten by me in standard form, but some cases are partly or entirely reanalyzed by me. I here take the "texts" proposed by him for granted, although I have some doubts that these quotations are all really accurate (in view of spelling mistakes, unexplained brackets, etc.). Hence, the exposition below (alphabetically ordered) is only tentative, a model and starting point for future research based on more reliable source texts.

The following list (table 3.1) shows the results obtained:

Reference	Qty	Valid or not	Q to P, P to Q or pari	Mood	May be a cresc.
Arakin 8:4	1	valid	P to Q	-s	
Avot 1:5	1	valid	Q to P	+s	&
Avot 6:3	1	valid	Q to P	+a	&
Baba Qama 2:5 (a)	1	valid	Q to P	+a	&
Baba Qama 2:5 (b)	1	valid	Q to P	+a	

140 Alexander Samely's database may be viewed at: mishnah.llc.manchester.ac.uk/search.aspx

Bekoroth 1:1	1	valid	pari	+s	
Bekoroth 9:1	1	valid	P to Q	-s	
Berakoth 9:5	1	valid	Q to P	+s	
Demai 2:2	1	valid	Q to P	-p	
Eduyyoth 6:2	1	valid	Q to P	+s	
Eduyyoth 6:3 (a)	1	valid	pari	+s	
Eduyyoth 6:3 (b)	1	valid	pari	+s	
Hullin 2:7	1	valid	P to Q	-s	
Hullin 10:1	1	valid	Q to P	+a	
Hullin 12:4-5	1	valid	Q to P	+s	&
Kilaim 8:1	1	valid	Q to P	+s	
Makkoth 1:7	1	valid	pari	+s	
Makkoth 3:15 (a)	1	invalid	Q to P	+s	&
Makkoth 3:15 (b)	1	valid	Q to P	+s	&
Menahoth 8:5	1	valid	Q to P	+s	
Nazir 7:4	1	valid	Q to P	+s	
Nedarim 10:7	1	valid	P to Q	+p	
Negaim 10:2	1	valid	Q to P	+s	
Negaim 12:5 (a), (b), & (c)	3	valids	Q to P	+s, +s, +s	&&&
Pesahim 6:2 (a)	1	valid	Q to P	+s	
Pesahim 6:2 (b) & (c)	2	valid rivals	Q-P, P-Q	+s, -s	
Pesahim 6:5	1	valid	Q to P	+s	
Sanhedrin 6:5	1	valid	Q to P	+s	&
Shebuoth 3:6	1	valid	Q to P	+s	
Sotah 6:3 (a)	1	valid	Q to P	+s	
Sotah 6:3 (b)	1	valid	Q to P	+s	
Temurah 1:1 (a) & (b)	1 + 1	valid, invalid	pari, Q-P	-s, -s	
Terumoth 5:4 (a) & (b)	2	invalids	Q to P	-s, -s	
Yadayim 4:7	1	valid	Q to P	+s	
Yadayim 4:8	1	valid	P to Q	-s	
Yebamoth 8:3	1	valid	P to Q	-s	

Yom Tov 5:2	1	valid	Q to P	+s	
Zebahim 7:4	1	valid	Q to P	+s	
Zebahim 7:6	1	valid	P to Q	-s	
Zebahim 8:12	1	valid	P to Q	-a	
Zebahim 12:3	1	valid	Q to P	+s	

The above list can be summarized as follows (table 3.2):

Mood of a fortiori argument	Number found	Of which, a pari	Maybe a crescendo
Positive subjectal {+s}	28	4	8
Negative subjectal (-s)	11	1	
Positive predicatal {+p}	1		
Negative predicatal (-p)	1		
Copulative	41	5	8
Positive antecedental (+a)	4		2
Negative antecedental (-a)	1		
Positive consequental (+c)	0		
Negative consequental (-c)	0		
Implicational	5	0	2
Total	46	5	10

The detailed expositions that these two tables are based on are given below.

Note that three arguments are invalid because they are negative subjectal, and yet go from minor to major; however, one of these invalids, viz. Terumoth 5:4 (b) is intentionally so, having been put forward only to illustrate the invalidity of its predecessor, viz. (a). A fourth argument, viz. Makkoth 3:15 (a), is invalid because it is a contrario. So, there are, it seems (unless alternative explanations for them are put forward), two unintentional formal errors of a fortiori reasoning in the Mishna (2 out of 46 = 4.3%). But one of these errors is challenged by someone else within the text; so only one, viz. Temurah 1:1 (b),

apparently passes unnoticed. Note also, in passing, that all the arguments listed involve normative judgment of some sort; none are purely factual in content.

Regarding the language used in these 46 arguments, a few observations are worth making. The main indicators or markers of a fortiori argument (in the English translation, which of course depends on the translator's choices of words) are: inference, inferred, logical[141] (19 cases), how much more, how much more so, how much the more, how can, all the more, still more (16 cases), light-heavy and the like[142], more stringent (10 cases), a fortiori (2 cases), as well as various other expressions: so, also, so also, just as … so, to these… and yet, *dayo*, etc. (16 cases); these add up to more than 46 cases because there are overlaps, i.e. some a fortiori argument are indicated by more than one marker.

It seems that, in the Mishna at least, a crescendo arguments are always indicated by expressions with 'more', viz.: 5 how much more, 2 how much more so, 1 how much the more, 1 all the more and 1 more stringently. However, note well, expressions with 'more' are not exclusively used for a crescendo discourse, but may also signal purely a fortiori discourse. As regards the *dayo* objection, it only appears in relation to the two arguments in Baba Qama 2:5, of which the first is a crescendo, while the second is purely a fortiori. There is no mention of *dayo* in relation to the remaining nine (possibly) a crescendo arguments[143], which anyhow do not involve inference of a penalty from the Torah. Assuming our list is exhaustive, there

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[141] These are formulated as negative questions: e.g. "Is it not an inference that?" I presume that such expressions refer to the phrase "*eino din*" in the original Hebrew. I do not at this time have the resources to verify translations.

[142] These are all, I presume, literal translations of expressions like *qal vachomer* or *miqal lechomer*.

[143] The expression "*dayo*" is used in Zebahim 7:6, but as I point out there this use is rhetorically and not literally intended.

are no other applications of *dayo* in the Mishna (though certainly many more in the Gemara). This is quite surprising![144]

Arakin 8:4

TEXT: "A man may devote part of his flock or of his herd or of his Canaanite slaves and bondwomen, or 'of the field of his possession'; and if he devoted the whole of them they are not devoted – words of R. Eliezer. R. Eleazar ben Azariah said: And if Man does not even have authority to devote to the High One everything he owns, *how much more* is Man obliged to protect his possessions!"

MY READING: negative subjectal, major to minor**.**

> Man's use of his possessions for holy ends (P) is more religiously valuable (R) than man's use of his possessions for profane ends [including the waste of his possessions without purpose] (Q) is.
>
> If man's use of his possessions for holy ends (P) is *not* religiously valuable (R) enough to be authorized without limit (S),
>
> then man's use of his possessions for profane ends (Q) is *not* religiously valuable (R) enough to be authorized without limit (S).

Avot 1:5

TEXT: "Yose ben Yohanan of Jerusalem was wont to say:… Engage not in overmuch converse with a woman. If he said this of his wife, *how much more* does it apply to the wife of another."[145]

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[144] This may explain why the lists of Hillel and R. Ishmael do not mention a *dayo* principle, though they mention a fortiori argument. Also, it suggests that the two *dayo* objections in the said Mishna may have been intended as merely ad hoc solutions, which were only later elaborated as guiding principles in the Gemara.

[145] Louis Jacobs, in his *Studies* (in a footnote on p. 4), suggests that this a fortiori argument, being by Jose ben Johanan (c. 160 BCE), "may be the earliest reference in Rabbinic literature to the *qal wa-homer*." Then he adds that "the highly plausible suggestion has been made that the *qal wa-homer* does not belong to Jose's saying but is a

MY READING: positive subjectal, minor to major. Could be intended as a crescendo.

Speaking to another man's wife (P) is more to be avoided (R) than speaking to one's own wife (Q) is.

If speaking to one's own wife (Q) is to be avoided (R) enough to be discommended by Yose (S),

then speaking to another man's wife (P) is to be avoided (R) enough to be discommended by Yose (S).

An a crescendo reading would imply a stronger recommendation against speech in the latter case, in proportion to its moral unsuitability.

Avot 6:3

TEXT: "If David king of Israel, who having learned from Ahitophel but a couple of worldly matters yet called him his master… *how much the more* honor must be shown by the one who learns from his associate but a single chapter, law, or verse or saying, or even a single letter of Torah."

MY READING: positive antecedental, minor to major**.** Could be intended as a crescendo.

Learning holy matters from someone (P) entails honoring him (R) more than learning worldly matters from him (Q) does.

If learning worldly matters from someone (Q) entails honoring him (R) enough to justify calling him one's master (S),

then learning holy matters from someone (P) entails honoring him (R) enough to justify calling him one's master (S).

An a crescendo reading would imply still more demonstrations of gratitude in the latter case, in proportion to the greater honor due to the Torah.

Baba Qama 2:5 (a) and (b)

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later addition;" in support of which he mentions Schwarz and Daube. But I would not regard a suggestion by the latter two writers as highly plausible.

TEXT: "An ox which causes damage in the [private] domain to him that is injured – thus, if it gored, pushed, bit, lay down, or kicked in the public domain it pays only half-damages; but if in the private domain of him that was injured, R. Tarfon says: It pays full damages. But the Sages say: Half-damages. R. Tarfon said to them: What! If they have dealt leniently with damage caused by tooth or foot in the public domain, when no restitution is imposed, and stringently with like damage in the private domain of him that is injured, when full damages are imposed, then since they have dealt stringently with damage caused by the horn in the public domain, when half-damages are imposed, ought we not therefore to deal *the more stringently* with damage caused by the horn in the private domain of him that was injured, so that full damages shall be imposed? They answered: It is enough (*dayo*) if the inferred is as strict as that from which it is inferred: if [for damage] caused by the horn in the public domain half-damages [are imposed], so also [for like damage] in the private domain of him that was injured, half-damages [only are imposed].

MY READING: The first argument by R. Tarfon, in view of its 'proportional' conclusion, may be taken minimally as an argument pro rata. It could alternatively be interpreted more elaborately as an a crescendo argument, i.e. as an a fortiori *cum* pro rata argument. But in any case, note well, it cannot be considered as a purely a fortiori argument, unless we are ready to suggest (unnecessarily) that R. Tarfon here argues in a formally invalid manner. The Sages counter this argument by saying that the penalty prescribed in the conclusion must not be greater than that given in the minor premise; this has come to be known as the *dayo* (sufficiency) principle. R. Tarfon's first argument, taken as pro rata, can be expressed as follows:

> Just as, in one case (that of tooth & foot), damage in private domain (full payment) implies more legal liability than damage in public domain (no payment) –
>
> so, in the other case (viz. horn), we can likewise say that damage in private domain implies more legal liability than damage in public domain (half payment).

Whence, R. Tarfon concludes with full payment for damage by horn in the private domain. The Sages may be construed to oppose this conclusion by means of a formally valid purely a fortiori argument, *without* pro rata extension, as follows:

> Private domain damage (P) implies more legal liability (R) than public domain damage (Q) [as we know by extrapolation from the case of tooth & foot].
>
> For horn, public domain damage (Q) implies legal liability (R) enough to make the payment half (S).
>
> Therefore, for horn, private domain damage (P) implies legal liability (R) enough to make the payment half (S).

Note that the Sages do not explicitly formulate this a fortiori argument, but may reasonably be assumed to intend it in view of their preferred conclusion. The *dayo* principle here simply corresponds to the principle of deduction, which is that the conclusion cannot contain more information than is given in the premises. For this reason, the *dayo* principle has been equated by many commentators (myself included, in the past) to the principle of deduction; but as we shall see this is only a point of intersection between them – they are not the same.

FURTHER TEXT: “He said to them: My inference is not from one case of damage caused by the horn to another case of damage caused by the horn, but from what applies in a case of damage caused by the foot to what should apply in the case of damage caused by the horn: If they have dealt leniently with damage caused by the tooth or foot in the public domain and stringently with damage caused by the horn [also in the public domain], then since they have dealt stringently [more stringently] with damage caused by the tooth or foot in the private domain of him that was injured [than in the public domain], ought we not, therefore, to deal *the more stringently* with damage caused by the horn [in the private domain]?! They answered: It is enough (*dayo*) if the inferred is as strict as that from which it was inferred: [as in the case of damage caused by the horn] in the public domain half-damages [are imposed], so also [for damage caused by the horn] in the private domain of him that was injured, half-damages [only are imposed].”

MY READING: The second argument by R. Tarfon can be read both as a mere argument by analogy (pro rata) like before, *and* as a valid purely a fortiori (as against a crescendo) argument that is in accord with the Sages' previous objection. The Sages nevertheless reject this restructured argument by saying that the penalty prescribed in the conclusion should not surpass that given in the raw data that was generalized into the major premise; this signifies an enlargement and complication of the *dayo* (sufficiency) principle, compared to its tenor in relation to the previous argument. R. Tarfon's second argument can be expressed as an argument pro rata as follows:

> Just as, in one case (that of public domain), damage by horn (full payment) implies more legal liability than damage by tooth & foot (no payment).
>
> So, in the other case (viz. private domain), we can likewise say that damage by horn implies more legal liability than damage by tooth & foot (full payment).

Whence, R. Tarfon concludes with full payment for damage by horn in the private domain. This 'proportional' conclusion is all the more credible, since the exact same conclusion can this time be obtained by regular (i.e. not a crescendo) a fortiori argument, as follows:

> Horn damage (P) implies more legal liability (R) than tooth & foot damage (Q) [as we know by extrapolation from the case of public domain].
>
> For private domain, tooth & foot damage (Q) implies legal liability (R) enough to make the payment full (S).
>
> Therefore, for private domain, horn damage (P) implies legal liability (R) enough to make the payment full (S).

The Sages remain unfazed by this new, double-barrel argument, repeating their previous "it is enough" objection, in exactly the same words. From this we must infer that their first objection did not consist merely in opposing a purely a fortiori argument to an argument pro rata or a crescendo, but referred to any source of information used in formulating the premises, limiting the conclusion drawn to such given information. In the present case, the limiting information is not apparent in the a fortiori argument

as such, but is influential in the formation of its major premise. This interpretation is in accord with rabbinical commentary.

Note that both a fortiori arguments are positive antecedental in form.

Bekoroth 1:1

TEXT: "The priests and Levites are free (i.e. from the duty of the first-born, including unclean animals which are treated like human first-born in Num. 18:15), by reason of the light and heavy (*mi-qal wahomer*): If they exempted those (first-born) of the Israelites in the desert, it is an inference that they exempted their own (first-born)."

MY READING: positive subjectal, a pari (egalitarian)[146].

> The (first-born) of the priests and Levites (P) were as much released in the desert from their duties (R) as the (first-born) of the Israelites (Q) were.
>
> If the (first-born) of the Israelites (Q) were released in the desert from their duties as first-born (R) enough to be henceforth exempt from them (S),
>
> then the (first-born) of the priests and Levites (P) were released from their duties as first-born (R) enough to be henceforth exempt from them (S).

Bekoroth 9:1

TEXT: "The tithe of cattle applies in the land (of Israel) and outside the land... It applies to the herd and to the flock, and they do not tithe from one to the other; to sheep and goats, and they do tithe from one to the other; to new and old, and they do not tithe from one to the other. For, it could be an inference: Just as for the new and old, which are not diverse kinds (cf. Lev. 19:19), they do not tithe from one to the other, is it not an *inference* that

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[146] The reason I think it is a pari is that I see no reason offhand to treat the two parties differently, i.e. I assume all Israelites at once and equally (not just the non-Levites) were removed from old the "first-born" religious régime and placed in the new "priestly caste" religious régime. That some Levites thereby lost and found the same duties does not really affect this change of overall framework.

for sheep and goats, which are diverse kinds, they (also) do not tithe from one to the other?”

MY READING: negative subjectal, major to minor.

> New and old (P) are more similar to each other (R) than sheep and goats (Q) are.
>
> If new and old (P) are similar to each other (R) *not* enough to be interchangeable (S),
>
> then sheep and goats (Q) are similar to each other (R) *not* enough to be interchangeable (S).

Berakoth 9:5

TEXT: “A man may not enter the temple mount with his staff, or his sandal, or his wallet; or with the dust upon his feet. Nor may he use it as a shortcut, let alone (*miqal wa-homer*) spit there. [Cambridge MS adds:] If it is forbidden to enter with shodden (*sic*) feet which implies lack of respect, *how much more* is spitting forbidden which implies contempt.”

MY READING: positive subjectal, minor to major.

> Spitting there (P) is more disrespectful of Temple Mount (R) than entering it with staff, sandal, wallet or dust or using it as a shortcut (Q) is.
>
> If entering it with staff, sandal, wallet or dust or using it as a shortcut (Q) is disrespectful (R) enough to be forbidden (S),
>
> then spitting there (P) is disrespectful (R) enough to be forbidden (S).

Demai 2:2

TEXT: “He that takes it upon himself to be trustworthy must give tithe [for?] that which he eats and that which he sells and that which he buys [in order to sell again] and may not be the guest of an ‘am haarets’ (ignoramus). R. Yehudah says: The one who is a guest of an ‘am haarets’ is also trustworthy. They said to him: He is not trustworthy concerning himself, *how can he be* trustworthy concerning others?!”

MY READING: negative predicatal, minor to major.

> More scrupulousness (R) is required to be trustworthy concerning others (P) than concerning oneself (Q).

> If someone (S) is *not* scrupulous enough (R) (e.g. by abstaining to partake of the food of an ignoramus) to be trustworthy concerning himself (i.e. for the good of his own soul) (Q),
>
> then he (S) is *not* scrupulous (R) enough (e.g. by tithing food before selling it) to be trustworthy concerning others (i.e. for the good of their souls) (P).

Eduyyoth 6:2

TEXT: "[They said:] R. Yehoshua and R. Nechunya ben Elinathan of Kefar Ha-Bavli testified with regard to [the smallest] member of a corpse that it is unclean [in the sense of conveying uncleanness by overshadowing, mOhol 2:1], concerning which R. Eliezer says: They [i.e. the aforementioned two] have said this only of a member of living being [mOhol 1:7]. They [i.e. the first speakers] said to him: But is it not a [relationship between] *lesser and greater*: For the living being, which is clean, a limb severed from it is unclean – so is it not to be inferred that for a corpse, which is unclean, a limb severed from it is unclean?"

MY READING: positive subjectal, minor to major.

> A limb severed from a corpse (a part severed from an unclean whole) (P) is more unclean (R) than a limb severed from a living body (a part severed from a clean whole) (Q).
>
> If the limb severed from a living body (Q) is unclean (R) enough to be declared unclean (S),
>
> then the limb severed from a corpse (P) is (R) enough to be declared unclean (S).

FURTHER TEXT: "R. Eliezer … said to them [i.e. the first speakers]: They [the aforementioned two] have said this only of a member of living being. Another answer is: The uncleanness of living beings is greater than the uncleanness of corpses, for the living being makes what it lies and sits on convey uncleanness to men and to garments, and [makes] what is above it *maddaf*-unclean so that it conveys uncleanness to food and liquids, which is not how the corpse makes unclean."

MY READING: This is not an a fortiori argument, but an attempted refutation of the preceding a fortiori argument. The

opponents correct the initial statement attributed to R. Yehoshua and R. Nechunya ben Elinathan of Kefar Ha-Bavli, saying they "testified with regard to [the smallest] member *of a living being* that it is unclean;" and they reject the major premise of the proposed a fortiori argument by reversing it, saying "The uncleanness of living beings is greater than the uncleanness of corpses."

Eduyyoth 6:3 (a)

TEXT: "R. Eliezer … said to them: We find that a member from a living being is like a whole corpse (mOhol 2:1); as an olive's bulk of flesh severed from a corpse is unclean, *so* an olive's bulk of flesh severed from the member of a living being will be unclean."

MY READING: positive subjectal, a pari (egalitarian).

> An olive's bulk of flesh severed from a living body (P) is as dead (R) as an olive's bulk of flesh severed from a corpse (Q).
>
> If an olive's bulk of flesh severed from a corpse (Q) is dead (R) enough to be declared unclean (S),
>
> then an olive's bulk of flesh severed from the limb severed from a living body (P) is dead (R) enough to be declared unclean (S).

FURTHER TEXT: "R. Yehoshua and R. Nechunya … said to him: No. If you declare unclean an olive's bulk of flesh severed from a corpse, of which you have declared unclean a barleycorn's bulk of bone severed from it (mOhol 2:3), would you also declare unclean an olive's bulk of flesh severed from the member of a living being, of which you have declared clean a barleycorn's bulk of bone severed from it?"

MY READING: This is not an a fortiori argument, but an attempted refutation of the preceding a fortiori argument. The opponents argue:

Given that: if a barleycorn's bulk of bone severed from a corpse is *un*clean, then an olive's bulk of flesh severed from a corpse is *un*clean.

Does it follow that: if a barleycorn's bulk of bone severed from a member of a living body is *clean*, then an olive's bulk of flesh severed from the member of a living being is *un*clean? No!

What the opponents are saying is that the major premise ("a member from a living being is like a whole corpse"), is not as general as it is made to seem. A barleycorn's bulk of bone is unclean severed from a corpse, yet clean severed from a member of a living being. Therefore, they say, we cannot infer an olive's bulk of flesh severed from a member of a living being to be unclean from the fact that an olive's bulk of flesh severed from a corpse is declared unclean.

Eduyyoth 6:3 (b)

TEXT: "R. Nechunya … We find that a member from a living being is like a whole corpse (mOhol 2:1); as a barleycorn's bulk of bone that is severed from a corpse is unclean, *so* a barleycorn's bulk of bone that is severed from a member from a living body will be unclean."

MY READING: positive subjectal, a pari (egalitarian).

> A barleycorn's bulk of bone severed from a living body (P) is as dead (R) as a barleycorn's bulk of bone severed from a corpse (Q) is.
>
> If a barleycorn's bulk of bone severed from a corpse (Q) is dead (R) enough to be declared unclean (S),
>
> then a barleycorn's bulk of bone severed from the limb severed from a living body (P) is dead (R) enough to be declared unclean (S).[147]

FURTHER TEXT: "They said to him: No. If you declare unclean a barleycorn's bulk of bone severed from a corpse, of which you have declared unclean an olive's bulk of flesh severed from it, would you also declare unclean a barleycorn's bulk of bone severed from the member of a living being, of which you have declared clean an olive's bulk of flesh that is severed from it?"

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[147] Note that this resembles the earlier a fortiori argument by R. Eliezer, except that the subsumed part is "a *barleycorn's* bulk of *bone*" instead of "an *olive's* bulk of *flesh*".

MY READING: This is not an a fortiori argument, but an attempted refutation of the preceding a fortiori argument. The opponents argue, as in the previous rebuttal:

Given that: if an olive's bulk of flesh severed from a corpse is *un*clean, then a barleycorn's bulk of bone severed from a corpse is *un*clean.

Does it follow that: if an olive's bulk of flesh severed from the member of a living body is *clean*, then a barleycorn's bulk of bone severed from the member of a living body is *un*clean? No![148]

Here again the major premise of the proposed a fortiori is put in doubt.

Hullin 2:7

TEXT: "R. Yose said: The things are *lighter and weightier*: Just as in the case (*maqom*) where the thought invalidates, regarding sacrifices (cf. mZeb 2:2), everything depends on the person officiating (i.e. not the owner), so in the case where thought does not invalidate, regarding profane slaughter, should not everything also depend on the slaughterer (i.e. not the owner, in this case a non-Jew)?"

MY READING: negative subjectal, major to minor.

> Sacrificial slaughter (P) is more dependent on the right thought of the owner (R) than profane slaughter (Q) is.
>
> If sacrificial slaughter (P) is dependent on the right thought of the owner (R) *not* enough to be invalidated (S),
>
> then profane slaughter (Q) is dependent on the right thought of the owner (R) *not* enough to be invalidated (S).

Hullin 10:1

TEXT: "{"the shoulder and the two cheeks and the stomach" (Deut. 18:3) ... applies to non-sacrificial slaughter but not to sacrificial slaughter.} For it might have been an inference [to

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[148] Notice that the "given" here is *the reverse* of the previous "given," and likewise the "does it follow that" antecedent and consequent are *reversed*! This seems to suggests that these rebuttals are quite hypothetical, and apparently not intended as factual.

say]: And if even non-sacrificial slaughter which is not liable to "breast and thigh" (Lev. 7:31) is liable to these [other] dues, is it not an *inference* to that consecrated animals which are liable to "breast and thigh" should be also liable to these [other] dues? {In this regard it is instructive that Scripture says: "[For I have taken the breast of elevation offering and the thigh of gift offering from the Israelites, from their sacrifices of well-being] and given them to Aaron the priest and his sons as a prescribed due for ever [from the Israelites]" (Lev. 7:34). You have there only what is said as stated.}"

MY READING: positive antecedental, minor to major.

> Sacrificial offerings (P) are more liable to priestly dues (R) than non-sacrificial slaughter (Q) is (this being generalized from 'breast and thigh' dues to all dues).
>
> If non-sacrificial slaughter (which has no priestly involvement) (Q) is liable to priestly dues (R) enough to necessitate payment of 'the shoulder and the two cheeks and the stomach' (S),
>
> then sacrificial offerings (which have priestly involvement) (P) are liable to priestly dues (R) enough to necessitate payment of 'the shoulder and the two cheeks and the stomach' (S).

The last remark "You have there only what is said as stated" seems intended to deny the conclusion of the *qal vachomer*, saying that Lev. 7:34 is to be read as exclusive of 'the shoulder and the two cheeks and the stomach' (i.e. as *davka*).

Hullin 12:4-5

TEXT: "A man may not take 'the dam together with the young' even in order to effect with them the purification of the leper [where one of whose birds is let go at the end of the ritual, cf. Lev. 14:7]. And if (concerning) a 'light' commandment, involving an Issar, the Torah says: 'So that it may be good with you and you have length of days', *how much more so* (*qal wahomer*) concerning the weightier commandments which are in the Torah!"

MY READING: positive subjectal, minor to major. Could be intended as a crescendo.

> Obeying weightier (more demanding) commandments (P) earns one more merit (R) than obeying lighter (less demanding) commandments (Q) does.
>
> If someone obeying a light commandment (demanding merely one Issar) (Q) earns merit (R) enough to get rewarded with good and long life (S),
>
> then someone weightier commandments (demanding more than one Issar) (P) earn merit (R) enough to get rewarded with good and long life (S).

An a crescendo reading would imply a greater reward (i.e. proportionately more good and longer life) in the latter case, in proportion to the greater merit of weightier commandments.

Kilaim 8:1

TEXT: "It is prohibited to sow kilaim [a certain mingling] of seeds, and to allow it to grow; but it is lawful to eat of it, and, *a fortiori*, to derive benefit therefrom."

MY READING: This is a Mishnaic a fortiori argument not mentioned by Samely. It is a straightforward positive subjectal case:

> Deriving benefit from something (P) is more innocuous (R) than eating of it (Q).
>
> If eating of something (Q) is innocuous (R) enough to be lawful (S),
>
> then, deriving benefit from it (P) is innocuous (R) enough to be lawful (S).

Makkoth 1:7

TEXT: "{'On the evidence of two witnesses or three witnesses, shall he that is to die be put to death' ...] R. Aqiva says: The third witness is here mentioned only that the same stringency shall apply to him also, and that his condemnation shall be made like to that of the other two.} If thus Scripture punishes the (person) who is joined to those who commit transgressions in the same way as those who (actually) commit transgressions, *how much more* will it reward the (person) who is joined to those who fulfill commandments in the same way as those who (actually) fulfill commandments."

MY READING: positive subjectal, a pari (egalitarian).

Joining those who fulfill commandments (P) earns one as much merit (R) as actual fulfilling of commandments (Q) does.[149]

If someone actually fulfilling commandments (Q) earns merit (R) enough to be rewarded in a certain way (S),

then someone joining those who fulfill commandments (P) earns merit (R) enough to be rewarded in that way (S).

Makkoth 3:15 (a)

TEXT: “R. Hananiah ben Gamliel (also) said: If the one who commits one transgression has his life taken away, *all the more* will the one who performs one commandment be given [or restored] his life!”

MY READING: positive subjectal, minor to major. Strictly speaking, this attempted a fortiori argument is *invalid*, because the subsidiary term (S) is not the same in the minor premise and conclusion.

The one who performs one commandment (P) deserves more credit (R) than the one who commits one transgression (who deserves not credit, but debit) (Q) does.

If the one who commits one transgression (Q) deserves credit (R) enough to have his life taken away (S1),

then the one who performs one commandment (P) deserves credit (R) enough to be given [or restored] his life! (S2).

We could regard this argument more generously as valid, if we look upon it as a crescendo, i.e. if we assume an unstated additional premise about proportionality to be tacitly intended. In that case, S1 (life taken away) and S2 (life given or restored) are viewed as two sides of a continuum S (life), the former being negative and the latter positive. This continuum being parallel to the continuum R (‘credit’ in a broad senses, ranging from actual

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149 The major premise is obtained by generalization from potential and actual transgressions (bad) to all relations to commandments (bad and good), including fulfillment of commandments (good).

debit to actual credit), we can reason proportionately. Just as Rq implies S1, so Rp implies S2.

However, even then the argument is of very doubtful validity, because it is essentially a contrario. Notice that not only the predicates (life forfeited, life restored) are contrary, but also the subjects (commits transgression, performs commandment) are contrary. This is not per se something inconceivable; however, the difficulty lies in the *coupling* of these two pairs of contraries. By what formal means does the speaker know that the switchover from the first predicate to the second is tied precisely to the switchover from first subject to the second? Obviously, he perceives a causative relation between the subjects and predicates, i.e. he believes that transgression causes life to be forfeited and performing commandments causes life to be restored. Fair enough; this may well be true as a pair of observations (or through further inductive and deductive arguments). But the problem is in the inference from the premises to the conclusion. If the conclusion is already known by observation (or however), and is appealed to in order to justify the said coupling of switchovers, then the proposed a fortiori argument constitutes circular reasoning. It begs the question, since its putative conclusion can only really be drawn if it is previously given.

Makkoth 3:15 (b)

TEXT: "R. Shimon ben Rabbi says: Behold it says: 'Only be firm not to eat the blood, for the blood is the life...' And if the person who separates from the blood, from which man recoils, receives a reward; then the person who separates from robbery and forbidden sexual relations, which man covets and desires, *how much more so* will he acquire merit for himself and his generations and the generations of his generations until the end of all the generations!"

MY READING: positive subjectal, minor to major. Could be intended as a crescendo.

> A person who separates from robbery and forbidden sexual relations (P) has more inner resistance to overcome (R) than a person who separates from the blood (Q).

> If a person who separates from the blood (Q), from which (many a) man recoils, has enough inner resistance to overcome (R) that he merits to receive a reward (S),
>
> then a person who separates from robbery and forbidden sexual relations (P), which (many a) man covets and desires, has enough inner resistance to overcome (R) that he merits to receive a reward (S).

An a crescendo reading would imply a greater reward in the latter case, in proportion to the inner obstacles that had to be overcome. Although at first sight, R. Shimon's argument appears a crescendo, it can definitely also be interpreted as purely a fortiori. The latter is possible in two ways, in both of which the minor premise and conclusion have the same predicate (the subsidiary term, S): either (a) both propositions state that the subject vaguely "receives a reward" (for self and perhaps children), or (b) both propositions state that the subject "will he acquire merit for himself and his generations and the generations of his generations until the end of all the generations!" In the event of (a), R. Shimon's conclusion must be taken as mere hyperbole, and cannot be accepted literally as the logical conclusion of the a fortiori argument as such. In the event of (b), R. Shimon's conclusion must be taken as having been tacitly intended also in his more vaguely put minor premise. But, equally well, we may consider R. Shimon's conclusion as occurring *after* the a fortiori argument, the product of a subsequent pro rata argument, i.e. as an extrapolation (in time) based on other considerations (e.g. the principle of measure for measure), i.e. as an a crescendo conclusion.

To be sure, underlying this positive subjectal argument, with the middle term "having some resistance to overcome," is a positive predicatal argument, with the middle term "having some self-control." The latter may be formulated as follows:

> More self-control (R) is required to avoid robbery and incest (P), which arouse desire, than to avoid shedding blood (Q), which arouses aversion.
>
> If a person (S) has self-control (R) enough to avoid robbery and incest (P),

> Then that person (S) has self-control (R) enough to avoid shedding blood (Q).

However, this argument lacks the information about reward, and moreover proceeds from major to minor. For the inference of reward, the subjectal form used by R. Shimon seems more appropriate.

Menahoth 8:5

TEXT: "Also, for the meal offerings should be inferred that they require 'pure olive oil': Just as the Menorah which is not to do with eating, requires 'pure olive oil', so meal offerings, which are to do with eating, is it not an *inference* that they should require 'pure olive oil'? Scripture instructs by saying: '[olive oil] pure, beaten, for lighting...' – and not pure, beaten for the meal offerings."

MY READING: positive subjectal, minor to major.

> Oil for the meal offering (P) has more to do with eating (R) than oil for lighting the Menorah (Q).
>
> If oil for lighting the Menorah (Q), though not intended as food, has enough to do with eating (R) (R = 0) to need to be pure olive oil (S),
>
> then meal offerings (P), which are intended as food, have enough to do with eating (R) (R > 0) to need to be pure olive oil (S).

The final sentence ("Scripture instructs, etc."), read *davka*, i.e. as exclusive of anything not explicitly mentioned therein, is intended as a rebuttal of the putative conclusion. In this case, the problem lies not with the major premise (which seems credible enough), but with the minor premise (which seems forced anyway).

Nazir 7:4

TEXT: "R. Eleazar said in the name of R. Yehoshua: For whatsoever uncleanness from a corpse a Nazirite must cut off his hair [mishnah 2], for that too is a man culpable if he enters into the Temple; and for whatsoever uncleanness from a corpse a Nazirite need not cut off his hair [mishnah 3], for that too is a man not culpable if he enters into the Temple. R. Meir said: Would there not thus be less stringency than [when uncleanness

is contracted from] a creeping thing! [Lev. 5:2, Num. 19:20] R. Aqiva said: I argued before R. Eliezer: If because of the contact or carrying of a barleycorn's bulk of bone which does not render a man unclean by overshadowing a Nazirite must cut off his hair, *how much more*, then, ought he to cut off his hair because of the contact or carrying of a quarter-log of blood [cf. mishnah 3] which renders a man unclean by overshadowing! He said to me: What is this, Aqiva? We cannot here argue *from the lesser to the greater* [since it is the accepted ruling]. But when I came and declared these words before R. Yehoshua, he said to me: You have spoken well; but thus have they said as Halakhah."

MY READING: R. Akiva's argument is positive subjectal, minor to major.

> The contact or carrying of a quarter-log of blood (P) renders a man more unclean by overshadowing (R) than the contact or carrying of a barleycorn's bulk of bone (Q) does.
>
> If a Nazirite's contact or carrying of a barleycorn's bulk of bone (Q) renders him unclean by overshadowing (R) (R = 0) enough to make him have to cut off his hair (S),
>
> then a Nazirite's contact or carrying of a quarter-log of blood (P) renders him unclean by overshadowing (R) (R > 0) enough to make him have to cut off his hair (S).

R. Akiva seems to sustain R. Eleazar[150], by arguing a fortiori as described. Then R. Akiva explains that R. Eliezer objected to this a fortiori argument (as against Halakha), to this, whereas R. Yehoshua approved of it (i.e. as formally valid) but suggested the Halakha goes the other way anyway (like R. Eliezer).

Nedarim 10:7 I (2) = A4.2

TEXT: "If a man said to his wife 'Let every vow be established that you shall vow from this time forth until I return from such a

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[150] R. Eleazar's argument looks like mere analogy (actually, an argument by inversion, i.e. a contrario): if uncleanness of Nazirite from corpse is sufficient to impose haircut then it is sufficient to forbid Temple entry; likewise, if uncleanness of Nazirite from corpse is *in*sufficient to impose haircut then it is *in*sufficient to forbid Temple entry. R. Meir's reply to this argument is intended to put it in doubt.

place', he has said nothing; but if he said, 'Let them be void', R. Eliezer says: They are cancelled. But the Sages say: They are not cancelled. R. Eliezer said: If he can cancel vows which have already had [for a time, before he cancelled them] the force of a 'prohibition' (cf. Num. 30:3) [as any vow of his wife that he cancels], can he not *also* cancel vows which have not yet the force of a 'prohibition'? {They answered: Behold, it is written. 'Her husband may establish it and her husband may cancel it' – that which comes under the category of 'establishing' also comes under the category of 'cancelling', and that which does not come under the category of 'establishing' [also] does not come under the category of 'cancelling'.}"

MY READING: R. Eliezer' argument is positive predicatal, major to minor:

> More authority (R) is required to cancel vows which already had the force of prohibition (P) than vows which do not yet have such force (Q).
>
> If a husband (S) has authority (R) enough to cancel his wife's vows which already have the force of a prohibition (P),
>
> then a husband (S) has authority (R) enough to cancel his wife's vows which do not yet have the force of a prohibition (Q).

The Sages reject this conclusion, effectively by denying the major premise. By saying that the husband can only cancel vows that he can establish, they mean (if I understand correctly) that since he is away and not able to establish his wife's vows individually, he has no authority to cancel them collectively in advance.

Negaim 10:2

TEXT: "'Thin yellow hair' means uncleanness: clustered together or dispersed, surrounded or not surrounded, turned [yellow by the scall] or not turned – words of R. Yehudah. R. Shimon says: It only means uncleanness if turned. R. Shimon said: And it is a an inference: If the white hair, against which another hair does not afford protection, does not render unclean except when turned, then the 'yellow thin hair', against which another hair does afford protection (cf. Lev. 13:31), is it not an

inference that it also does not shall render unclean except when turned?'

MY READING: R. Shimon's argument is positive subjectal, minor to major.

> 'Yellow thin hair' (P) is afforded more protection against uncleanness by another hair (R) than white hair (Q) is.
>
> If someone with 'white hair' (Q) is afforded enough protection against uncleanness by another hair (R) (R = 0) to not-render him unclean except when it is turned (S),
>
> then someone with 'yellow thin hair' (P) is afforded enough protection against uncleanness by another hair (R) (R > 0) to not-render him unclean except when it is turned (S).

TEXT: "R. Yehudah said: In every place where it was necessary to say 'turned', it [i.e. Scripture] said 'turned' (e.g. Lev. 13:3). But the scall, about which it is said: 'And there is no yellow hair in it', renders unclean [whether the hair] turned [yellow[151]] or whether it did not turn."

MY READING: R. Yehudah proposes a case which apparently belies or gives an exception to the conclusion of the previous a fortiori argument, i.e. he says that: whether it turned or did not turn, scall renders unclean. How is this a rebuttal? I am not sure. I would rather look at the above conclusion clause 'except when turned' and suggest that R. Yehudah is saying: the above conclusion says that *un*turned implies *not* unclean, whereas scall is a case where albeit *un*turned, nevertheless unclean *is* implied.

Negaim 12:5

TEXT: "About what then does the Torah take care? About his earthenware utensils, and about his flask and his [oil] vessels. If the Torah thus cares for his humble possession, *how much more* for his beloved possession! If [it thus cares] for his possession, *how much more* for the life of his sons and daughters! If [it thus

151 The [yellow] interpolation may be Samely's.

cares] for those of the wicked, *how much more* for those of the righteous!"

MY READING: There are here three distinct a fortiori arguments, all of positive subjectal (minor to major) form. These could be intended as a crescendo. The first is:

Beloved possessions (P) are more valuable (R) than humble possessions (Q) are.

If humble possessions (Q) are valuable (R) enough to be taken care of by the Torah (S).

then beloved possessions (P) are valuable (R) enough to be taken care of by the Torah (S).

Similarly the other two. Note that there is a progression in value, from humble to beloved possessions, from material possessions to life of children, from life of children of wicked to those of righteous. The conclusion of first is a springboard for the next, which is in turn a springboard for the third. A crescendo readings would imply more care taken by the Torah in each succeeding case, in proportion to the value of the possessions.

Pesahim 6:2 (a)

TEXT: "These acts pertaining to the Pesah offering override the Sabbath: slaughtering it, tossing its blood, scraping its entrails and burning its fat pieces. But the roasting of it and rising its entrails do not override the Sabbath. Carrying it [to the Temple] and bringing it from the outside to within the Sabbath limit and cutting off a wen [from the carcass] do not override the Sabbath. R. Eliezer says: They do override it. And is it not an *inference*: Just as the slaughtering which comes under [Sabbath] work overrides the Sabbath, those [activities] which come [only] under [Sabbath] rest – should they not [also] override the Sabbath?"

MY READING: This is positive subjectal, minor to major.

Activities classed under Sabbath rest (P) are more leniently regulated (R) than activities classed under Sabbath work (Q).

If activities classed under Sabbath work (Q) are leniently regulated (R) enough to be permitted on the Sabbath (S),

then, activities classed under Sabbath rest (P) are leniently regulated (R) enough to be permitted on the Sabbath (S).

FURTHER TEXT: “R. Joshua said to him: The festival day proves [it], for on it they have allowed [activities] under the category of work and [activities] under the category of rest are forbidden. R. Eliezer said to him: What is this, Joshua! What is a proof from that which is allowed to that which is commanded?”

MY READING: R. Joshua objects to R. Eliezer’s argument by pointing out that on a festival some Sabbath work activities are permitted and some Sabbath rest activities are forbidden. This means that R. Eliezer’s major premise about relative leniency of regulation is not universally true – and so the conclusion he draws cannot be drawn. R. Eliezer replies by claiming that R. Joshua is inferring something commanded from something allowed. I do not know to what he is referring specifically.

FURTHER TEXT: “R. Aqiva replied and said: The sprinkling [of the sin offering water on day 3 and 7 after attracting corpse-uncleanness] proves [it], for it is commanded and it comes under [Sabbath] rest, but it does not override the Sabbath. Thus also do not be astounded at those [other] ones, for they [too], despite being commanded and [only] under the category of rest, do not override the Sabbath.”

MY READING: R. Akiva is saying: Sprinkling is commanded Sabbath rest, yet is forbidden on a Festival. Therefore, conceivably, other things may be commanded Sabbath rest, yet be forbidden on a Festival. This like the preceding objection is designed to neutralize R. Eliezer’s a fortiori argument.

Pesahim 6:2 (b) and (c)

TEXT: “R. Eliezer said to him: And on this [itself] do I base an inference: (And) if the slaughtering which is under the category of work overrides the Sabbath, the sprinkling which is under the category of rest – should it not be *inferred* that it overrides the Sabbath [also]? R. Aqiva said to him: Or the reverse! If the sprinkling which is [only under the category] of rest does not override the Sabbath, the slaughtering which is [under the category] of work – should it not be *inferred* that it [also] does not override the Sabbath?”

MY READING: Here we have for once two rival a fortiori arguments! This is worth mentioning as an example of such rivalry.

R. Eliezer's is almost the same argument as already seen, except that here 'slaughtering' and 'sprinkling' are specifically mentioned instead of the vaguer minor and major term. It is positive subjectal, going from minor to major.

> Activities classed under Sabbath rest (P) are more leniently regulated (R) than activities classed under Sabbath work (Q).
>
> If the slaughtering which comes under Sabbath work (Q) is leniently regulated (R) enough to be permitted on the Sabbath (S),
>
> then, sprinkling which comes [only] under Sabbath rest (P) is leniently regulated (R) enough to be permitted on the Sabbath (S).

R. Aqiva's retort is negative subjectal, going from major to minor, as follows:

> Activities classed under Sabbath rest (P) are more leniently regulated (R) than activities classed under Sabbath work (Q).
>
> If sprinkling which comes [only] under Sabbath rest (P) is leniently regulated (R) *not* enough to be permitted on the Sabbath (S),
>
> then, the slaughtering which comes under Sabbath work (Q) is leniently regulated (R) *not* enough to be permitted on the Sabbath (S).

What is the status of this controversy? The two arguments in fact formally imply each other, since they have the same major premise. What puts them in opposition to each other is that each speaker assumes himself to have a true minor premise, and therefore his opponent to have a false conclusion. Presented with the two arguments, and no other information, we have no way to choose between them. Though contrary, they are both equally cogent hypothetical scenarios, given their common major premise. It is a standoff. The answer is presumably given further on in the text.

Pesahim 6:5

TEXT: "R. Eliezer argues: If a person, when he has changed the name of the paschal sacrifice, which sacrifice he may slaughter on the Sabbath, is deemed to be guilty; does it not follow that when he had changed the names of other sacrifices which are already prohibited to be offered thereon as such, that he must *a fortiori*, be considered guilty?"

MY READING: This is a Mishnaic a fortiori argument not mentioned by Samely. It can be put in positive subjectal form:

> Changing the purpose of a sacrifice that must not be slaughtered on the Sabbath (P) is more culpable (R) than changing the purpose of a sacrifice that may be slaughtered on the Sabbath (Q).
>
> If a person who changes the purpose of a sacrifice (such as the paschal sacrifice) which may be slaughtered on the Sabbath (Q) is culpable (R) enough to be liable to a sin-offering (S),
>
> then, a person who changes the purpose of a sacrifice which (though eligible on Pesach) must not be slaughtered on the Sabbath (P) is culpable (R) enough to be liable to a sin-offering (S).

FURTHER TEXT: "To this R. Joshua answered: You cannot apply what is affirmed in respect to the sacrifice, when it was changed to that which it is unlawful to offer on the Sabbath, to other sacrifices where the name has been changed to what is lawful. R. Eliezer replied: The offerings brought for the whole congregation [of Israel] shall prove [my assertion,] for it is lawful to offer them on the Sabbath under their proper name; yet whoever brings other offerings under their denomination is declared to be guilty. Then R. Joshua answered: You cannot apply what is affirmed in respect to the offerings of the whole congregation which have a determinate number, to the paschal sacrifice which has no determinate number."

MY READING: R. Joshua apparently denies the major premise, saying that relabeling a sacrifice as equivalent to one unlawful on the Sabbath (e.g. changing the purpose of a paschal offering to some other) is not comparable to relabeling a sacrifice as equivalent to one lawful on the Sabbath (e.g. changing the purpose of some other offering to paschal). To defend his major premise, R. Eliezer retorts that whereas sacrifices for the whole

congregation may be offered on the Sabbath under their name (i.e. as public offerings), other sacrifices cannot be offered on the Sabbath under that name (i.e. as public offerings); that is, the latter name change does not make them Sabbath compatible (just as the name change to paschal sacrifice does not make an offering Sabbath compatible). But R. Joshua rejects that defense, saying that whereas the offerings of the whole congregation are limited in number, the paschal sacrifice is not (so no comparison between them is possible).

Sanhedrin 6:5

TEXT: 'R. Meir said: … says God (var. Scripture), I am pained at the blood of the wicked, *how much more* at the blood of the righteous!'

MY READING: positive subjectal, minor to major. Could be intended as a crescendo.

God has for the righteous (P) more concern (R) than He has for the wicked (Q).

If God has for the wicked (Q) concern (R) enough to be pained at their blood (S),

then God has for the righteous (P) concern (R) enough to be pained at their blood (S).

An a crescendo reading would imply God's greater unhappiness in the latter case, in proportion to His greater love for the righteous.

Shebuoth 3:6

TEXT: "If he swore to cancel the commandment and did not cancel it, he is free (but see mShebu 3:8); [if he swore] to fulfill the commandment and did not fulfill it, he is free. Yet, it might be inferred that he was culpable, as according to the words of R. Yehudah ben Batyra. R. Yehudah ben Batyra said: If he is liable for [broken] oaths concerning that which is discretionary, for which no oath was imposed from Mount Sinai, is it not *logical* that he should be liable for [broken] oaths concerning commandments, for which an oath was imposed from Mount Sinai?"

MY READING: R. Yehuda's argument is a positive subjectal, minor to major.

Broken oath about commandment (P) is more binding (R) than broken oath about discretionary item (Q) is.

If broken oath about discretionary item (Q) is binding (R) enough to make one liable (S),

then broken oath about commandment (P) is binding (R) enough to make one liable (S).

FURTHER TEXT: "They said to him: No; if you speak of an oath concerning what is discretionary, in which a No is as [valid as] a Yes, would you say the same for an oath concerning a [positive] commandment, where the No is not as [valid as] the Yes? (some mss add: So that a person taking an oath to cancel it, and did not cancel it, is not liable)."

MY READING: The rebuttal apparently denies the truth of the major premise – i.e. not all broken oaths about a commandment are taken that seriously. I gather from Samely that this refers to oaths against the commandment which are exempt from liability if not fulfilled.

Sotah 6:3 (a)

TEXT: "[mishnah 2] If [even] one witness said: I have seen her that she was defiled, she does not drink [the Sotah waters], and not only this, but even a slave, even a female slave, behold these are believed ... Her mother-in-law, the daughter of her mother-in-law ... behold these are believed ... [3] It could have been a [correct] *inference* [to say]: If the initial testimony, which renders her not forbidden forever [to her husband], cannot be established by less than two witnesses, should not that which does render her forbidden forever, [also] be established by a minimum of two witnesses? {In this regard it is instructive that Scripture says, 'and there is no witness against her' – any testimony regarding her.}"

MY READING: This is positive subjectal, minor to major.

The later testimony (P) forbids wife to husband for longer time (R) than the initial testimony (Q) does.

If the initial testimony (Q) forbids wife to husband (not forever) for long (R) enough to require at least two witnesses (S),

then the later testimony (P) forbids wife to husband (forever) for long (R) enough to require at least two witnesses (S).

Sotah 6:3 (b)

TEXT: “There is an inference to be drawn *from the less to the more stringent* concerning the first testimony from this very fact [that only one witness is necessary]: Just as the last testimony which renders her forbidden forever, behold, is established by one witness [only], should not the first testimony which does not render her forbidden for ever *also* be capable of being established by one witness [only]?!”

MY READING: This is positive subjectal, minor to major.

The initial testimony (P) forbids wife to husband for shorter time (R) than the later testimony (Q) does.

If the later testimony (Q) forbids wife to husband (forever) briefly (R) enough to require only one witness (S),

then the initial testimony (P) forbids wife to husband (not forever) briefly (R) enough to require only one witness (S).

This argument, take note, is intended to rebut – or at least to rival (being apparently an equally cogent alternative) – the preceding one. Notice that though the terms here are labeled by me similarly to those there (i.e. P, Q, R, S), the meanings are different. Here, the middle term is the relative of the previous middle term (referring to shortness of time instead of length of time), and consequently the roles of the initial and final testimony are reverse; moreover, the subsidiary terms has changed from “at least two witnesses” to “only one witness.”

FURTHER TEXT: “{In this regard it is instructive that Scripture says: ‘For he has found in her the indecency of a matter [and he writes for her a bill of divorce]’, and above it says: ‘According to two witnesses [or according to three witnesses] shall the matter be established’. Just as the ‘matter’ enunciated above is [established] according to two witnesses, so the ‘matter’ enunciated here is according to two witnesses also.}”

MY READING: The above counterargument (b) is rejected by reference to Scripture, which specifies two or more witnesses for the initial testimony. It does not follow, however, that the previous argument (a) is established. I suspect (though this needs

verification) that the Mishna which advocates only one witness for the final testimony is maintained, somehow.

Temurah 1:1 (a) and (b)

TEXT: "{The priests may substitute what is theirs and Israelites substitute what is theirs. The priests do not substitute the sin offering, and not the guilt offering and not the firstling. R. Yohanan ben Nuri said: And why do they not substitute the firstling? R. Aqiva said to him: The sin offering and the guilt offering are a gift to the priest; and the firstling is a gift to the priest. *Just as* they may not substitute the sin offering and the guilt offering, *so* they may not substitute the firstling.}"

MY READING: R. Akiva's initial argument seems to be a negative subjectal, a pari (egalitarian).

> The sin/guilt offerings (P) are as much a gift to the priest (R) as the firstling (Q) is.
>
> If the sin/guilt offerings (P) are gifts (R) not enough to be substitutable (S),
>
> then the firstling (Q) is a gift (R) not enough to be substitutable (S).

FURTHER TEXT: "R. Yohanan ben Nuri said to him: What do I have [knowing that] there is no substitution of sin offering and guilt offering, for *to these* they have no right while they [the animals] are alive, *and yet* you are telling me regarding the firstling to which they do have a right while it is alive? {R. Aqiva said to him: And is it not already said: 'And it will be that both it and its substitute will be holy'? Where does its holiness take effect for it? In the house of the owner. So also substitution, in the house of the owner.}"

MY READING: R. Yohanan's argument is intended to rival the preceding one by R. Akiva. It appeals to an additional distinction between live and dead offerings, which makes the attempted a fortiori argument not egalitarian, and therefore *invalid*, because though it is negative subjectal, it is yet minor to major.

> What becomes priestly property while alive (P) is more fully owned (R) than what becomes priestly property only after slaughter (Q) is.

> If the sin/guilt offering, which becomes priestly property only after slaughter (Q) is fully owned (R) not enough to be substitutable (S),
>
> then the firstling, which becomes priestly property while alive (P) is fully owned (R) not enough to be substitutable (S).

R. Akiva apparently counters this invalid argument, if I understand correctly, with a claim that both offerings are equally holy and that holiness takes effect as soon as it comes into the owner's home, so that substitution can take effect at once. This is not a third a fortiori argument, but an attempt to neutralize R. Yohanan's rival a fortiori argument by denying his minor premise and conclusion. It is noteworthy that R. Akiva does not here (apparently) challenge R. Yohanan on more formal ground, i.e. by pointing out that his reasoning process is invalid.

Terumoth 5:4 (a) and (b)

TEXT: "If one seah of unclean heave offering fell into a hundred seahs of clean heave offering, the House of Shammai forbid the whole, but the School of Hillel permit it. The House of Hillel said to the House of Shammai: *Since* clean [heave offering] is forbidden to non-priests and unclean is forbidden to priests, if the clean can be outweighed cannot the unclean be outweighed too? The House of Shammai answered: No! If the *'light'* common produce, which is permitted to non-priests, neutralizes what is clean (cf. mTer 5:3), should the *'weighty'* heave offering, which is forbidden to non-priests, neutralize what is unclean?! After they agreed, R. Eliezer said: It should be taken up and burnt. But the Sages say: It is lost through its scantiness."

MY READING: There are in fact two a fortiori arguments here, both of them negative subjectal, and both invalid because minor to major (instead of major to minor). The first argument, by the House of Hillel, is intended as valid; the second argument, by the House of Shammai, is put forward as invalid: it is formulated in order to show up the invalidity of the first argument.

The Hillel House argument seems to be the following:

> What is forbidden [even] to priests (unclean heave offerings) (P) is more restricted (R) than what is forbidden to non-priests [but not to priests] (clean heave offerings) (Q).

> If the clean heave offerings, which are forbidden to non-priests [but not to priests], (Q) are restricted (R) not enough to be prevented from being outweighed by clean common food (= effectively turned into clean common food by mixture in 100 times more of it) (S),
>
> then the unclean heave offerings, which are forbidden [even] to priests (P) are restricted (R) not enough to be prevented from being outweighed by clean common food (= effectively turned into clean common food by mixture in 100 times more of it) (S).

This argument is fallacious: one can well imagine the clean being outweighed but the unclean not being outweighed. To say that the latter follows the former is a non-sequitur. This is apparently the intent of the objection by the Shammai House. They are not so much proposing a counter a fortiori argument as denying the process of the Hillel House proposal. Nevertheless, they modify the wording of the a fortiori argument as follows, presumably so as to show more clearly its absurdity: "If the 'light' common produce, which is permitted to non-priests, neutralizes what is clean (cf. mTer 5:3), should the 'weighty' heave offering, which is forbidden to non-priests, neutralize what is unclean?!"

> What is forbidden to non-priests ('weighty' heave offerings) (P) is more restricted (R) than what is permitted to non-priests ('light' common produce) (Q).
>
> If the 'light' common produce, which is permitted to non-priests, (Q) is restricted (R) not enough to be prevented from being neutralized by clean common food (= effectively turned into clean common food by mixture in 100 times more of it) (S),
>
> then the 'weighty' heave offerings, which are forbidden to non-priests, (P) are restricted (R) not enough to be prevented from being neutralized by clean common food (= effectively turned into clean common food by mixture in 100 times more of it) (S).

This argument differs from the preceding in that it concerns only non-priests, ranging from what is forbidden to them to what is permitted to them. This clarifies the logical issue a bit, removing

complications in the terms. If what is permitted to them can be neutralized, then surely what is forbidden to them can be neutralized too? The logical answer is of course: no – one can conceive the former being true without the latter being true. So, this is an illicit process – i.e. the argument is invalid, going from minor to major whereas it should have gone from major to minor (i.e. if the forbidden can be neutralized then yes, surely the permitted can be so too). So, this second a fortiori argument is invalid too – but intentionally so, so as to emphasize the invalidity of the first a fortiori argument.

In my opinion, Shammai here beats Hillel; i.e. Hillel House has not proven its point and Shammai House has demonstrated that absence of proof (though that does not mean it proves the opposite point). The last sentence in this passage, "After they agreed, R. Eliezer said: It should be taken up and burnt. But the Sages say: It is lost through its scantiness." seems to say that the two sides agreed that Shammai House was right in its critique of Hillel House.

ADDITIONAL NOTE. Moreover that the conclusion of Hillel House is about outweighing by clean common food – but a further argument is tacitly implied, that if unclean heave offerings are outweighed by clean common food, then they are also a fortiori outweighed by clean heave offerings (which is the desired final conclusion), since the latter are more holy than the former. Similarly, the (ad absurdum) conclusion of Shammai House is about outweighing by clean common food – but a further argument is tacitly implied, that if 'weighty' heave offerings are outweighed by clean common food, then they are also a fortiori outweighed by clean heave offerings (which is the desired final conclusion), since the latter are more holy than the former. So, we may say that we in fact have four a fortiori arguments here! The first two (explicit) are invalid, but the latter two (implicit) would be valid. I do not count the latter, since no one in the text has actually stated them.

Yadayim 4:7

TEXT: "The Sadducees say: We raise a complaint against you, o Pharisees, (for you say: If my ox and my donkey have caused damage they are culpable [making me liable]; but if my slave

and female slave have caused damage, they are free [causing no liability for me]). Just as with regard to my ox and my donkey, concerning which I am not liable through commandments, behold I am culpable for damage, is it not *logical* that with regard to my slave and my female slave, concerning whom I am liable through commandments, I should be liable for damage?"

MY READING: The Sadducees propose the following positive subjectal, minor to major:

> The owner of a male or female slave (P) is more liable through commandments (R) than the owner of an ox or donkey (Q) is.
>
> If the owner of an ox or donkey (Q) is liable through commandments (R) (R = 0) enough to be culpable for damage (S),
>
> Then the owner of a male or female slave (P) is liable through commandments (R) (R > 0) enough to be culpable for damage (S).

FURTHER TEXT: "They said to them: No. If you say this about my ox and my donkey that have no understanding, will you also say it about my slave and female slave who have understanding? So that if I provoke him he goes and sets fire to someone's stack of corn and I am liable to compensate?"

MY READING: The Pharisees object to the above a fortiori argument of the Sadducees by denying its major premise, saying: the owner is responsible for his animals because they cannot understand laws, but the owner is not responsible for his slaves because they can understand laws.

Yadayim 4:8

TEXT: 'A Galilean heretic (var.: Sadducee) said: I raise a complaint against you, O Pharisees, for you write the [name of the] ruler together with [the name of] Moses in a bill of divorce. The Pharisees say: We [*raise a complaint*] against you, O Galilean heretic, for you write the Name [of the] God together with the [name of] the ruler on [one] page, and not only that, but you write the ruler above and the Name beneath, (*var*. as it is said:) 'And Pharaoh said: Who is the Lord that I shall listen to his voice to let go Israel? [I do not know the Lord and also Israel I shall not let go]'. {And when he was smitten, what does he say?

'The Lord is righteous [and I and my people are the wicked ones].'}'

MY READING: The Pharisee argument is best expressed as negative subjectal, since the argument goes from major to minor.

> God (P) is more worthy of being dissociated from earthly rulers (R) than Moses (Q) is.
>
> If God (P) is worthy of being dissociated from earthly rulers (R) not enough to have his name excluded from a document with an earthly ruler's name in it (S) (specifically, in the Torah, with Pharaoh),
>
> then Moses (Q) is worthy of being dissociated from earthly rulers (R) not enough to have his name excluded from a document with an earthly ruler's name in it (S) (specifically, in a bill of divorce, with any current ruler).

This a fortiori argument is put forward by the Pharisees, in order to arrive at a conclusion which contradicts the Sadducee's (or Galilean's) assertion (which is not an argument, notice) that we cannot write the name of Moses together with that of the ruler in a bill of divorce. They say, citing an instance from Scripture: not only can such names appear together, but the more honorable one can even appear beneath the less honorable one, and not only in bill of divorce but in any document.

Yebamoth 8:3

TEXT: "{'An Ammonite and a Moabite' is prohibited [to marry an Israelite] and their prohibition is an everlasting prohibition (cf. verse). But their females are allowed right away. An Egyptian and Edomite are only prohibited for three generations, males as well as and females.} R. Shimon allows the females right away. R. Shimon said: The things are *lighter and heavier*: If in a place for which it [Scripture] forbids the males with an everlasting prohibition, it allows the females right away, then in a place for which it forbids the males only for three generations, is it not *logical* that the females are allowed right away?! They answered: If this is Halakhah [which you have received] we receive it. But if it is but an inference [of your own] a counter-interference may rebut it. He answered: Not so, but I declare what is Halakhah."

MY READING: This argument is negative subjectal, since it goes from major to minor.

> The females of peoples whose males are forbidden forever (namely, Ammonites and Moabites) (P) are more liable to exclusion (R) than the females of peoples whose males are forbidden for three generations (namely, Egyptians and Edomites) (Q) are.
>
> If the females of peoples whose males are forbidden forever (P) are liable to exclusion (R) not enough to be prevented from inclusion forthwith (S),
>
> then the females of peoples whose males are forbidden for three generations (Q) are liable to exclusion (R) not enough to be prevented from inclusion forthwith (S).

Yom Tov 5:2

TEXT: “Any act that is culpable on the Sabbath, whether by virtue of the rules concerning Sabbath rest (cf. Erub. 10:3, 15) or concerning acts of choice or concerning pious duties, is culpable also on a festival day. And these by virtue of the rules concerning Sabbath rest: no one may climb a tree or ride a beast or swim on water or clap the hands or slap the thighs or stamp the feet [or dance]. And these by virtue of the rules concerning acts of choice: no one may sit in judgment or conclude a betrothal or perform Halitsah or contract levirate marriage. And these by virtue of the rules concerning pious duties: no-one may dedicate anything or make a vow of valuation or devote anything or set apart heave offering or tithes (Deut. 14:22-29). All these things have they prescribed [as culpable] on a festival day: *still more so* [are they culpable] on the Sabbath. A Festival-day differs from the Sabbath in nothing but the preparing of necessary food (cf. mMeg 1:5).”

MY READING: This is a positive subjectal, minor to major.

> The Sabbath (P) is more restrictive (R) than any Festival day (Q) is.
>
> If a Festival day (Q) is restrictive (R) enough to prescribe certain listed actions (S),
>
> then the Sabbath (P) is restrictive (R) enough to prescribe the same listed actions (S).

We are given that everything prescribed on Sabbath is so on Festival day, *except* food preparation; and everything prescribed on Festival day is all the more so on Sabbath [without exception]. The first proposition is almost general but exceptive. The second, which is the reverse if-then, is fully general. Both propositions are needed to fully express the relation between the two situations. As regards the a fortiori argument, it is an apparent redundancy, since we anyway know its conclusion before and independently of its premises. Nevertheless, it can be presented as a useful rule of thumb. That is, it may not be of hermeneutic/theoretical value, but it is heuristic/practical utility. In any case, the argument is formally valid and that is what concerns us here.

Zebahim 7:4

TEXT: "If the whole offering of a bird was offered below (the red line) after the manner of a sin offering and under the name sin offering, R. Eliezer says: The law of sacrilege still applies to it. R. Yehoshua says: The law of sacrilege no longer applies to it. R. Eliezer said: If the sin offering, which is not subject to the law of sacrilege when it is offered under that name, becomes subject to the law of sacrilege if it is offered under another name, *how much more* must the whole offering, which is subject to the law of sacrilege when it is offered under that name, be subject to the law of sacrilege when it is offered under another name."

MY READING: R. Eliezer's argument is positive subjectal, minor to major.

> The whole-offering (P), being subject to law of sacrilege under its own name, is more susceptible to sacrilege (R) than the sin-offering (Q), which is not subject to law of sacrilege under its own name.
>
> If the sin-offering (Q) is susceptible to sacrilege (R) (R = 0) enough to be subject to the law of sacrilege under another name (S),
>
> then the whole-offering (P) is susceptible to sacrilege (R) (R > 0) enough to be subject to the law of sacrilege under another name (S).

FURTHER TEXT: "R. Yehoshua said to him: No, as you argue of the sin offering, which when its name is changed to that of a

whole offering thereby becomes changed to a thing subject to the law of sacrilege, would you also argue of a whole offering, which when its name is changed to that of a sin offering thereby becomes changed to a thing not subject to the law of sacrilege)?"

MY READING: R. Yehoshua objects to R. Eliezer's a fortiori argument, by considering changes of status from sin offering to whole offering and vice versa. He points out that in the former case, the change makes the offering become subject to the law of sacrilege; whereas in the latter case, the change makes the offering cease to be subject to the law of sacrilege. This denies the conclusion of the a fortiori argument, and thus puts in doubt the process of inference. What is formally wrong with that process? The answer to this question is that although superficially the subsidiary term is the same in the minor premise and conclusion, if we examine it more closely we realize that it is not really so. The words used are the same, but their underlying meaning is quite different. In the minor premise, the offering becomes *truly* subject to the law of sacrilege, whereas in the conclusion the offering becomes *not* subject to it. In the subsidiary term, we cannot use the same relative language as we use in the middle term. Whereas (R) = 0 and (R) > 0 can both count as (R), (S) = 0 and (S) > 0 cannot both count as (S). This is precisely the meaning of R. Yehoshua's objection.[152]

Zebahim 7:6

TEXT: "If he had nipped off the head (of the bird) and it was found to be terefah, R. Meir says: It does not convey uncleanness of the gullet. R. Yehudah says: It conveys uncleanness of the gullet. R. Meir said: If in the case of a beast which as carrion would convey uncleanness by contact or carrying, slaughtering renders clean the uncleanness of an animal that is terefah, is it not an *inference* that, in the case of a bird which as carrion would

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[152] After this, R. Eliezer counters R. Yehoshua's objection, by pointing out that in some cases name change of an offering subject to the law of sacrilege does not cause that offering to cease to be subject to said law – so this constancy may well apply to the whole offering. But R. Yehoshua rejects this analogy, pointing out certain differences between the proposed analogues.

not convey uncleanness by contact or carrying, slaughtering should render clean the uncleanness of an animal that is terefah? Just as we find with slaughtering that it renders fit for eating and renders clean the terefah from its uncleanness, so nipping off (the head) which renders fit for eating, renders clean the terefah from its uncleanness."

MY READING: R. Meir's argument negative subjectal, major to minor.

> A beast (which as carrion would so convey) (P) is more able as carrion to convey uncleanness by contact or carrying (R) than a bird (which as carrion would not so convey) (Q) is.
>
> If a beast (P) is able as carrion to convey uncleanness by contact or carrying (R) not enough to prevent its slaughtering from rendering clean the uncleanness of its terefah (S),
>
> then a bird (Q) is able as carrion to convey uncleanness by contact or carrying (R) not enough to prevent its slaughtering from rendering clean the uncleanness of its terefah (S).

Thereafter, R. Meir argues by analogy from slaughtering to nipping off head. It goes apparently: "Since slaughtering and nipping-off both render fit for eating, then just as the former renders clean the terefah from its uncleanness, so does the latter."

FURTHER TEXT: "R. Yose says: It is enough (*dayo*) to compare the carrion of a beast: slaughtering renders clean, nipping off does not."

MY READING: R. Yose objects to R. Meir's arguments. Though he uses the language of *dayo*, saying "it is enough," I do not think he is really invoking the principle of sufficiency, since there is no quantitative or other difference in the subsidiary term of R. Meir's proposed conclusion. R. Yose denies that the conclusion of the a fortiori argument follows from its minor premise (which he accepts), saying: "[Even though] slaughtering the carrion of a beast renders clean, [still] nipping off [head of bird] does not [render clean]." This implies that R. Yose doubts R. Meir's major premise, for some reason.

Zebahim 8:12

TEXT: “If the blood of a sin offering was received into two cups and one of them was brought to the outside [of the temple court], the one that remained inside is fit. If one of them was brought inside [the sanctuary], R. Yose Ha-Gelili declares the outside one fit [i.e. the one that is in the temple court], and the Sages declare it unfit. R. Yose Ha-Gelili said: If in the case where the thought renders unfit, [as when there is an intention to sprinkle] outside [the temple court, cf. mZeb 2:2], this [outside] does not render unfit the remainder [still inside the temple area] like the one that was brought out, is it not an *inference* that in a case where thought does not render unfit, [as when there is an intention to sprinkle] inside [the sanctuary], the one that remains outside is [also] not made like the one brought in [to the sanctuary, namely invalid, mZeb 8:11] ?”

MY READING: R. Yose’s argument is negative antecedental, major to minor.

> Wrongly sprinkling blood outside the temple (which renders it unfit) (P) is more ritually problematic (R) than wrongly sprinkling blood inside the sanctuary (which does not render it unfit) (Q).
>
> If wrongly sprinkling blood outside the temple (P) is ritually problematic (R) not enough to render the remaining blood unfit (S),
>
> then wrongly sprinkling blood inside the sanctuary (Q) is ritually problematic (R) not enough to render the remaining blood unfit (S).

Zebahim 12:3

TEXT: “The hides of the lesser holy offerings belong to the owners; the hides of the most holy offerings belong to the priests. *Light and heavy*: Just as when in the case of a burnt offering for which they do not have the right to its flesh, they have the right to its hide, for the most holy offerings, for which they have a right to their flesh, is it not an *inference* that they also have the right to their hides?”

MY READING: This is a positive subjectal, minor to major.

The most holy offerings (whose flesh does belong to the priests) (P) belong to the priests (R) more than the burnt offerings (whose flesh does not belong to the priests) (Q) do.

If the priests have in relation to the burnt offerings (Q) ownership rights (R) enough to have the right to the hides (S),

then the priests have in relation to the most holy offerings (P) ownership rights (R) enough to have the right to the hides (S).

FURTHER TEXT: “The (case of the) altar cannot serve as standard (countering the inference), for it does not have the hide in any case.”

MY READING: This is an objection: a denial of the conclusion, which puts in doubt a premise or the process.

DISCLAIMER: I would like to emphasize that I am not a Talmudist. Being but an amateur, it is quite possible that I have partly or wholly misunderstood some of the texts. I do not pretend here to have fully and accurately explicated the Mishna passages listed – I am not knowledgeable in Jewish law enough to do that. All I have tried to do is to briefly interpret the a fortiori aspect of these discourses in standard form, as they appear without looking at the wider context. Of course, I should have devoted more study to this field, and even consulted an expert in it in order to confirm or correct my interpretations, but I chose not to do so, considering that I had my hands full already with more pressing matters. I would be very grateful to anyone who, finding errors in my treatment, tells me about them. I would certainly encourage anyone who can improve on my work to do so. If the latter wishes me to publish his or her commentary, please submit it to www.logicforum.org.

2. A fortiori discourse in the two Talmuds

There is a great need for someone to go through all Talmudic literature, and in particular the two Talmuds, looking for all sorts of reasoning in it, and more specifically for applications of the rabbinic hermeneutic principles, and in particular for instances of a fortiori argument. This is a massive job, of course, which ideally ought to be carried out in relation to the original texts, in Hebrew and Aramaic. Many people need to get involved in this project, which is really worthwhile. We can never hope to fully

and correctly understand and evaluate Talmudic logic without such thorough empirical research. I have no intention to do this important work, for the simple reason that I do not have the linguistic knowledge needed for it. But I here try and do a small part of it, specifically in relation to a fortiori argument and in English translation.

The Jerusalem Talmud (JT) was the first to have been closed, ca. 400 CE. I have almost no personal experience with this Talmud, but judging from what I have read about it, it is shorter and less disputative, and so we may expect it to contain relatively fewer a fortiori arguments. As Neusner wrote:

> "The Yerushalmi speaks about the Mishnah in essentially a single voice, about fundamentally few things…. [It] takes up a program of inquiry that is not very complex or diverse. The Yerushalmi also utilizes a single, rather limited repertoire of exegetical initiatives and rhetorical choices, etc." (*Rabbinic Literature: An Essential Guide*, p. 41.)

The Babylonian Talmud (BT), closed ca. 600 CE, is the document that will require the most research work. We can expect hundreds of a fortiori arguments in it, to be listed and eventually analyzed. Blau reports that Schwarz[153] estimates the statistics for the second hermeneutic rule, that of *gezerah shavah*, as follows:

> "…in the Babylonian Talmud alone, there has to be close to four hundred, in the Talmud Yerushalmi about one hundred and fifty and in the Tosefta thirty. If one adds to that the *gezerah shavah* in halakhic works and other sources, there would be, after deduction of the

[153] In his Der Hermeneutische Analogie in der Talmudischen Litteratur, pp. 84, 87, 89.

> numerous parallel passages, a total of six hundred" (p. 156).

I do not know if Schwarz made similar estimates for the first hermeneutic rule, *qal vachomer*, in his book devoted to that subject. But it is a fair guess offhand that the statistics are in the same order of magnitude. Needless to say, we are not counting a fortiori arguments in order to discover who has argued a fortiori the most often; there is no competition to be won! The purpose of our counting them is to accurately determine the number of cases we have to eventually list and analyze.

In any study of a fortiori argument in the Talmud, we must of course distinguish the different *sources* of cases found in it. The Talmud may be quoting a passage from the Torah (the Five Books of Moses) or the Nakh (the rest of the Jewish Bible), or from the Mishna (redacted ca. 220 CE)[154], or from the Tosefta (compiled at about the same date or soon after)[155], or a *baraita* (a statement the Gemara claims as Tannaic, not included in the Mishna, though it may be in the Tosefta), or lastly the Gemara (which in turn has many layers). I will not do this here, but obviously it has to be done if we want to obtain an accurate picture of a fortiori use.

As regards English translations of the Talmuds, we have, I think only five sets to choose from. The three most recent are *The Schottenstein Edition of the Talmud Bavli* as well as *The Schottenstein Edition of the Talmud Yerushalmi* (New York: ArtScroll, various dates)[156], *The Steinsaltz Edition of the Talmud* (New York: Random House, 1989-99)[157], and *The Talmud of Babylonia. An American Translation* (Atlanta: Scholars Press

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154 See www.jewishencyclopedia.com/articles/10879-mishnah.

155 See www.jewishencyclopedia.com/articles/14458-tosefta.

156 These seem to be complete. See: www.artscroll.com/Talmud1.htm.

157 This refers to BT and apparently only includes Bava Metzia, Ketubot, Ta'anit, and Sanhedrin. See: www.steinsaltz.org/learning.php?pg=Talmud_-_Books&articleId=1424.

for Brown Judaic Studies, 1984-95)[158]. To my knowledge, these editions are not available in a form that allows computer search, although the Steinsaltz edition is at least partly posted in the author's website[159].

An older translation is *The Soncino Edition of the Talmud* (London, 36 volumes, 1935-1952), edited by R. Isidore Epstein (1894–1962). This is freely available online, thanks to Halakhah.com (a Chabad project), in 63 pdf files[160]. This resource is potentially very useful, provided we take the trouble to merge all these files into one document so as to avoid repetitive work; the single file would of course need to be purged of all editorial content, such as introductory material and footnotes.

Still older is *The Rodkinson Edition of the Babylonian Talmud* (1903)[161]. This edition is freely available online thanks to the Internet Sacred Text Archive[162], in Kindle format[163]. I managed to convert this file into a Word file, from which I removed all extraneous material (i.e. all Rodkinson's introductions, synopses, footnotes, etc.). This edition contains all of the tractates in the Orders (Sedarim) of Moed (Appointed Seasons:

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[158] This is translated (or edited?) by Jacob Neusner, Tzvee Zahavy and others. Complete.

[159] At: www.steinsaltz.org/index.php. Since the search facility returns only 11 results for 'fortiori', I assume the data base is far from exhaustive.

[160] This is found at: www.halakhah.com/indexrst.html. A Kindle edition is also available for a small price, at www.talmudicbooks.blogspot.ch/2012/05/amazon-kindle-oral-torah-in-36-volumes.html.

[161] Michael Levi Rodkinson, previously Frumkin, was a Jew who emigrated to America (1845-1904).

[162] At www.sacred-texts.com/jud/talmud.htm.

[163] It is also available in eBook format which can be read using Adobe Digital Editions (ADE) reader. I should mention that, while the Kindle for PC reader has the advantage that its search facility lists 'all' the matching cases at once, it has a maximum limit of 100 hits; the ADE reader, on the other hand, has no maximum limit, but it only takes you to the matching cases one at a time.

12 tractates) and Nezikin (Damages: 10 tractates)[164]. Thus, four entire Orders are missing in it, namely: Zeraim (Seeds: 11 tractates), Nashim (Women: 7 tractates), Kodashim (Holy Things: 11 tractates), Tohoroth (Cleannesses: 12 tractates). Clearly, the Rodkinson edition does not comprise the whole Talmud, so that any information gathered from it is likely to be incomplete.

But my purpose here is to launch *a pilot study*, to show the way we may obtain the desired information and statistics. I would have preferred to do this pilot study in relation to the Soncino edition, which is not only more complete but also more generally respected; but I decided to focus on the Rodkinson edition to save time and effort. This should suffice to show the way, even if the results obtained will not be as thorough and reliable. Anyway, even if Rodkinson's translations are not universally approved, this handicap hardly affects our study because it specifically focuses on a fortiori argument.

Pilot study. Ultimately, we need to actually list all passages of the Talmud that seem to have a fortiori intent, and see whether they can indeed be cast in standard form (whether valid or invalid). This can only be done exhaustively by going through the whole Talmud page by page, which I do not propose to do here. Instead, I propose to search for a number of key phrases which are usually, or even just often, *indicative of a fortiori discourse*. This is why I needed a single file, purged of all commentary. We cannot find key phrases and count instances in the Rodkinson edition by means of an Index, because it does not have one.

I did in the past, when I wrote JL, look into the Index Volume of the Soncino edition (1952), and there found 137 entries apparently indicative of a fortiori argument, which I tabulated as follows (table 3.3)[165]:

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[164] "Plus some additional material related to these Orders;" namely: Ebel Rabbathi / Semahoth; Aboth of R. Nathan; Derech Eretz Rabba and Eretz Zuta.

[165] As I pointed out at the time, this statistic cannot be taken at face value, "because the references are to page numbers, which may

Soncino BT index entries	#
A fortiori	52
A minori ad majus	31
Kal wa-homer	34
Deduction, proofs by	2
Inference from minor to major	8
Major, inference from minor to	8
Minor, inference from major to	2
Total count of a fortiori references	137

Research by means of search strings is bound to give us a more accurate picture of a fortiori use. The problem with it, of course, is that it allows for *overlaps*. For example, we might count twice the single argument "Aqiba then drew an *a fortiori* conclusion. He said: 'If the soft has so much power over the hard as to bore it (water over stone), *how much more* power will the Torah, the words of which are as hard as iron, have over my heart, which is flesh and blood?'" – once for the phrase "a fortiori" and once for "how much more." Such overlaps can only be eliminated at a later stage, when each argument is listed and examined closely. For the time being, we shall ignore this difficulty and aim for a rough estimate.

Incidentally, it is important to keep in mind when searching for such arguments that the relevant quantitative indicator has to be in the putative conclusion – not in a premise. In the above example, for instance, the relevant indicator is not the antecedent "so much" (which merely refers to an unspecified, impressive quantity), but the consequent "how much more" (which serves to signal a fortiori argument). Thus, an expression (such as the

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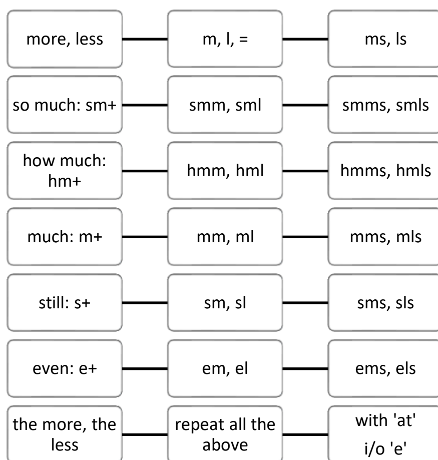
contain more than one argument of the same type; also, not having looked at them, I cannot guarantee that they are all legitimate cases. I would suspect offhand, on the basis of my minimal experience of Talmud study, that this list is incomplete (all the more so if we include the Commentaries)."

"so much" used here) might be counted as indicative of a fortiori argument and yet in fact not be so – because, though it would be indicative were it in the conclusion, it is not in the conclusion.

The first step in our research is to think of key phrases to search for. The expressions possibly indicative of a fortiori discourse are of two kinds. The first groups includes idiomatic markers like 'all the more', 'how much the less', 'so much more', and so on. The second groups descriptive markers such as 'a fortiori', 'from minor to major', 'inference', 'argue', 'logical' – to name just a few.

With regard to the first kind, we need to decide the order in which our search will proceed, so as to avoid unnecessary repetition. For that purpose, I have developed the hierarchical arrangement shown in the following diagram. The a fortiori phrases are there abbreviated, using the first letters of the words constituting them; for example, 'smms' means 'so much more so'. Note that for every expression with 'more', there is a similar expression with 'less'. The root of all these expressions is the top one, the comparative 'more' (or 'less', as the case may be); from this we derive 'much more', 'how much more', 'so much more', and also 'still more' and 'even more', and more specific verbal forms. A similar flowchart may be constructed starting with the subsidiary root 'the more', from which we derive 'much the more', 'how much the more', 'so much the more', and also 'still more' and 'all the more', and less generic verbal forms.



In the above chart (diagram 3.1), showing the hierarchy of a fortiori expressions, the most specific expressions (e.g. smms) are on the right; the more generic (e.g. smm) are in the middle, and the most vague (e.g. sm+) are on the left (examples of the latter are ‘so much greater’ or ‘so much worse’). From this we see that the best way to search through a given document, to ensure a minimum of misses or overlaps, would be in the following order. First, we should look for derivatives of ‘the more’, starting with the most specific ones and ending with the most generic ones; second, we should look for derivatives of ‘more’, starting with the most specific ones and ending with the most generic ones. The full orderly list and the results obtained are given in the following (table 3.4):

A fortiori wording	Qty	A fortiori wording	Qty
so much the more so	10	so much more so	0
so much the less so	1	so much less so	2
so much the more (residue)	152	so much more (residue)	11
so much the less (residue)	9	so much less (residue)	3
so much the (residue)	1	so much (residue)	6
how much the more so	0	how much more so	0
how much the less so	0	how much less so	0
how much the more (residue)	13	how much more (residue)	15
how much the less (residue)	0	how much less (residue)	4
how much the (residue)	0	how much (residue)	1
much the more so (residue)	0	much more so (residue)	1
much the less so (residue)	0	much less so (residue)	2
much the more (residue)	3	much more (residue)	2
much the less (residue)	0	much less (residue)	18
much the (residue)	0	as much as	2
still the more so	0	as little as	0
still the less so	0	much (residue)	4
still the more (residue)	0	still more so	3
still the less (residue)	0	still less so	1
still the same	1	still more (residue)	10
still the (residue)	0	still less (residue)	0

all the more so	2	still (residue)	?
all the less so	0	even more so	1
all the more (residue)	2	even less so	0
all the less (residue)	1	even more (residue)	15
all the same	3	even less (residue)	4
all the (residue)	0	even (residue)	?
none the less / nonetheless	18	more so (residue)	0
nevertheless	?	less so (residue)	0
the more so (residue)	8	no/not more	3
the less so (residue)	3	no/not less	0
the more (residue)	3	more (residue)	?
the less (residue)	1	less (residue)	?

Please note well that this is almost raw data, yet to be fully processed by detailed analysis case by case. However, I have here made a small effort to narrow the field. As regards idioms that are almost sure to signal a fortiori discourse, I looked at most cases briefly, in an offhand manner, and eliminated obvious 'duds', by which I mean letter strings that accidentally resemble a fortiori ones (for example: in 'a children-teacher who struck too much the children', the string 'much the' is obviously not intended as an a fortiori marker). As a general rule, in cases of doubt I counted possible cases as actual cases, without taking the trouble to closely examine the data further.

As regards the search strings labeled 'residue', my policy was to discount all cases but the most likely to be a fortiori discourse. The statistics for such more generic words or phrases exclude the counts for more specific phrases derived from them: whence the label 'residue'. For example, the count for 'so much the' excludes the counts for 'so much the more' and 'so much the less', which in turn exclude the counts for 'so much the more so' and 'so much the less so'. This allows us to see more precisely the a fortiori wording used, and also facilitates dealing with the vaguest residues. To give an example: the count for 'so much the more' (152) excludes the more specific cases of 'so much the more so' (10), and the more generic string 'so much the' (1

instance) excludes the cases of ‘so much the more’ and of ‘so much the less’.

Similarly with other word strings. Obviously, the count of the residue of ‘all the’ must exclude cases falling under ‘all the same’, as well as those under ‘all the more’ and ‘all the less’. The reason why phrases with ‘the more’ (first column) must be counted before those with just ‘more’ (second column) is that the residue of ‘much’ excludes all cases with ‘much the’; and likewise, ‘still’ must exclude ‘still the’, and ‘more/less’ must exclude ‘the more/less’.

The more vague the search string, the more instances it in fact includes; but the method of residues here used allows us to narrow the field somewhat. In the case of ‘so much the’, only one instance (“so much the firmer”) was leftover, and this happened to indeed be a fortiori. In the case of the residue ‘so much’, only 6 instances out of 75 qualified at first glance as a fortiori (namely, those worded “in a so much larger degree” or “in so much greater a degree”). For ‘how much’, out 80 remaining instances only 1 qualified (worded “how much severer”). For ‘much’, out of 234 instances only 4 qualified (worded “much better” or “a much greater”). For the residue ‘the more’, out of 83 instances only 3 turned out to be apparently a fortiori (“I enjoyed myself the more because I fulfilled two religious duties,” “the more should it be allowed…,” “it applies the more to…”).

Note that all admitted cases involve *a comparison* (e.g. firmer, larger, greater, severer, better, more enjoyable). In many cases, no potentially a fortiori instances were found (at least in my offhand reading of them). Thus, to illustrate: none of the 99 instances of ‘no less’ or ‘not less’ qualified; likewise, none of the residual 33 instances of ‘still the’ and none of the 1010 instances of ‘all the’ qualified (I looked). In certain residual cases, I did not take the trouble to look at the individual instances at all, expecting negligible results (i.e. close to zero). Thus, for ‘nevertheless’ (498 instances) ‘still’ (777), ‘even’ (3642), ‘more’ (1159) and ‘less’ (1949) – I put a question mark, and counted the results as zero. I should explain that the work of individual verification, even done as roughly as I did it, is extremely time consuming.

It is worth remarking that the 'so' of phrases ending in 'more/less *so*' obviously refers to a previously given predication. Phrases with '*the* more/less' are intended as more emphatic than those with just 'more/less'; likewise, '*so* much' is more emphatic than just 'much'; but these emphases are rhetorical: the logical weight is the same. Similarly, '*how* much' is a rhetorical question and therefore less emphatic than 'so much'; but their logical weight is the same. Looking at the above list of commonly used expressions, it occurs to me that, from a purely logical point of view, we could equally well use milder forms, like 'a bit more', 'quite a bit more', 'a little more', 'somewhat more', or even 'some more' – for it is clear that *the amount of* 'more' is irrelevant here. Our habit is to signal a fortiori intent by means of hyperbole (e.g. 'all the more'), but we could equally do so by understatement. However, looking for such milder expressions in Rodkinson's Talmud, I found no cases. Maybe some occur in the Soncino Talmud.

Notice that I add in the above table a number of search strings not included in the preceding diagram, namely: 'still the same' (1 out of 2 instances), 'all the same' (3/4), 'none the less' (18/18), 'nevertheless' (?/498), 'as much/little as' (2/114 and 0/0)[166], and 'no/not more/less' (3/117 and 0/99)[167]. These are all expressions which may be (though evidently often are not) indicative of *a pari* a fortiori argument (i.e. forms with an egalitarian major premise, from which we can equally well reason from minor to major or from major to minor). In any event, when we include these expressions in our listing, we realize that there is a continuity in the wording, ranging from 'all the more', through 'much the more' and 'much the less', to 'all

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[166] The two apparent *a pari* in the sentence: "Yea, thou hast occupied thyself as much as R. Hyya, but thou hast not multiplied the Torah as much as he did" are perhaps more implicit than explicit. Paraphrasing: If you occupied yourself with Torah as much as he did, then if his credit is x, your credit would be x (as much as his); and if you spread the Torah as much as he, then your credit would be as much as his.

[167] Wording: "not more rigorous" (2 instances of 3) or "no more than…" (1 instance of 17).

the same' and 'none the less' (and other expressions possibly indicative of *a pari*).

To repeat, definitive statistics will only be possible when each and every case is actually listed and examined in detail – a massive job, which I will not here attempt to do. Having in the above table dealt with idiomatic a fortiori indicators, we should next deal with the more descriptive ones. The following (table 3.5) should, I think, cover most of the potential ground.

A fortiori wording	Count	A fortiori wording	Count
a fortiori	147	it is sufficient	73
a minori (ad majus)	0	sufficient (residue)	365
a majori (ad minus)	0	it suffices	13
from minor (to major)	0	suffice (residue)	144
from major (to minor)	0	it is enough	0
kal vochomer	0	enough (residue)	171
inference(s)	60	it follows	19
infer(s), inferred, inferring	984	not follow	23
deduction(s)	19	analogy, analogies	166
deduce(s), deduced, deducing	467	analogous	32
proof	70	analogical, analogue	0
prove, proved, disproved	142	likewise	121
argument(s), argumentation(s)	70	similarly	23
argue(s), argued, arguing	27	general	261
logical	10	particular	255
other wording	?	N.B. These counts are raw data.	

Please note well that the statistics in this table are even more unprocessed than those in the previous table. I just give the raw numbers dished out by the search engine, without taking the trouble to look at individual cases. The total for this table is 3662, and this is not counting words indicative of inference like 'therefore' (1616), 'hence' (2270, including 861 'whence' and

42 'thence'), then (4729, including 'thence'), etc. Clearly, a lot of work is necessary to sort through all these.

I include 'kal vochomer' in this table, because Rodkinson used this phrase in a note[168]; but as it turned out he did not use it in the text proper. Nor does his translation, unlike the later Soncino translation, ever use the key phrases 'a minori/majori', or 'from minor/major'. His main descriptive term is, thus, 'a fortiori'; this may be used to signal a fortiori intent or to refer to an already proposed a fortiori argument. In any event, use of this key phrase cannot be indicative of anything other than assumed a fortiori discourse.

Nevertheless, many more a fortiori arguments *may* be found by means of the other key words listed in this table and others like them. The word 'infer' presumably usually corresponds to the Hebrew word *din*, which is in rabbinic discourse often used to refer to a fortiori; the same may apply to the words 'deduce', 'prove' and 'argue'. Note that these words often appear in a rhetorical negative question: 'is it not an inference that…', 'can we not deduce that…', 'is it not logical that…'.[169]

Obviously, some of these inferences, deductions, proofs or arguments must refer other hermeneutic principles, such as *gezerah shavah* and *binyan av*, since a fortiori is not the only form of reasoning used in the Talmud. I do not at this time have

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[168] Rodkinson's there (in Vol. 2, Part I) says: "This is a case of where the peculiar Talmudical expression of Kal Vochomer appears in the text. The literal translation is 'light and heavy', i.e., from the lighter to the heavier or from minor to major. In the Introduction to the Talmud by Prof. Dr. Mielziner an entire chapter is devoted to the explanation of this term (pp. 130-141). However, no general term can be found to express its meaning, and the expression must be varied according to the demand of the text." This remark is to my mind rather strange, given that the Hebrew expression *qal vachomer* has long been known to refer to a fortiori argument, and indeed Rodkinson freely uses the expression a fortiori elsewhere!

[169] Note that the 365 instances of 'sufficient' include 56 'not sufficient' and 5 'insufficient'; the 144 instances of 'suffice' include 20 'not suffice'; and the 171 instances of 'enough' include 15 'not enough'. Note also that besides the 19 instances of 'it follows' and the 7 of 'not follow', there are 281 other 'follows' and 82 other 'follow'.

a clear idea as to how such other interpretative forms are actually worded in Rodkinson's edition, or anywhere else for that matter. Obviously, this question must eventually be answered. When we do that, our investigation will expand from specific concern with a fortiori argument to general concern with all the hermeneutic principles. However, I am not disposed at the present time to look further into this matter.

The main key phrases used by Rodkinson to refer to a fortiori argument are now seen to be the descriptive phrase 'a fortiori' (147 instances), and the various idiomatic phrases 'much the more/less' (189), 'much more/less' (71), 'even more/less' (20), 'still (the) more/less' (15), 'all the more/less' (8), among others (36)[170]. The overall result is that the number of a fortiori arguments in the Rodkinson edition of the Talmud may be **about 500** (a round number). This is ignoring overlaps in the first and second tables (no doubt many), as well as all possibly a fortiori intents in the remainder of the second table (maybe numerous); perhaps these and those balance each other out somewhat. This is still a very rough and uncertain tally, of course; but it is better than nothing – an educated guess, let's say. Moreover, keep in mind that Rodkinson's edition includes only two of the six orders of the Talmud – so the final count may be three times this figure!

It should be emphasized that this statistic lumps together purely a fortiori arguments and a crescendo arguments. It is clear that a future fuller study has to distinguish them, i.e. identify how many cases of each of these two types there are. Moreover, each case must be classified as either positive or negative, and subjectal or predicatal (copulative) or antecedental or consequental (implicational), to be really understood. These various moods should then be counted separately. All this additional precision of course requires more detailed analysis of each individual case than here done.

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[170] Note that here under 'more/less' I include cases of 'same' and other comparatives.

Regarding the *dayo* principle. The key phrase 'it is sufficient' seems to be our main indicator of appeals to the *dayo* principle here; surprisingly, this occurs very rarely. From the data found through mechanical search for "it is sufficient" (73 instances) in the Rodkinson edition of the Talmud, there appears to be *only six passages* that explicitly appeal to the *principle* of *dayo* in some form, such as "it is sufficient that the result derived from an inference be equivalent to the law from which it is drawn," or more briefly as "the rule of 'It is sufficient,' etc." The passages concerned are the following: In tract Baba Kama: the Gemara concerning Mishna 2:1 (1 mention); the Mishna 2:5 (1 mention) and its Gemara (5 mentions); the Gemara concerning Mishna 4:3 (1 mention). In tract Baba Metzia, the Gemara concerning Mishna 3:6 (1 mention). In tract Baba Bathra, the Gemara concerning Mishna 8:1 (2 mentions). And in tract Shebuoth, the Gemara concerning Mishna 4:1 (1 mention).

One question to ask here is: do all these applications concern the inference of a penalty from Biblical law? The answer is clearly yes in cases 1-4, which all concern payment of damages. Case 6 concerns legal liability through making an oath, and so can also be viewed as proper for *dayo* application. Case 5 is open to debate: I have dealt with it in AFL in the chapter on Adin Steinsaltz, in the section called 'A recurring fallacy' (18.2), under the heading of 'On Baba Batra 111a-b', there pointing out that reference to the *dayo* principle may be misplaced because while for the daughter the proposed judgment is unfavorable, for the son it is favorable[171]. Thus, judging by the Rodkinson edition, in the 6 cases which explicitly appeal to the *dayo* principle, it is used to limit a penalty or responsibility or right. This accords with my theory of the intended scope of *dayo*.

This result, of course, does not exclude the possibility that there are cases other than those here enumerated, where the *dayo* principle is appealed to explicitly but using other wording than "it is sufficient," or in a more tacit manner, which might yield a different conclusion regarding the intended scope of the

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[171] This may be why the halakhah in this case does not align with the *dayo* principle.

principle. To give an example, we saw in the chapter 2.6 of the present volume, how the *dayo* principle (in both its versions) may be very present in the background of a discussion without being explicitly mentioned. Moreover, the Rodkinson edition is far from complete; so, some *dayo* applications may well be missed in it – for instance, the *dayo* principle is appealed to in Zebachim 43b-44a, but the Rodkinson edition lacks this tractate.

Note lastly that I have not here made an effort to determine the standard form(s) of the six arguments relative to which *dayo* was used. Cases 2 and 5, having been dealt with elsewhere, we know to be positive subjectal; but the other four cases have yet to be classified. Since the original *dayo* objections in the Mishna are of two sorts, applicable respectively to purely a fortiori argument or to a crescendo argument, we cannot predict how many of these two sorts occur in the Gemara. Furthermore, we should look and see whether the language used in proportional differs from that in non-proportional arguments. I leave these tasks to others.

We will end our pilot study here, without going into more detail or precision, having set an example of methodology and structure of research, and anticipated and dealt with some of the pitfalls that may be encountered.

4. POST-TALMUDIC COMMENTARIES

Drawn from A Fortiori Logic *(2013),*
chapters 9:1,3-11 and 32:1-3.

1. Logic and history issues

In the present chapter, our object shall be to discuss and to some extent trace some of the developments in rabbinic and more broadly Jewish thought concerning the a fortiori argument, and to a lesser extent more broadly the hermeneutic principles. This is of course a massive task that we cannot remotely hope to carry out exhaustively in the present study; we can however hopefully reflect on some of the issues involved and give scattered examples of the kind of research and evaluation that are needed in this context.

The first thing to make clear is the distinction between hermeneutic and logical principles. Although the rabbis to some extent regarded their hermeneutic principles as logical principles, the truth is that logic was not a prime interest for them: their primary interest was in justifying the traditional legal system enshrined in the Mishna and expanded on in the Gemara and subsequently. I will not here even try to roughly trace the development of Jewish law from its Biblical beginnings, through the formative period from Ezra to the Mishna, followed by the Gemara and later rabbinic work. I can only recommend to the reader who has not already done so to read works (preferably critical) on the subject, such as Mielziner's *Introduction to the Talmud*. The important thing, in the present context, is to take to heart what Mielziner writes regarding the "circumstances that necessitated artificial interpretation":

> "As long as the validity of this oral law had not been questioned, there was no need of founding it on a Scriptural basis. It stood on its own footing, and was shielded by the authority of tradition. From the time

> however when the Sadducean ideas began to spread, which tended to undermine the authority of the traditional law and reject everything not founded on the Scriptures, the effort was made by the teachers to place the traditions under the shield of the word to the Thora. To accomplish this task, the plain and natural interpretation did not always suffice. More artificial methods had to be devised by which the sphere of the written law could be extended so as to offer a basis and support for every traditional law, and, at the same time, to enrich the substance of this law with new provisions for cases not yet provided for. This artificial interpretation which originated in the urgent desire to ingraft the traditions on the stem of Scripture or harmonize the oral with the written law, could, of course, in many instances not be effected without strained constructions and the exercise of some violence on the biblical text…" (pp. 120-121).[172]

Two ideas should be emphasized in this context. The first is that *the hermeneutic principles have a history*. They did not come out of the blue all of a sudden, whether at Sinai or later, but were gradually developed in response to specific needs by specific persons, and often against conflicting opinions by other persons. Changes evidently occurred over time. This development can be precisely traced to some extent, even though traditional commentators make every effort to deny significance to the known history. The second idea is that *the hermeneutic principles are not necessarily logical*. Mielziner rightly refers to "artificial" as against "natural" methods, using exactly the same terms as I did independently fifteen years ago when I wrote JL. In that work, I showed, clearly and by formal means, to what

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[172] Further on, Mielziner remarks that there were "some legal traditions… for which the Rabbis were unable to find a biblical support or even a mere hint" (and informs us that 55 such cases have been enumerated). These were suggestively labeled as *halakhot leMoshe miSinai* – laws handed down to Moshe from Sinai.

extent the hermeneutic principles could be regarded as logical and to what extent they could not. Mielziner, in his reference to "strained constructions and the exercise of some violence on the biblical text," had the honesty and courage to admit the limits of rabbinic logic.

In the present work, following detailed logical analyses mainly of the Mishna Baba Qama 2:5 and the related Gemara Baba Qama 25a, I have developed a more precise assessment of Talmudic logic. It appeared from this exploration that the a fortiori logic found in the Mishna is more natural, less artificial, than that found in the Gemara. Judging from the Talmudic passage we examined, the understanding of a fortiori argument by the earlier rabbis was simpler and more straightforward, while that of the later rabbis was more complicated and tortuous. The two groups should not be lumped together. This is as regards their practice; neither group engages in much theoretical reflection (if any) on the subject. So, the artificiality that Mielziner speaks of is more centered in the Gemara than in the Mishna (at least as regards a fortiori argument).

What is clear from our research is that it is misleading and futile to try to interpret and justify the rabbinical hermeneutic principles entirely through logic. They undoubtedly have some logical character, and are often thought of and intended as logic, but they are not purely and entirely logical. They are, as Mielziner well described them, ad hoc responses to the problem of anchoring the oral law so-called, i.e. the Jewish legal tradition existing at a certain period of history, in the more authoritative written Torah. Sometimes that anchoring is possible by quite natural (i.e. purely logical) means; but sometimes some intellectual artifices are necessary to achieve the desired end. With this frank admission in mind, we can more clearly trace the history of commentaries on the hermeneutic principles and practices in general, and on the a fortiori argument in particular, from two points of view.

The first viewpoint is that of the *uncritical traditionalists*. Their writings or lectures on the a fortiori argument or on hermeneutics are simply designed to pass on as clearly as possible the information received from tradition. This teaching is presumed true and valid without question, and the only role of

the teacher is to clarify it and give examples of it. The second viewpoint is that of the *critical logicians*, among which I count myself. Their written or oral reflections on the subject are aimed at scientific evaluation, and are therefore perforce more formal and not necessarily in agreement with tradition. Truth and validity are not automatically granted, simply because the argument in question is claimed to be, directly or indirectly, of Divine or prophetic origin, or to have the stamp of approval by rabbinical or whatever authorities. These two viewpoints are pretty well bound to be at odds in some cases, though not in all.

Many indices can be used as litmus tests for the classification of a commentator in one camp or the other. We must look and see where each commentator stands in relation to the debate between R. Tarfon and the Sages in the Mishna; how he perceives the argument(s) of the former and the objection(s) of the latter. We must also pay attention to his eventual reactions to the Gemara: to its general equation (on the basis of a *baraita*) of a crescendo argument with a fortiori; to its readings of the argument about the isolation of Miriam in Num. 12:14-15; to its claims about R. Tarfon's ideas about when the *dayo* principle may or may not be applied to an a fortiori argument. In short, we must look out for the depth and breadth of a commentator's awareness of the issues involved. Certain authors will judge such matters dogmatically: they are the traditionalists. Others will be more circumspect: to the extent they are so, they belong to the critical school.

That is our theoretical stance; but in practice, as we shall presently discover, there is rarely need to get that fancy, because most commentators on the a fortiori argument treat the issues relatively superficially.

2. Sifra

The *Sifra* is a halakhic midrash to Leviticus, which is occasionally called *Torat Kohanim* like the Torah book

(Leviticus) that it is an exegesis of (JE[173]). According to Jacob Neusner (USA, b. 1932), in *Rabbinic Literature: An Essential Guide*[174], it is considered as dated ca. 300 CE (p. 3). I nevertheless include it in the present chapter – as an extra-Talmudic document, rather than as a post-Talmudic one, for lack of a better place. Indeed, though later than the Mishna, it is often referred to in the Talmud (JE). Neusner describes it as an effort to more thoroughly anchor the 'oral Torah' – meaning the Mishna (and the Tosefta) – in the 'written Torah' – i.e. essentially the Pentateuch (pp. 56-57). Neusner does not mention the work's author, but JE discusses the matter[175].

My interest here is in certain features of Sifra's logic that are mentioned by Neusner. I have not personally read Sifra, but take Neusner's description of these features for granted. As Neusner puts it, Sifra's purpose is to show that "the Mishnah is subordinated to Scripture and validated only through Scripture;" and it does so by means of a "critique of the Mishnah" which too often seems to rely on its own logic rather than explicitly refer to the Pentateuch (p. 58ff). This critique, as we shall see, focuses both on syllogistic and a fortiori logic. Sifra reportedly makes (or seems to make) assertions concerning these fields that simply, as I will definitively show in formal terms, cannot be upheld.

Syllogism. First, Sifra disputes "that we can classify things on our own by appeal to the traits or indicative characteristics, that is, utterly without reference to Scripture." According to Sifra (or according to Neusner's reading of it), "on our own, we cannot

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[173] *The* JE article referred to here may be consulted online at: www.jewishencyclopedia.com/view.jsp?artid=697&letter=S.

[174] Nashville, Tenn.: Abingdon, 2005.

[175] Maimonides (in the introduction to his *Yad haḤazaḳah*), among others, considers its author to be Rab, aka Abba Arika (Babylonia, 175–247 CE), in view of the book's other title, *Sifra debe Rab*. Another theory, proposed by Malbim (in the introduction to his Sifra edition), is that R. Ḥiyya b. Abba (ca. 180-230 CE), a late Tanna or early Amora who lived in Eretz Israel, was the book's redactor. The latter is also credited with compilation of the *Tosefta*. A lot more is said on this topic, which need not concern us here.

classify species into genera. Everything is different from everything else in some way. But Scripture tells us what thing are like what other things for what purposes, hence Scripture imposes on things the definitive classifications, not traits we discern in the things themselves." And again:

> "The thrust of *Sifra*'s authorship's attack on taxonomic logic is easily discerned… things have so many and such diverse and contradictory indicative traits that, comparing one thing to something else, we can always distinguish one species from another. Even though we find something in common, we can also discern some other trait characteristic of one thing but not the other."

If I understand such statements correctly, what Sifra is saying (or more probably, just implying through its many particular discursive acts, since rabbinic literature is rarely if ever so abstract in its approach) is that antithetical syllogisms can consistently be constructed. This would mean the following in formal terms:

All S1 are G;	No S2 are G;
and X is S1.	and X is S2.
Therefore, X is G.	Therefore, X is not G.

On the surface, such a situation might seem conceivable. The individual or class called X might be classified under species S1 in some respects and under species S2 in other respects; and S1 might fall under genus G, while S2 does not fall under genus G. The two major premises do not seem incompatible, since they concern different subjects, S1 and S2; and the two minor premises do not seem incompatible, since a term may well have different predicates, S1 and S2. Yet the two conclusions are clearly incompatible!

However, logic is quite able to show where in the said premises the contradiction lies, by constructing a 2nd figure syllogism using the two initial major premises:

No S2 are G

All S1 are G

Therefore, No S1 is S2.

Using the latter conclusion as our new major premise, it follows by syllogism that if X is S1, it cannot be S2, and vice versa. That is, despite surface appearances, the two species, S1 and S2, are in fact mutually exclusive, by virtue of being related in contrary ways to the genus G. Thus, in fact, the two minor premises 'X is S1' and 'X is S2' cannot both be true at once. Therefore, the contradiction between 'X is G' and 'X is not G' will *in fact* never arise.

That is to say, the apparent argument of Sifra that contradictions are possible if we rely only on logic, so that appeal to Scripture is necessary to help us choose one side or the other, is not credible. It only seems credible due to superficial appeal to syllogistic reasoning; but in fact such quandaries cannot occur in practice for someone who truly knows logic. It should be said that the supposition that such quandaries are conceivable is not peculiar to Sifra; Greek and Roman sophists have also often imagined them possible.

Of course, Sifra may not be saying what I have here assumed it to say. It may just be saying that without Scripture's guidance we cannot know whether X is S1 or S2; or perhaps (more likely) we cannot know whether species S1 or S2 falls under genus G or not, where G is some law or legal ruling. Such arguments would be logically acceptable. But what is sure, anyway, is that no one can legitimately argue that the initially listed two 1st figure syllogisms are compatible. This is not open to discussion.

The same of course can be said with regard to rival hypothetical syllogisms:

If B1 then C;	If B2 then not C;
and if A then B1.	and if A then B2.
Therefore, if A then C.	Therefore, if A then not C.

The if–then premises of such arguments may offhand seem compatible, but their conflicting conclusions (assuming thesis A is not a paradoxical proposition) show them to be in fact incompatible. However, it should be obvious that this restriction

is only applicable in cases of strict implication; if some of the implications involved are less firm, a situation of rivalry might conceivably occur. If A deductively implies B and B deductively implies C, then the conclusion is that A deductively implies C. But if A merely inductively implies B and/or B merely inductively implies C, then the conclusion is that A merely inductively implies C. Whereas 'deductive implication' signifies a 100% certainty, what I call 'inductive implication' refers to a looser relationship where the antecedent *probably* (with less than 100% certainty) implies the consequent. In such cases, the conclusions 'if A, maybe then C' and 'if A, maybe then not C' may both be justified, even though there is some degree of tension between them.

We can similarly admit that potential (though not actual) conflicts might occur in categorical syllogism. If for instance the rival syllogisms have as major premises that Most S1 are G and Most S2 are not G, and as minor premises that X is S1 and X is S2, then the conclusions will be respectively that X is probably G and X is probably not G. Though these two conclusions are in tension, they are not strictly speaking incompatible, and therefore they might conceivably occur together (especially if their probabilities are expressed so vaguely). It is probably the possibility of such *tendencies* to conflict that the author of Sifra had in mind. Another possibility is that there are unstated conditions to the premises of the categorical or hypothetical syllogisms, which make the rival arguments compatible although they superficially seem incompatible.

A fortiori argument. Second, concerning the argument a fortiori or *qal vachomer*, Neusner tells us in the name of Sifra that it "will not serve" – for "if on the basis of one set of traits that yield a given classification we place into hierarchical order two or more items on the basis of a different set of traits, we have either a different classification altogether or, much more commonly, simply a different hierarchy." This is intended as a critique of "the Mishnah's… logic of hierarchical classification." To wit: "Things are not merely like or unlike, therefore following one rule or its opposite, Things are also weightier or less weighty."

Here, the suggestion is that we can construct compatible a fortiori arguments, with reference to different middle terms (R1, R2), which yield contrary conclusions. This is a very similar suggestion to the previous one, but one specifically centered on a fortiori argument. It should again be stated that Sifra is not alone in this error (if it indeed makes it) – many people seem to think that such a situation is logically possible. Such people do not truly understand the logic involved, as I will now formally show. Consider the following two arguments:

P is more R1 than Q is;	P is more R2 than Q is;
and Q is R1 enough to be S.	and Q is R2 enough *not* to be S.
Therefore, P is R1 enough to be S.	Therefore, P is R2 enough *not* to be S.

On the surface, looking at the premises superficially, such a situation may seem possible. After all, such major premises certainly occur in practice. P and Q may be in a certain relation within the hierarchy R1 and in a very different (even opposite) relation in another hierarchy R2. But such differences could not give rise to contrary conclusions, one implying that ‘P is S’ and the other that ‘P is not S’ – for the simple reason that the minor premises are incompatible, one implying that ‘Q is S’ and the other that ‘Q is not S’. Thus, in fact, such a situation is logically inconceivable.

Thus, contrary to what Sifra seems to be (according to Neusner’s analysis) suggesting, we do not need to appeal to Scripture to choose between this hierarchy and that one so as to avoid contradiction. Two hierarchies that lead to contrary conclusions will never be true together. This is logically obvious and demonstrable. Of course, here again, we might defend Sifra by saying that it perhaps does not claim such antithetical a fortiori arguments, but merely says that Scripture is required to establish the major and/or minor premises. This would present no problem. But if the claim is indeed one to viable antitheses, it is untenable.

We could also defend Sifra by pointing out that many rival arguments that seem to adhere to the formal conflict presented above are in fact not intended so strictly. The major premises, which tell us that P is more R than Q, may be tacitly intended to

mean that P is *usually* (though not always) more R than Q; and/or the minor premises may really have the form 'Q is *usually* R enough to be S'; in which cases, the conclusions will also be probabilistic at best. Thus, there may be an appearance of conflict, when in fact there is only some logical tension. This, I believe, often occurs in practice, and may well be what the author of Sifra had in mind when he raised this issue. Or again, there may be unstated conditions to the premises of the rival a fortiori arguments, which make them compatible although they superficially seem incompatible.

To sum up and conclude. If, as Neusner seems to be implying, Sifra criticizes the Mishna on the ground that it relies on *logic* independently of Scripture, and that by doing so it opens itself to irresolvable contradictions, Sifra can and must be opposed on purely formal grounds. Logic does not lead to contradictions, but on the contrary deflects them, or uncovers and resolves them. If, however, Sifra is only saying that the Mishna has to refer to Scripture for its major and/or minor premises, i.e. for the content of its propositions – that is another matter entirely: it is then an issue not of logic, but of *fact* or even of moral and legal *evaluation* of fact.

But upon reflection, even in the latter cases we must distinguish between deductive and inductive logic. It is true that *deductive* logic cannot prescribe facts and even less so their evaluations (though it can be used to ensure that such prescriptions are kept internally consistent). But *inductive* logic certainly can strongly impinge on issues of fact or even of moral and legal evaluation of facts. Through experience and scientific method we can, for instances, contest that hare are to be classified with ruminants, or that there are no fish that have scales but lack fins. And moreover, from purely factual material, we can put in doubt the credibility of evaluations; for example, how we conceive sunrise and sunset to occur directly affects the times prescribed for beginning and ending the Sabbath.[176]

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[176] For these and many other examples, I recommend the reader to the website: www.daatemet.org.il/, although I must stress I do not agree with its sweeping radical conclusions, against belief in God,

3. The Korach arguments

The Midrash called *Bemidbar* (Numbers) *Rabbah*, which is closely related to the Midrash called *Tanhuma* (named after a rabbi), is (or at least its earliest portions are) thought to date from the 5th century CE, apparently before the completion of the Babylonian Talmud[177]. What interests us in it here is its commentary regarding Numbers 16:1, which reads:

> "'Now Korach... took'. What is written in the preceding passage (Num. 15:38)? 'Bid them that they make them... fringes (Heb. *tzitzith*)... and that they put with the fringe of each corner a thread of blue (Heb. *techeleth*)'. Korach jumped up and asked Moses: 'If a cloak is entirely of blue, what is the law as regards its being exempted from the obligation of fringes?' Moses answered him: 'It is subject to the obligation of fringes'. Korach retorted: 'A cloak that is entirely composed of blue cannot free itself from the obligation, yet the four blue threads do free it?!'
>
> He [Korach] asked again: 'If a house is full of Scriptural books, what is the law as regards its being exempt from the obligation of *mezuzah* [a small scroll with a selection of Torah verses, which is affixed to the doorposts of Jewish gates and homes]?' He [Moses] answered him: 'It is [still] under the obligation of having a mezuzah.' He [Korach] argued: 'The whole Torah, which contains two hundred and seventy-five sections, cannot exempt the house, yet the one section in the mezuzah exempts it?! These are things which you have not been commanded, but you are inventing them out of your own mind!'"

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against the Jewish religion as a whole, and against our national right to Israel.

177 See: www.jewishencyclopedia.com/articles/14236-tanhuma-midrash.

There is, note well, no evidence of this discourse in the Torah itself; it only appears much later in history, in the Midrash. These two arguments attributed to Korach are traditionally regarded as samples of *qal vachomer*, although (I presume) most commentators view them as *qal vachomer* of a fallacious sort. For that reason, they are especially interesting, in that they illustrate a possibility of erroneous reasoning in the a fortiori mode. We may paraphrase the two arguments briefly as follows:

a) If mere threads of blue wool (on each of the four corners) are sufficient to make a garment lawful to wear, then surely if the whole garment is made of such blue wool (even if without the corner threads) it is likewise lawful.

b) If a few passages of the Torah (in a mezuzah affixed to the doorposts) are sufficient to make a house lawful to live in, then surely if the whole Torah is stored in a house (even if without a mezuzah) it is likewise lawful.

These two arguments have the following form in common: If a *small quantity* of something (Q) is sufficiently in accord with the norm (R) to make so-and-so be declared lawful (S), then surely a *large quantity* of that thing (P) is sufficiently in accord with the norm (R) to make so-and-so be declared lawful (S). The preceding hypothetical proposition comprises the minor premise and conclusion of the a fortiori argument. Its tacit major premise is therefore: a large quantity of something (P) is more in accord with the norm (R) than a small quantity of same (Q). The argument is clearly positive subjectal, from minor to major.

What is wrong with this argument? The answer is obvious: its major premise does not have the logical necessity it is implied to have. While on the surface it might seem like a large quantity is preferable to a small one, this is not necessarily the case, because the two quantities may present *significant qualitative differences*. That is, the terms of the proposed major premise are incompletely specified, and therein lies the fallacy. The minor premise, regarding the sufficiency of a small quantity (Q) to satisfy the norm (R) for a certain result (S), may be true only provided that this quantity fulfills certain qualitative criteria (which may have additional quantitative aspects). If the larger

quantity (P) does not fulfill these same qualitative criteria, it may well *not* be able to satisfy the norm (R) for a certain result (S). Therefore, the major premise should, to be truly universal, more precisely read: a large quantity of something *precisely specified* (P) is more in accord with the norm (R) than a small quantity of the *exact* same thing (Q).

Returning now to the two Korach arguments for the purpose of illustration, we can say the following. In both cases, the sophistry consisted in occulting the details given in brackets. In (a), what makes the garment kosher is not merely that it contains blue threads, but that it contains them *on the four corners*. In (b), what makes the house kosher is not merely that it contains Torah words, but that it contains them *on the doorposts*. The details do matter – they are not expendable. Therefore, in effect, Korach's two arguments may be said to commit the fallacy of having more than four terms. The major and minor terms in the major premise are made to appear the same as the subjects in the minor premise and conclusion, but they are in fact different from them.

The two arguments might have been a bit more credible, had they respectively advocated an inference from a garment not made of blue wool yet having kosher tzitzit, to a garment entirely made of blue wool as well as having kosher tzitzit; or from a small mezuzah affixed to the doorposts, to a giant mezuzah affixed to doorposts. But even then, such inference would not be *necessarily* true, because there is no formal reason why the law might not interdict garments made entirely of blue wool (even with kosher tzitzit) or giant mezuzot (even affixed to doorposts). The major premise in use in any argument must be in fact true, for a true conclusion to be drawn from it. Very rarely is the major premise logically necessary; it is only so if its contradictory is self-contradictory. In most cases, the major premise has to be determined empirically – or, in such a religious context, be given in the proof text.

In my opinion, the two arguments attributed to Korach are not factual reports, but post facto fabrications with an educational purpose. Because: either Korach had some brains and could see for himself the fallacy of his reasoning, but he cynically proposed these arguments anyway, thinking no one else would notice; or he was not intelligent enough to realize his own errors

of logic. But in either case, surely Moses had the intelligence needed to see through the fallacy, and would have publicly reproved Korach for his dishonesty or his intellectual deficiency, so as to stop the rebellion in its tracks by discrediting its leader. However, since according to the Torah account Divine intervention was used, we can infer that Moses did not use this logical means. I think the arguments were imagined by the author(s) of the Midrash for three reasons. One was to flesh out the story of Korach with some (most likely anachronistic) Talmudic-style legal debate, showing up the perversity and stupidity of the rebel. Another was perhaps to intimidate eventual readers, saying in effect: if you behave like Korach, expressing doubts in the law of Moses, you will be punished like Korach. The third was perhaps to teach people some a fortiori logic, to make sure they do not make similar errors of reasoning.

However, this is not how some later commentators have understood the purpose of this Midrash. They have taken it to mean, not that Korach was arguing fallaciously, but that Korach was being too logical, so that we ought to learn from this story to suspend our rational judgment now and then. For instance, R. Ephraim Buchwald, in an essay called "The Excesses of Rationality" (2007)[178], explains the matter as follows:

> "According to Korach, human logic always prevails. Korach is certain that the rational processes are the ultimate determinant of right and wrong. Since the laws handed down from Moses and Sinai have no internal logic, they must be summarily rejected. It is for that very reason that parashat Chukat follows parashat Korach. The Torah, in Numbers 19:2, declares: '*Zoat chukat HaTorah*': This is the statute of the Torah! There is no logic to the laws of the Red Heifer. Reason is of little value when it comes to this irrational ritual. The Red Heifer comes to confirm to Korach and all his fellow

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178 Posted at: rabbibuchwald.njop.org/2007/06/18/chukat-5767-2007/.

> rationalists, that the ultimate authority is the law of Moses and Sinai, not mortal logic! … While Judaism in general is a most rational and logical faith, true believers must eventually conclude that there are certain aspects of the religion that one can not rationally fathom or master. It is that leap of faith that a believer must make, and this doubt that we all must overcome, and for which we are ultimately rewarded."

This is obviously, in view of what our analysis above has demonstrated, an erroneous interpretation of the Midrash. The commentator evidently does not have great logical knowhow, since he seems to think that the two Korach arguments are valid. He is therefore not qualified to discuss the limits of human logic. Korach cannot be presented on the basis of the two arguments attributed to him as a "rationalist," or proponent of reason, since they are in fact not in accord with logic. If he was not an idiot, he was a sophist who cynically faked logical argument. In the Midrashic story, Moses does not answer Korach by sullenly saying: "your arguments are sound, but I will stick dogmatically to my positions," as our commentator implies. Rather, I'd say, Moses refutes Korach, as often done in Talmudic debate, by denying his conclusion, thereby tacitly implying that at least one of his premises is incorrect; and since the minor premise is in accord with the law of Moses, it must be the major premise that is mistaken. In other words, the correct interpretation is that Moses does not concede Korach's reasoning powers, but rather challenges them.

R. Buchwald is, of course, relying on the traditional commentaries regarding the statute of the red heifer (Numbers 19). They find it odd that the ritually clean people involved in preparing the ashes of the red heifer should be made unclean (v. 7, 8, 10), while those ashes are used to ritually clean people who are unclean due to having come in contact with a dead person (v. 12). Rashi comments, citing Yoma 67b: "Because Satan and the nations of the world taunt Israel, saying, 'What is this commandment, and what purpose does it have?' Therefore, the Torah uses the term "statute." I have decreed it; You have no right to challenge it."

But in truth, what has this to do with logic? It is not logically inconceivable that the same substance (the ashes of the red heifer) might have one effect (ritual uncleanliness) on one set of people (the people producing or handling it) and another, opposite effect (ritual cleaning) on another set of people (the people it is sprinkled on). Such complex relations can readily be found in nature – e.g. a chemical substance might be harmful to one kind of organism and beneficial to another. Or consider, to take an extreme example, the particle-wave duality in quantum mechanics, where the same phenomenon seems different viewed from different perspectives.

The red heifer ritual is no more 'illogical' than the ritual of sacrificing animals to purify people of their sins, or the rituals of tzitzit or mezuzah, or that of matza, or those of shofar, lulav and succah, or any other religious ritual. When dealing with the supernatural, everything is equally artificial, i.e. inexplicable by natural means. Rituals are not given in nature, or rationally inferred from it. Such truths (if they are indeed true) can only be known through revelation or similar (alleged) extraordinary means. Belief in them – at least in the case of people without prophetic powers of their own, and maybe even for prophets – depends on faith. Even prayer, the most natural expression of belief in God, depends on faith.[179]

Moreover, the inexplicability of alleged spiritual practices is not a reflection on human logic. Human logic does not promise omniscience. There are many things we do not, and perhaps can never, understand, even in the natural world; all the more so, in the (presumed) spiritual world. The fact that there are limits (whether short or long term) to the power of logic can never be used as an argument against the power of logic within its natural

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[179] To form objective judgments on such matters, one must take into consideration not only one's own religious beliefs but also those of other people. There are many religions in the world, each with its own rituals and its own rationales for these. They cannot *all* be absolute truths. Most, if not all, must be human inventions. Of course, each of us conveniently believes it is *the others'* belief systems that are imaginary. But try proving that! Therefore, all of us should have a measure of modesty and tolerance in his beliefs. This is not relativism, but honesty.

limits. There is no logical argument by which logic might be invalidated, because such argument would be claiming to have some logic, and thus be self-defeating. Even if logic admittedly cannot predict all truth, it can certainly eliminate quite a bit of falsehood. For this reason, we should not hasten to ditch it just because it does not deliver everything we wish for.

R. Buchwald's attempt to compare the Korach argumentation to the red heifer statute is, anyway, ingenuous. He regards the Korach arguments as perplexing because though sound (in his view), they lead to conclusions that are contrary-to-fact (i.e. to Biblical fact); and he regards the red heifer ashes as perplexing, because (I presume, though he does not say so) they have contrary behavior patterns in relation to different subjects. But even supposing these two perplexities are justified, they are certainly logically very different and cannot be lumped together. If they are, as he supposes, both 'illogical', they are 'illogical' in significantly different ways.

In any case, there is one kind of illogic that no amount of faith can ignore or cure – and that is any breach of the laws of thought. Faith is acceptable where there is some gap or uncertainty in knowledge; but if a claim – however 'authoritative' – goes against these fundamental laws, we can be absolutely sure it is incorrect. This applies equally well to other-worldly claims as to this-worldly ones. Our reaction in such case should not be blind faith, but to demand a credible resolution of the paradox. This is the adult, mentally-healthy reaction to such conundrums. In this sense, logic has much to say even about spiritual claims. Logic is mankind's main protection against falsehood of any kind.

4. Saadia Gaon

When I found out that Saadia Gaon, ben Yosef (Egypt, ca. 882 – Iraq, 942), had written a short book, entitled in Hebrew *Perush Shelosh Esre Midot* (Explanation of the Thirteen Hermeneutic

Principles), and actually found a copy of it on the Internet[180], I was overjoyed, hoping to find in it some interesting original insights into *qal vachomer*. However, upon reading it (with the help of a friend), I was rather disappointed. Saadia Gaon there in fact says nothing theoretical about *qal vachomer*, other than to say that it may be used for non-legal as well as legal purposes.

He does not analyze the argument in any way, but is content to present five rabbinical examples of it – without, by the way, explaining why he chose those particular ones. If a man is obligated to take good care of his second wife, all the more so his first wife. Since, if one finds one's enemy's strayed animal, one is obligated to return it to him, it follows a fortiori that one must do that for a friend. And so forth. All these examples are in fact legal in content; he does not actually give any with non-legal content, but simply repeats (somewhat lamely, as if he could not think of any offhand) that non-legal content is possible. That's it. Of course, examples have their importance; but they are certainly not enough.

According to the introduction (in French) to the *Œuvres Complètes*, Saadia does not always thus limit his commentary on the *midot* to examples, but in some cases gives explanations, even if his explanations are sometimes obscure (e.g. as to what distinguishes the 7th and 8th rules). In any case, he does not go into the details concerning the rules. Moreover, we are told, Saadia considers that anyone has a right to put forward new applications of the thirteen rules, which liberty is far from admitted by other commentators. Nevertheless, I should add, Saadia is known to have defended the rabbinic tradition that the

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[180] Originally written in Arabic; translated into Hebrew by Nahum ha-Maarabi in the 13th century. Full Hebrew text is given in the *Œuvres Complètes*. According to the introduction to this volume, the authenticity of the text has been demonstrated. Some comments are included in footnotes. You can also read it online at the Internet Archive: www.archive.org/stream/oeuvrescomplete01josegoog#page/n130/mode/2up. The Wikipedia article on Saadia Gaon informs us that, according to Azulai, Saadia has also written (again, in Arabic) a methodology of the Talmud entitled *Kelale ha-Talmud*.

thirteen *midot* were Divinely revealed to Moses at Mt. Sinai[181]. He no doubt did so in the context of his polemics with the Karaites, who of course rejected rabbinic interpretation[182].

So I was taught, anyhow; but I have not offhand found an explicit statement to that effect. Perhaps he merely implied it. We might, for example, so interpret his citation of *Sanhedrin* 88b, "With the increase in numbers of the disciples of Shammai and Hillel, who did not advance far enough in their studies, the controversies increased" (*The Book of Doctrines and Beliefs*, pp. 32-33), to explain the existence of disagreements between rabbis. The implication is that originally, when the Torah was first given, there were no doubts; these developed over time, when levels of learning diminished. This matter could be further pursued, but I will leave it at that for now and move on.

I would like, rather, to take this opportunity to quote Saadia Gaon on the value of empiricism and rationalism:

> "Furthermore [authentic tradition] verifies for us the validity of the intuition of reason. It enjoins us, namely, to speak the truth and not to lie. Thus it says: *For my mouth shall utter truth*…. Besides that it confirms for us the validity of knowledge inferred by logical necessity, [that is to say] that whatever leads to the rejection of the perception of the senses or rational intuition is false…. Next [tradition] informs us that all sciences are [ultimately] based on what we grasp with our aforementioned senses, from which they are deduced

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[181] It is stated (apparently in the *Sifra*) that Exodus 21:1, "Now these are the ordinances which thou shalt set before them," was said by R. Ishmael to refer to the thirteen rules for interpretation of the Bible revealed to Moses on Sinai. This equation may be convenient, but it is not based on a literal reading.

[182] His book, *Emunot veDeot* (Constantinople, 1562; in Hebrew), can be downloaded free at: www.seforimonline.org/seforimdb/index.php?table_name=seforim_database&function=details&where_field=id&where_value=2.

> and derived." (*The Book of Beliefs and Opinions*, Pp. 18-19.)

It is also interesting to note here certain rules for inference set by Saadia Gaon:

> "In endeavoring to establish the truth of inferential knowledge, we shall henceforth be on guard against these five possible forms of mistakes, namely: (1) that it does not conflict with knowledge established by sense-perception; (2) that is does not conflict with knowledge established by Reason; (3) that it should not conflict with some other truths; (4) that it should not be self-contradictory; still more, that it should not (5) involve a difficulty more serious than the one intended to avoid." (*The Book of Doctrines and Beliefs*, p. 42.)[183]

Taking Saadia at his word, we can predict that were he placed squarely before new facts and shown the validity of certain logical inferences, he would have the intellectual and moral integrity to admit them, and would not dogmatically insist on contrary, more traditional 'facts' or 'inferences'. Unfortunately, there are still today some people who think they do religion a service by refusing to face facts and logic. Just yesterday, I had the hilarious experience of watching an online video showing an Islamic apologist claiming in 2007 on Iraqi TV that the earth is flat and much larger than the sun, which is also flat![184]

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[183] Needless to say, the two books quoted here, *Of Doctrines and Beliefs* (Abridged ed. Trans. Alexander Altmann. Oxford: Phaidon, date not specified.) and *Of Beliefs and Opinions* (vol. I. Trans. Samuel Rosenblatt. New Haven: Yale, 1948.) are two translations of Saadia Gaon's *Emunot veDeot*. Incidentally, I am amazed how different they are; so much so that I had to quote them both because I could not find the same material in both!

[184] See: www.memritv.org/clip/en/1684.htm.

Fortunately, apologists for Judaism never go so far; but they also sometimes show considerable resistance to change.

I say this here because readers of the present volume must obviously be prepared to adapt to new discoveries and insights, and not cling at all costs to traditional views. I want to emphasize in passing that to be critical does not signify to be hostile and willfully negative. Though critical, I have personally no desire to contradict or denigrate our religious tradition. Not all critical commentators are so moderate in their views or intentions; some are very eager to find fault with the rabbis or the Torah. For my part, I would prefer to always justify the rabbis and the Torah, and confirm their wisdom, and it is only reluctantly that I criticize some of their claims. Nevertheless, I try to be scrupulously fair and honest – i.e. to be scientific – and to admit that there is a problem when there indeed appears to be one. This is the golden mean – neither dishonestly attacking nor dishonestly defending, but sincerely looking for the truth.

5. Rashi and Tosafot

Concerning the contribution of Rashi, i.e. R. Shlomo ben Yitzhak (France, 1040-1105), to the understanding of the hermeneutic principles, Mielziner tells us that he "occasionally explained, in his lucid way, the single rules where they are applied in the Talmudic discussions." There is, he adds, "a separate treatise on the hermeneutic rules ascribed to this commentator and published under the title of *Perush Rashi al Hamidot*," which however "seems to be spurious." This is found "in Kobak's *Jeschurun*, vi, Hebrew part, pp. 38-44, 201-204; the remaining commentaries on the thirteen rules are enumerated by [Adolf] Jellinek in *Ḳonṭres ha-Kelalim*, Nos. 163-175."

I have no access to these various sources, so must make do with a more ad hoc treatment. The question that interests me here is: firstly, what does Rashi say about the *qal vachomer* in Numbers 12:14-15 (and eventually, the other cases found in the Torah, and maybe also those in the Nakh)? And secondly, what does he say about the discussion concerning the *dayo* principle in Baba Qama 25a-b? I shall also try and determine the viewpoints on

these topics of Rashi successors, the Tosafot. The basic issue to my mind is: do these post-Talmudic commentators accept the idea seemingly advocated in the Gemara (based on a *baraita*) that *qal vachomer* is naturally 'proportional' and the *dayo* principle is designed to reign in such velleity in it? The answer to expect is, obviously: yes, they do.

First, let me mention in passing Rashi's comments on other a fortiori arguments appearing in the Torah. Concerning Genesis 44:8, all Rashi says is: "This is one of the ten a fortiori inferences that are found in Scripture, which are all listed in *Bereishit Rabbah* (92:7)." For Exodus 6:12: he is likewise content to say: "This is one of the ten a fortiori inferences in the [Tanakh]," although he additionally explains Moses' speech defect as an "obstruction of the lips." He has no comment regarding Deuteronomy 31:27. Evidently, Rashi does not question the Midrashic statistic of just ten *qal vachomer* in the Tanakh.

As regards Numbers 12:14, Rashi's comment is: "*If her [Miriam's] father were to display, to her, an angry face, would she not be humiliated for seven days? Certainly, then, in the case of the Divine Presence, [she should be humiliated] for fourteen days. However, it is sufficient that the derivative equal the source of its derivation. Therefore, even with My rebuke, let her be confined for seven days.*" As can be seen, this is just a repetition of the thesis given in a *baraita* transmitted in the said Gemara. If we look for Rashi's comment opposite that *baraita* in the Gemara, we find that he has none. That means he considers the matter sufficiently clear as it is and sees no point in adding anything to it. There you have it. Rashi does not ask or answer any theoretical questions concerning *qal vachomer* reasoning or the *dayo* principle, but takes them for granted.

Rashi comments somewhat more extensively on another *qal vachomer* and *dayo* principle application, namely in Tractate *Zevachim* 69b (*Seder Kodashim*)[185]. There, the Mishna explicitly refers to both the argument (by R. Meir) and the application of

[185] This can be read in English in the Soncino Talmud, at: www.halakhah.com/pdf/kodoshim/Zevachim.pdf.

the principle (by R. Jose), and the Gemara expounds almost exactly in the same words as in Baba Qama 25a, saying: "Does not R. Meir accept the principle of *dayo* [it is sufficient]? Surely the principle of *dayo* is Biblical, for it was taught: How is a *qal vachomer* applied? And the Lord said unto Moses: If her father had but spit in her face, should she not hide in shame seven days? How much more should a divine reproof necessitate [shame for] fourteen days; but it is sufficient for that which is inferred by an argument to be like the premise!" But Rashi does not add much, other than to (rightly) point out that the *qal vachomer* in the Miriam story is implicit rather than explicit.

That Rashi uncritically accepts the common notion that a fortiori argument is 'proportional' is evident not only in his acceptance without comment of the "fourteen days" given in the Gemara of Baba Qama 25a, but also in his comment to Genesis 4:24 (which, it should be noted, is not included in the traditional list of ten a fortiori arguments in the Tanakh). There, based on *Tanchuma Bereshit* 11, Rashi elucidates Lamekh's statement "If Cain shall be avenged sevenfold, truly Lamekh seventy and seven-fold" as a *qal vachomer*, as follows: "If Cain killed intentionally, [and yet] his punishment was delayed for seven generations, [then] I, who killed unintentionally, surely will have my punishment deferred for many periods of seven generations."

Note, however, that though in the case of Miriam Rashi acknowledges the *dayo* principle, he does not mention its application in the case of Lamekh; nor does he tell us why he doesn't. I suggest that the reason why it seems reasonable in one case and not the other is the following. In the example of Miriam, the conclusion (14 days penalty) is more stringent than the minor premise (7 days penalty), in accord with the principle of *midah keneged midah* (measure for measure), so the *dayo* principle is required to mitigate the punishment; whereas, in the example of Lamekh, the conclusion, though likewise quantitatively superior (77 instead of 7 generations), is more lenient as regards the sanction than the minor premise (i.e. signifies longer deferral of punishment), and so is not subject to the *dayo* principle (which if applied would speed up the punishment).

Successors of Rashi, known as Tosafot[186], comment on the Mishna and Gemara in more detail. Essentially, they subscribe to the scenario apparently advocated by the Gemara when interpreting the Mishna of Baba Qama 25a. That is to say, they accept uncritically that R. Tarfon's two arguments are a crescendo. Nevertheless, to their credit, they consider that his first and second try are logically (and not merely rhetorically) different, due to reshuffling. They also agree with R. Tarfon that his second argument is able to avoid the *dayo* restriction as set by the Sages against his first argument, because while the first argues from half to full damages, the second argues from full to full damages. As a result of which, they intelligently explain the Sages' continued insistence on *dayo* application with reference to premises antecedent to the *qal vachomer* itself.[187]

However, since Tosafot accept the Gemara reading of both arguments as a crescendo, they also accept the "fourteen days" notion proposed by the Gemara (following a *baraita*), i.e. the claim that *qal vachomer* naturally yields a 'proportional' conclusion. Without questioning this claim, they only focus on trying to explain this number (rather than any other large number[188]). An explanation they give is to refer to seven days as the minimum period of quarantine in the event of leprosy (Leviticus 13:4); a more severe confinement must be at least another seven day period.[189] Tosafot also consequently make

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[186] The Tosafot were medieval rabbis, active between the 12th and mid-15th centuries mainly in France and Germany, who elucidated and explicated many passages of the Talmud. Their commentaries (*tosafot* means additions) were very important to subsequent development of Jewish law. Many grandsons of Rashi are counted among them, by the way. I here refer to them collectively, because I do not know precisely which one(s) commented on the issue here concerning us; perhaps his or their names is/are known to experts.

[187] For a summary in English of the comments of Tosafot and others, see the Art Scrolls' *Talmud Bavli*.

[188] Even thousands considering God's exaltedness.

[189] Another commentator has suggested: "Why particularly fourteen? The Rabbis (*Nidah* 31a) remark that each parent provides a child with five essential parts (the father with bones, sinews, etc., the mother with skin, flesh, etc.), whereas God provides him with ten (spirit,

efforts to defend the obscure notion, ascribed by the Gemara to R. Tarfon, that the *dayo* principle can on occasion be ignored, specifically where it would "defeat the purpose of" the *qal vachomer*.[190]

But such glosses are superficial in their concerns; they gloss over the more serious underlying issues. I have shown in my detailed analysis of this *sugya* in the two preceding chapters of AFL (7-8) that we cannot countenance some of the commonplace interpretations of this Mishna and Gemara without getting ensnared in a multitude of logical errors, which make at least some of the rabbis involved look very foolish. Once the logical errors are understood, it is seen that many of the explanations proposed in the Gemara, and later by others, including Tosafot, are vain attempts to uphold a very wobbly structure. If we want to redeem the rabbis involved, we must approach the whole matter much more lucidly, and consider a moral instead of logical explanation of the *dayo* principle.

I do not want to seem to be dismissing Tosafot in a debonair manner, being fully aware of their importance, but simply see no point in repeating here what I demonstrated earlier. So, I invite the reader to go there.

6. Kol zeh assim

A thorough study of the logic in Tosafot, and even just of its a fortiori logic, would doubtless result in a thick and interesting book. Not having the necessary language skills, I cannot myself undertake such a study; but I would certainly recommend that

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soul, etc.). Since God doubles the father's portion, the humiliation for his rebuke is also double, fourteen days to the father's seven." From the Metsudah Chumash w/Rashi at: www.tachash.org/metsudah/m03n.html#fn343.

[190] As I have shown, this notion is based on rhetoric; it has no basis in logic. But note that since I regard the *dayo* principle in its broadest sense as a moral rather than logical principle, I do not deny that it might have exceptions, as R. Tarfon claims in the Gemara's scenario.

someone duly qualified in both logic (especially as taught in AFL) and the Talmud do the job. But we can here get an idea of the logical resourcefulness of Tosafot through one example, which has to do Baba Qama 25a. This is thanks to Yisrael Ury, who in his book *Charting the Sea of Talmud* provides an English translation of a commentary by Tosafot and some useful clarifications as to its intents[191]. This passage of Tosafot is only incidentally concerned with Baba Qama 25a, using it to illustrate a certain form of argument; so, we shall not here cite all of it, but only quote or paraphrase the parts of it relevant to our narrower purpose.

The Tosafot commentary, whose precise author is not named, proceeds in three stages, we might say. In a **first stage**, it refers to one of the arguments originally given in the Mishna Baba Qama 2:5, which it paraphrases as follows:

> "Whereas tooth and foot, for which damages are not paid for damage done in the public domain, yet are liable for full damages for damages done in the domain of the damaged party, then horn, for which half damages are paid for damage done in the public domain, certainly should pay full damages for damage done in the damaged party's domain."

Looking at this argument, we easily recognize the first argument of R. Tarfon, since it proceeds by mentioning first tooth & foot damage in the public and private domains and then horn damage in the same domains. As I have shown previously, this argument can be put in standard a fortiori form as follows:

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[191] Although Ury does not clearly state where this Tosafot is found, it seems from the context to be opposite *Kiddushin* 4b. The relevant pages in Ury's book are 113-118.

Private property damage (P) implies more legal liability (R) than public domain damage (Q) [as we know by extrapolation from the case of tooth & foot[192]].

Public domain damage (Q) implies legal liability (Rq) enough to necessitate *half* payment for damage by horn (Sq) [this is derived from the Torah[193]].

The payment due (S) is 'proportional' to the degree of legal liability (R).

Therefore, private property damage (P) implies legal liability (Rp) enough to necessitate *full* payment for damage by horn (Sp = more than Sq).

We shall here label this argument as argument (1a). Notice that it is positive antecedental. The major premise is obtained by generalization from the givens regarding damage by tooth & foot. The major and minor terms are 'damage on private property' (P) and 'damage on public domain' (Q). The middle term is 'legal liability' (R); and the subsidiary term is 'to make the payment for damage by horn have a certain magnitude' (S). In fact, note well, the argument is not purely a fortiori but a crescendo, since the magnitude of S in the conclusion is greater than that in the minor premise. This means there is a tacit premise to take into consideration, about the proportionality of 'payment due' (S) to 'legal liability' (R).

Although not directly mentioned by Tosafot, the second argument of R. Tarfon is, as we shall see, also (if not more) relevant to the present discussion; so, we shall restate it here, in standard form:

Horn damage (P) implies more legal liability (R) than tooth & foot damage (Q) [as we know by extrapolation from the case of public domain].

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192 Based on Ex. 22:4, and its extreme inversion, as explained in chapter 2.6 of the present volume.

193 Ex. 21:35 – "And if one man's ox hurt another's, so that it dieth; then they shall sell the live ox, and divide the price of it; and the dead also they shall divide."

Tooth & foot damage (Q) implies legal liability (R) enough to necessitate *full* payment for damage on private property (S).

Therefore, horn damage (P) implies legal liability (R) enough to necessitate *full* payment for damage on private property (S).

We shall here label this argument as argument (1b)[194]. Notice that it is also positive antecedental. The major premise is, here, obtained by generalization from the givens regarding damage on public grounds. However, the major and minor terms are 'damage by horn' (P) and 'damage by tooth & foot' (Q). The middle term is again 'legal liability' (R); but the subsidiary term is 'to make the payment for damage on private property full' (S). Note that this argument is purely a fortiori, and not a crescendo. But it is clear that it could also be stated in a crescendo form, and that if it were would yield the same conclusion (viz. full payment for horn damage on private property), since no payment greater than full is admitted by the Torah or the rabbis. For this reason, it suffices to state it in pure form.

The **second stage** of our Tosafot commentary concerns an objection, and the reply to it, put forward in the past by a commentator called the Ri (presumably this refers to R. Isaac ben Samuel, a 12th century French Tosafist). The Ri's objection is described as follows:

> "But consider that the damages of tooth and foot are common!"

To which objection the Ri himself replies:

> "Paying full damages in the damaged party's domain is not a severity (*chumra*) to be used in an objection (*pirka*), for it does not at all cause tooth and foot to lead to the requirement of half damages for damage done in the public domain as does horn."

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194 Its premises are based on the same Biblical information as the first argument.

I have to say that I only understood the Ri's objection thanks to the clarifications given by Ury, which I presume are traditional. He explains it as follows: because damage caused by tooth & foot is "commonplace," the ox's owner is obligated to take extra care "that his animal not cause damage when it comes in proximity to the property of others;" so that if such damage does indeed occur, he is more open to blame. As regards damage by horn, since the goring of another animal by an ox is "a rare event," it is unexpected by the ox's owner and he is justified in not taking special precautions against it; so that if such damage does indeed occur, he is not as liable.

Thus, the Ri's objection means that, whereas *on public grounds* tooth & foot damage implies less liability than horn damage (no liability against half liability), as the Mishna teaches (based on the Torah), it may well be that *on private property* tooth & foot damage implies more liability than horn damage (full liability against, say, only half). This reasoning thus constitutes an objection to the original Mishna argument – i.e. it is designed to show that the conclusion that seems inevitable in the latter (namely, full liability for damage by horn) is perhaps not so inevitable. Putting this reasoning in standard form, we obtain the following:

> Tooth & foot damage (P) implies more legal liability (R) than horn damage (Q) [since the former is common and the latter is uncommon].
>
> Tooth & foot damage (P) implies legal liability (R) enough to necessitate full payment for damage on private property (S).
>
> *From which it does not follow that* horn damage (Q) implies legal liability (R) enough to necessitate full payment for damage on private property (S).

We shall label this as argument (2a). This argument should be compared to the second argument of R. Tarfon, which we labeled (1b). Notice that they are very similar, except that the major premise has been reversed so that the putative conclusion no longer follows. In (2a), tooth & foot damage is the major term, while the horn damage is the minor term. The middle term is unchanged. The subject of the minor premise is unchanged

(still tooth & foot damage), but now this subject is the major term. The subject of the putative conclusion is unchanged (still horn damage), but now this subject is the minor term. Since the format of the attempted a fortiori argument is still positive antecedental, inference from major to minor is illicit. Thus, we can no longer draw the conclusion of (1b) that 'horn damage on private property necessitates full payment'.

Such conclusion is now a non sequitur – it is not excluded by the new premises (it does not contradict them), but it is not justified by them, either. This argument is not itself an a fortiori argument, note well, but merely serves to put in doubt R. Tarfon's second a fortiori argument. It obstructs his conclusion, without needing to actually contradict it. It rejects his argument by reversing its major premise[195]. If, as R. Tarfon takes it, the owner of an ox is more responsible for horn damage than for tooth & foot damage, then the inference from full liability in the latter to full liability in the former is perfectly logical. But if, as the Ri contends with reference to 'frequencies of occurrence', the owner of an ox is more responsible for tooth & foot damage than for horn damage, then the inference from full liability in the former to full liability in the latter is debatable.

Another way to look at the objection (2a) is to say that the major premise of R. Tarfon's first a fortiori argument (1a) – which take note is the one that Tosafot mentions – is no longer granted. This premise, viz. "private property damage (P) implies more legal liability (R) than public domain damage (Q)," was obtained *by generalization* from the given that damage *by tooth & foot* implies no liability in the public domain and full liability on private property. However, now the objection makes us aware that this generalization is open to question, since *the conditions for* legal liability are not the same in the case of damage by horn, due to there being different frequencies of occurrence. Thus,

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[195] Such reversal of course means that the two major premises are in conflict, and therefore that the two arguments cannot be both upheld. It is not surprising, then, that they yield conflicting results.

analogy is blocked. What applies to tooth & foot does not necessarily apply to horn.

This, then, is the objection conceived of as possible by the Ri, stated in more formal terms. Let us now try to understand the way he himself neutralized the objection. Remember that we are *given* by the Mishna (based on certain Torah verses) that tooth & foot damage on public grounds does not necessitate any payment for damages, while horn damage on public grounds necessitates payment of half damages. On this basis, the Ri replies to the objection by saying: (i) that "paying full damages in the damaged party's domain" ought to "cause tooth and foot to lead to the requirement of half damages for damage done in the public domain as does horn;" and (ii) that since this consequence does not in fact occur, "paying full damages in the damaged party's domain is not a severity to be used in an objection."

The first part of his remark (i) refers to an a fortiori argument with the same major premise as (2a) combined with the given information about horn damage on public grounds necessitating half payment; these premises would conclude that tooth & foot damage on public grounds necessitates half payment (at least – more than half, i.e. full, if proportionality is applied). We may label this argument (2b), and put it in standard a fortiori form (positive antecedental, from minor to major) as follows:

> Tooth & foot damage (P) implies more legal liability (R) than horn damage (Q) [since the former is common and the latter is uncommon].
>
> Horn damage (Q) implies legal liability (R) enough to necessitate half payment for damage on public grounds (S).
>
> Therefore, tooth & foot damage (P) implies legal liability (R) enough to necessitate *half* payment for damage on public grounds (S).

But, the Ri tells us in the second part of his remark (ii), *this conclusion cannot be true*, since the Torah tells us that tooth and foot damage on public grounds is exempt from any payment! Therefore, he concludes, this last a fortiori argument must be rejected. This last argument, which is a *reductio ad absurdum*, can be labeled argument (2c). It says: since the minor premise of

argument (2b) is Torah given, and the process is valid, the only way to reject it is by abandoning its major premise[196]. That is to say, tooth & foot damage *cannot* be taken to imply more legal liability than horn damage on the basis of the former being more common and the latter being less common, as the objection (2a) initially attempts. Thus, the Ri shows that the objection, although reasonable sounding in itself, leads to absurdity and must be dropped.

The **third stage** of the Tosafot commentary we are analyzing is introduced by the statement in Hebrew: "*vekhol zeh assim bakal vachomer*," meaning in English: "and all this I will put into the a fortiori argument"[197]. The unnamed Tosafist then argues as follows[198]:

> "Whereas tooth and foot, even though their damages are common, they are exempt from payment for damage done in the public domain, but necessitate a full payment for damage done on the property of the injured party – then horn, even though its damage is not common, and it necessitates payment of half damages for damage done in the public domain, does it not follow (lit. *eino din*) that it necessitates payment of full damages for damage done on the property of the injured party?"

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[196] What the Ri actually says is: "paying full damages in the damaged party's domain is not a severity to be used in an objection," which could be taken to mean that he advocates denial of the minor premise of the objection (2a); but obviously, he cannot be intending that, since he knows that the minor premise is given in the Torah; therefore, it must be the major premise of the objection, which institutes the greater severity for tooth & foot damage compared to horn damage, that he intends to abandon.

[197] Note that Ury has it as "*kol zeh achnis*," which he (or whoever) translates as "all this I will fold." But the Hebrew portion he quotes clearly has "*assim*," so I have preferred that word. Maybe there are different versions of the same Tosafot text. It is not an important issue.

[198] I have referred to the translation given by Ury, but modified it considerably so as to make it both more literal and more readable.

The question posed is of course rhetorical – the author's intention is clearly that the proposed conclusion does follow. Where the author says "even though" (lit. *af al pi*) – as in even though the damage is common or even though the damage is uncommon – he is obviously referring back to the objection of the Ri, which suggests an inverse proportionality between frequency of occurrence and legal liability, i.e. that the more common a certain kind of damage is, the less the liability for it, and conversely that the less common a certain kind of damage is, the more the liability for it.

The purpose of this Tosafot commentary is, as its introduction ("all this I will put into the a fortiori argument") implies, to somehow *merge together* the original argument of the Mishna and the Ri's objection and his retort to the objection. Obviously, "all this" refers to the two preceding stages. Our job now is to judge whether the argument here proposed by Tosafot does indeed perform what it is designed to do. We can, for a start, put the proposed argument in standard form, as follows:

> Tooth & foot damage (P) is more *common* (R) than horn damage (Q) [since the former is common and the latter not so].
>
> Yet, tooth & foot damage (P) is common (R) *not* enough to make the ox's owner exempt from full payment for damages on private property (S) [since tooth & foot damage on private property necessitates full payment[199]].
>
> Therefore, horn damage (Q) is common (R) *not* enough to make the ox's owner exempt from full payment for damages on private property (S) [whence, horn damage on private property does necessitate full payment].

We shall label this argument as argument (3), or refer to it more familiarly and briefly as "*kol zeh assim.*" As can be seen, it is

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[199] Although strictly speaking "tooth & foot damage on private property necessitates full payment" does not imply "tooth & foot damage is common (R) not enough to make the ox's owner exempt from full payment for damages on private property," we can inductively assume this implication granting that there is a threshold value of the middle term (R) that allows access to the predicate.

negative subjectal in form (it goes major to minor). Its major and minor terms are respectively ‘damage by tooth & foot’ (P) and ‘damage by horn’ (Q). Its middle term is ‘frequency of occurrence’ (R), and its subsidiary term is ‘to make the ox’s owner exempt from full payment for damages on private property’ (S). The major premise is known to us by generalization from the frequencies of occurrence observed in the public domain, where P and Q are characterized as common and uncommon, respectively. The minor premise is based on Torah information. The argument *has to be* put in negative subjectal form to be validated, note well, because it has as its subjects the two causes of damage and it goes from major to minor. Note that the subsidiary term is identical in minor premise and conclusion; this means that the argument is purely a fortiori. The negative conclusion can finally be restated in the more familiar positive form (this being a simple eduction).

Alternatively, we could formulate the argument in *positive subjectal* form (going from minor to major) as follows. Note the change of polarity in the middle and subsidiary terms, and the change in the order of the terms tooth & foot and horn. The net result is the same:

> Horn damage (P) is more *uncommon* (R) than tooth & foot damage (Q).
>
> Yet, tooth & foot damage (Q) is uncommon (R) enough to make the ox’s owner have to pay in full for damage on private property (S).
>
> Therefore, horn damage (P) is uncommon (R) enough to make the ox’s owner have to pay in full for damage on private property (S).

The question we must ask here is: what does Tosafot mean by “all this”? In other words, what features of the preceding arguments (1a), (1b), (2a), (2b) and (2c), is argument (3) really referring to? “All this” is rather vague and needs to be specified more precisely. The two essential features that the Tosafot *kol zeh assim* argument shares with the discourse preceding it are the following: first, it has the same final conclusion as R. Tarfon’s two arguments, viz. that damage by horn on private property entails full payment; second, it takes into consideration

the Ri's objection, in that it is built around the observed fact of tooth & foot damage being more common than horn damage, and at the same time, it takes into consideration the Ri's reply to the objection, in that the *kol zeh assim* argument abstains from inferring greater liability for tooth & foot damage than for horn damage from their different frequencies of occurrence.

Thus, it can be said that the unnamed Tosafist's *kol zeh assim* argument does indeed, in a certain sense, conflate all the preceding arguments. Nevertheless, it does not annul and replace the preceding discourse. Especially note that we cannot formally derive the *kol zeh assim* argument from either or both of R. Tarfon's arguments, or derive them from it. However, unlike the Ri's objection (2a), this argument (3) is compatible with R. Tarfon's (1a) and (1b), since the major premise here has a different middle term. Thus, Tosafot's argument is a new, additional argument – not a substitute for the others. Its major premise comes from the Ri's commentary, taking both the objection (2a) and the retort to it (2b) and (2c) into consideration; its minor premise comes from the Mishna, and before that the Torah; and its conclusion agrees with that of R. Tarfon. Therefore, the *kol zeh assim* argument is a clever artifice, a way to allude to a number of issues in one shot.

Nevertheless, it should be stressed that the Tosafot argument is logically quite redundant, once we have become aware of the Ri's objection and his own retort to it. For the Ri's objection to R. Tarfon's original argument is that 'frequency of occurrence' may have an impact on 'legal liability', while his own retort to the objection is that if this impact were admitted a contradiction to Torah law would ensue; whence it follows that such objection is inadmissible. Once this inadmissibility is realized, there is no utility whatsoever in at all mentioning 'frequency of occurrence' as this Tosafot commentary so glibly does, since all connotation of 'legal liability' has been permanently removed from it.

Moreover, note well, Tosafot's argument does not constitute decisive proof of anything, just as R. Tarfon's arguments do not. We have to admit that these arguments are not decisive, anyway, if we wish to leave room in the discussion for the Sages' *dayo* principle. For the conclusion that damage by horn on private property entails full payment is eventually denied by the Sages

(the colleagues of R. Tarfon in the Mishna), when they say and insist: "*dayo*—it is enough!" Their preferred conclusion is that damage by horn on private property entails only half payment. The Tosafot commentary (at least that part of it translated for us by Ury, which is all I have on hand) does not deal with this important issue here, its purpose being only to illustrate *kol zeh assim* argument (i.e. it refers to Baba Qama 25a only incidentally, here, so as to clarify another issue entirely).

Upon reflection. After writing the above, it occurred to me that Tosafot's argument (3), *unlike* R. Tarfon's arguments (1a) and (1b), is *immune* to both of the Sages' *dayo* objections. R. Tarfon's two arguments, you may recall, were neutralized by the Sages' two *dayo* objections, because they both relied in some way on the information that damage by horn on public grounds obligates the ox's owner to half compensation, in order to arrive at the conclusion that damage by horn on private grounds entails full compensation. The *kol zeh assim* argument differs radically from those in that it does not rely on the said information to arrive at the same conclusion. This means that Tosafot's argument is not logically affected by the Sages' *dayo* rebuttals, and conversely that they are logically unable to neutralize it.

As far as I know, Tosafot did not realize the collateral damage his *kol zeh assim* argument was capable of causing in this *sugya*. His argument, as we have seen, was only intended to save some of the insight of the Ri on 'frequency of occurrence' (the leftover, as it were, after the Ri's objection was neutralized by his retort) and to reaffirm R. Tarfon's conclusion. But actually, Tosafot's argument does not merely buttress R. Tarfon's – it definitely proves it, since it is not subject to reproof by *dayo*. Does this then mean that the Sages' *dayo* objections, and therefore (at least in this particular case) the *dayo* principle, are null and void? Hopefully not – but then, under what conditions, exactly, could we still sustain them?

Since Tosafot's argument (3) is formally clearly valid, we can only find fault with its content – i.e. by denying its major premise and/or minor premise. The major premise, "tooth & foot damage is more common than horn damage," does not seem easily deniable assuming it is based on empirical observation; if it is not based on empirical observation, however, it could be denied

as factually inaccurate. The minor premise, "tooth & foot damage is common not enough to make the ox's owner exempt from full payment for damages on private property," was, you may recall, based on the information given in the Torah (Exodus 22:4[200]) that tooth & foot damage on private property necessitates full payment.

It could be argued that this Torah passage does not actually specify *full* compensation, but rather refers to the quality of the feed or food restituted, leaving open the issue of quantity. But the rabbis, to my knowledge, do not accept this interpretation, and probably would not do so. We could still, however, deny Tosafot's minor premise by denying that there is a threshold of the middle term, i.e. a frequency of occurrence *as of which* the ox's owner is exempt from full payment for damages on private property and before which he is not. This is a more subtle yet technically possible approach, aimed at still more thoroughly detaching the concept of legal liability from that of commonness.

That is, if we say that no matter how common or uncommon tooth & foot damage is, this statistical feature has no effect whatever on the legal liability for the owner of an ox to pay (in full or whatever) for depredations on private property – then the minor premise of the *kol zeh assim* argument is dissolved, and the conclusion of that argument (concerning horn) no longer logically follows. Indeed, if we reflect on the meaning of the minor premise, we see that it does not make sense, anyway. It seems to suggest that if tooth & foot damage was more common than it is, it might at some point be common enough to exempt from full compensation on private property, whereas the Torah seems to unconditionally impose full payment.

Thus, it is possible in various ways to attack Tosafot's argument, and the probably best way to do so is by totally disconnecting the issue of legal liability from that of frequency of occurrence.

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[200] "If a man cause a field or vineyard to be eaten, and shall let his beast loose, and it feed in another man's field; of the best of his own field, and of the best of his own vineyard, shall he make restitution."

In that event, nothing of the Ri's initial objection would be left over, and the "all this" of the Tosafot *all this I will put* claim ceases to be credible. This would be, I daresay, an acceptable price to pay if we wish to continue to uphold the Sages' *dayo* principle – at least in the present context, and more likely in all contexts, since the present context is in fact the root context for that principle, on which all subsequent appeals to that principle in the Talmud historically depend.

One thing is sure, we cannot cling to both the Sages' *dayo* principle and Tosafot's present *kol zeh assim* a fortiori argument – they are logically incompatible. We have to choose between them. It is obvious that we ought to choose to hang on to the *dayo* principle, which is more ancient (about late 1st – early 2nd century CE) and seems more important in Talmudic discourse, rather than on to the *kol zeh assim* argument, which appears much later in Jewish history (about the 12th cent. CE, say) and whose loss has less impact on Jewish jurisprudence. Therefore, the *kol zeh assim* argument seems condemned – at least in the present context (i.e. with reference to Mishna Baba Qama 2:5), even if a similar form of argument might be attempted in some other context(s) without unpleasant consequences.

7. Maimonides

Rabbi Moshe ben Maimon (Spain, 1135 – Egypt, 1204), known in Jewish literature by the acronym "Rambam," and more widely as Moses Maimonides[201], wrote at about the age of sixteen[202] a treatise on logic, called *Maqala Fi-Sana'at Al-Mantiq* (in Arabic), first translated into Hebrew by Moses Ibn-Tibbon (France, ca. 1240-1283)[203], and thence into other languages,

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201 The suffix '-ides' means 'son of'.

202 This is according to Ventura's Introduction to his *Terminologie Logique* (p. 7). The Wikipedia article claims he was "in his twenties."

203 The Tibbonides were a famous family of translators in the 12th-13th century, in the south of France. According to Ventura (pp. 14-17), it is they who translated the Arabic word *mantik*, which means much the same as the Greek word *logos*, into the Hebrew word *higayon*. A better

including Latin (Basel, 1527), German (19th century), French and English (20th century). The edition I have in hand is a 1982 reprint of a 1935 critical edition with the text in Hebrew and in French (translation by Moise Ventura); its title is *Milot haHigayon* in Hebrew and *Terminologie Logique* in French (meaning, in English, *Terms of Logic*). It also contains the original Arabic-language version (extant parts) written in Hebrew letters. The scope of this work is considerable; it is not a mere lexicon, as its title suggests. It is an earnest teaching of formal logic and many of the more philosophical concepts surrounding it.

Briefly put, the contents of Maimonides' study are as follows, chapter by chapter. 1) proposition: subject, predicate, affirmation, negation; 2) quantity: universal, particular, indeterminate, singular; 3) terms, copula, tenses, modalities; 4) oppositions, modalities; 5) immediate inferences, conversion, inversion; 6) syllogism, premise, conclusion, major, middle and minor terms; 7) figures and moods of the syllogism, conclusive-inconclusive, hypothetical and disjunctive arguments, direct reduction and reduction *ad absurdum*, induction, analogy, juridical reasoning; 8) sensory experience, axioms of reason and their derivatives, widespread opinions, traditional assertions, true propositions, demonstrative syllogism, dialectical syllogism, rhetorical syllogism, sophistical syllogism, poetic syllogism, enthymeme; 9) the four causes, material, formal, efficient and final, proximate and remote causes, the four elements, the material substratum; 10) species, genus, difference, attributes *per se* and *per accidens*, substance,

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choice would have been *dibbur*, but they avoided it because of certain philosophical connotations (association with the Arab dialectics of Kalam). Until then, the word *higayon* did not have the precise sense of 'logic'. Opponents of Maimonides used this word (which the translators chose, not him) against him, quoting the Bab. Talmud (*Berachot* 28a): "Prevent your children from using *higayon.*" But other commentators, namely R. Joseph b. Caspi and Jacob Anatolio (a relative of the Tibbon family), objected to this reading, the former arguing that by *higayon* the rabbis meant pseudo-logical babble, while the latter pointed out that this statement referred specifically to children and not to adults.

definition, description, the ten categories[204]; 11) essential and accidental, potentiality, actuality, contraries with or without an intermediary, property, privation, relative, opposite; 12) anteriority in time, in nature, in rank, in merit, in cause; 13) names of various sorts, synonyms, homonyms, amphibologies, metaphors; 14) logos as rational faculty, thought and verbal discourse, logic as art and science, divisions of theoretical and practical philosophy, logic as instrument of all other sciences.

Effectively, Maimonides was importing into Jewish culture some very powerful tools developed by Aristotle and his successors[205]. But, while this book contains an interesting exposé of the main elements of Aristotelian logic, what is surprising is that it does *not* mention a fortiori argument[206]. One

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[204] Here Maimonides lists the *Organon* of Aristotle as including eight works. Today, only six are included therein, the *Rhetoric* and the *Poetics* being excluded. But such inclusion, as Ventura points out (p. 13), is reasonable from Maimonides' point of view, since for him rhetorical syllogism is based on traditional assertions and poetical syllogism is based on fictions or imitations. Incidentally, the latter concept was introduced by Al-Farabi.

[205] Maimonides apparently learned logic at least partly through his readings of Muslim commentators, especially Abu Nasr Al-Farabi (Central Asia, 872-950); he certainly mentions the latter (see e.g. p. 106). The impact of such early study of logic on the rest of his work is evident; such studies explain his orderly mind, rationalism and conceptual powers. It cannot be said that the rabbis after Maimonides all studied this work and took it to heart. Unfortunately, many still today carefully avoid studying logic, even as they refer to Maimonides' halakhic works.

[206] Ventura expresses the same surprise, I think, when he remarks, in his Appendix to Chapter VIII (pp. 76-77): "Maimonides did not in his treatise mention a fortiori reasoning." Notwithstanding, he then suggests that Maimonides' mention of enthymeme (p. 72) might be construed as a tacit reference to a fortiori argument, since M. Lalande, in his *Vocabulaire technique et critique de la philosophie*, defines a fortiori as "an enthymeme that assumes a premise like the following: 'Who can do the more can do the less.'" But this argument of Ventura's is clearly spurious, since 'enthymeme' may refer to abridged argument of any sort. He goes on, describing how a fortiori is understood in the Talmud. Here, he adheres to the idea that "Miriam should have been sequestered fourteen days instead of seven," suggesting that a fortiori

might understand such silence regarding most of the other of the hermeneutic rules, since they are principles of interpretation used specifically in Talmudic contexts. But the a fortiori argument is, as well as one of the means used in the Talmud for exegetic purposes, a universal method of reasoning. One would therefore have expected Maimonides to have included this form of argument in his treatise on logic[207]. However, two excuses can be put forward on his behalf. The first is that Aristotle himself, and subsequent logicians to the time of Maimonides, hardly mentioned this form of argument and never treated it in any significant detail. The second is that Maimonides wrote this book at a very young age, and perhaps was not then fully aware of the great significance of a fortiori argument in Talmudic discourse.

However, it does not appear that Maimonides subsequently dealt with a fortiori argument, or for that matter the other hermeneutic rules. Maimonides of course freely used a fortiori discourse in his works. In his *Guide for the Perplexed*, for instance, I found 23 instances. But, such use is practice, not theory (I have checked them all). As far as I know, he did not anywhere specifically stop and reflect on the reason why this argument works, even though he was exceptionally conscious of logical issues. The following are some examples of use of a fortiori argument by Maimonides, which I found in the said work:

- “If the firmament, with that which is over it, be supposed to be above the heavens, it would *a fortiori* seem to be unreal and incomprehensible.” (Part 2, chapter 30.)

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argument is naturally ‘proportional’ and requires the *dayo* principle to restrict its excesses. This belief of Ventura’s is indicative of a lack of reflection on his part on the logic of a fortiori argument, no doubt under the influence of the Gemara.

[207] Ventura (p. 23) lists some modern authors who have made an effort to relate Aristotelian logic and Talmudic hermeneutics, namely A. Schwarz and M. Mielziner, and M. Ostrovski. He also mentions (p. 18) a commentary by Moses Mendelssohn on Maimonides’s treatise on logic (I have not read it).

- “We thus learn that his prophetic perception was different from that of the Patriarchs, and excelled it; *a fortiori* it must have excelled that of other prophets before Moses.” (Part 2, chapter 35.)
- “The best test is the rejection, abstention, and contempt of bodily pleasures: for this is the first condition of men, and *a fortiori* of prophets.” (Part 2, chapter 40.)
- “Man is superior to everything formed of earthy matter, but not to other beings; he is found exceedingly inferior when his existence is compared with that of the spheres, and *a fortiori* when compared with that of the Intelligences.” (Part 3, chapter 13.)
- “But I agree with Aristotle as regards all other living beings, and *a fortiori* as regards plants and all the rest of earthly creatures.” (Part 3, chapter 16.)
- “The law forbids us to imitate the heathen in any of these deeds, and *a fortiori* to adopt them entirely.” (Part 3, chapter 29.)

Although Maimonides does not mention or discuss a fortiori argument in his treatise on logic, *Terms of Logic*, he does (in chapter 7) mention inductive reasoning and argument by analogy, both of which are involved in the background of a fortiori thinking. He describes induction as follows: “it proceeds from some particular assertions, admitted as true due to experience, to arrive at a general proposition that can be made into a premise of syllogism.” Regarding analogy he says: “when one of two objects that resemble each other by a certain trait has some attribute that is not apparent in the other [object], we affirm of the latter [object] the same attribute.” Also noteworthy is the great credence Maimonides gives to sense data and to the axioms of reason and deductive inferences from them (in chapter 8), saying: “all that is perceived by a healthy organ is indubitably

true. And the same can be said of rational data… and their derivatives."[208]

These remarks and similar ones of his strike me as very 'modern', because in the past (and in very many cases still today) people thought of logic as essentially a deductive enterprise. Maimonides here devotes some space to the more inductive and analogical aspects of reasoning (which are also found in Aristotle, of course[209]). Yet his outlook is not quite modern, in that he does not mention the all-important proviso that a generalization is always tentative, i.e. subject to rejection or particularization if subsequent experience reveals instances to the contrary. That is to say, he makes the common error of focusing on the positive side and ignoring the negative side. The same is true, of course, of analogy – it is an inductive act, which may later be repudiated; i.e. its credibility remains dependent on further experience. Moreover, Maimonides does not mention that induction and analogy are closely related logical acts. First, as already said, in that analogy is inductive. And second, in that every generality is a statement that the individuals constituting it have some attribute in common, i.e. are analogous in some respect; this was also known to Aristotle[210].

Still, Maimonides' outlook is considerably different from that of Talmudic scholars who preceded him[211]. This is true not only in

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[208] Pp. 64 and 69; translations from the French my own. Compare a similar statement by Saadia Gaon quoted earlier.

[209] See for instance *Topics* 1:12: "Induction is a passage from individuals to universals."

[210] For instance: "For there is no name common to all the objects that I mean, but, for all that, these things are all in the same class by analogy." (*Meteorology*, 4:9)

[211] This does not mean that the Talmudic rabbis did not engage in induction and analogy. As Ventura points out (pp. 77-78), they engaged in analogy (e.g. *mah matsinu*, *hequesh*, *gezerah shavah*); and in induction (e.g. *binyan av*), more or less consciously. But in either case they do not seem to have reflected on the issue from a logician's viewpoint. This is of relevance to a fortiori argument, since it depends on induction for its premises and involves a sophisticated form of analogy. See also Saadia Gaon.

his frank acknowledgment of experience, axiom, induction and analogy, as important elements of human judgment, as already stated, but even with regard to deduction. Having been influenced by Aristotelian logic and philosophy, Maimonides' understanding of deductive reasoning was no doubt a lot more structured and rigorous. I would speculate that, even if he did not openly criticize any of the Talmudic inferential processes, he was personally aware of the tenuousness of some of the arguments used. This may perhaps explain, at least in part, his viewpoint concerning the hermeneutic rules in his *Sefer Hamitzvot* (Book of Commandments). In this important halakhic work, he adopts a more sweeping and severe position than the Talmud itself regarding the legislative effectiveness of the hermeneutic principles, including a fortiori argument (presumably, since he does not explicitly except it):

> "And now I will begin to discuss the Principles (*shorashim*, roots), totaling fourteen, to be relied upon in enumerating the *mitzvot*… The Second Principle: Do not include laws which are derived from one of the 13 principles of Torah interpretation [of Rabbi Yishmael] or from a *ribui* [an extra word, letter, etc. in a Scriptural verse]."[212]

Mielziner comments on this ruling as follows: "Maimonides holds that laws derived from the Mosaic law by means of the hermeneutic rules are, in general, not to be regarded as *biblical laws* (*min hatorah*) except when expressly characterized as such in the Talmud. But this somewhat rational view is strongly criticized by Nachmanides (in his annotations to that book) who shows that from the Talmudical standpoint every law which the Rabbis derived by the authoritative interpretation from sacred

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212 See www.shiur.org/daily/rambam-mitzvos.pdf.

Scripture, has the character and sanctity of a Mosaic Law"[213]. To quote Nachmanides: "all elucidated in the Talmud through one of the thirteen methods are words of Torah and they are the interpretation of the Torah which was told to Moshe"[214]. Be that as it may, the fact remains that for Maimonides, even if an inference a fortiori is highly deductive, it does not pass the Biblical status of its premises onto its conclusion.

Other, more recent authors concur with this assessment. Halbertal writes: "Maimonides also defines *mitsvot* of a Scriptural status in terms of their traditional pedigree and their non-controversial nature. As a result of this definition, all laws derived from the application of legal hermeneutical principles, such as *a fortiori* and analogy, are relegated to Rabbinic status, not that of Scripture. This definition is a direct result of Maimonides' theory of *mitsvot*, according to which direct linkage with Sinaitic Revelation is incompatible – at least at the level of Scripture – with controversial laws. This definition brought Maimonides into conflict with Nahmanides, who strongly criticized the Maimonidean position on this issue. Nahmanides' critique is based upon both the corpus of Talmudic law and considerations of an ideological nature." Sinclair likewise: "According to Maimonides, the status of Scriptural law (*de'oraita*) is conferred by tradition alone upon laws which are

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[213] Nachmanides, also known as Rabbi Moses ben Nachman, acronym Ramban (Spain, 1194 – Israel, 1270). Note that the Ramban was born ten years before the Rambam passed away.

[214] Cited in: www.daatemet.org.il/articles/article.cfm?article_id=8. However, the Ramban is also there quoted as saying: "know that though they [the Sages] said a man does not rule via analogies by himself, they did not mean to say that all analogies were explicated to them from Sinai and given to them from the mouth of Moshe [etc.]; this is not true, since we have found them always disagreeing in many places [etc.], and were this received tradition from Sinai [etc.], there would be no occasion for these questions and for the answers that were said in the Gemara [etc.]. But the intent of an analogy which is from Sinai is that they had received a tradition that a certain ruling is learned from an analogy, but from where exactly it is derived was not a part of the received tradition." In other words, the Ramban's opinion is not as sweeping as it first seems, at least as regards analogical reasoning.

free of controversy. Any controversial law is *ipso facto* Rabbinical in nature, including a law which is derived from the Scriptural text by means of hermeneutic principles such as *a fortiori* and analogy."[215]

We can dig more deeply into Maimonides' thinking on this issue in his commentary on the Mishna, found in his introduction to *Seder Zeraim*[216]. He does believe that "all the commandments were stated with their generalities, specifics and fine details at Sinai…. [Moshe was given] the 613 precepts with their explanations; the commandments in writing, and the explanations by oral transmission." He makes a similar statement in the introduction to his *Mishneh Torah*, citing Exodus 24:12. This is the doctrine that the revelation consisted of two components, viz. a written Torah and an oral Torah, which is of course relevant to any discussion of the hermeneutic principles.

Moreover, the Rambam explains, for those, like Joshua and the Elders, who received the Torah entirely and directly from Moshe Rabbeinu, there were no doubts or disputes (*machlokot*); it is only those who came after them that had to resort to inferences (*svara*), i.e. to the thirteen *midot*. Regarding the latter, some of the inferences made convinced everyone; but in other cases,

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[215] M. Halbertal, *Maimonides'* Sefer Hamizvot *and the Structure of the* Halakhah. (Heb.) Tarbiz 59 (1990), 457-480. D.B. Sinclair, *Legal Reasoning in Maimonidean Jurisprudence*. L'Eylah 29 (1990), 32-35. Both quotations found on the Internet at: www.mucjs.org/JLAS/reasoning.htm.

[216] The full Hebrew version can be read at: www.daat.ac.il/daat/mahshevt/hakdama/1-2.htm. I have found a large portion of this text in English online at: rambam.merkaz.com/Class%204%20-%20Intro%20to%20Mishnah.pdf.
See also a short extract in English at:books.google.ch/books?id=OKL4bGI-S80C&pg=PA377&lpg=PA377&dq=Maimonides,+Introduction+to+Seder+Zera%27im&source=bl&ots=LgkwH1IjFv&sig=j3Za_U2oGiiUUZ6TRxIDROGruWw&hl=en&ei=vMxWTdP5FoiAOuT8zKAF&sa=X&oi=book_result&ct=result&resnum=12&ved=0CGEQ6AEwCw#v=onepage&q&f=false.

there were disagreements concerning the inferences to be made: in such cases the sages resorted to majority vote (*rov*). Thus, apparently, he believed the hermeneutic rules were given at Sinai, even while acknowledging that some disagreements arose over time concerning them too.

I have not anywhere found more specific comments by Maimonides on the individual hermeneutic principles, and in particular on *qal vachomer* and the *dayo* principle. It may, however, be that he has scattered significant remarks in his halakhic works: I do not know. So, I will stop here.

8. More on medieval authors

In this section, we will examine bits and pieces of additional information drawn from various sources regarding a fortiori and other reasoning found in Jewish medieval literature.

Moise Ventura, in his very fine 1935 critical edition of Maimonides' *Terms of Logic*, which was based on thorough comparative research in numerous past editions and manuscripts, as well as various commentaries, wrote somewhat wonderingly:

> "When one browses through the Hebrew manuscripts in the great libraries, one is struck to see the considerable number of works written in the Middle Ages to abridge or comment on Aristotle's Logic. Among these writings, some are due to Moslem authors, whose works were subsequently translated from Arabic to Hebrew, and the others to Jewish authors who wrote in Hebrew on this subject. Almost all these works have remained unpublished.…" (p. 18, my translation from French).

He goes on, asking why Maimonides' work received such special attention, that it was so often translated, published and commented on. Was it his authority or the literary qualities of the work that earned it such exceptional popularity? His explanation is that Maimonides' book (written while yet in his

teens) was not intended to vulgarize Aristotle's *Organon*, but to prepare the ground for his own philosophical system in the framework of Judaism, which came to maturity decades later (when he was fifty-five) in his *Guide for the Perplexed*[217]. It would, of course, be very interesting to examine all the above mentioned manuscripts and to see what is said in them, if anything, concerning a fortiori argument, and to evaluate the level of understanding of such argument exhibited in them.

In a recent but unfortunately too brief article by Aviram Ravitsky, entitled "Aristotelian Logic and Talmudic Methodology: The Commentaries On The 13 Hermeneutic Principles And Their Application Of Logic," included in Schumann's collection *Judaic Logic*[218], we are informed that there are "probably… dozens of treatises" on this subject:

> "In 1917 Aaron Freimann published a bibliographic list[219] of commentaries on the thirteen principles, in which he counted over fifty different commentaries. Today, some sixty manuscripts are known to consist of commentaries on the principles (though some of them overlap)" (p. 120).

Ravitsky rightly distinguishes between "material" and "formal" commentaries. The former class, which most commentaries fall into, make use of examples drawn from the Talmud and related

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[217] Ventura's idea that Maimonides' *Terms of Logic* was effectively a propaedeutic to his *Guide* is perhaps mirrored in Joseph A. Buijs essay *Maimonides' Use of Logic in the Guide to the Perplexed* (in Schumann's *Judaic Logic* collection), where the earlier logical and epistemological work is said to "infuse the development of issues in his later philosophical work." Buijs does not, however, mention Ventura's commentary.

[218] Piscataway, N.J.: Gorgias, 2010. Not to confuse with my JL (1995).

[219] "Die Hebräischen Kommentare zu den 13 Middot des Rabbi Ismail" in *Festschift Adolf Schwarz*, ed. S. Krauss (Berlin and Vienna, 1917).

literature to illustrate and explain hermeneutic principles. The latter refer to Aristotelian logic and philosophy to elucidate them (the qualification of 'Aristotelian' being here broadly understood to include later developments). Ravitsky informs us, based on his careful examination of some thirty documents, that "a recognizable trend of [such more 'formal'] commentaries… began in the 14th century" (p. 117)[220].

This article is of considerable interest to us here, since a few of these commentaries (hopefully their most significant elements) are actually quoted. This gives us a chance to discover and evaluate the thinking of their authors, especially regarding a fortiori argument. The first quoted is **R. Avraham Elijah Cohen** (late 14th – early 15th centuries); referring to the argument of *qal vachomer*, he writes:

> "And I contend that this would be… explained by the art of logic. […] A bull is robust compared to a donkey, and nonetheless it is not robust compared to a man; a cat is not as robust as a donkey, all the more it is not robust compared to a man." (P. 122.)

Ravitsky regards this as an "instance of formalistic commentaries" because it uses non-halakhic concepts (in this case, features of animals) instead of the legal or rabbinical content usually found in Talmudic examples. I would not however call this statement an example of formal analysis, even if it does refer abstractly to "the art of logic." But I do agree that its use of a secular illustration is significant (although, to be precise, such illustrations also do occasionally occur in the Talmud and related literature[221]), since it is indicative of

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[220] See also, by the same author, "Talmudic Methodology and Aristotelian Logic: David ibn Bilia's Commentary on the Thirteen Hermeneutic Principles" in the *Jewish Quarterly Review* – Volume 99, Number 2 (Spring 2009), pp. 184-199.

[221] E.g. *Chullin*, 60a. Not to mention the Bible, where most of the a fortiori discourse has a non-legal content. Note too that one of the first medieval commentators, Saadia Gaon (in his *Commentary on the*

recognition that the argument can be used in any context. In any event, let us examine this example in formal terms:

Donkeys (D) are less robust (R) than bulls (B).

Even so, bulls (B) are less robust (R) than men (A).

Cats (C) are less robust (R) than donkeys (D).

Therefore, cats (C) are less robust (R) than men (A).

Although some sort of a fortiori argument is explicitly *intended* here, if we label the five terms involved as shown above we see that what we are actually given is a chain of three quantitative comparisons (relative to R) resulting in a fourth: “A > B and B > D and D > C; therefore, A > C.” But this cannot be considered as a fortiori argument, for the simple reason that there is no predication involved – i.e. A, which seems to play the role of subsidiary term, is not a predicate of B or C (or even D). In other words, the author of this example did not (at least, not in this instance) understand a fortiori argument! (Nor, incidentally, does Ravitsky show understanding, since he does not raise the issue!)

The next author quoted is **R. Isaac Aboab of Castile** (1433-1493), a disciple of R. Isaac Canpanton (whose school, Ravitsky tells us (p. 139), was distinguished in that its interest in Aristotelian logic was not merely philosophical, but had a potential impact on halakha). R. Isaac Aboab describes “the essence of the argument” as follows:

> “A fortiori is a principle that teaches the scale of astringency from lenient to strict, and the scale of extenuation from strict to lenient.” (P. 123.)

He then gives the following illustration of this argument: Even though Reuven received a scholarship, he was not given a place; therefore, Shimon, who did not get a scholarship, would “all the more” not be given a place. This author demonstrates some

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Thirteen Midot), explicitly teaches that *qal vachomer* may be legal or non-legal in content.

understanding of a fortiori argument, both in his abstract description of it and in the example he proposes for it. We can show this sample argument valid by casting it in standard (negative subjectal) form:

> Reuven (P) was given greater regard (R) than Shimon (Q) was given, since the former received a scholarship whereas the latter did not.
>
> Yet, Reuven (P) was not given enough regard (R) to be given a place (S).
>
> Therefore, all the more, Shimon (Q) will not be given enough regard (R) to be given a place (S).

I wonder whether R. Isaac Aboab was the first to express a fortiori argument in this terminology of "strict" and "lenient," which has remained the rabbinical norm to this day? This is a historical question that is worth investigating. If the answer is yes, that would make him a significant figure in the development of a fortiori logic[222]. Be that as it may, we have to note that his above quoted description of the argument is a bit vague. What does he mean by "the scale of astringency from lenient to strict" and "the scale of extenuation from strict to lenient"? All it tells us is that stringency increases as we go from lenient to strict and decreases as we go from strict to lenient. We have to refer to his example to get a better grip on what he is trying to say.

As for his example, it only illustrates the negative subjectal mood of a fortiori argument. He does not (at least, not in the segment of his discourse that Ravitsky has quoted for us) give examples of the other three (or seven) valid moods. On the other hand, Ravitsky mentions that this author noticed "the discrepancy … between the single Hebrew term of *qal vachomer* and the two forms of the application of this principle" (p. 132), as the earlier quotation ("from lenient to strict" and "from strict to lenient") makes clear. We can wonder whether Isaac Aboab might not be the first Jew to have noticed this difference of direction. Nevertheless, it is not clear whether he identified it as

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[222] Of course, this is assuming these English words reflect similar ones in Hebrew, and are not mere interpolations by the translator.

one between positive and negative subjectal moods, or as one between positive subjectal and positive predicatal moods; I do not suppose he did either.

Moreover, although Ravitsky classifies this effort as "formal" analysis, and there is indeed some formalism in it insofar as abstract terms like "strict" and "lenient" are used, it is strictly-speaking not very formal. Aristotle's theory of syllogism may be characterized as formal in that he used abstract symbols like A, B, Γ (or labels like "the minor," "the middle," and "the major," or ordinal numbers) instead of concrete terms, and because he systematically developed all possible figures and moods and determined with reference to the laws of thought which are valid or invalid. R. Isaac Aboab, on the other hand, is still apparently stuck in the realm of sample concrete labels like "Reuven" and "Shimon," and makes no attempt at systematization or validation. This is, admittedly, closer to formal than the earlier Talmudic total absorption in concrete cases; but it is not yet quite formal.

Regarding the issue of validity, Ravitsky quotes the unknown author of *Sharei Tsedek* (apparently in Spain, ca. late 14th – early 15th centuries)[223]:

> "The reason [R. Ishmael] began with this principle [i.e. *qal vachomer*] is that it features self-explanatory truth more than the other [hermeneutic] principles, alike the first figure of logical syllogism that is more self-evident than the rest of the figures." (P. 124.)

What this author seems to be saying is that a fortiori argument is (at least, comparatively to the other hermeneutic principles) self-evident, just as first figure syllogism is (compared to the other figures) an irreducible primary. But the analogy in fact stopped

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[223] Whose identity is uncertain according to Ravitsky, though some have identified him with Gersonides. He refers us to his essay "On the Date of Sha'are Sedek, attributed to Gersonides" (in Hebrew), *Daat*, 63 (2008), pp. 87-102.

there. He was certainly not claiming, as Ravitsky seems to suggest, that by placing it in first position in his list of thirteen principles R. Ishmael was implying that the other hermeneutic principles can be reduced to *qal vachomer*, just as the other figures of syllogism can be verified by means of the first. In truth, as I have shown in JL, a fortiori argument is not an irreducible primary, but is reducible to simpler forms of argument, including hypothetical syllogisms and quantity comparisons; as for the other hermeneutic principles, see my comments there.

Ravitsky goes on to quote other medieval authors regarding other hermeneutic principles: Moses of Narbonne, who equated *gezerah shavah* to analogical inference; R. Avraham Elijah Cohen, who analyzed *mah matsinu* in terms of the distinctive properties of subjects; R. David Ibn Bilia, who analyzed *klal uphrat* using the terminology of genus and species. We need not in the present context discuss these issues. I only wish to remark in passing that I agree with Ravitsky that the influence of Aristotelian logic (and more broadly, philosophy) is evident in all these cases.

Two other authors are quoted by Ravitsky on the subject of a fortiori argument. One is **R. Immanuel ben Isaac Aboab** (ca. 1555-1628), a great-grandson of the earlier quoted Isaac Aboab of Castille. He explained as it follows: “The initial principle is *qal vachomer*. Meaning, the Torah is expounded by the element and manner that lead from lenient to strict, and is what the logicians refer to as: Argumentum a minori ad maius, vel a fortiori” (pp. 131-2). The other is the much latter **Isaac Samuel Reggio** (1784-1855), who says essentially the same thing, viz. that the rabbinical hermeneutic principles are mostly “based on the rules of the art of logic. E.g. the first principle, named *qal vachomer* is extremely fluent amongst the scholars of the art of logic under the title of ‘Argumentatio a minori ad majus’…” (p. 131). Note that both these definitions focus solely on minor to major reasoning, ignoring major to minor, and making no distinction between positive and negative, subjectal and predicatal, forms.

These two authors are quoted in support of the notion that the hermeneutic principles and the art of logic are, on the whole, in

agreement. Another, much earlier author, R. Hillel ben Samuel of Verona (ca. 1220 – ca. 1295), went so far in this optimistic vein as to declare sweepingly: "the Sages of the Talmud established all of their scrutinies (*sic*) on the methods of syllogism and demonstration" (p. 127)[224]. Naturally, some rabbinical authorities expressed their disagreement with such naïve statements. For instance, Isaac ben Joseph Ibn Polgar (ca. 14th century), who argued: "when they begin to study logic, foolery and error enter their minds, for they think that the conditions of syllogism are necessary in legal-religious matters [… whereas] our sacred Torah is expounded by the thirteen principles alone" (p. 129).

Having studied the issues involved in great detail in my earlier work JL, I would place myself somewhere in between these various opinions; I will not go into detail here, but merely repeat some conclusions. The rabbinical hermeneutic principles are variously logical: some are quite logical (notably *qal vachomer*), some are more or less so, some are not logical (*non sequiturs*), and some are antithetical to logic (antinomies). Thus, it is inaccurate to regard them as either all logical or all illogical. In my view, they all ought to have been logical; logic is not something one can discard at will.

The claim that the hermeneutic principles were originally a secret code applicable only to Torah interpretation may seem conceivable *prima facie*; but once one considers it seriously, it is seen to be difficult to uphold. Briefly put: for a start, since this code is not given in the written Torah, to claim it as given in the oral Torah as a tool for the justification of the oral Torah is a circular argument. Secondly, one can imagine a secret code as being necessary, assuming that God wanted only some people (namely the Jewish people, or perhaps more specifically the rabbis) to truly understand the Torah; but once this code is no longer secret, the past argument in its favor falls apart.

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224 Similarly optimistic statements by R. Avraham Shalom (15th century) and R. Elijah Galipapa (18th century) are quoted by Ravitsky.

Mielziner, who I quoted on this topic in an earlier section (4.1), rightly identifies the hermeneutic principles as developed ad hoc by the rabbis over time, as means by which traditional laws existing and developed from pre-Mishnaic times to post-Talmudic times, could be anchored – by hook or by crook, if I may so put it – to the written Torah. I suggested much the same in my own study, JL. Ravitsky, I think, shows the same awareness when he defines them as "basic and fundamental rules by which the oral tradition is related to the Scriptures" (note the guardedly vague term 'related' he uses, p. 117).

It is of course not possible with so limited a sample to describe and evaluate medieval attempts to relate the rabbinical hermeneutic principles, and in particular the first of these, viz. *qal vachomer*, to Aristotelian logic. We cannot even be sure that Ravitsky, on whose brief study we have heavily relied in the present section, selected and quoted the most significant authors and works. We have seen that this commentator did not notice certain weaknesses in logic in his selections, notably R. Avraham Elijah Cohen's confusion between simple quantitative comparisons and a fortiori argument. Moreover, we saw that Ravitsky was too quick to acknowledge as 'formal' arguments that were still, strictly speaking, material. Furthermore, his uncritical acceptance of Saul Lieberman's claims in "Rabbinic Interpretation of Scripture" makes me doubt his judgment. So, we cannot take for granted that he acquitted his set task in a fully representative manner.[225]

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[225] Regarding Saul Lieberman, see my comments in AFL 15. Another index that makes me wary of Ravitsky's reliability is his failure to take account of my work in JL when discussing 'modern research'. He mentions this book in passing twice, on issues of minor import; the first time, regarding the expression '*qal vachomer*,' and the second, only to imply that, like Jacobs, I perceived in *binyan av* reasoning a type of induction close to J.S. Mill's Method of Agreement. All the original work in JL, such as the formalization of *qal vachomer* and of the *midot* used for harmonization, is not even mentioned, let alone taken into consideration. This suggests to me that he did not take the trouble to study this important book, but only mentioned it to 'pad' his references. No wonder he can say in his abstract: "To date, the application of logic to the realm of the 13 principles has not received proper attention in the

Much more detailed studies would be needed to arrive at some solid historical conclusions. Nevertheless, based on the data we have at hand, we can tentatively propose the following conclusions. Medieval Jewish commentators wished to correlate (at least some of) the rabbinical hermeneutic principles with Aristotelian logic, out of a desire to reconcile the philosophy and science of their day with the worldview and claims of the Torah and subsequent Judaic tradition. Some of these commentators were themselves rabbis, some were lay philosophers. They were on the whole not critical, in the modern sense; rather, they had faith that the two fields of human endeavor could indeed be reconciled. They remained in the mainstream of Rabbinism, although presumably some passed over to Karaism.

Logic was regarded by many as a neutral discipline, without conceivable negative impact on religion. R. Jedaiah ben Abraham Bedersi Ha-Penini (ca. 1270 – ca. 1340), for instance, wrote "this art [i.e. logic] is comprised of knowledge or views that would result in neither harm nor benefit to faith" (p. 135)[226]. Some rabbis, on the contrary, realized the dangers posed by logic for the Judaic viewpoint. As Ravitsky points out, "they cast restrictions on the study of logic or even opposed it;" some of them could well see that logic is "a discipline that educates for rational criticism, or even animadversion, of the type that would make it difficult to accept religious truths" (p. 134). Nowadays, no one can contest that the study of logic has both a positive and a negative impact on religious belief; mostly, perhaps, the latter. Ravitsky clearly agrees when he concludes: "Attempts to reconcile [the two are] farfetched and artificial."

From a logician's perspective (as far as I can see so far), these various medieval commentators cannot be claimed to have entirely succeeded in their endeavor to correlate hermeneutics

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research literature." This is of course factually inaccurate and only stated so as to amplify the importance of his paper. Nevertheless, his paper is informative and thoughtful.

226 Ravitsky also quotes R. Joseph Ibn Caspi and the Moslem philosopher Al-Ghazali to the same effect. He also mentions Maimonides, R. Abraham Ibn Izra, and others.

and logic, because: (a) their approach was not formal enough; (b) they were not sufficiently systematic; and (c) they did not make the required efforts of validation. Aristotle and his successors had given them examples of formalism, systematic treatment and validation, in relation to the syllogism and other forms of argument; but they had not done the same job in relation to a fortiori argument or the logic of causation. So, the later commentators were not able to draw on such past work. Of course, many of the hermeneutic principles could be explicated somewhat in non-formal terms. For instance, rules like *gezerah shavah* or *klal uphrat* could be adequately discussed informally. But some, such as *qal vachomer* and *binyan av*, to name but two, could only be dealt with credibly by formal means. These means were, in fact, largely available in the epoch under study; but apparently none of the medieval commentators surveyed had the logical competence needed to apply them.

9. Moshe Chaim Luzzatto

Although the Ramchal deserves in many ways to be classed as a modern author, I have put him here so as to count him among the post-Talmudic Jewish logicians[227]. Surprisingly, this important author is not even mentioned in many standard studies of Talmudic logic, such as Mielziner's; somehow, and quite unfairly, he has passed unnoticed. Ravitsky, likewise, does not mention him.

Formulation. R. Moshe Chaim Luzzatto (Italy-Netherlands-Israel, 1707-1746), also known in Jewish literature by his acronym "Ramchal," wrote two books on logic, namely *Sepher haHigayon* (The Book of Logic, 1741) and *Derech Tevunot*[228] (The Way of Understanding, 1742); he also wrote a couple of

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[227] In this regard, it is interesting to quote Louis Jacobs in his *Religion and the Individual*, p. 101: "Although Luzatto lived in the eighteenth century, the historian Zunz rightly remarked that the Jewish middle ages lasted until the end of the eighteenth century."

[228] An image in pdf of this book in Hebrew may be viewed/downloaded at: hebrewbooks.org/19760.

books on grammar which may have some logical significance, though I have not read them. Concerning *Derech Tevunot*, which is more intended as a teaching of Talmudic reasoning than of logic in general, I wrote the following in my review of it (or more precisely, of a 1989 translation of it, called *The Ways of Reason*) in JL:

As well, he mentions *a fortiori* argument, in the form: X1 is greater than X2, and X2 is Y, therefore X1 is Y; we may notice, however … that the middle term which explains and justifies the process, being *the respect* in which X1 and X2 are compared, is lacking, and also that he is not apparently aware of the formal varieties of the argument (but the form of his argument is correct, as a positive subjectal).[229]

But at the time I wrote that comment, I had not seen *Sepher haHigayon* (i.e. the English translation of it, called *The Book of Logic*), for the simple reason that it was first published in 1995, the same year my said book was first published. About this work by Ramchal much needs be said, but what will be said here is only what it says about the a fortiori argument (in chapter 14). I have to admit that R. Luzzatto's understanding of a fortiori argument is surprisingly original and advanced[230]. On second thoughts, we should perhaps not be surprised; the mid-18th century is after all not so long ago, and writers of that period are normally counted as 'early modern'.

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[229] Note that all symbols introduced here [viz. X1, X2, and Y] are my own. N.B. I do not have my copy of the book on hand, and therefore cannot quote exactly what is said in it, as I would have preferred to today. I assume my past summary was accurate, although it is possible that today I would see things differently.

[230] I wondered at first if the translators had, perhaps unwittingly, infused their own relatively modern ideas into the original text – because it seems so modern! But the original Hebrew is shown and it is evident that the translation is correct. With regard to their translation of *Derech Tevunot*, I had in JL expressed strong disappointment – not because I doubted that they rendered the Ramchal's words accurately, but because I felt that the English wording they used for various items and processes was not in accord with more familiar works and therefore could be misleading.

> "**Quantified commensurates** [are terms that] **share a common quality, but not in the same degree**. One exhibits a Greater degree and the other a Lesser degree of the same quality. Rules of Greater Degree: 1. To whichever subject the greater is predicated, the lesser will also be predicated… 2. What cannot be predicated to the greater term cannot be predicated be predicated to the lesser… Rules of Lesser Degree: 1. To whichever subject the lesser is not predicated, the greater will not be predicated either. 2. Whatever is affirmed about the lesser will surely be affirmed about the greater." (Pp. 89-90.)[231]

Let us examine these four "rules," and see to which of the standard models of a fortiori argument they respectively correspond. The middle term (R) of each argument is left tacit in these rules, but may be identified with the "common quality shared in different degrees" referred to in the definition. The major (greater), minor (lesser) and subsidiary terms (P, Q, S) are noted symbolically (as P, Q, and S, respectively) by me in each rule. I give the Hebrew original, so everyone can verify the accuracy of the translation:

- מי שיפל בו היתר, יפל בו הפחות. "**To whichever subject** (S) **the greater** (P) **is predicated, the lesser** (Q) **will also be predicated**." This, being major to minor and positive, refers to positive predicatal argument; note that P and Q are predicates.
- מה שלא יפל ביתר, לא יפל בפחות. "**What** (S) **cannot be predicated to the greater term** (P) **cannot be predicated to the lesser** (Q)[232]." This, being major to minor and negative, refers to negative subjectal argument; note that P and Q are subjects.

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231 Bold fonts used by the translators omitted by me.

232 בשמירת היחס "…provided that the relationship of greater and lesser is maintained in regard to that predicate."

- מי שלא יפל בו פחות, לא יפל בו יתר. "**To whichever subject** (S) **the lesser** (Q) **is not predicated, the greater** (P) **will not be predicated either**." This, being minor to major and negative, refers to negative predicatal argument; note that P and Q are predicates.
- מי שמחיב בפחות, כל שכן ביתר. "**Whatever** (S) **is affirmed about the lesser** (Q) **will surely be affirmed about the greater** (P)." This, being minor to major and positive, refers to positive subjectal argument; note that P and Q are subjects.

Amazing! This is the first time I see *all four* moods of (copulative) a fortiori argument listed by anyone before me. They are classed in the following order: first the two major-to-minor moods, the positive and the negative; then the two minor-to-major moods, the positive and the negative. For this reason, their order of presentation seems odd by my standards: positive predicatal, negative subjectal, negative predicatal, positive subjectal. But that, of course, is an unimportant issue – the fact remains all four forms are clearly there.

Since these definitions are explicitly built around a "common quality shared with varying degrees," we can say that[233] they do include the middle term (R). However, what is manifestly lacking in them is the notion of a threshold of R that any subject must cross before it gets the predicate. Yet, this is an essential feature of a fortiori that anyone must acknowledge who claims to understand the argument. We can therefore say without any exaggeration that R. Luzzatto correctly formulated the four moods of a fortiori argument, in the sense of perceiving their two possible orientations (subjectal and predicatal) and two possible polarities (positive and negative) some 250 years before I did. As far as I know, he was the first to do this important work (in or before 1741, presumably while a resident of Amsterdam). However, although his formulation does mention the middle term, it is still incomplete since it does not mention the crucial

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233 Contrary to what I say in JL, with reference to his treatment in *Derech Tevunot* (above quoted).

issue of the sufficiency (or insufficiency) of that term, without which the argument cannot be validated. Therefore, while Ramchal should be regarded as an important contributor to a fortiori logic, he cannot fairly be said to have been the first to formalize the argument correctly.

Assessment. That these four moods are not listed by him using symbols instead of terms (like my P, Q, R, S) is not important. Nor is it important that he does not devise descriptive names for the arguments (positive/negative, subjectal/predicatal). What we have here is still a considerable measure of formalization in the strict sense of the term, since abstract concepts are used instead of concrete examples. Expressions like "what," "whatever," "whichever subject," "predicated," "affirmed," "the greater (term)," "the lesser" are all equivalent to use of symbols – they serve the same function of theoretical generalities allowing for any specific values that may occur in practice.

Note, too, that his definitions are not made in narrowly legal terms, but in terms adaptable to any subject matter. We can also say that he was clearly aware of the middle term underlying the major and minor terms, which puts him ahead of many past and present logicians. So, R. Luzzatto may *almost* be said to have been the first to formalize a fortiori argument, or at least its four forms (the primary copulatives). I say 'almost' – because some criticism of his presentation is possible and necessary. There are a number of significant deficiencies in it, from a formal logician's point of view.

Firstly, the preamble, "Quantified commensurates share a common quality, but not in the same degree" (הם שחלוקים בכמות איכותם), is actually the unstated *major premise* of all four "rules," telling us that the major and minor terms P and Q share a common quality R to different degrees. This premise should not be detached from the four arguments, because it is an integral part of each of them, making the inference possible. It should be repeated every time it is relied on.

Secondly, the *middle term* R should also be explicitly mentioned in the minor premises and conclusions, whereas it is left tacit in them. It is not enough to state there that P and Q are greater or lesser, with implicit reference to the major premise. The term R

mentioned in the major premise must be repeated in the minor premise and conclusion, to ensure that it is with respect to that exact same term that they are intended; otherwise, we risk committing the fallacy of two middle terms. If the middle term is not mentioned in all three propositions, it is not fulfilling its role of intermediary, which explains why the putative conclusion follows the given premises.

Thirdly, and most importantly, note again the absence of the explanatory concept of *sufficiency* (or insufficiency) in the minor premises and conclusions, i.e. the awareness that there is in each case a threshold value of R as of which S is applicable (or not). Without this subtle feature, we have no explanation for the link between the subject and predicate in the minor premise, and therefore no explanation for our claiming the same link in the conclusion. The middle term, and its being present enough or not enough, are essential details to succeed in validating the argument. The minor premise *must* specify these details, even if the conclusion is stated without them.

Even so, it would not be fair to say that Ramchal confused a fortiori argument with argument by analogy. If he had done so, he would have allowed for inference in positive subjectal form from major to minor and in positive predicatal form from minor to major. The fact that he did *not* count such reasoning (and its negative corollaries) as valid shows that he was referring to a fortiori reasoning rather than to qualitative[234] analogy. For whereas the analogical argument is non-directional, able to function indifferently in either direction, a fortiori argument is distinctively directional.

In sum, although we can rightly attribute the formulation and listing of all four moods of (primary copulative) a fortiori argument to R. Luzzatto – assuming no one preceded him in this

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[234] The analogy would be qualitative rather than quantitative (pro rata), since in each of Ramchal's four moods the subsidiary term S remains constant, i.e. the same in the minor premise and conclusion. As pointed out further on, Ramchal does not show awareness of a crescendo argument, or even (to my knowledge) of quantitative (pro rata) analogy.

feat that I do not know about – we cannot say that he succeeded in *fully formalizing* these arguments. A little bit more work was needed to thoroughly define each unit of reasoning he listed, in a way that made their validations possible. The deficient way he has formulated the arguments (i.e. without mention of sufficiency or insufficiency of the middle term in the minor premise) makes their putative conclusions invalid – i.e. the contradictories of these conclusions *remain logically possible*.

We should also note that he does not actually analyze the four moods he has listed, and distinguish between those in which P and Q are subjects and those in which they are predicates. We can suppose that he was aware of the differences between major-to-minor and minor-to-major moods, and between positive and negative moods, because of the way he has ordered the material. But he does not seem to have clearly noticed the also important structural difference between subjectal and predicatal. Still, what he did achieve should not be belittled. It deserves high praise.

This historical finding is a quite unexpected and somewhat humbling for me. Although I independently formulated these four principal moods back in 1995 (no doubt some time before), I must now admit they were already roughly known. But I can still claim as original, their more precise formulation and analysis, as above detailed. I can also claim the discovery of the corresponding implicational forms and various derivative secondary forms.

Moreover, fourthly, as far as I know, R. Luzzatto made no effort of *validation*, but accepted the reasoning involved in his four "rules" as self-evident. But of course, that won't do – logicians have to justify all arguments they acknowledge in appropriately detailed and convincing ways[235]. So, I can claim this important

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[235] In their Foreword (p. xxi), the translators state: "He goes beyond the logical investigation of validity and nonvalidity to find the means of evaluating what is true and what is false. In his treatment of syllogisms, the Ramchal passes over how given premises make a conclusion logically necessary." But of course, there is no exemption from the obligation to demonstrate validity – the "beyond" they claim for Ramchal is a cop-out.

achievement, having formally demonstrated that a fortiori arguments can be reduced to more familiar and proven arguments. And that was of course made possible by my more precise formulations and analyses.

Needless to say, the said four deficiencies in R. Luzzatto's treatment of a fortiori argument are not a reflection on his intellectual capacities. It is evident that he could easily have further developed his study of the subject in the stated directions had he wished to. Obviously, he was a logician more concerned with teaching practical logic than in researching theoretical issues. Of course, deeper theoretical analysis does improve practice, but it is a fact that most people do not feel the need to go that far.

An insight by R. Luzzatto also worth noting is the following:

> "In addition, it is necessary to distinguish between quantified commensurate terms which are greater or lesser on the one hand, and more or less likely, on the other. For when a certain quality is exhibited to a greater degree, it is not, therefore, more likely to occur; in fact, it is often less likely." (P. 90.)

Here again, we see the lucidity of the man. Many people, from Aristotle's time to the present day, have made the mistake, when discussing a fortiori argument, of confusing *ontical* differences in degree between the major and minor terms in relation to an underlying middle term with *epistemic* differences in degree, i.e. with degrees of likelihood. R. Luzzatto is evidently aware of the alternative possibilities involved, since he stresses that the major term may in fact (in some cases) be less likely than the minor term. Clearly, this is an author whose work on logic deserves careful reading or rereading.

Nevertheless, it must be pointed out that the Ramchal's above listed four arguments are all purely a fortiori; he does not like many logicians before and after him attempt to draw 'proportional' conclusions. This is in one sense to his credit, in that purely a fortiori argument is the essence of a fortiori. But in another sense this is a deficiency, in that a crescendo argument

is also valuable, provided we understand that it involves an additional premise about 'proportionality'.

The Ramchal's non-mention of a crescendo argument – and for that matter of the *dayo* principle – is surprising, considering the large role such argument plays in the Talmud, and in particular in Baba Qama 25a. I do not know whether he has anywhere written any comments regarding Talmudic a fortiori argument. If he did, it would be very interesting to know what he said, in view of his above-average clarity of insight and logical skill.

10.More research is needed

What we have found so far in the preceding pages concerning the views of early Jewish commentators on a fortiori argument may look a bit slim. The truth is that my linguistic skills are insufficient to do a much more thorough job than that on them. Someone with better Hebrew and Aramaic than mine will have to look into this matter more fully, carefully examining any relevant comments in the literature, and publish a new work on the subject.

This of course means, for a start, examination of the later commentaries placed all around the Mishna and Gemara in current editions of the Talmud; but all other possible sources must also be investigated. A thorough, chronologically-ordered *bibliography* on Talmudic logic, hermeneutics and methodology needs, perhaps, to be drawn up for this purpose. This can be done using material from various sources. Possible starting points: the *Jewish Encyclopedia* article on Talmudic hermeneutics[236]; the 'Logic and methodology' section of the Wikipedia article on Talmud[237]; M. Mielziner's *Introduction to the Talmud*, pp. 83, 96, 128-9; and others. These various lists are doubtless far from

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[236] Online at www.jewishencyclopedia.com/view.jsp?artid=34&letter=T&search=Talmudical%20Hermeneutics. The list there is reproduced in the corresponding Wikipedia article: en.wikipedia.org/wiki/Talmudical_hermeneutics.

[237] See: en.wikipedia.org/wiki/Talmud.

exhaustive[238]. The works they include seem offhand to relate to logic and the rabbinical hermeneutic rules in general, and thence to the subject-matter of *qal vachomer* in particular. But some or even many of them might have no distinctive additional information or even no relevant information at all.

The reason I mention these lists, and the potentially relevant authors and works in them, is in order to stress that the present work is far from complete: it is probably at best sketchy. The work of history and evaluation that needs to be systematically done is yet to be done. We need to collect all the relevant information in those and similar works before we can hope to write a thorough history of the subject and to more precisely trace the evolution in understanding of *qal vachomer* and other arguments among Jewish logicians and commentators. I of course should have – and would dearly have loved to – study all the works listed there, but I have so far not found many of them in English (or French) translation: most are, of course, in Hebrew.

I could only here, for now at least, do some of the work – whatever was within my linguistic purview. Ideally, the books listed in the eventual bibliography should all be translated into English by someone so as to be available for scrutiny by international scholars like me who do not necessarily master Hebrew. At least the segments relevant to our study should be translated; that is, those to do with the hermeneutic principles and practices of the rabbis, and in particular those to do with the a fortiori argument. The ideal would be to create a freely accessible '.org' website in which such works would be collected and their translations posted for all to see and study.

In truth, the probability is high that most of the books listed – especially those by medieval rabbis – simply repeat the same old

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[238] My passing on of this bibliographic material should not be construed as an attempt on my part to appear more "learned" than I really am. The material I list here is, for the most part, material I am ignorant of. Had I consulted it, I would have treated in within my book. The reason I include it here is merely to give other researchers a bit of a starting point for further investigation.

platitudes about the *qal vachomer* argument, the *dayo* principle, and other hermeneutic principles. The reason for this is simple – the obligation of rabbis to conform to orthodox standards in order to be accepted by their peers. There are, to be sure, sometimes disagreements and even very passionate disputes among them. But these are all probably within certain bounds, for otherwise they would not be considered as kosher and perpetuated and read.

We must, however, remain open to the possibility of the unexpected: the Ramchal's seemingly original discovery of the four moods of a fortiori argument is a felicitous case in point.

5. A FORTIORI IN CERTAIN LEXICONS

Drawn from A Fortiori Logic *(2013), chapter 32:1-3.*

In the present chapter, we shall investigate the treatment (or non-treatment) of a fortiori argument in general – and of the more specifically Jewish concepts of *qal vachomer* and *dayo* – in three standard encyclopedias (more are dealt with in AFL 32). This is not intended to be an exhaustive survey, but should give us a good idea of how this topic is regarded and how far it is understood by the academics, writers and editors, who produce the lexicons concerned.

1. The Jewish Encyclopedia

The *Jewish Encyclopedia* (henceforth, JE) is an important English-language resource for information on Judaism and Jews, which was published in 1901-6 in New York. It can nowadays be consulted online[239]. The article in it which interests us here is called "Talmud Hermeneutics" (in vol. 12, pp. 30-33); it was apparently written by **Jacob Zallel Lauterbach** (1873-1942), with a bibliography by Wilhelm Bacher[240]. This article is wide-ranging, dealing with all sorts of interpretative techniques, as well as the more logical ones enshrined in the seven rules of Hillel and the later thirteen rules of R. Ishmael.[241]

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[239] At: www.jewishencyclopedia.com. For more on this encyclopedia, see: en.wikipedia.org/wiki/Jewish_Encyclopedia.

[240] See at: www.jewishencyclopedia.com/articles/14215-talmud-hermeneutics. The JE articles on Talmud www.jewishencyclopedia.com/articles/10739-methodology and on Bible Exegesis: www.jewishencyclopedia.com/articles/3263-bible-exegesis are also worth reading in this context.

[241] Two remarks in this article are worth noting in passing. First, that "neither Hillel, Ishmael, nor Eliezer ben Jose ha-Gelili sought to give a complete enumeration of the rules of interpretation current in his

We shall not here, needless to say, review the whole article but only focus on what it says regarding a fortiori argument, i.e. which it refers to as Ḳal wa-ḥomer, the first rule in the lists of Hillel and R. Ishmael. JE tells us that "The completed argument is illustrated in ten examples given in Gen. R. xcii." – however, this statement is not entirely accurate, because this set of ten examples is claimed in Genesis Rabbah 92:7 to be exhaustive; JE should have pointed out that there are a lot more than ten examples of such argument in the Tanakh (at least 46, according to more recent research).

JE identifies Ḳal wa-ḥomer as "the argument 'a minori ad majus' or 'a majori ad minus';" and states that "The full name of this rule should be 'ḳal wa-ḥomer, ḥomer we-ḳal' (simple and complex, complex and simple), since by it deductions are made from the simple to the complex or vice versa, according to the nature of the conclusion required." This is of course an important observation regarding the two directions of a fortiori thought; but JE does not clarify when it first appears in Jewish texts. Note also its translation/interpretation of the terms *ḳal* and *ḥomer* as respectively "simple" and "complex;" this is not the most accurate rendering of their meanings. For a start, we are not told *what* is qualified as "simple" or "complex," let alone what these expressions mean. This is not terminology used by the rabbis.

Note that JE gives no unified definition for a fortiori argument, i.e. it does not attempt to uncover what the two above forms of it have in common. Nor indeed what in fact distinguishes them

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day." Second, that "The antiquity of the rules can be determined only by the dates of the authorities who quote them; in general, they can not safely be declared older than the tanna to whom they are first ascribed. It is certain, however, that the seven middot of Hillel and the thirteen of Ishmael are earlier than the time of Hillel himself, who was the first to transmit them. At all events, he did not invent them, but merely collected them as current in his day, though he possibly amplified them. The Talmud itself gives no information concerning the origin of the middot, although the Geonim regarded them as Sinaitic…. This can be correct only if the expression means nothing more than 'very old', as is the case in many Talmudic passages. It is decidedly erroneous, however, to take this expression literally and to consider the middot as traditional from the time of Moses on Sinai."

(namely, that the first is positive whereas the second is negative). Moreover, JE makes no attempt to clarify how and why the a fortiori argument works, i.e. to formally describe and validate it. All it tells us regarding its structure is: "The major premise on which the argument is based is called 'nadon', or, at a later period, 'melammed' (that which teaches); the conclusion resulting from the argument is termed 'ba min hadin', or, later, 'lamed' (that which learns)." It is inaccurate to call the *nadon* the major premise; it is more accurate to refer to it as the minor premise.

Evidently, JE is not aware of the premise that compares the major and minor terms in relation to the middle term, which deserves the name of major premise. As we saw, it does not mention the major and minor terms as such (it mentions *ḳal* & *ḥomer* and simple & complex – but it does not say that these items are terms). Also, it does not even hint at the middle term, nor realize that it has to be present (setting a threshold) in the minor premise for the conclusion to be possible. The predication in common to the minor premise and conclusion is not at all mentioned either. Furthermore, JE shows no awareness of the differences between subjectal and predicatal forms of a fortiori argument, let alone of the differences between copulative and implicational forms.

All in all, then, this article provides little information on the nature of a fortiori reasoning. It does mention the distinction, found as rules 5 and 6 in the list of Eliezer ben Jose ha-Gelili, "between a course of reasoning carried to its logical conclusion in the Holy Scriptures themselves ('ḳal wa-ḥomer meforash') and one merely suggested there ('ḳal wa-ḥomer satum')." But this is a relatively unimportant insight, as it refers to the degree to which the Biblical text is explicit or implicit rather than to the form of a fortiori argument as such.

As regards the *dayo* principle, JE describes it as follows:

> "The process of deduction in the ḳal wa-ḥomer is limited by the rule that the conclusion may contain nothing more than is found in the premise. This is the so-called 'dayyo' law, which many teachers, however, ignored. It

> is formulated thus: *dayo lavo min hadin lihiot kanidon* ('The conclusion of an argument is satisfied when it is like the major premise')."

This description, too, is inaccurate, in that it confuses the *dayo* principle with what I have called the principle of deduction, i.e. the logical rule applicable to all deductive argument that "the conclusion may contain nothing more than is found in the premise." As I have shown, the *dayo* principle is something else entirely: it is an ethical limitation on the inference of greater penalties for greater crimes, or relatively stringent laws, from information given in the Torah regarding lesser penalties for lesser crimes, or relatively lenient laws. It constitutes self-restraint on the part of rabbis, so as to avoid the risk of excessive punishment, or severity of duties, through erroneous human interpretation of Divine law.

JE should have realized that the reason why "the 'dayyo' law" could be "ignored" by "many teachers" is precisely that it is not a principle of deduction, but more like one of induction. JE also shows unawareness of the difference between inductive and deductive inference when it informs us that: "The discovery of a fallacy in the process of deduction is called 'teshubah' (objection), or, in the terminology of the Amoraim, 'pirka'. The possibility of such an objection is never wholly excluded, hence the deduction of the ḳal wa-ḥomer has no absolute certainty."

In truth, most such objections in practice refer to the content, rather than to the form, of the a fortiori argument. The deduction involved in the argument, if properly formulated, is quite certain – that is what the term "deduction" (when applicable) means. The questions raised in objections are occasionally whether the argument has indeed been correctly formulated, but more commonly whether the information or perspective it relied on is indeed reliable. Thus, we see, here again, that the author of the JE article was not too clear about many issues concerning general logic, as well as some issues relating to Talmud.

Nevertheless, the article as a whole remains very interesting historically and doctrinally. It certainly, albeit brief, contains a lot of valuable information on the topics it treats.

2. Encyclopaedia Judaica

The *Encyclopaedia Judaica* (henceforth, EJ) is a more recent English-language resource for information on Judaism and Jews, which was published in 1971-2 in Jerusalem and New York; over time, this was supplemented with several yearbooks and decennial volumes; a second edition, including many major revisions and updates, was published in 2006-7[242]. The article we shall take a look at here is called "Hermeneutics," and is found in the first edition (pp. 367-372). It is signed by **Louis Jacobs** (Britain, 1920-2006). This article was retained in the second edition, perhaps with some minor modifications (since it is there cosigned by David Derovan)[243].

Although the EJ article expounds the thirteen rules of R. Ishmael and other interpretative techniques in some detail, we shall only here be concerned with its exposition of *Kal va-ḥomer*, i.e. of the first of the thirteen rules. Since, in AFL, we have already devoted a whole chapter (16) to the views of Louis Jacobs regarding a fortiori argument, we need not go into great detail in the present context. It will suffice for us to briefly comment on a number of points.

To begin with, EJ defines "*Kal va-ḥomer*" as "an argument from the minor premise (*kal*) to the major (*ḥomer*)." This is, of course, wrong – *kal* and *ḥomer* refer not to premises but to terms within the premises and conclusion! It is true that in the *a minori ad majus* form of the argument the *kal* (minor) term is in the minor

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[242] More on this encyclopedia at: en.wikipedia.org/wiki/Encyclopedia_Judaica. Note that a CD-rom version of it (presumably of the 1st ed.) exists.

[243] Online at: www.jewishvirtuallibrary.org/jsource/judaica/ejud_0002_0009_0_08805.html. The only difference I have spotted in the section about *qal vachomer* in the 2nd ed. is the added statement: "Not all of the thirteen principles are based on logic as is the *kal va-ḥomer*. Some are purely literary tools, while the *gezerah shavah* is only valid if received through the transmission of a rabbinic tradition." This statement is interesting in that it explicitly characterizes *qal vachomer* as "based on logic."

premise; but the *ḥomer* (major) term here intended is, not in the major premise as EJ implies, but in the conclusion. It is also to be found in the major premise, which compares the two terms, but this is not the proposition that EJ is referring to here. So, this is an error, if only of inattention[244].

Furthermore, EJ does not mention the major premise, nor therefore the presence in it of a middle term that performs the comparison that determines which term is the major and which is the minor. Nor does EJ here mention the presence of the middle term in the minor premise and conclusion, and its crucial role in them in establishing the quantitative threshold as of which predication is possible. The subsidiary term (the predication) is likewise not highlighted. Note also that, whereas JE explicitly acknowledges both the *a minori ad majus* or *a majori ad minus* moods of a fortiori argument, EJ only considers the former (implicitly, without naming it) and ignores the latter.

So, what we find in the EJ article on the whole is a very limited understanding of the nature and scope of a fortiori reasoning. All it gives us is a very rough sketch of the paradigmatic form of such argument. Not surprisingly, it fails to distinguish between positive and negative arguments, between subjectal and predicatal ones, and between copulative and implicational ones.

However, further on, when EJ rightly strongly rejects the identification by Schwarz between a fortiori argument and Aristotelian syllogism, it offers a somewhat better definition inspired by Kunst: "in the *kal va-ḥomer* it is not suggested that the 'major' belongs in the class of the 'minor' but that what is true of the 'minor' must be true of the 'major'". In this statement, the "major" and "minor" more clearly refer to subjects (or even antecedents), since the phrase "what is true of" them obviously refers to a predicate (or even a consequent). Thus, EJ here may

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[244] In a 1972 paper, "The *Qal Va-Ḥomer* Argument in the Old Testament" (*Bulletin of the School of Oriental and African Studies*, 35:221-227. Cambridge University Press), Jacobs writes more accurately: "The argument runs: if A is so then B must surely be so; if the 'minor' has this or that property then the 'major' must undoubtedly have it."

be said to point to three of the four items of a fortiori argument. But the middle term (or eventually, thesis) is still missing, and this is of course a serious lacuna.

As regards use of a fortiori argument in Judaism, EJ lists the ten examples of it found in the Bible according to the Midrash (Gen. R. 92:7), and two more examples drawn from the Mishna (Sanh. 6:5) and Gemara (Ḥul. 24a). The article then proposes Jacobs' own theoretical distinction between "simple" and "complex" *qal vachomer* (which the preceding two Talmudic examples are taken to illustrate, respectively). In the "simple" type, "the 'major' and 'minor' are readily apparent," whereas in the "complex" type, "an extraneous element… has to be adduced to indicate which is the 'minor' and which is the 'major'."

The two types are symbolically represented as follows: "Simple: If A has x, then B certainly has x;" and "Complex: If A, which lacks y, has x, then B, which has y, certainly has x." As I have argued at length in the chapter devoted to Louis Jacobs (AFL 16), the symbolic formulae used to define the proposed distinction are very superficial, since they fail to clarify why or how the consequents should logically follow from the antecedents. In truth, a major premise is required in either case, whether it is readily apparent or takes an effort of reflection to formulate. This means that the simple type is tacitly complex, since its terms A and B are known to differ in some respect (say, in degrees of y). Thus, the distinction is formally inadequate.

Nevertheless, the "complex" form proposed by EJ does have considerable value, in that it does effectively allude to the middle term and the major premise of a fortiori argument. Here, "y" plays this mediating role, although this is just a special case of a more general form. A more general statement would have been: 'If A, which *has less y*, has x, then B, which *has more y*, certainly has x'. In that expanded formula, the major premise that 'B has more y than A does' is clearly implied. The case referred to by EJ is the special case where 'less y' is specifically 'no y', and 'more y' is specifically 'some y'. We do often in practice come across a fortiori statements both of the general kind (with 'less y' and 'more y') and of the special kind (with 'zero y' and 'more than zero y'). Thus, EJ cannot be said to have totally ignored the

middle term and the major premise – it just did not clearly acknowledge them.

As regards "the principle of *dayyo* ('it is sufficient')," EJ presents it as "a qualification of the *kal va-ḥomer*," according to which "the conclusion [can] advance only as far as the premise and not beyond it." In symbolic terms, this means: "It must not be argued that if A has x, then B has x + y. The *kal va-ḥomer* suffices only to prove that B has x, and it is to go beyond the evidence to conclude that it also has y." This definition, though nice and clear, is partly inaccurate. It is a good statement of the principle of deduction for purely a fortiori argument – but that it not what the *dayo* principle is really about.

EJ rightly refers the principle to the Mishna Baba Qama 2:5, where it is first formulated, but it wrongly interprets its discussion in the corresponding Gemara Baba Qama 25a. The latter does not exactly or merely teach that "R. Tarfon rejects the *dayyo* principle in certain instances." Rather the Gemara, relying on a *baraita* (known as The Baraita of R. Ishmael), advocates precisely the view that *qal vachomer* yields a 'proportional' conclusion. This is evident from the Biblical example regarded as the prototype of *qal vachomer*, viz. Numbers 12:14-15.

In this example, according to the Gemara, the correct inference by *qal vachomer* would be a punishment of fourteen days incarceration (for Miriam, for speaking out of turn concerning her brother Moses), even though only seven days incarceration is mentioned in the Torah. The *dayo* principle then serves to reduce the concluding penalty from fourteen days to back to seven. Thus, the Gemara's view is that *qal vachomer* is essentially a crescendo argument (rather than purely a fortiori argument as EJ implies it), and that the *dayo* principle diminishes its conclusion ex post facto (rather than denying that the 'proportional' conclusion can at all be drawn as EJ implies it). Thus, EJ does not represent the *dayo* principle as it is actually understood in Talmudic literature.

Evidently, EJ looks upon the *dayo* principle as a principle of formal logic, whereas it is more precisely put an ethical principle adopted by the rabbis to ensure their deliberations do not end up with excessively severe legal rulings. Moreover, the scope of the

dayo principle is clearly not as wide as EJ has it, if we refer to its genesis in the said Mishna. It is not a general principle regarding any sort of conclusion (i.e. *any* A, B, x and y) – but more specifically a warning against inferring a harsher penalty for a greater crime from a Biblical text that imposes a certain (gentler) penalty for a specific (lesser) crime. Even though this warning might be extended somewhat to duties in general (instead of being applied only to penalties for crimes), it is by no means as general as EJ implies.

In conclusion, while the EJ article on hermeneutics is admittedly full of valuable information, it is seen on closer scrutiny to be open to considerable criticism. As the saying goes, "the devil is in the details." *Qal vachomer* and the *dayo* principle are certainly more intricate topics than EJ makes them out to be. And I suggest, based on my past study of the hermeneutic principles in JL, that EJ treatment of the other hermeneutic rules can similarly be criticized as oversimplified and not entirely accurate. Of course, one should not expect too much from a brief article in an encyclopedia.

Still, to my mind, there was a failure of adequate research by editors of this important encyclopedia. It is shocking that in the first edition (1971-72) there is no mention of the Ramchal's 1741 contribution to understanding of *qal vachomer* (he managed to describe the four main moods of the argument) and that in the second edition (2006-7) there is no mention of Avi Sion's 1995 clarification of *qal vachomer* (which included full formalization and validation of such reasoning).

There is in EJ, 2nd ed. (vol. 9) an article on "Interpretation" in which, under the heading of "Analogical Interpretation," can be found a brief explanation of *qal vachomer* (p. 819). This article was authored by **Menachem Elon**. The term analogical interpretation (*midrash ha-mekish*) refers to "the subject matter of the first three of the 13 middot enumerated by R. Ishmael." The first of these is "*kal va-ḥomer*," which refers to "a fortiori inference, a minori ad majus or a majori ad minus."

"The basis of this *middah*," we are told, "is found in Scripture itself (Gen. 44:8; Deut. 31:27) and the scholars enumerated ten

pentateuchal *kallin va-ḥomarim* (Gen. R. 92:7).” This information is not quite correct. Though examples of *qal vachomer* occur in Scripture, it does not follow that they are its “basis;” a fortiori argument is rationally evident, and does not require revelation. Moreover, the ten examples given by the cited Midrash are not all “pentateuchal,” i.e. in the Five Books of Moses (Torah), but range across the whole Jewish Bible (Tanakh); and besides, there are in fact many more instances of the argument in the latter than the ten mentioned in the Midrash.

This article defines “the rule of *kal va-ḥomer*” as “a process of reasoning by analogy whereby an inference is drawn in both directions from one matter to another, when the two have a common premise – i.e., it can be drawn either from the minor to the major in order to apply the stringent aspect of the minor premise also (BM 95a), or from the major to the minor in order to apply the lighter aspect of the major premise to the minor premise (Beẓah 20b).” The two examples here mentioned are not quoted in the article, but I have looked them up (in the Soncino English ed.) so as to examine them.

The example in Baba Metzia 95a reads as follows: “You can reason a *minori*: if a paid bailee, who is not responsible for injury and death, is nevertheless liable for theft and loss; then a borrower, who is liable for the former, is surely liable for the latter too!” This argument is indeed from minor to major, being positive subjectal in form. Its major, minor, middle and subsidiary terms are, respectively, “a borrower” (P), “a paid bailee” (Q), “responsible for injury and death” (R, ranging from zero upwards), and “liable for theft and loss” (S). Note that what EJ refers to, here, as “the stringent aspect of the minor premise” is the subsidiary term, S; more precisely, this is a stringency applicable to (i.e. predicated of) the minor term, Q (which in this case happens to be located in the minor premise) which is passed on to the major term, P (located in the conclusion).

There are in Beẓah 20b two examples of *kal va-ḥomer* (they are there discussed and contested, but this need not concern us here). These are indeed arguments from major to minor, being negative subjectal in form. The first example reads: “If, when it is forbidden [to slaughter to provide food] for a layman, it is permitted [to slaughter] for the Most High, then where it is

permitted on behalf of a layman, it is surely logical that it is permitted for the Most High." Its major premise is that "slaughter for a layman (P) is more restricted (R) than slaughter for the Most High (Q)," since the former is forbidden when the latter is permitted (this involves a generalization, note, from certain cases to all cases). The minor premise and conclusion predicate that P and Q, respectively, are "restricted (R) not enough to be forbidden (S)." The second example reads: "If when thy hearth is closed, the hearth of the Master is open, how much the more must the hearth of thy Master be open when thy hearth is open." It is very similar (and indeed is presented as "the same in another form"), except that here, P is "thy hearth," Q is "the hearth of the Master," R is "restricted," and S is "closed."

With regard to these arguments, EJ remarks that they go "from the major to the minor in order to apply the lighter aspect of the major premise to the minor premise." This tells us that the author of this article interprets the expression 'from major to minor' as referring not to terms but to premises; i.e. in his perspective, the "major premise" is the proposition containing the major term and the "minor premise" is the one containing the minor term. But obviously this perspective is incorrect – for the proposition containing the minor term here is not a premise but the conclusion! So, this is a misinterpretation of the said expression. This reveals that the author is not very well versed in logic.

As regards the *dayo* principle, the article states: "Material to this rule is the principle *dayo la-ba min ha-din lihyot ka-niddon* (Sifra, loc. cit.; BK 25a, etc.), i.e., it suffices when the inference drawn from the argument (*ha-ba min ha-din*) is equal in stringency to the premise from which it is derived (the *niddon*), but not more so, not even when it might be argued that logically the inference should be even more stringent than the premise from which it is derived." This formulation is potentially interesting, in that the *dayo* restriction is placed in opposition to possible "logical inference." Unfortunately, the author does not discuss the implications of such opposition. If it disagrees with logical inference, then *dayo* is not a logical principle; in which case, we have to suppose that it is based on other considerations, perhaps moral ones. Moreover, we must ponder: is the logical inference necessarily, or only contingently, "more stringent"? If

the logical inference is necessarily a crescendo, how can it be occasionally ignored by a *dayo* principle? And if the logical inference is only occasionally a crescendo, under what conditions does this occur, precisely? The author does not ask these questions.

Despite of such mistakes and deficiencies, the EJ article on Interpretation is on the whole, of course, very informative.

3. Encyclopedia Talmudit

The *Encyclopedia Talmudit* (henceforth, ET) is a Hebrew language encyclopedia whose purpose is to "summarize all the Talmudic halakhic issues and concepts, and all the opinions of halakhic scholars, from the completion of the Talmud to modern times, on every aspect of Jewish law"[245]. This ambitious task began over 60 years ago, and is still far from finished today (though 29 volumes have been published so far, 50 more are on the way). An English translation, called the *Encyclopedia Talmudica*, is also being published over time.

I looked for but nowhere found the Hebrew ET volume containing an article on *qal vachomer*[246]. I did however find the volume with an article on the *dayo* principle (vol. 7, 1990)[247]. It is this article that I will here comment on briefly. As would be expected from an encyclopedia devoted to halakhic thought in Judaism, it simply presents the main lines of the traditional view of the *dayo* principle relative to *qal vachomer* argument. There

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[245] It is published by the Yad HaRav Herzog Torah Institute in Jerusalem. More information on this work is given at: www.talmudic-encyclopedia.org/.

[246] Maybe the libraries I looked in did not buy that volume; or maybe it has not been published yet; or maybe it has not been written yet – I do not know.

[247] I do not know who its author(s) is (or are). I hired someone to translate it for me. Actually, he only translated the main text, and ignored the footnotes. He was a Hebrew speaker, but (to put it mildly) not very good at English.

is no novel theoretical research in it, or criticism of existing doctrines and methods.

The *dayo* principle is stated by the Sages in the Mishna as: *dayo lavo min hadin lihiot kanidon*, which can be translated as: "it is quite sufficient that the law in respect of the thing inferred should be equivalent to that from which it is derived." ET explains this rule as teaching, with regard to inferences made by means of a fortiori, that "one cannot lay down (*lehatil*) more in the conclusion (*halamad*) than there is in the premises (*hamelamed*)." This is a reasonable explanation, except that it seems here intended too generally; that is to say, it does not specify what is being "laid down," whereas (in my view) it should say that this rule specifically concerns the inference of *penalties or restrictive laws* (as is true of the Mishnaic example where the principle is first formulated).

ET goes on to say that "this principle of *dayo* is from the Torah;" and it presents its source, just as the Gemara (Baba Qama 25a) does, as the episode of Miriam's punishment (Numbers 12:14-15). According to the Gemara, even though the Torah only mentions seven days incarceration and makes no mention of fourteen days, the penalty of seven days for offending God was not directly inferred (by purely a fortiori argument) from the seven days for offending one's father, but was inferred indirectly (by a crescendo argument and then by application of the *dayo* principle) from fourteen days for offending God. After which, ET merely discusses the basis of the "fourteen days" interpolation, rather than any other (e.g. infinitely larger) quantity.

But the truth is that this narrative is a fanciful retroactive projection by the Gemara (based on a *baraita*). The *dayo* principle historically first appears in the Mishna (Baba Qama 2:5) which is being commented on by the Gemara. Here, R. Tarfon tries to prove in two different ways that the penalty for damage by an ox on private property is full payment, and his colleagues the Sages reject his two proofs, saying both times: "*dayo*—it is enough." The Gemara's explanation of this dispute is quite contrived and far from credible, as I have shown earlier in the present volume. Moreover, the Gemara only takes into consideration the first argument of R. Tarfon in its narrative. ET

does not show any awareness of the logical issues involved, but accepts the traditional treatment quite unthinkingly.

ET does thereafter mention the two arguments of R. Tarfon, but only in order to illustrate the two types of *dayo* application. This is of course an important distinction[248]. The first type, called "at the beginning of the law" (*al techelet hadin*), is illustrated by the Sages' *dayo* to R. Tarfon's *second* argument; while the second type, called "at the end of the law" (*al sof hadin*), is illustrated by the Sages' *dayo* to R. Tarfon's *first* argument.

Both of his arguments attempt to prove that damage by horn on private property entails full compensation; and in both instances, the Sages reject his conclusion and limit the penalty to half. R. Tarfon first argues from the facts that damage by tooth & foot in the public domain entails zero compensation, while on private property it entails full compensation, and that damage by horn in the public domain entails half compensation. Then, seeing his argument rejected, he argues from the facts that damage in the public domain by tooth & foot entails zero compensation, while by horn it entails half compensation, and that on private property damage by tooth & foot entails full compensation. Both attempts, though significantly different, are blocked by the Sages using the exact same words: *dayo lavo min hadin lihiot kanidon*.

ET's explanation of the two terms seems to be as follows. The *dayo* objection to the second argument is characterized as "at the beginning of the law," because it is applied to the major premise (which comes first), while the *dayo* objection to the first argument is characterized as "at the end of the law," because it is applied to the minor premise (which comes last). The "beginning" type of *dayo* could not be applied to the first argument, because there the major premise does not mention horn damage; the "end" type of *dayo* could not be applied to the second argument, because there the minor premise (concerning

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[248] To my knowledge ET does not state precisely who first made the distinction; this information is historically important and must be sought. I suspect offhand the discovery was made by some Tosafist, though I have not found out just who and in what commentary precisely.

tooth & foot) and the conclusion (concerning horn) have the same law (viz. full payment). This explanation is essentially correct in my view, though I would say more precisely that as regards the major premise, it is the generalization that precedes its formation which the *dayo* blocks; and as regards the minor premise, it is rather the formation of the additional premise of ‘proportionality’ that the *dayo* blocks.

After this, ET develops in some detail the notion, found in the same Gemara, of “nullification” of an a fortiori argument. It presents various views regarding when such nullification is possible or even necessary, and how this affects application of the *dayo* principle. ET also details various limitations imposed on the *dayo* principle in later rabbinic discourse. All this is presented with apposite examples. But the logical issues underlying such manipulations of human discourse are never raised. Thus, ET treatment of the subject-matter tends to remain on a rather superficial level, a mere presentation of traditional doctrines without any attempt to question them and dig deeper.

This, as already said, was to be expected from the sort of publication that ET is intended to be. Even so, the article can be faulted for lacking chronological information, i.e. for not tracing the historical development of ideas relating to the *qal vachomer* argument[249] and the *dayo* principle. Moreover, it fails to present certain ideas as clearly as it might and should have, preferring to faithfully reproduce the peculiar ways of expression found in rabbinic discourse.

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[249] Perhaps some of that may appear in the ET article on *qal vachomer*, if there already is or ever is one. I would be curious to see, in particular, if ET there mentions the important contribution of the Ramchal to the categorization and thence understanding of *qal vachomer* argument. See my essay on this topic in chapter 4.9 of the present volume.

6. INITIAL IMPRESSIONS ON METHOD

Drawn from Judaic Logic *(1995), chapter 8.*

In this chapter, we shall make some preliminary, general comparisons between some of the propositional forms and logical processes used in Biblical, Talmudic and Rabbinic literature, and those found in modern, secular scientific thought[250].

But note well that these initial reflections were written before engaging in formal analysis of hermeneutic principles. The latter analysis, as we shall see in subsequent chapters, considerably changes our perspective[251].

1. Methods and contents

The present study relates primarily to issues of *method*, and not to issues of content. Our focus is not philosophical, in the sense of metaphysical, nor scientific, in the sense of relating to special sciences like cosmology, biology or history. Our approach is rather *epistemological*, to compare the methodological aspects of religion and science, and take note of similarities and differences.

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[250] Using the terms "secular" and "scientific", here, without implying such thought to be at the outset or inevitably anti-religious (secularist). We may include under the same broad category, not only the natural sciences and history, but also philosophy at its best (not all philosophy is well thought out; however, most philosophy has a contribution to make, however inarticulately expressed), and any aspects of the humanities which obviously qualify.

[251] The present essay's general conclusions are rather over-optimistic; but the specifics on which it bases such conclusions are essentially correct.

The traditional view of the development of Jewish law, which we traced briefly in the opening chapter of JL, suggests that it is mainly a *deductive* enterprise. The laws were derived from the Torah, which was revealed by God through Moses to the Children of Israel at Sinai. These laws were either explicitly given in the revelation, mostly in writing, partly orally, and then faithfully transmitted; or later inferred in accordance with strict hermeneutic rules, by the religious authorities charged with this responsibility in direct line since Moses.

We are not (to my knowledge) told by Jewish tradition **precisely how the first *Sefer Torah* (physical scroll of the Law) was written**.[252]

Did God orally dictate it all word by word to Moses, and if so, out loud or in his head? Or did God visually display text for Moses to copy down, and if so, externally or internally? Or did God take control of Moses' hand directly, without passing the message through his mind and asking him to transcribe it? The latter hypothesis seems more likely, at least in certain passages *about* Moses, such as those which declare him the humblest of men. The hypotheses of dictation are suggested by Biblical passages like Exod. 17:14, "write this... in the book," though one may wonder why such orders would have been given in specific cases if they were the general rule[253]; video display is suggested by, e.g., Exod. 25:40.

In any case, the Torah must be *entirely* from God, to be authoritative; we cannot suspect *some unspecified parts* of it to have been authored by humans, whether Moses or any other(s), without Divine origin and control.

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252 See Lewittes, p. 35. He quotes the Rambam as saying "... though exactly by what method is known only to the recipient, Moses." In the Talmud, *Gittin* 60a, two possibilities are floated, one, that Moses wrote the Torah down when it was communicated to him, another, that he memorized it and wrote it all at the end of his career.

253 A. Ibn Ezra suggests this specific order may have referred to the Book of the Wars of the Lord, rather than the Book of Torah (Cohen, p. 433).

With regard to the issue of the writing of the Torah, a distinction ought to be drawn between the time of *events* and the time of *narrating* of the events. Reading the stories, one is normally too absorbed to reflect that they were probably not written at the time they occurred. Obviously, there were action situations during which Moses was too busy to write reports; he must have written them later, under some sort of Divine control (preferably – since human memory is always selective). Even where we read that God spoke to Moses to communicate laws (e.g. Lev. 1:1), we may wonder whether Moses was writing that down as it was happening or he wrote it ex post facto.

An attempt at epistemological rationale of Jewish law would run as follows. What is Divinely revealed is indubitably true, because God is omnipotent, omniscient and saintly; and what is tightly inferred from such data by holy and wholly committed men, such as the Jewish Sages, is also without doubt true. Such laws are therefore immutable, not open to doubt or review by later religious authorities or lay thinkers. Let us now briefly consider the strengths and weaknesses of such a rationale.

First, some comments in defense of the concept of ***revelation***. What in principle gives revealed truth its 'apodictic', absolutely certain, character, is that it is proposed to us by a Being, God, who is the Creator of all reality (including objective values, as well as neutral facts), and therefore all-knowing (having created whatever He wished to, consciously, knowing exactly what He was doing and why He did it), and who is perfect in morality (having freely invented it and desired it), and therefore completely honest and trustworthy (wanting to persuade us, not manipulate us). These are, to be sure, not arguments, but concepts included in or implied by the Torah revelation itself, to be taken on faith; however, their significance is their ability to fit into the concept of logical necessity.

As we saw in the opening chapter of JL, a proposition is logically necessary, if it appears as true in all knowledge contexts. There are only two conceivable ways that such modality may occur: either by its having a contradictory which is immediately evidently self-contradictory; or ***by being apprehended as evident within every knowledge context which can ever arise***. The former kind of insight is in the power of all human beings,

although their cognitive faculties have natural limits; and it makes possible the firm foundation of secular knowledge (science). The latter kind of insight is obviously not within our grasp, but it would be accessible to an all-encompassing consciousness, such as God's; whence the significance of the omniscience of God to revealed religion. The difficulty in this rationale is that we humans have no prior knowledge of God, except through the revelation, and therefore we cannot logically justify the revelation without circularity, but must always ultimately rely on faith.

As for the second part of the rationale of Jewish *status quo*, namely the implied infallibility of the Talmudic Sages and later religious authorities, the justification given is essentially that, by virtue of their unswerving obedience of the law in practice, these people were favoured by God with special help in their pursuit of truth, help which very few since then have deserved; hence, no review of their conclusions by anyone is ever possible. Reflecting on the miraculous wonder of consciousness as such, and acknowledging the existence of Providence, it is easy to realize that all knowledge is a gift from God. In this perspective, when even the scientific knower is a passive recipient, the idea that some people might be subject to additional grace, and receive special inspiration in their pursuit of religious knowledge, does not seem far-fetched. Nevertheless, here again, there are logical circularities, and we must view the statements made as expressions of faith, rather than pure reasoning. The difficulty is of course that similar claims can be, and indeed historically have been, made by other people, even people in other religions.

In contrast to religion, natural science is primarily an *inductive* enterprise. That is, it relies heavily on empirical evidence, from which it derives general statements by 'trial and error' methods, like generalization and particularization, and adduction, making imaginative theories and testing them – methods in which the role of deduction, though very important, is still relatively secondary. Faced with a world of appearances, which often

conflict with each other and change, the scientist[254] is simply a human being trying his or her best to understand and make sense of things. Not having been made privy to any whispered game plan, even the methodological tools scientists rely on, have had to be evolved inductively, starting from intuitive notions which gradually in an ever larger context have demonstrated their reliability.

In such an approach to knowledge, all appeal to Divine inspiration has been eschewed, and all researchers are therefore on equal footing with respect to the need to provide convincing evidence and arguments for their claims. No one has unshakable authority, however deservedly respected in his or her time for great discoveries and ideas of genius[255]. There is no good old wine, or rather origin and age are beside the point. Newer truths are more reliable than older ones, insofar as they take into consideration not only the data on which preceding beliefs were based, but also more recent discoveries and insights. We are not attached to some perfect past, but on the contrary, full knowledge is projected to be in a distant future, something to which we can only tend but which we can never expect to fully reach.

Since the data base of experience is constantly changing and growing, and new insights and ideas are always conceivable, we must always in principle be ready and willing to review our beliefs and belief-systems, however certain they seem at any given time. This does not imply anarchy or working in a vacuum; there is intellectual and cultural continuity and changes are achieved over time and through collective efforts. Still, every proposition is ultimately no more than a theory, a working hypothesis, valid only so long as it is not overturned by another, more informative and consistent proposition. A scientific world-

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254 The ideal scientist, if you prefer.

255 When we support or reject an idea, only with regard to the person(s) formulating it, without regard to its coherence and cogency, we are committing the logical fallacy of *ad hominem*. (Some reserve the expression for the negative case, preferring *ad verecundiam* for the positive case; but there is no essential difference, in my view.)

view might be abandoned in one swoop, if only and as soon as another has been found which is reasonably more convincing and fruitful – and this has occurred often enough.

As we shall see, the above contrast of the methods of religion and science, as respectively deductive and inductive, has some truth and justification; but it emphasizes differences, some of which are superficial, without paying due attention to many similarities.

But, before going further with the issues of method, a few comments are worth making with respect to issues of *content*. A comparison of the specific contents of Torah and Science is not our subject-matter, here; readers interested in that are referred to specialized literature[256]. Much has been written and continues to be written, comparing the claims of the Jewish religion and those of natural science. Such comparisons usually refer to cosmogony[257], cosmography[258], biology[259] or history[260].

Such comparative studies will, according to the ideology and information of the writer – either seek to contrast religion and science, and reject the one or resist the other; or to reconcile the

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[256] For instances, see Schroeder or Kelemen. See also JL. Appendix 2 for additional comments.

[257] e.g. Comparing the Biblical account of Creation, apparently in 7 days, 5754 years ago, with the Big Bang scenario, 15 billion years ago.

[258] e.g. Comparing the seeming Biblical view of the Earth as the main theater of the universal drama, and the empirical evidence that our planet is without centrality in its own solar system, or even galaxy, and a mere speck of dust in an enormous universe. Actually, this issue seems to have been a burning issue at the time of Galileo, but today seems irrelevant, except perhaps to people attached to the qabalistic notions of 'heavenly spheres' built on the Ptolemaic model of the universe (actually several hundred years more ancient than Ptolemaeus, being found in Plato and Aristotle).

[259] e.g. What is the nature of life, is it material or spiritual? And what are the origins, ages, and evolutionary courses, if any, of living species?

[260] e.g. Comparing the stories and dates given in the Bible and subsequent tradition, with the findings of archaeology and the scenarios they suggest.

two, by means of some reinterpretation in more metaphoric terms of certain claims of religion, or by showing the essential compatibility of specific religious claims with current scientific views, or by demonstrating the continuing uncertainties in the scientific positions under scrutiny.

The Torah itself contains various 'factual' information; some of it concerns human history, some is about nature, and some is more metaphysical[261]. With regard to history – for instances, the common origin of all peoples (the Adam and Eve story), their subdivision into linguistic groups (the Tower of Babel story), the time and circumstances of the Exodus from Egypt and entry of the Children of Israel into the Holy Land, and so on. With regard to nature – for instances, the age of the world or data on the physiology of certain animals or the psychology of human beings. With regard to metaphysics – we may mention information like the existence of God, His names, His attributes, powers and acts, like His unity, primacy, supremacy, His justice and mercy, His authorship of the universe and open or hidden providential interference in human affairs, and so forth.

Similarly, for the rest of the Bible, the Talmud and other Rabbinic writings. In the legal debates of the Talmud, the Rabbis often make factual claims, which may be historical or natural as well as metaphysical, to justify their positions. For instance, in *Yom Tov* 2b, Rabbah claims that an egg is always 'fully developed' a day before it is laid; for him this is obvious, because it is required as a logical precondition of the law he defends[262]. In effect, laws handed down by a tradition may be

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[261] History is of course an aspect of nature, insofar as we humans belong to this world; however, what philosophically distinguishes historical processes from other natural processes, is the role played in the former by human freewill; methodologically, differences are due to the peculiar intimacy, singularity and temporal distance of most historical facts, which makes most accounts of them largely conjectural, whereas natural facts are generally more easily verifiable. Metaphysics can similarly be analyzed with regard to its distinctions from the natural sciences.

[262] Namely, the prohibition to eat an egg laid on a holy day.

certain enough to infer even plainly physical or biological 'fact' from them[263].

It should be noted in passing that much of the Jewish religion's view of the world, 'natural' and 'supernatural', is built on this mode of thought: i.e. projecting attributes of the world from laws (or even, eventually, just traditions). The latter serve effectively as 'empirical data' from which a world-view is cumulatively developed; they constitute springboards and boundaries for non-legal theories. But such theories must be considered speculative, to the extent that they ignore, or contradict, the data of natural cognition.

Now, in the event of disagreements between religion and science with regard to natural or historical facts, we are of course faced with a problem, which must eventually somehow or other be solved, if we want to have a consistent body of knowledge. It would be dishonest to ignore such discrepancies; but on the other hand, it would be naive to expect to resolve them all convincingly or to make overly severe judgments when they cannot be. We must leave room for doubt and even mystery[264]. With regard to metaphysical facts, like the supreme sovereignty of God, these are to a large extent inaccessible to normal empirical evaluation; we can only speculate concerning them, if we have not been gifted with special states of consciousness or Divine revelation.

In any event, the traditional view is that the Torah, as its name attests, is essentially a legal document. Factual data in it, concerning history or nature, is incidental, providing a context for the understanding of the law. As for information about God, it provides a justification and rationale for the law, suggesting the existence of a "moral order" in the universe. But the essential message is the law. Thus, the content of such a religious document is primarily ***normative***, rather than descriptive. Its role

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[263] In the example here given, the concept of full development of an egg is sufficiently vague and ambiguous to be unverifiable. A better example should be found.

[264] In any case, as already indicated, such harmonizations are not within the scope of the present work.

is to prescribe or proscribe, or allow and exempt, or leave to individual choice, specific acts of human behaviour[265]. Within such a perspective, it may matter little what the date of Creation might be, or whether humans evolved from animals, and Biblical passages relating to such matters need not be taken literally[266].

In contrast, the content of science is overwhelmingly ***descriptive***; it tends to deliberately avoid normative issues. Its goal is to "get at the facts" – to provide humankind with a neutral database, allowing us to make informed choices and providing us with intellectual and material tools to carry them out effectively. Judgments of value are regarded as a separate problem, the concern of ethical philosophy or religion. The ambition of science is only to know the way things "are" (or at least, how they appear to us to be), which includes certain forms of explanation (our answers to "why" things are as they are, are themselves further descriptions, with reference to wider or deeper abstractions or yet more removed causal factors). With regard to the way things "should be", science is modestly silent[267].

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265 Note that Torah laws are regarded by Judaism as binding on their subjects, whereas the concept of "norms" is generally understood more broadly, as including the gentle advice of wisdom.

266 Difficulty arises due to the reasoning that if the Bible is not entirely literal, it cannot be strictly-speaking considered true, and therefore one may doubt its Divine origin. However, it is also conceivable that God wished us to find out certain less relevant or pressing matters for ourselves, over time, by natural means (science) – and considered it enough for us to have, until then, easily-grasped token accounts of things, images and ideas designed to inspire rather than inform.

267 Of course, the normative data which are the main concern of religion are ultimately as "factual" and "descriptive", in enlarged senses of these terms, as the neutral data which interests science. If objective values exist, decreed by the Creator, they are effectively "inscribed in nature", as much as other phenomena. Their ontological status is the same, though they differ constitutionally. However, their epistemological status may be different: whereas neutral information is known through its gradual appearance before our perceptual senses and conceptual insight, Judaism suggests that God chose to deliver

Furthermore, the founders of modern science deliberately chose to bypass metaphysical issues. The idea of God was, as it were, put between parentheses. There were political reasons for this: the Church a few hundred years ago had the power to persecute those with ideas it considered threatening, and often used that power. The interests of the scientists were in any case secular and material; they did not mind leaving religious and spiritual issues to "specialists". But also, they realized that such issues were ultimately unresolvable, and they did not want to get bogged down in them, but preferred to move on and deal with phenomena more accessible to empirical testing and rational scrutiny.

Such fractionalizing of the pursuit of knowledge did not necessarily reflect a negative attitude towards religion, but represented a legitimate strategy. The idea of God was not intended to be permanently ignored or rejected, but was merely put on hold. Often the difficult problems we encounter are shunted aside, and we concentrate on the easier ones, hopefully at least temporarily, waiting for new insights and gathering more data in the interim. As the achievements of science increased, ecclesiastics gradually came to accept, even if reluctantly, the narrowing of their domain. In practice, the division of labor has not always been maintained – on either side. Many believers in God and the Bible continue to have dissident opinions concerning nature and history[268], and some scientists occasionally claim their theories or findings have metaphysical or normative implications[269].

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normative information to us (mostly, if not exclusively) by special proclamation.

268 Belief or disbelief in God should have no effect on the descriptive appearance of the natural world, since one can always claim that, however the world happens to appear, it may well have been the way He chose to make it. Conflicts between religion and science arise only in relation to religious texts or oral traditions; and even then, the flexibility and intelligence of the beholder count for much.

269 For examples, speculations about Creation by Big-Bang proponents, or advice given by psychologists to their clients. But we must not forget that scientists are people, too; and like all people, need

From the logical point of view, the setting of norms has always been a problem difficult to solve. There have of course been attempts to derive ethical propositions from emotional, psychological or sociological facts, but invariably close scrutiny reveals the element of arbitrariness involved, the subjectivity and cultural bias underlying the suggested norms. Many people, including many capable philosophers, conclude that objective norms are impossible. The Jewish religion suggests that, in the normative domain, the human faculties of cognition are inadequate because the answers to our questions are not inscribed and made manifest in nature: there has to be an external impulse, a credible message from God, to settle issues and provide us with standards. God, it seems, wished to reserve access to this domain, and transmit moral guidance to us through the words of Torah.

2. Davqa or lav-davqa?

In this section, we shall demonstrate, through a technical peculiarity of Talmudic logic, that in contrast to other kinds of discourse, it is inherently oriented towards deduction. However, we shall also begin to unveil, with reference to the exceptions to this very same peculiarity, the strong inductive currents underlying Talmudic thought processes.

When one compares the logical pronouncements in Talmudic and other Rabbinic discourse to the logic apparent in common and scientific thought and discussion, an immediately noticeable practical distinction is ***the different interpretation each gives to particular propositions***. This refers to sentences which are introduced by the quantifier "some", as in "some swans are white".

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answers to certain questions right now, to be able to run their lives. People may, even without religion, have opinions about what is right or wrong, and correct or incorrect ideas as to how to justify these opinions. Often, secular moral beliefs historically stem from religion, but after being deeply ingrained in a person or culture they become independent of the religion.

Normally, **in everyday discourse or in science**, we understand the expression "some" as meaning "at least some" – it is *indefinite* about the exact quantity. Such a statement is *left open, to give us time for further investigation*, which will determine whether we may assume, for the subject-matter at hand, that the universal "all" is applicable or we must assert that the contingent "only some" (meaning "some, but not all", or "some yes and some no") is the case. These latter quantities are *relatively more definite* (with regard to proportion, though not to number). In contrast, **in Talmudic and related discussions**, the word "some" has usually got a *prima facie* value of "only some", which excludes the option "all". It is only after much debate that *sometimes, in rare cases*, the initial "some" is concluded to have been intended as an indefinite particular, which admits of interpretation as "all".

Particular statements taken to be contingent are said to be ***davqa*** particular; whereas indefinite particulars, which allow for a universal as well as contingent interpretation, are said to be ***lav davqa***. *Davqa* is Aramaic[270], and means 'thusly', or 'precisely thus', or 'exclusively thus'; *lav* signifies 'not'. These expressions are not, of course, limited to the quantifier "some", but may be applied to any quantity variously interpretable; for instance, does "10" mean exactly ten, or ten or more, or up to ten, or about ten?

Now, this difference in approach has a deep and interesting reason; it is not accidental or merely conventional. When, say, an Amora (a Rabbi in the Gemara) encounters a particular statement by a Tana (a Mishnaic Rabbi), or in the Torah itself, it is a matter of course for him to interpret it, at least to begin with, as intended as *davqa* "some", that is, "some, but not all". *For it is a statement made by an intelligent being* (a Tana, in the case of the Mishnah, or God, in the case of the Torah). So, he (the Amora) can argue: "*Nu?* if the author meant 'all', he would have said so!" Thus, the statement may reasonably be assumed to

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270 Related to the Hebrew 2-letter root *DQ*, connoting minuteness, as in *daq*, fine dust (Isaiah, 40:15), *daqah*, a minute in time, and *bediuq*, exactly.

mean no more than what it says – that is, only “some”, or “only some”.

In Talmudic logic, then, “some X are Y” (**I**) is taken to *imply and be implied by* “some X are not Y” (**O**), because both mean no less than **IO**; i.e. there is here no **I** or **O** other than in **IO**. This ***deductive*** rule[271] holds in the large majority of cases, as the ***lekhatechila*** (initial) position. It does happen comparatively infrequently that, after a thorough analysis of the situation, such an *ab initio* assumption is found untenable, because it leads to internal contradictions or acute disagreements between different Rabbis. In such case, the particular, which was first taken as *davqa*, is ***bedi’eved*** (as a last resort) downgraded to a *lav davqa* status (making it compatible with a corresponding general proposition, in which case **I** and **O** are subcontrary). Here, the indefinite particular is the result of an ***inductive*** process, an attempt to reconcile conflicting theses, to resolve a difficulty. However, it does not retain this status long, since the whole purpose of the process is to arrive at the corresponding general conclusion![272]

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271 This form of inference, which is quite common in Talmudic discourse, might be called, in English, "inference by negation"; in Latin, its name is, if I am not mistaken, *a-contrario*.

272 We must interpret in a similar vein statements like the following, by Guggenheimer (pp. 179, 193):

> “The inner logic of the Law (...) is definitely hostile to modalities... The Talmud avoids all attempts at modal logic. Instead, we have a set of rules, known as **rob** (majority) and **hazaka** (status quo ante) which serve to transform actual probabilities into judicial certainties. The result of such transformation may be used in a universe of discourse in which modalities have no place.”

While it is true that *lav davqa* statements in the Talmud are left indefinite no longer than it takes to find a *davqa* finale to their discussion, it is totally untrue to claim that there is no modality in the Talmud. The very fact that distinction is made between *lekhatechila* and *bedieved* positions is proof enough that logical modalities are involved in it. The recognition that some arguments are strong (deductive), and some relatively weak (inductive), is further proof. But anyway, the "transformations" mentioned in the above quotation would suffice: before a ruling is decided, it must have been momentarily uncertain, or

The above explains why Talmudic logic is regarded as essentially deductive. The Talmud is built on a number of *ready-made* (written or oral) propositions considered to be of Divine origin. In such a situation, a proposition of the indefinite form **I** or **O** is merely a shorthand expression of the definite compound **IO**, because that is the expected inductive result in, say (this is a wild guess), 95% of the cases to be dealt with. The raw data on which such knowledge is based is already verbalized; the epistemological processes used are directed towards the ***interpretation*** of this verbal raw data (expressing it in other words, drawing inferences from it), through its internal and external ***integration*** (that is, checking the mutual consistencies of the parts of the revelation, and its coherence with the wider context of empirico-rational knowledge, including linguistic factors).

In contrast, in ordinary or scientific thought, there are no *verbal* givens, other than those impinging on individuals from the rest of society[273]. Verbal knowledge is ultimately built-up from experience, by labeling groups of similar and distinct phenomena (be they sensory or mental, concrete or abstract). In such a framework, there are virtually no absolutes which can serve as top principles from which the rest of knowledge may be derived; apart from a very small number of logically self-evident axioms (whose denials would be paradoxical, that is, self-contradictory), we have to develop knowledge very tentatively and gradually. Here, the indefinite particular forms **I** and **O** are

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else it would not have been open to debate. As for natural, temporal, extensional and especially ethical modalities – the Talmud would have been unable to describe different situations and conditions without use of them, nor been able to make any legal rulings. We might readily have excused Guggenheimer with reference to the widespread gap in knowledge concerning modal logic, which he himself admits, saying: "modal logic is without satisfactory formulation even today"; but his denial of modality is too extreme even in that context.

273 We must refer, here, to humanity as a whole since its inception, when discussing the construction of language and knowledge from scratch; evidently, individuals today receive a great deal of their knowledge in already verbalized form from the society around them.

pressingly needed for efficient discourse, as way-stations and stepping-stones to fuller knowledge, as already explained.

Nonetheless, our above observation does not signify that there is an unbridgeable epistemological gap between the two “logics”, that of the Talmud and the common. It should be clear from the preceding that the two systems use by and large one and the same logic[274], only *their givens differ in format*. That is, were they faced with equally formatted data, their way of development would indeed be identical; but one depends largely on verbal givens, while the other is limited to non-verbal data. It is true that *their givens also differ in source*, being Divinely revealed (to some people) in one case and naturally apparent (to everyone) in the other; but this issue affects the credibility of the initial data, rather than the subsequent mental processes relating to assimilation of the information.

In any case, note, the two bodies of knowledge are not mutually exclusive. For a start, religious knowledge is never totally independent of secular data; a religion may explain the material world away, as a big illusion, but it may not completely ignore it – the language used by religion is understood only because it is reducible to common experience. And since religion (certainly, the Jewish religion) admits of secular data, it also acknowledges the inductive method which assimilates such data. But furthermore, as we shall see, the method by which religion (at least, the Jewish) ultimately assimilates its own peculiar data is very similar to the secular.

Secular knowledge without religious data might seem conceivable, but only if one turned a blind eye to various otherwise burning questions – in the limit, religion is unavoidable, except by silence, because even negative answers to such questions may be counted as effectively ‘religious’ in

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[274] This statement, and similar ones elsewhere in the present chapter, will have to be considerably revised later on in the book, after formal analysis of the Rabbinic hermeneutics. For we will thereafter discover Talmudic thought processes which can only be called 'logical' or 'inductive' by a very generous concession – but which rather deserve the labels 'pseudo-logical' and 'arbitrary'.

their own way[275]. With regard to methodology, the secular sciences certainly, to some degree, use techniques found in religious study, like textual analysis, since the sciences generate texts to communicate their results, and these texts while being written or read are subject to analysis. Textual analysis is also used in secular contexts in relation to historical documents (literary or legal documents, including the Bible itself). So, scientists cannot object to hermeneutics as such (though they may look askance at specific interpretative techniques).

We have seen that Talmudic logic, being more deductive than inductive, has a preference for the *davqa* interpretation of particular propositions. However, we will now show that *formal logic cannot ultimately avoid recourse to lav-davqa particulars, and so demonstrate that Talmudic logic must at least implicitly acknowledge them.* The situations implied by the forms **I** and **O**, of partial ignorance or deficient knowledge, arise again and again in the course of all human thought – not only within inductive processes of gathering and judging empirical data, but just as much *within purely deductive processes*. Indefinite particulars are therefore indispensable if we want to be articulate.

We could, in truth, construct a formal logic with a propositional arsenal devoid of indefinite particulars, simply by explicitly expressing our position in such cases by the disjunction of definite forms (general and contingent). Instead of **I**, we would always say "either **A** or **IO**"; and instead of **O**, "either **E** or **IO**". But this would be artificial. Why deprive our thinking of valuable tools, and not take as given what ordinary language has provided? Ordinary language surely satisfies the needs of our cognitive faculties. A certain degree of linguistic brevity is necessary to reason clearly, otherwise language may become a source of confusion. The forms **I** and **O** make such simplification possible (even though having them slightly increases the size of our propositional arsenal).

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[275] In this sense, atheism is also a religion, one which opts for a negative answer to the question of God's existence.

To show that Talmudists need indefinite particulars as much as anyone, to reason clearly beyond the *ab initio* stage, we need not go into a systematic and exhaustive listing and analysis of logical processes. It suffices for us to consider some *arguments whose conclusions are quantitatively more indefinite than their premises*. In eduction, we may illustrate what we mean with reference to certain conversions:

(**A)** All X are Y, is convertible to (**I**) Some Y are X.

(**IO**) Some X are Y and some X are not Y, converts to (**I**) Some Y are X.

Whether we start off with a general affirmative or contingent proposition, we can by conversion only arrive at an indefinite particular; so that in fact it is only the **I** element in these forms which is convertible[276]. In contrast, on the negative side, an **O** proposition is inconvertible, and only the **E** form may be converted (but that fully, to an **E**)[277]. Thus, given **A,** or given **IO**, inference by conversion will only yield a conclusion of less definite quantity, namely an **I**. We could, of course, reword the conclusion as "either all Y are X, or some Y are X and some Y are not X", but its correctness might seem less immediately evident. Other eductions display similar results, though in different cases[278].

With regard to syllogistic reasoning, particular conclusions are almost always indefinite. Only in the third figure (by conjoining the valid moods **3/IAI** and **3/OAO**, which have the same minor premise) is it possible to construct an argument with a contingent (major) premise, which yields a contingent, and therefore just as definite, conclusion. We get the following "double syllogism":

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[276] "Some X are Y" and "Some Y are X" both mean "some things are both X and Y", in which form the order of the terms is irrelevant.

[277] The conversion of **E** is reducible to that of **I**, by ad absurdum; or it may be understood independently, in a like manner.

[278] For instance, in contraposition, it is the **E** and **I** forms which inhibit the process, since "All X are Y" (**A**) may be contraposed to "All nonY are nonX", and "Some X are not Y" (**O**) to "Some nonY are not nonX".

Some Y are Z and some Y are not Z (**IO**);

and all Y are X (**A**);

therefore, some X are Z and some X are not Z (**IO**).

In all other cases, even if we start with a contingent proposition as one of our premises, the conclusion as such can only be an indefinite particular. For in the first and third figures, the valid moods **AII** and **EIO** cannot be combined, since their major premises are contrary, and there are no valid moods with a negative minor premise; and in the second figure, only negative conclusions may be drawn (see **AOO** and **EIO**), anyway. This shows that anyone reasoning syllogistically from contingent premises *is sooner or later bound to encounter indefinite particular conclusions*.

Thus, deductive logic requires a language with *lav davqa* particulars, as surely as inductive logic does. This incidentally confirms that Aristotelian-type logic is indeed generic, as applicable to the world-view of the Talmud (with its preponderance of deduction), as to that of people concerned with cognition of non-revelational phenomena (who rely more on induction).

The reading of (indefinite) *particular* propositions as contingent is the paradigm of *davqa* interpretation; a similar movement of thought is used in relation to *general* propositions, as we shall now explain. When we read a particular proposition 'Some X are Y' as *davqa*, we are producing new information, because we are supposing that 'Some (<u>other</u>) X are <u>not</u> Y'. The latter proposition concerns instances of X *other than* those subsumed by the former; and it assigns the *opposite* predicate to them (i.e. not Y, instead of Y).

For this reason, the allegedly derived proposition is sometimes, in Latin, said to be the ***a-contrario*** of the original. I hesitate to use this expression too freely, however, because it might be misinterpreted. It is important to note that the original proposition and the one derived from it by a *davqa* reading are not contrary; they are compatible, since they can be and are conjoined. Thus, *a-contrario* does not mean 'on the contrary,'

but assigns, to the remainder of a subject-class, the negation of a predicate.[279]

Thus, the essence of *davqa* interpretation is to *limit* a statement, by means of an *exclusion*. In the case of particulars, the movement of thought is from ‘Some X are Y’ to ‘Only some X are Y’ (or, needless to say, from ‘Some X are not Y’ to ‘Only some X are not Y’). Similarly, in the case of generals, the *davqa* reading of ‘All X are Y’ is the exclusive ‘Only X’s are Y’, implying ‘Every nonX is not Y’ – that is, ‘No nonX is Y’[280] (or, likewise, the *davqa* reading of ‘No X is Y’ is ‘All nonX are Y’).

Note well that, by mere *eduction*, we can only infer from ‘All X are Y’ that ‘Some nonX are nonY’ (the process is called inversion, and is validated in this instance by contraposition, then conversion[281]); to get to the inference ‘All nonX are nonY’, we must *generalize* the inverse. From the point of view of ordinary logic, therefore, the *davqa* reading of a general proposition involves an inductive factor. Just as in the case of particulars, new information is produced, so in the case of generals.[282]

The parallelism of the *davqa* interpretations of general and particular propositions can be further brought out as follows. Consider a subject S (for species), which is subsumed under a larger subject G (for genus); and let P refer to a predicate. The general ‘All S are P’ implies the particular ‘Some G (namely

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279 Note, anyway, that *a-contrario* is not really an 'argument' (though used in arguments); it is merely a 'reading', since the result is not formally inferable from the given.

280 This is usually the case, though note that *'davqa all* X are Y' is often intended to mean: *literally all* (and not just most) X are Y. What is negated, in such case, is the possible assumption that the quantifier 'all' is being used in a hyperbolic sense, i.e. when what is really meant by it is '*virtually all*' or 'almost all (but not quite all)'.

281 Inversion of "No X is Y" would be done by conversion, then contraposition.

282 Note that modality changes may be involved. For instance, the Rabbinical reading of Lev. 7:19, which says that the ritually impure are *allowed* to eat holy offerings, is that the ritually impure are *forbidden* to eat holy offerings (see Scherman, p. 51).

those S) are P', and the former's *davqa* implication 'All nonS are nonP' parallels the latter's 'Some G (namely those not S) are not P'.

Similar readings may be made with respect to (normal) conditional propositions. For instance, when 'if P, then Q' is understood as *davqa*, it implies 'if not P, then not Q'; although *lav davqa*, it only (normally) implies 'if not P, not-then Q'.

3. Kushya and terutz

In comparing the methodologies of the Talmud (and cognate investigations) and science (and everyday discourse), so far, we have stressed certain overall differences. We noted, firstly, their different data bases. And, secondly, we presented religion as a predominantly deductive system, and secular science as an essentially inductive one, and indicated some of the reasons for this contrast. But we need now to consider certain similarities between these disciplines, to obtain a more balanced appraisal, for further scrutiny makes clear that they converge in many respects.

With regard to raw data, though in theory our religion is based on mystical experiences (mainly the Revelation at Sinai, which was partly collective, though in large measure the privilege of prophets, especially Moses, to which we must add later events, like the prophecies of Isaiah, for instance), which included both non-verbal and verbal components – in practice, today, only the verbal components remain, so that our religion depends on very ordinary sense-data, namely *words read in books or heard from the mouth of others*, as well as some personal intuitions, and some imaginations and emotions.

With regard to logic, though the starting posture of Jewish law is theoretically deductive, if we pay close attention to the way such law is actually *developed* in Talmudic and Rabbinic texts, and the way it is *taught and studied* in practice, we see that they are *manifestly inductive*. The Talmud develops in large part **dialectically**, by uncovering a ***kushya*** (literally, a difficulty – a logical problem) in the midst of received texts and related data, and searching for and usually finding a ***terutz*** (a solution) for it.

This is also the way the Talmud is taught and studied, retracing the steps of the original debate.

The *kushya* in question may be an outright contradiction, or it may be a less obvious tension between two or more statements. Two or more propositions may be said to be in a state of *tension* – of possible incompatibility – if there are conceivable logical or natural qualifications under which they would be contradictory, or there are conceivable interpretations of their terms which would result in an untenable antinomy. Also, the difficulty may not be a conflict between explicit statements, but relate to implicit factors, such as a perplexing silence concerning some topic or a surprisingly superfluous comment. However, once the tacit source of discomfort is brought out in the open, the difficulty is verbalized and can be dealt with.[283]

Conflicting propositions may come from the same or different sources. The relevant sources are, as we have seen, the written Torah, the Nakh, the Mishnah and allied documents (e.g. Baraitot), the Jerusalem and Babylonian Gemarot and allied documents (e.g. later Midrashim), oral traditions carried by authoritative Rabbis, and later various Rabbinical Responsa and codes of law[284]. Thus, for examples, a Mishnah may seem to conflict with some Torah sentence; or two Gemarot, even two having the same author, may seemingly conflict; and so forth (in every combination). In rare cases, the difficulty may be an

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283 The word *kushya* has originally, within the Talmud, a more specialized sense, referring especially to textual differences. However, nowadays, in Talmud-study, the word is used more broadly, much like the English word 'difficulty'. It is in this sense that we will use it here. Note that there is often a subjective element involved: it is *someone* who is perplexed by silence or surprised by repetition, etc. In such case, there is a need to understand the whys and wherefores of that person's logical or other expectations, which other people may not share.

284 *Responsa* are written answers to questions posed to authoritative Rabbis concerning the Halakhah; this way of clarifying and explaining the law has played an important role in Jewish life since Geonic times. The codes, like Maimonides' *Mishneh Torah* and R. Joseph Caro's *Shulchan Arukh*, were later developments, but are today of course very authoritative in any legal decision making.

apparent conflict between the teaching of some Rabbi and some teaching of science (e.g. agronomy or medicine).

The role of the *terutz* is to reconcile such real or imagined differences. This might be achieved in a variety of ways. Sometimes, the Rabbis admit not knowing how to solve a problem, and they leave the issue open (***teku***) “for the prophet Elijah” to deal with when he returns. Meanwhile, they may use their prerogative to arbitrate, and simply reject, through a majority vote[285], one of the conflicting theses, which is thus reclassified as “a theoretical tradition without practical appeal”[286]. But ***preferably, the conflict is dissolved by showing that the propositions involved concern distinct assumptions, or refer to different cases, or are applicable to different circumstances or times, or mean different things***. At first sight, the conflict seems insurmountable, but after careful verbal or conceptual analysis the propositions are shown to be more harmonious than previously thought.

Such resolutions of paradox are often, after a long-winded debate, disappointingly anti-climactic: a statement which seemed at first general, turns out to have been of more limited

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285 Regarding the all-important principle that the majority opinion is Halakhah, its epistemological justification obviously cannot be that the truth comes to be known through a majority vote. Rather, we may refer to a shared impression of truth, or a collective memory of a previously known, but no longer certain, truth, in which cases majority vote establishes a sort of inductive probability. A still better rationale to offer is ontological: through a power granted by Divine authority, a potential law is made actual by majority arbitration.

286 The epistemological motive of that concept is obvious enough: namely, to incapacitate the rejected thesis Halakhically, without delegitimizing the authority of its proponent, i.e. without putting in doubt his infallibility in other contexts. Ontologically, the concept seems to imply a transcendental reservoir of previously potential laws which can no longer be actualized. That idea would be consistent with the remark made previously, that the legislative power seemingly granted to the Rabbis by God must be viewed as a creative power, since the moment a law is promulgated by them it becomes an objective value, a normative fact. We may then speak of the irreversible actualization of a potential law.

applicability; or a statement initially made unconditionally, is finally inferred to have been intended as conditional; or some word(s) that were apparently identical end up having dissonant senses in different contexts. One wonders why the people involved did not from the start take the trouble to express themselves clearly and unequivocally, if what they meant was the same as what they are later taken to have meant. In some cases, one is tempted to suspect an *ex post facto* forcing of reconciliation! To a newcomer, or an unsympathetic outsider, the process may at times seem downright dishonest, a come-on, a time-wasting weaving and unweaving of illusions[287]. But evidently, or apparently, there is progress, since a reasonably consistent and meaningful doctrine does gradually emerge. From a didactic point of view, the succession of confusion and relief serves to create and maintain interest. In any case, what concerns us here is the inductive role of the dialectic.

An underlying problem is the telegraphic style used in Talmudic discourse. A seemingly simple word is often a mere *catchword* for a very complex thesis, and there is no way for us to know what's what except *through* the dialectic. ***Theses and counter-theses are not from the start clearly defined, but receive their final form only through the final synthesis***, which shows that they were not quite so antithetical as they appeared.

Examples abound. For instance, in *Baba Qama* 84b, which debates the payment of damages in the event of burning (causing pain) or bruising (wounding) – for one party, the term "burning" is interpreted as *ex*cluding "bruising" by definition, and the term "bruising" is taken as *in*cluding "burning"; for another party, the term "burning" is interpreted as "burning *and* bruising" by definition, and the term "bruising" (funnily enough, if I am not mistaken) is taken to mean "burning *without* bruising"; and so on. We see here that "X" need not mean "X, whether or not Y", but may mean "X and Y", or "X but not Y", or even "notX and Y", or "notX and notY". A term is merely an abridged title

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[287] It must be pointed out that this kind of reasoning, in which the goal is to reconcile conflicting authorities, is not confined to Judaism, but was common practice in Medieval European universities.

(***techila***) for a more complicated expression, in which it may even have negative value!

Now, the dialectical process of correlating divergent answers to a legal question cannot be considered part of deductive logic, but has to be classified as inductive, for several related reasons. Firstly, the process of finding answers to the questions posed is more creative than mechanical; it is essentially a process of *adduction* – proposing new terms or conditions, which will reestablish internal or external consistency in one's knowledge base. Secondly, alternative solutions may usually be offered to the problem at hand, and often are. Thirdly, the final decision, if any, is rarely arrived at immediately, but rather through a gradual trial and error process. The Sages make various suggestions as to how the conflicting theses *might conceivably* be harmonized, and these proposals be successively eliminated for some reason or another, until a proposal is found which is obviously acceptable to everyone or withstands all criticism leveled against it.[288]

Notice that we have two superimposed levels of discussion: at the core, there is a conflict relating to textual matters and/or authoritative opinions about such matters; but next, there may be contending opinions as to how the core conflict may be remedied. Yet further levels of discussion may be identified, when we consider all subsequent commentaries and supercommentaries across the centuries! All that is additional evidence of the inductive character of large segments of Talmudic discourse.

Similarly, by the way, the mental operations of anyone who teaches or studies the Talmud are of necessity inductive. All the more so, since the Talmud does not set out its results in an orderly, organized fashion, but leaves its researches in their brute form. The reader is required to retrace the course of the discussion, as if a participant in it, using trial and error. For this

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[288] See Lewittes pp. 66-68 on Rabbinic disputation; in particular, note R. Yannai's statement: "If the Torah had been given clear-cut, no opinions would be countenanced in the halls of learning." On the wide law-making powers of the Sanhedrin in practice, see pp. 62-63 of same.

reason, the Talmud remains forever a peculiarly living document, free of the dry finality of more modern codifications of law.

The radicalness and importance of our classification of much of Talmudic logic under the heading of *inductive* logic must be emphasized, for it is contrary to the views of certain past commentators who (it must be said, without intending disrespect) did not always have a very advanced knowledge and understanding of the science of Logic.

4. Standards of knowledge

Thus, in conclusion (so far in our research), the thought-processes involved in and generated by the Talmud largely resemble those of science. Like the scientist, the Talmudist must repeatedly make hypotheses and test them on the given data which specifically concerns him, as well as pursue logical consistency.

For the scientist, the data-base consists ultimately of non-verbal sensory impressions of natural phenomena (which are ideally reproducible in public, though not always so). For the Talmudist, as we saw, the data-base consists of the (written or oral) verbal leftovers of long past mystical experiences. But apart from these essential differences in empirical context, the two display *a uniform mental response, the same array of methodological tools – inductive and deductive arguments used in various combinations and orders*. Which is to be expected – we are all people, similarly constituted, having the same cognitive faculties, subject to the same epistemic facilities and constraints.

Epistemology is the philosophical discipline concerned with understanding how knowledge is obtained and how it may be justified. That discipline, through the work of formal logicians, has made clear that the justification of any content of knowledge, or of any change from one content to another, is *a formal issue*. Prior to any scientific or Talmudic inference, be it inductive or deductive, there is ***the need to examine the logical validity of that method of inference independently of its content***. No reasoning process, be it by a pious Talmudist, a professional

scientist, or a common man or woman, is exempt from such formal scrutiny.

However, it must be emphasized that (contrary to the views of certain philosophers and logicians) the validation of a logic is a very prosaic achievement of "common sense", and not at all the special privilege of some transcendental method. Just as our everyday reasoning proceeds by logical intuitions – our common conceptual insights that, say, some thesis is compatible or incompatible with another, or implies or does not imply it – so it is with the reasoning processes of logicians intent on formal validations. The ultimate test of any reasoning process, material or formal, is its ability to convince us. If, sincerely, however informed and intelligent we be and however hard we try, we are not convinced – then, we are not convinced. An argument must carry within itself the power to change our minds.

Some logicians think that we can, following the model of Euclidean geometry, in advance posit standards of reasoning, by means of "axioms" standing outside of the totality of knowledge. But they fail to realize that such "axioms" would themselves remain unproved, and therefore be unable to prove anything. Other logicians, finding this circularity problematic, try to avoid it by rejecting all conceptual knowledge and considering only purely perceptual knowledge as valid. However, such a position cannot be consistently sustained, being itself a conceptual proposal. A balanced and practical viewpoint is only possible, through honest introspection and acknowledgement of the ways we actually reason, and reason about reasoning.

Talmudic reasoning, like secular reasoning, could not proceed if we did not have the same logical reactions to the stimuli of received doctrines. An esoteric "logic", like the incomprehensible mental acrobatics of the Zen *koan*, has little credibility. It is only to the extent that a "logic" causes a universal reaction of understanding and conviction that it qualifies as a real logic. The goal of the *koan* is not to convince by appeal to evidence and rational processes, but to assist those who meditate on it to overcome such ordinary mental patterns and break through to another kind of consciousness; in that case, assuming even that it works and produces the desired result, the *koan* is not a logic, but at best a psychological tool.

Similarly, we must draw a clear line between Talmudic logic and faith; these bases of belief cannot be confused. When we face an argument, or a form of argument, used in the Talmud, if we are to grant it *the status of logic*, it must be capable of convincing us by itself, *independently of* any issue of faith. We may well grant proper respect to faith, but we cannot do violence to our minds and pretend that there is logic where there is none. Being convinced by an argument cannot be *a test of faith*; either we arrive at a conviction through logic, in which case no forcing of belief is needed or permissible, or through faith, in which case we simply honestly admit that this is the basis of our belief.[289]

These comments have to be made, here, because it may be that the Talmud has a *koan*-like function. Many positions and processes found in it may seem weird to some people; perhaps continued study eventually causes a sort of shift in consciousness, after which everything previously found enigmatic becomes perfectly comprehensible. Be that as it may, we cannot be swayed by such a consideration; our concern in the present volume is only with logic. We will as we proceed consider various patterns of argument found in the Talmud, and related documents, and try to fairly and frankly assess their credibility, with reference to high standards of truth.

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289 What is said here should be obvious, but I have often enough observed people afraid to admit being unconvinced by an argument, through fear of being suspected of lack of faith or of disrespect of the Rabbis.

7. TRADITIONAL TEACHINGS

Drawn from Judaic Logic *(1995), chapter 9.*

A brief overview of the ways Judaism traditionally presents the art of "Talmud Torah", followed by some suggestions on same.

1. Hermeneutics

Talmudic law was decided, with reference to the Torah, after much debate. In a first stage, the debate crystallized as the Mishnah; in a later stage, as the Gemara. The methods used in such discourse to interpret the Torah document are known as 'hermeneutic' principles (or, insofar as they are prescribed, rules). In Hebrew, they are called ***midot*** (sing. *midah*), meaning, literally, 'measures' or 'virtues'. This Talmudic 'logic', as we shall see, has certain specificities, both in comparison to generic logic and intramurally in the way of distinct tendencies in diverse schools of thought. Various Rabbis proposed diverse collections of such methodological guidelines, intending thereby to explain and justify legal decision-making[290].

Readers may find it useful, in this context, to study: the articles on hermeneutics in JE[291] and EJ[292], as well as Bergman's *Gateway to the Talmud*[293], and the *Reference Guide* to Steinsaltz's English edition of the Talmud.

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290 The hermeneutic principles are applicable more broadly to all Scriptural exegesis, including Hagadah; however, in the case of the non-legal aspects some less strictly regulated forms of interpretation are often used, additionally. If the latter are not considered trustworthy enough for Halakhah, I do not see how they may be relied on for Hagadah, which also affects the beliefs and actions of people.

291 Vol. , pp. 30-33.

292 Vol. 8, pp. 366-372.

293 Specifically, chapter 13.

The earliest compilations were: the **Seven Rules of Hillel haZaken** (1st century BCE)[294]; the **Thirteen Rules of Rabbi Ishmael ben Elisha** (2nd century CE); and the **Thirty-two Rules of Rabbi Eliezer ben Yose haGelili**, of slightly later date. These lists are given as Baraitot, the first two in the introductory chapter to the *Sifra* (1:7)[295] and the third within later works. As already mentioned, Baraitot were legal rulings by Tanaim not included in the Mishnah; but they were regarded in the Gemara as of almost equal authority[296].

According to Jewish tradition, at least since Geonic times (notably, Saadia Gaon) and still today, these rules all date from the Sinai revelation and were since then transmitted from teachers to pupils without interruption[297]. This is *in part* confirmed by statements in the Talmud and literature of that era, in which Rabbis claim to have received knowledge of certain rules from their teachers[298]. But the historicity of the *general* claim has not so far been demonstrated by any pre-Talmudic evidence: in particular, there is no obvious mention of such interpretative principles anywhere in the Tanakh.

According to JE: "The antiquity of the rules can be determined only by the dates of the authorities who quote them; in general, they cannot be safely declared older than the tanna to whom they are first ascribed. It is certain, however, that the seven middot of Hillel and the thirteen of Ishmael are earlier than the time of

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294 Note that Hillel and Shammai are traditionally not given the title Rabbi, or any equivalent.

295 A Halakhic commentary to *Leviticus*, also known as *Torat Kohanim*, attributed to R. Yehudah b. Ilayi, a disciple of R. Akiba (2nd cent. CE).

296 As Scherman has pointed out, these Baraitot were different, in that they were not in themselves statements of law but explanations of how the laws were derived from the Torah source.

297 To explain the differences in listing, orthodox commentators go to great lengths. We shall have occasion to discuss some of these explanations as we proceed.

298 For examples, *klal uphrat*, a R. Ishmael principle, is attributed to Nechunia b. Hakaneh (*Tosefta Shevuot* 1:7); *ribui umiut*, a R. Akiba principle, is attributed to Nachum Ish Gimzu (*Shevuot* 26a).

Hillel himself, who was the first to transmit them. At all events, he did not invent them, but merely collected them as current in his day, though he possibly amplified them." Still according to *J.E.*, Ishmael's rules are "merely an amplification of" Hillel's; and similarly Eliezer's rules coincide in many instances with Hillel's and Ishmael's, though in other instances they concern the Hagadah rather than the Halakhah.

It does not, in any case, seem likely that such rules would suddenly be 'invented', as a conscious act, by their apparent authors or anyone else. The most likely scenario, from a secular point of view, is that they were for some time unconscious discursive practices by participants in legal debates; gradually, it occurred to some of these participants (most probably precisely those whose names have come down to us as formulators, or reporters and collectors, of hermeneutic rules) that they and their colleagues, and their predecessors, repeatedly appealed to this or that form of reasoning or argument, and such implicit premises would be made explicit (thereby reinforcing their utilization). Different such commentators would find some rules more convincing than others and thus compile selections; eventually, contending schools emerged.

Those would be the natural stages of development of such a body of knowledge: first, unconscious *practice* (which might be correct or incorrect); second, dawning *awareness* of such practice (due to what we call 'self-consciousness'); thirdly, *verbalization*, randomly to begin with (by exceptional individuals, focusing on the most outstanding practices), and then more and more widespread (more insights, by more people, as a cultural habit develops); fourthly, systematization (of the simplest kind, namely: listing) and dispute (as different lists are drawn up by different groups). In the case of Judaism, the next stage was *merging* results (by later generations, out of veneration making all the lists 'kosher' at once); and subsequently, there was a stage of *commentary* (trying to justify, explain – within certain parameters). However, sadly, as we shall see, the last natural stages of *formalization* and *evaluation* never occurred (until recently, outside orthodox circles).

According to JE, these various lists were not, even in their own times, viewed as exhaustive. I am not sure how true that remark

is, i.e. whether there is any statement in the Talmud or related literature which confirms the assumption that Hillel, R. Ishmael, R. Eliezer, or whoever compiled a list, did not consider himself as having succeeded in making a full enumeration of valid *midot*. At the other extreme, the view of traditionalists today, that these lists were all equally complete, is (as we shall see) just as conjectural, and based on anachronistic and circular arguments.

What is in any event evident, is that the rules in each list were not in their own times uncontested. The school of Hillel was opposed by that of **Shammai**, and Rabbi Ishmael's formulations were challenged by **Rabbi Akiba ben Yossef**. It is interesting to note that, *at first, these opposing views were considered mutually exclusive; but, over time, they came to be used indiscriminately*[299].

It apparently came to be considered that, although two dissonant rules may indeed lead to conflicting interpretations, the selection of one or the other of them as the finally applicable rule in any given single context, was a matter of tradition or majority decision; effectively, the correct conclusion was predetermined, and the rule selected only served as an ex-post-facto rationalization. Thus, the ontological status ascribed to the hermeneutic rules is that they were conditional on material factors – formalities activated or left dormant by textual content (which details were, one by one, designated by authorities, on the basis of transmissions or by vote).

Although R. Akiba's approach usually prevailed in practice, R. Ishmael's thirteen *midot* are the most popularly known: they have become part of the daily liturgy and can be found in most Jewish prayer books. Since the above mentioned initial formulations, many attempts have been made to compile more complete lists (for instance, by Malbim). We will in the next chapter analyze all the hermeneutic principles systematically

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[299] Still today, in Talmud study, people do not find it odd that a R. Ishmael rule might prevail in one context and a R. Akiba rule in another. Logically, one would have thought that just one of the systems would have to be adopted for the whole Talmud.

with examples; here, we will be content to only make some introductory comments.

At the outset, it shall be pointed out that **the rules are *not* all of a purely deductive nature**, contrary to what may be thought at first glance. When the rules suggest a "derivation", they do not necessarily refer to a mechanical relation between premises and conclusion. Most of the rules' results are partly or entirely inductive; that is, they are, at best, a good working hypothesis within the given context of knowledge, which may possibly be replaced by another hypothesis or a deductive inference in an altered context of knowledge.

Some of the rules, wholly or partly, represent deductive or inductive principles which can readily be justified by natural logic. Of these, some may be validated in formal terms (i.e. substituting symbols for specific contents); whereas others describe discursive acts which are rather intuitive – responses to material data without fixed patterns – and which can be approved with reference to broader epistemological considerations. However, some of the rules, wholly or partly, seem, from the point of view of natural logic, rather obscure and arbitrary, and remain acceptable only due to a claim that they are of Divine origin.

The Talmud itself at least implicitly recognizes the inductive nature of many of the arguments in it. This is evidenced by the fact that when several alternative premises are given for a certain conclusion, it is viewed as being weak. The Rabbis argue: *Nu*, if each of the sets of reasons given was sufficient, why bother to adduce the others? From a deductive point of view, there is indeed no utility in giving many reasons; but nor is there any harm in it. It is only in inductive logic that giving more reasons increases the probability of the result, and therefore also suggests (incidentally) its relative weakness.

Our remark that **Talmudic (and indeed later Rabbinic) reasoning is very often inductive**, rather than purely and exclusively deductive, should be emphasized. It is contrary to popular belief (people are rather surprised when I suggest it), and so manifestly ignored by other writers that I would tend to claim it as original. If it is original, then it should be stressed as very

important, among the most significant insights of the present work. In any case, it is evident and incontrovertible fact.

The idea is disturbing, not to say devastating, to many people, because induction is thought of as inherently more fallible than deduction, and it is difficult to juggle with doubt and dogma. But in all fairness the truth of the matter is that deductive reasoning can also in principle and often does in practice err, and that inductive reasoning is not in principle necessarily weak nor does it always go wrong in practice. Each case must be considered on its own merits; one cannot make sweeping statements for or against such broad categories of mental process.

Let us now briefly take a look at the tenor of the 13 *Midot* of R. Ishmael; we will have occasion further on to analyze them more fully[300]. We may distinguish three groups:

a. *Midot* whose purpose is **to infer information** from the text, i.e. to make explicit what is implicit in it; this includes **rules Nos. 1-3 and 12**.
b. *Midot* used **to elucidate terms** in the text, especially their extensional aspect; this includes **rules Nos. 4-7**.
c. *Midot* serving **to harmonize** seeming or manifest incongruities in the text, including, as well as inconsistencies, mere redundancies, discrepancies, and other sources of perplexity; this includes **rules 8-11 and 13**.

Admittedly, this grouping of the 13 *Midot* is a bit artificial. For, in a strict view, all inference of information is an eventual elucidation of terms and a prevention of inconsistency; and similarly, all elucidation of terms constitutes inference of information and harmonization; and likewise, all harmonization results in elucidation of terms and leads to inferences of information. Nevertheless, the immediate goals of these different movements of thought are sufficiently distinct to justify our subdivisions. A nice thing about these groupings is that they show a continuity of sorts in the approach of R. Ishmael, and explain and justify the sequence in which the *midot* were listed.

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300 See chapters 8-9 of the present volume.

The only misplaced *midah* in our view is No. 12, which should be closer to No. 2, or at least in the same group.

a) Inferences of information

Rule 1, ***qal vachomer*** (lit. lenient and stringent), refers to a fortiori, a form of argument whose conclusion is essentially deductive, though there are in practice inductive aspects involved in establishing the premises, as we have seen. Within Judaic logic, this form of reasoning has in fact served as the paradigm of deduction, much as Aristotle's syllogism (with which it is often confused) has had the honour within Western logic. The discovery of a fortiori is, I would say, one of the most brilliant contributions of Jewish logicians to generic logic. It should be noted that a fortiori has Biblical roots, as Jewish tradition has reported since Talmudic times if not earlier.

Rule 2, ***gezerah shavah*** (lit. equal rulings), refers to arguments by analogy, or more specifically inferences based on homonymy (similarity of wording) or on synonymy (similarity of meaning). Reasoning by analogy was very common among the ancients, Jewish and otherwise, until the advent of the scientific method in relatively modern times; it could range from far-fetched comparisons to very credible equations. Of course, most arguments, including syllogism, are based on analogies, since conceptualization depends on our intuition of similarities between apprehended objects. However, not until recently was it fully understood that the legitimacy of an analogy rests on its treatment as a hypothesis to be tested, and repeatedly tolerated (i.e. not rejected) and even confirmed (if predictive) by evidence, more so than its alternative(s). So, analogy is essentially an inductive mode of thought.

While *gezerah shavah* is based on closeness of subject-matter, inferences from context appeal to the textual proximity of topics. Such logistical considerations are relatively incidental, but they lean on the fact that the text in question was written by an orderly mind. This form of reasoning includes: the rules known as ***heqesh*** (relating to two items in the same verse) and ***semukhim*** (relating to two items in adjacent verses), which are traditionally counted as aspects of rule No. 2 (though probably later inclusions under that heading); and rules classed as No. 12,

meinyano (inference from immediate context) and ***misofo*** (inference from a later reference). Such reasoning has obviously got to be regarded as inductive, since however intentional the positioning of words, phrases or sentences, there have to be occasional changes of topic.

A matter of related significance, note, is the assumption by R. Akiba that, in a Divine document such as the Torah, the choice and placement of words cannot be accidental; whence, no repeated word is superfluous and no missing word is insignificant, every letter counts, and so on. This view allows, indeed encourages, many an inference (or alleged inference). Be it said, R. Ishmael did not in principle agree on this issue, but considered that the Torah "speaks in the language of men".

The interpretations involved in analogical or contextual arguments may be intuitively reasonable enough, but they are not readily put in formal terms and are therefore difficult to validate systematically. In any case, applied indiscriminately, such arguments are bound to lead to difficulties – one line of reasoning may lead to one conclusion, and another to its opposite, there being no inherent logical protection against contradiction. And indeed, difficulties were often encountered. For this reason, many limitations were imposed on these rules; and ultimately, they were regarded as unusable without the support of an accepted tradition, or at least the approbation of the majority of the authorities.

Rule 3, ***binyan av*** (lit. father construct), seems to refer to causal reasoning; that is, to finding the causes (in a large sense) of differences or changes, and thus predicting similar effects in other contexts. In a legal context, this means finding the underlying basis of known laws, so as to be able to make coherent laws in other areas. Here too, argument by analogy is involved, and the mode of thought is essentially inductive. The way the rule is traditionally worded ("a comprehensive principle derived from one text, or from two related texts") gives a false impression that it refers to immediate or syllogistic inference; but we must look at its operation in actual practice to understand it, and in such event the role played in it by the process of generalization becomes evident. While such reasoning is relatively easy, nowadays, to express formally and control

scientifically, the Rabbis (as we shall see) had a surprisingly hard time with it.

b) Elucidation of terms

Rules 4-7, labeled collectively as ***klalim uphratim***, seem to concern class logic, to a large extent, as they involve the expressions *klal* (general) and *prat* (particular) in various combinations. Many arguments of this kind may be viewed as effectively proceeding from definable linguistic conventions – in the non-pejorative sense that they reflect certain uniformities of intent, in the style of Hebrew expression used by the Torah. For instances: the combination of a general term followed by a particular term, in close Torah verses or parts of a verse, yields a particular result (*klal uphrat*); whereas the reverse combination, of a particular term followed by a general term, yields a general result (*prat ukhlal*). As every writer or speaker knows, a maximum of information can be communicated in a minimum of words, through certain turns of phraseology. This seems to be the motive, here.

Well and good, thus far – in theory. But in actual practice the expressions *klal* and *prat* cannot always be taken at their face value. Closer acquaintance with practical applications of the *klalim uphratim* rules reveals that their logic is not quite identical with that of Aristotle. In Western logic theory, inclusions or exclusions between broader concepts (genera, overclasses) and narrower ones (species, subclasses), or classes and their singular instances (individuals), are purely mechanical procedures, which presuppose *clearly defined* terms. Such subsumptive arguments can be readily represented pictorially by circles within or intersecting or outside other circles, known as Euler Diagrams, and are the domain of Aristotle's syllogistic processes. But in the more Oriental logic of the Talmud, things are not so simple; terms are vaguer and may be taken to "imply" formally unrelated ones.

The truth is that in practice, *even in Western thought*, terms are not always at the outset clearly defined; rather, usually, the definition of a term is arrived at through a gradual, inductive process, as we focus on the subject matter more and more, and acquire a deeper knowledge of it. Sometimes we do decide by

convention to name a phenomenon whose description we have already; but more often, we name a phenomenon before we are able to express its essence in words, and then work our way by trial and error to a satisfactory definition of it. This developmental aspect is not yet well accounted for in the classical theory of class-logic.

Certain efforts at exegesis are rather contorted, and a great deal of fantasy and credulity are needed to accept them. R. Akiba's methodology, where the terms used for the purposes of inclusion or exclusion are ***ribui*** (broad) and ***miut*** (narrow), seems especially weird to our minds. For instance, "sheep" may imply "birds" or even "garments", without apparent rhyme or reason[301]. This is why Maimonides regarded such arguments as having a mere mnemonic purpose[302]. Their conclusions were foregone[303], received in the chain of oral tradition; nevertheless, the Rabbis made a determined effort to anchor them, however flimsily, in the written Torah.

The best we can do to formalize such logic, then, would be to say that, *given* the tradition that the laws concerning a certain

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301 In *Baba Qama*, as I recall, but I did not note the page. However, here is another example used by commentators, which is probably closely related. Consider, for instance, the sentence "For all manner of trespass, whether it be for ox, for ass, for sheep, for a garment, or for any manner of lost thing... he shall pay double to his neighbour" (Exod. 22:8). The question is, why after saying "all" are various specifics (ox, ass, etc.) mentioned? *Klal uphrat* understands them as having an *constructive* function, it starts with a minimalist thesis then expands it: "ox" *means* ox, and so forth. *Ribui umiut* gives them an *eliminative* function, starting with a maximalist thesis then successively contracting it: "ox" is mentioned *so as to exclude* land (which is immovable property, unlike oxen), "ass" and "sheep" to exclude slaves or bills (which differ from the given examples in certain unstated respects), "garment" to exclude the unspecific (such as unspecified quantity).

302 According to what I was told by a teacher; I have not looked for the reference.

303 To illustrate this, a funny joke is circulated in Yeshivot: "How do you know you have to wear a yarmulke? Because it says *Vayetse Yacov*.... Would Yacov go out without a kipah?"

topic are X, Y, and Z; and that these laws are to be derived from a specified passage of the Torah, distinguished by the terms or phrases A, B and C; *then, if* X is related to A, and Y is related to B, *it follows that* Z is to be paired-off with C[304]. The formal logic involved is therefore conjunctive and hypothetical:

If A and B and C, then X and Y and Z;

and if A then X and if B then Y;

therefore, if C then Z.

However, apart from this aspect, it is frequently difficult to honestly find formal justification for such argument; that is, *how* the connective relations of the major and minor premises were in the first place established. When in such contexts the Rabbis are found to argue between themselves at length, the discussion often does not revolve around such basic issues of proof, but is merely a controversy as to *which* of X, Y, Z is to be paired-off (seemingly arbitrarily) with which of A, B, C. The only way then left to us, to explain the unexplained, is to appeal to 'tradition'.

c) Harmonization

Rules 8-10, which start with the words ***kol davar shehayah bikhlal veyatsa*** (lit. whatever was in a general principle and came out), deal with sets of statements whose subjects are in a genus-species relation. Rule 8, although perhaps originally intended as one rule, has become traditionally viewed as having two variants, which we are calling ***lelamed oto hadavar*** and ***lelamed hefekh hadavar***; these concerns cases where the predicates are also in a genus-species relation of sorts. Rule 9, ***liton toan acher shehu kheinyano***, concerns predicates which are otherwise compatible; and rule 10, ***liton toan acher shelo kheinyano*** concerns incompatible predicates.

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[304] We might cite as an example of such reasoning Rashi's "if it does not apply", which Bergman clarifies as follows: "If the Torah indicates a halachah in a case or category where it is *already* known, then apply that halachah to *another* situation" (p. 120, my italics). Obviously, here, Rashi is appealing also to the R. Akiba principle that there is nothing repetitive or superfluous in the Torah. The problem remains, *which* other situation, and *how* is the choice to be justified!

Rule 11, which also starts with the words *kol davar shehayah bikhlal veyatsa*, and continues with the words ***lidon badavar hechadash***, deals with situations where an individual changes classes and then returns to its original class. Rule 13, the last in R. Ishmael's list, ***shnei ketuvim hamakhechishim***, concerns other reconciliations of conflicting theses; note that this principle is to some extent reflected earlier in the present volume, in the section on *kushya* and *terutz* (6.3).

All these dialectical principles are quite capable of formal expression, and (as we shall see) are mainly inductive in nature, involving generalizations and particularizations. There are some deductive, logically necessary, aspects to them; but on the whole, as complexes of intellectual responses to given textual situations, they favour one course over another, which is logically equally possible, if not equally probable, and therefore they constitute inductive mental acts.

One might well ask why God, the ultimate author of the Torah, expressed Himself in so tortuous and confusing a manner, that necessitated such complicated interpretative principles, instead of speaking plainly and straightly. The answer I received from teachers when I asked that question was that His purpose must have been to conceal the truth somewhat, so as to stimulate Torah study. Also, if everything was made clear in a systematic and explicit manner, the Torah could be studied fully in isolation; whereas, God wished it to be studied in a more social manner.

Some also suggest as an answer, on the basis of qabalistic ideas, that if the Torah was perfectly explicit and unambiguous, then there would be no room for doubt in the world, and skeptics would have no opportunity to make the redemptive leap of faith, which is needed to safeguard human freedom of choice. If God was totally revealed, then humans would be forced, in fear and trembling, and out of infinite love, to surrender all personal will and identity. The diversity of the world was created and is maintained precisely through a concealment of some of the truth (for if the world is ultimately, in truth, unitary, then all appearance of plurality must be a sort of untruth).

So much for the content, in brief, of R. Ishmael's list of rules. Our analysis (above and below) somewhat justifies the order in which the rules appear in this list (except, as already stated, for rule 12). However, some of the groupings implied by this list are open to discussion. I would suggest that all inferences from context, including *heqesh* and *semukhim* (traditionally considered as subcategories of *gezerah shavah*) and *meinyano* and *misofo*, should have been grouped together under one heading (just as, for instance, *gezerah shavah* constitutes one heading with subdivisions). Especially, the *klalim uphratim* should, in my view, be reorganized, and counted as one heading, or as at most two (classifying each process according as its result is a *klal* or a *prat*)[305], instead of four. Finally, in my opinion, the two variants of *lelamed* ought to be regarded as separate rules, comparable to the two rules *liton toan acher*.

A comment worth making is that the arrangement and numbering of the *midot* may not be stipulations of R. Ishmael, but may be proposals of the compiler R. Yehudah. To my knowledge (without having researched the matter greatly), R. Ishmael did not systematically group and list his *midot*, but merely formulated them and referred to them individually in various contexts as the need arose; it is probably R. Yehudah who later brought them together in a list, and organized them into 13 sentences in the given order. But the number 13 is not sacrosanct. According to Bergman, the Raavad noted the possibility of a count of 16 (counting rules Nos. 3, 7, 12 as two each); while others suggested counting rules 8-11 as one[306] and thus supposedly arrived at a count of 10. My preferred manner of counting yields the number 13-2+1=12.

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[305] Including, appropriately separated, the two rules distinguished by the word *hatsarikh*, which are traditionally lumped together under No. 7. As later discussed, the treatment of complementarity as something distinct is an overreaction, in my view.

[306] In my view, this is wrong. Rule 11 is functionally radically distinct from rules 8-10, albeit the common opening phrase. And rules 8-10 are sufficiently different in their premises and conclusions to justify separate treatment, even though they are obviously a related series. This will become clear further on.

It must be noted that, judging by actual Talmudic and Rabbinic discourse, the inventory is incomplete[307]. Orthodox commentators would not accept this last remark, and try to explain away every silence or disagreement of R. Ishmael (or R. Yehudah) concerning some rule or some detail of a rule mentioned by other authorities, earlier, contemporary or later. Since they regard the 13 rules as (an oral) part of the Revelation at Sinai, they must explain why Hillel listed only 7 rules, or R. Eliezer listed as many as 32. For this reason we find Bergman making statements like "Hillel certainly did not intend to dispute the teaching of R' Yishmael," even though Hillel lived a couple of centuries before R. Ishmael![308]

Hillel's rules (which we shall label (**a**) through (**g**), to distinguish them from R. Ishmael's labelled numerically) are given in JE as follows:

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307 Other principles worth noting, which are in practice used for hermeneutic purposes, are *rov* (this statistical principle is usually associated with majority decision by judges, but it may also be applied to *matters of* judgment, as for instance in *Avoda Zara* 75b, where Num. 31:22-23 "every thing that may abide the fire" is understood by Rashi as referring to cooking utensils, since they are the metal implements *habitually* subjected to fire) and perhaps *hazakah* (which, again, is usually associated with the legal *status quo*, but in many contexts refers to empirical evidence). Note in passing, with reference to Num. 31:22, the mention of *iron* – which suggests that the Iron Age had started by 1300 BCE, whereas historians, supposedly on the basis of archeological findings, place it at closer to 1000 BCE, if I am not mistaken [but about this issue, see also JL, Addendum 5]. See also JL, Appendix 3 for comments on Judaic numerology (*gematria*), and other such exegetic techniques, which count as aspects, however marginal, of Judaic logic.

308 Besides, how can one make conjectures about a past person's "intentions", without written record to support one's case, and say "certainly"?!

Hillel's		**R. Ishmael's**
a	*qal vachomer*	**1**
b	*gezerah shavah*	**2**
c, d	*binyan av*	**3**[309]
e	*klal uphrat and prat ukhlal*	**4, 5**
f	*kayotse bo mimakom acher*	**?**[310]
g	*meinyano*	**part of 12**

Now, I have put in the last column my initial impressions as to correspondences; from which it appears that Hillel did not know (or use or list) at least seven of R. Ishmael's rules, namely 6-11, 12 (the *misofo* part), and 13, while he adds (or has another name for) one, namely (f). We might stretch our equations, and include rules 6 or 7 under (e); regard R. Ishmael's *misofo* as a special case of Hillel's *meinyano*; and maybe even assimilate eventual cases of (f) under rules 2, 3, and 12. But it seems very unlikely to me that Hillel intended any of R. Ishmael's harmonization rules (8-11, 13).

It could well be, as *J.E.* suggests, that R. Ishmael gradually developed the latter additional rules[311] as "special applications" (I would prefer to say extensions) of Hillel's (e), since they concern subjects in a genus-species relation. But we must in any

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309 Bergman claims, in Raavad's name, that (c)=3 while (d)=13. But I do not see, judging from *J.E.*'s wording, how such a position is possible. I suspect a characteristic attempt to force facts to fit the comforting view that Hillel's list is a condensation of R. Ishmael's; it is significant that Bergman occults the actual wording of the rules in question in the original sources.

310 This rule is called *mah matsinu* by Bergman; it is interesting to note that *mah matsinu* is equated by Scherman to *binyan av*! The wording "as came out for it from another place" suggests some kind of inference of information, anyway.

311 *J.E.* does not include R. Ishmael's rule 13 in this remark. Concerning rule 13, *J.E.* says that it is "not found in Hillel".

case admit that R. Ishmael's list of 13 was more than a mere rearrangement of Hillel's list of 7; there were clearly novel elements in it[312]. Similar patterns of development, involving subdivisions, collapsing of categories, and new issues, are apparent with regard to R. Eliezer's list of 32[313], judging by the data given in *J.E.* Note that if we refer to Shammai and R. Akiba, the problems of comparison and contrast become much more complicated[314]; and it would be very difficult to claim that these various authorities based their work on a common blueprint.

Not only does Talmudic logic have specificities in comparison to generic logic, but there are different logical trends *within* the Talmud itself. That is already clear in what we have said above, concerning the competition between the schools of Hillel and Shammai, or between R. Ishmael and R. Akiba. But the differences embodied in explicit principles may not reflect all the underlying differences; there seems also to be unstated differences, which were not brought out into the open. This refers to the concept of the ***shitah***: as is well known, there are leitmotifs which run through the legal rulings of individual Rabbis.

Some Rabbis, for instance Hillel, tend to rule leniently; others, like Shammai, are reputed to lean on the side of stringency. The terms lenient and stringent, here, need not be considered as implying a value-judgment on our part. Hillel appears the warmer of the two, because he tends to ease people's

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312 Apparently, some orthodox commentators concede this point, since Bergman remarks "Some explain that when he [Hillel] expounded before the elders of Beseira, he required only these seven rules," implying the existence of other rules not expounded by him on that occasion.

313 As already mentioned, R. Eliezer's list is distinguished by its mixture of principles of merely Hagadic value with those of Halakhic value; the exegesis of inspirational stories is less strictly regulated than that of legal matters. I do not know first-hand how true these remarks are, but am just passing on information.

314 Is it to avoid bringing such problems out into the open that, apparently, no lists are traditionally given for Shammai's and R. Akiba's rules?

obligations; but Shammai also cares for people, he just wants to make very sure they get to Heaven. (It is interesting to note, in passing, that in the French language the word *chamailles* to refer to endless quarrels! I have long suspected, though this is not the explanation given in etymological dictionaries, that the word was derived from the proverbial Shammai-Hillel controversy.)

What concerns us, here, is the possibility that different *logics* underlie these different tendencies. Say, someone utters what seems like a vow; how binding is it legally? One Rabbi might answer generously that the statement is binding only if it has a certain precise wording; it is to be taken at face value, *with a minimum of implications*, admitting as inference only what strictly necessarily follows according to generic formal logic. Another Rabbi might take the more severe view that, so soon as the utterance is articulated, all sorts of motives and intentions may be taken for granted as implied; little need be said to mean much. The latter Rabbi seems to be referring to a more specific logical framework, in which there are unaccustomed relations among propositions.

To give an idea of the issue, here: in ordinary logic "all X are Y" does not imply "all Y are X"; but one can readily construct a special logical system in which such inference is acceptable. It would be onerous, make difficult the expression of all possible thoughts, but it is not unthinkable (since every form has a contradictory). It may well be such distinct (specific) patterns of formal logic underlie the differences in *shitah*. This is merely a speculation; but the idea seems worthy of follow-up. To demonstrate it decisively would require analysis of all of any given Rabbi's pronouncements, in search of uniformities.

2. Heuristics

The hermeneutic principles were intended, as discussed in the previous section, to explain and justify the development of Jewish law from its Torah source. They were the methodological bridge between the Torah and the Mishnah and Gemara; the more or less logical techniques by means of which (to the extent that they are accurate renditions and exhaustively listed) the

written foundation-document, together with the oral tradition, were transmuted into the Talmud.

However, a further set of principles is traditionally transmitted in Judaism, which reflects more broadly the transition from Mishnah to Gemara, and then from Talmud to subsequent Rabbinic Law, and finally the way Halakhah is actually *taught and studied*. These additional principles may be characterized as *heuristic* (practical rules of thumb), rather than hermeneutic (*a priori* methodologies), in that most of them constitute *ex post facto* summaries of certain uniformities in terminology[315], textual presentation and personal authority found in the Talmud. I say 'most', because some of them though listed together with relatively incidental rules of thumb, are more or less objective logical forms and would have been more appropriately listed together with interpretative techniques[316].

Many of the heuristic principles were already made explicit in the Talmud itself, reflecting the intelligence, self-consciousness and unity of purpose of its protagonists, recorders and redactors[317]; but some were evidently formulated in succeeding centuries, by Savoraim, Geonim, Rishonim and Acharonim. Among the current works in English which describe such principles, often in tandem with hermeneutics, we may mention again Steinsaltz's *Reference Guide*, Bergman's *Gateway to the Talmud*, as well as Rabinowich's *Talmudic Terminology*[318] (whose introduction includes an excellent bibliography on the subject[319]) and Feigenbaum's *Understanding the Talmud*. The

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315 Note in passing that some terms are apparently reserved to Halakhic contexts, while others are reserved for Hagadic contexts (Rabinowich).

316 The reason for their inclusion is usually to elucidate the terminology, rather than to deeply study their logical properties.

317 Judging by a chart in *Aiding Talmud Study*, there were a couple of hundred named participants over a period of some 450 years.

318 This work is, according to its author and as the full title implies, an adaptation of M. Mielziner's *Introduction to the Talmud*; New York, 1903.

319 The earliest work on terminology mentioned by Rabinowich, is *Sefer Keritot* by R. Samson of Chinon, 'one of the last French Tosafists

last two of these books are summarized in Appendix 4 of JL for the reader's edification.

The primary function of traditional teachings is simply to enable the student to understand what the dense Talmudic text is all about. This presupposes, for a start, a knowledge of Hebrew[320], to follow the Mishnah, and of Aramaic, to follow the Gemara, including the ability to read and a certain amount of vocabulary and grammar. Practice is, of course, crucial, but theoretical accessories are also essential, both to begin with and as one proceeds. Such tools are provided to some extent within the text itself; but studying with a teacher, at least at first, is necessary for most people, and a relatively easy way to gather information and skill; additionally, there are quite a few written aids to Talmud study.

The phrases used in the Talmud, as well as their meanings and the significances of their sequences, are not absolutely uniform and permanent, but do vary subtly from context to context, as well as (to a larger extent) from one geographical location to another and from historical period to historical period (in the different generations of Tanaim, of Amoraim, and of later Rabbis)[321]. The uniformities in vocabulary and semantics no doubt developed largely spontaneously, reflecting the idiom of time and place, although the Talmudic disputants and the compilers of the Talmud must have made some arbitrary conventions, too. As for the patterns of exposition, e.g. the rule that "if an anonymous Mishnah [containing only one opinion]

(fourteenth century)'. Then we have the *Mevo HaTalmud* of R. Shmuel Ibn Nagrela 'HaNagid' (so-called, but wrongly according to M. Margolis). And so forth. Thus, according to Rabinowich's listing, the *systematic* development of such linguistic analysis is a relatively late phenomenon (Rishonim). More details on this question might be found in the *History of the Talmud* by Rodkinson (1903), mentioned on p. xiv, which I have not read.

320 For some quite incidental comments on the Hebrew language, see JL, Appendix 5.

321 The contrast between Mishnaic Hebrew and the Aramaic of the Gemara or between the Aramaic of B.T. and that of J.T. being only the most obvious variations.

precedes one containing a dispute, the Halakhah does not follow the anonymous Mishnah"[322], they must have been *ab initio* conscious conventions or at least *ex post facto* decisions supposedly based on research findings.

With regard to the rules of thumb, and their exceptions, concerning the relative reliability of deciders of the law, e.g. that "the Halakhah generally follows Beis Hillel over Beis Shammai, except..." for certain cases, they must be understood as after-the-fact summaries of information[323]. They were not prejudices imposed by Divine fiat, but final evaluations of the winners and losers in a multitude of unrelated disputes. In other words, such principles are statistical reports on personal scores, rather than reflections on substance or logical techniques; they cannot be used as proofs.

We have to take into consideration the historical development of this science[324] of Talmudic language, textual order and personal authority. There is an inevitable empirical element involved in the formulation of heuristic principles, since they are not (as it were) inscribed in Nature in the way Logic is, but depend on human factors. We may well wonder how much of the regularity described by the books on the subject is shaky assumption and how much of it is incontrovertibly established: i.e. what constitutes *evidence for*, and what *inference from*, the postulate that there is regularity; for if the assumption is an empirical generalization, rather than a before-the-fact convention, then it

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322 Bergman, p. 92.

323 See Bergman, p. 94. Even here, there are differences of opinion. For examples, some say that the law follows Beit Shammai rather than Beit Hillel in 6 cases, while some say in 3 cases; or again, some say that in disputes between R. Yehudah and R. Nehemiah, the latter wins, whereas the Rambam rejects this rule of thumb.

324 Talmudic language and organization has a history; and then *the study of* such history has its own history. To what extent the latter has been traced, and accurately so, I do not know. Evidently, some effort has been done, witness Rabinowich's bibliography; but a more thorough effort may be necessary.

has to be studied much more carefully (since the law is affected by it).

The Talmud page is laid-out in a standardized way, with portions of Mishnah first, followed by Gemara commentary thereon, the latter being separated by the Hebrew letters גמ (GM); later commentaries, including mainly those of Rashi and Tosafot, are normally included in the page, around the Talmudic text. It should be noted that, Semitic languages being basically consonantal, the text was originally written and published without *vowel signs*; and until recently this practice has been continued, partly because of uncertainties or different traditions concerning proper vocalization. Since the text is also devoid of *punctuation marks*, it is first necessary to identify where a sentence begins and ends, and its various clauses; what we include or exclude in a sentence, and how we cut it up into clauses, will obviously generally affect its meaning. Also, many *abbreviations* are used, which must be assimilated.

As Feigenbaum makes clear, a related issue is *the role* of the sentence in the wider context: is it a new topic or the continuation of an ongoing discussion; and if the latter, is it a question or an answer, and in relation to what? This implies the need to recognize and appreciate the function of every word, phrase, or sentence in each and every line of argument, and to keep track of who said what and why. Facilitating such apprehension and comprehension is the fact that there are recurring schemata; but even having prepared oneself by their theoretical study does not always guarantee one's ability in practice to correctly match the data and map the course of the discussion.

Talmud heuristics, judging by Rabinowich's excellent effort, consists of an ordered lexicon of terms, including, at a first level, ***terms found in the Mishnah***, then ***terms the Gemara uses to clarify its Mishnah antecedents***, and finally ***terms instituted by the Gemara for its own development***. Some terms can be characterized as analytical, as they help to define the subject-matter, referring to various aspects of its classification; this division mainly concerns the form and content of propositions, their terms, quantity, polarity, eventually also modality or conditions; and (to some degree) awareness of what is implicit

in them. Some terms are synthetical, describing the logical or discursive procedures through which a formulated proposition has come to be considered and eventually become established or rejected.

The divisions and subdivisions of words and phrases appropriate to each context, differ considerably in Mishnah and Gemara, because of differences in the development of these two documents. The Mishnah is essentially a document intended to lay down predetermined laws; a relatively static picture of the law at a given time, an end-product. Whereas the Gemara is engaged, to begin with, in a studying and digesting process, and eventually, having acquired momentum, it develops the law further in the presence of the reader.[325]

So much, here, for the content of Talmud heuristics; we need not go into detail, duplicating the work of others. However, some broad critical comments on the subject are necessary. First, let us point out that if we wish to elicit from heuristic teachings some items of epistemological significance, we must look especially at all little notes their authors make concerning *deviations* from the norm: terms used with variant meanings in certain contexts; different terms used for seemingly the same thing; unusual terms sometimes used by certain players instead of the standard terms used predominantly; Gemara contradicting or emending Mishnah, Savoraim doing same to Gemara; and so forth. It is precisely such limiting cases, which fall outside the traditionally stressed major norms, which should be carefully considered by us.

We may refer to some examples of abnormal heuristics given in Rabinowich's treatise. The Gemara may indicate cases "not provided for in the Mishnah" (p. 62). This suggests that the Amoraim did not consider the Tanaim as omniscient, or at least

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325 Baraitot often stir heated debate. Unlike Mishnaiot (which have primary authority), these pronouncements of Tanaim *are not necessarily known to all* Amoraim, and yet they have considerable authority (after Mishnaiot). For this reason, Baraitot often cause differences of opinion between Amoraim: those in the know having one opinion, and those not in the know having another opinion.

as having foreseen all possibilities. The Gemara sometimes rejects a Mishnah, for one reason or another: "In one instance (*Niddah* 13b) the Mishnah is not accepted since the law it states is considered illogical!" and the Gemara will often consequently "make slight emendations in the text" of the Mishnah (p. 21); "in one instance (*Yevamos* 43a)", due to differences in decision for seemingly like cases, the Gemara states "this Mishnah is not authoritative" (p. 26). These examples suggest that the Gemara sages considered themselves fit to question the judgment of the Mishnah sages, rejecting material which in time becomes contrary to reason.

This is also suggested by the following example: "In fact, in one case (*Yevamos* 27b)" the Gemara "pushes aside a Mishnah in deference to a Memra of R. Yochanan!!" (who was an Amora) (p. 28). There are also suggestions that the Mishnah text had been adulterated by the time the Gemara reviewed it: "In, at least, two instances (*Chullin* 82a)," the Gemara cannot resolve a conflict between authoritative passages, "and must claim that a certain law is not really part of the Mishnah!" (p. 28); a Mishnah may also be corrected (p. 32). Baraitot were also occasionally ignored (p. 37) or corrected (p. 32), though that is less significant, since by definition, though of the same period as the Mishnah, they may have been intentionally excluded from it because not authoritative. The expressions "perhaps it is mistaken", "it should not be taught", and "it is not to be taken seriously" reflect this greater possibility of rejection in regard to Baraitot (p. 60).

Further on in time, we find cases of Savoraim making additions to the Talmud, for instance in *Yoma* 30b (p. 56), or again, according to one opinion, in *Pesachim* 102a-b (p. 45). This suggests that the Talmud was doctored after being sealed. More broadly, we should also consider discordances between sages of the same epoch: the Sages finding an argument of one of their colleagues strained (p. 59) or arbitrary (p. 69) or unconvincing; or finding his approach to an issue too vague or too fantastic or trivial (p. 64); or Sages being frankly stumped by a problem, unable to solve it (***teku***) (p. 63). Such events tell us something about the sages as individuals: their knowledge and reasoning powers were not necessarily perfect.

All the above applies to successive later generations of *poskim*, too. It all demonstrates the inductive nature of the development of Jewish law – and it cannot but be so, since human knowledge develops in response to phenomena. It is well known, also, that, as a consequence of being transcribed by hand over and over again, from copies on which readers had put their own handwritten commentaries, and sometimes as a consequence of censorship of parts of it by non-Jewish authorities, by the time of the Rishonim, many versions of the Talmud were circulating; and scholars had to labor mightily to detect the correct, or most likely, version[326]. That, too, is induction: observation and reasoning, hypothesis and confirmation or infirmation.

We need not, here, belabor these matters further, though many more examples can be brought to bear from throughout the history of Jewish jurisprudence. In my view, such footnotes to Talmudic study cannot be taken lightly and dismissed as insignificant; they prove several things beyond shadow of doubt, such as: that later sages did not always defer unconditionally to

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326 Notably, Rashi, see Shereshevsky. Incidentally, it is shocking to learn that there have even been variant versions of the Torah! On this matter, Lewittes (pp. 44-47) informs us that the Talmud reports slight emendations in the text by the Soferim (*Nedarim* 37b – the Soferim appeared after the First Exile); he also tells how, in one instance, three Torah scrolls were found in the Temple which were not identical, and it was decided to adopt the reading common to two of them as valid (*Soferim* 6:4) – a simply statistical method, note well. Also note his comment: "Shortly after the period of the Talmud critical editions of Scripture were produced by the so-called masoretes, from whom we derive the present-day Masoretic text. They decided which version of the several existing ones should become standard..." though he rightly considers the matter of minor significance – rightly, because such fiddling presupposes a pre-existing document in many versions. But problems of this sort have recurred, judging by a comment in Cohen that Rashbam "apparently reads *alecha* 'concerning thee,' not *lecha* as in the editions" (p. 166). More broadly, there are many apparent inconsistencies (in names, spelling, numbers, etc.) in the Tanakh, which could well be ascribed to mistakes of the writers or to scribal errors, though orthodox commentators go to great lengths to explain them away in other ways; for instance, *dodanim* in Gen. 10:4 is written *rodanim* in 1-Chron. 1:7 (the Hebrew letters *d* and *r* are easily confused). See Mitchell pp. 31-32, and also 101-102.

earlier ones, but were willing to use their heads; that texts were often enough doubtful, so that there were breaks in the continuity of the transmission of Jewish law; and more broadly, that the law underwent a development, with growth and decay, changes and reversals.

It is interesting that even an author like Feigenbaum, who may be classed as very orthodox, acknowledges a development in the method and language of the Oral Law: "The Tannaim... began to organize it into a network of precise laws arranged by topics" – and eventually "*the material, methods of analysis, and modes of expression expanded greatly*" (p. 3, my italics). The fact is that the orthodox are usually loathe to admit that the law, and indeed its methodology, have undergone any *significant* change since Moses' time. Changes have to be glossed over as 'minor', for the simple reason that the Law would otherwise not be purely Sinaitic and therefore entirely Divine in origin.

However, the reader has only to examine a work like Lewittes' *Principles and Development of Jewish Law*[327] to see that there has undeniably been change over time, most often in the way of expansion and increased density, and often enough in the way of contraction or simplification. Practices may be added or abandoned, specified in increasing detail or become less demanding. How such changes, viewed collectively, are to be frankly reconciled with the Biblical injunction not to add to or subtract from the Law (Deut. 4:2; 13:1) is unclear – and that is the reason why the matter has to be glossed over. Similarly, study of works on hermeneutics and heuristics clearly shows that there have been variations in Judaic logic[328].

One suggestion I can make here, to resolve the inherent ideological problem, is that we distinguish between 'a general delegation of authority' and 'an endorsement of all the particular expressions of the authority'. That is to say, God may well say to us: your wise men of each generation and locality have My

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[327] See for instance its ch. 6, but the whole book is well worth reading.

[328] Examples may be found scattered in the present work.

sanction to enact and enforce laws, without thereby implying that these laws must be the same everywhere and for all time. Just as, in the secular realm, the king (in a kingdom) or ‘the people’ (in a democracy) grants its chosen government (the executive, the legislative and the judiciary) the power to make laws, without implying that it cannot later revise these laws, as it may reasonably need to as circumstances change, within limits defined by some Constitution – so in the religious realm may God do so.

The mere fact of delegation of authority does not make immutability imperative and adaptation forbidden. Indeed, the Torah passage in question specifies the judges "*in those days*" (Deut. 17:8-13), reflecting an awareness that man-made laws, even those with general Divine sanction, may well need to be modified, as knowledge and social conditions evolve[329]. In no way does such delegation of authority logically necessitate that earlier judges be regarded by later ones as perpetually right, as having divine powers of omniscience and infallibility, but it is only suggested that they are likely to be the wisest for their time and place. If, say, today, our judges, reviewing the status of women, perceive them differently than previous generations did, in the light of a more open intellectual and societal atmosphere, they may well revise certain laws relating to women, without thereby insulting past sages, or denying the sages in general Divine sanction and invalidating their work.

Nowhere is it demonstrated formally that later sages need rigidly comply with all rulings of the earlier. Such a principle of compliance is taken for granted by current orthodoxy, as an established tradition, but there is no real textual basis for it. A circular argument is required of us: we have to believe in the

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[329] Logicians have called the tendency to classify objects with reference to their past characteristics, rather than with respect to their eventual new attributes, commission of the "genetic fallacy". This is an inductive fallacy, of course, in that it reflects a mental rigidity, a failure to empirically monitor objects of study for possible changes in their identity. Progress must be allowed for in our perceptions and conceptions.

tradition because the tradition tells us to believe in it. But, I say, there has to first be some kind of more authoritative justification, standing outside the tradition. For example, women cannot be called to the weekly Torah reading, not because the Law originally forbade it, but because of 'the community's honour'. Perhaps in those days communities generally had such reactions; but what if today, in many communities, that is not the case anymore?[330]. The reason proposed by the ancients reinforces itself, instituting social habits, but it has not been considered at a sufficiently radical level.

3. A methodical approach

Although logic is ever-present in Jewish thinking, it is not as explicitly referred to as it ought to be, in my view. *Talmud Torah*, i.e. Biblical and Talmudic studies, constitute a powerful logical training, and the extraordinary success of Jews in all other fields is in large part, directly or indirectly, attributable to this training. Nevertheless, we could do better – much better.

Biblical exegesis could be improved by a more conscious application of logic. What precisely has been, or can be, logically inferred from each and every sentence and wording of the Torah, and by means of which specific form(s) of argument? Commentators give explanations, but they rarely specify their precise sources, whether they are purely traditional or whether they are based on reasoning. I imagine a book which would collect next to every verse all the lessons to be learned from it, and just how. Judaism constitutes a mass of beliefs, most of which are implicit if not explicit in the Torah. For instance, the belief in Providence is not only based on abstract statements (like, say, that in the second paragraph of the *Shema*), but is also suggested by various concrete stories.

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[330] Many women today are evidently 'respectable' in any sense of the term understood for men; the Swiss *Conseillère Fédérale* Ruth Dreyfuss comes to my mind. Another group which seems to me wrongly despised by the Talmud are deaf-mutes; today, we know their true abilities.

But especially in Talmud studies, I believe a great improvement to be called for. A section of the Talmud which describes all the complex arguments and counter-arguments concerning a specific issue, is known as a ***sugya***. The Talmud is naturally subdivided into a large number of sections; some are brief, some are very long. The Mishnah makes a statement; the Gemara finds some difficulty in it, in relation to some other Mishnah or to a Baraita, and debates the issue; later commentators enter the discussion: Chai Gaon, Rashi, Tosafot, Moshe Feinstein. More and more subtle questions are raised, finer and finer distinctions are made, until everyone is satisfied, or silenced.

It appears, and I do not deny it, that experts in the field are able to follow these complex arguments, without even the need for pen and paper; their minds are quick and in perfect working order, and their intelligence is great. But for a dull wit like mine, and I do not think that I am far below average, all this is hard to follow without a more point by point approach. I personally know only too well, from repeated experience, how an argument may seem very convincing on the surface, and then be found by applying the methods of formal logic to be erroneous, or at least in need of revision.

I would like to see each *sugya* patiently analyzed, in such a way that all its arguments are rendered entirely explicit, line by line, and it is demonstrated that all possibilities have been taken into consideration, and no other conclusions than those traditionally proposed are drawable. If there was an area of doubt, and a *psak din*, a ruling by the authorities, was made, so well and good; the law need not be based exclusively on logic. But the logic involved must in any case be made clear, to be fully justified. *A whole book might be written about each sugya*, if necessary. There is great scope for scholarly study in such an approach, and it would surely highly revive and stimulate interest in the Talmud.

Our proposal may seem to go against the tradition that the Oral Law be kept as oral as possible. But the truth is that this tradition has been virtually ignored since the redaction of the Mishnah and of the Gemara: look at all the written commentaries which have made their appearance since then. All I am advocating is the collection of all the authoritative writings, concerning any

given *sugya*, and their exact ordering with formal logic in mind. That is only a kind of supercommentary, one might say. In any case, there is nothing to hide from non-Jews; their scholars know the languages involved, and can study the original texts, anyway, if they care to. On the other hand, the Talmud might in this way be made more accessible to the modern Jew; and surely that is what counts the most.

The following is a succinct illustration of what I mean; how I would like to see the Talmud studied and taught. The example is partial, but it suffices (in any case, these are the only notes I took!). It is drawn from tractate *Berachot*, p. 14. The *sugya* arises out of a difference of opinion (*machloqet*), between Sheshet on the one hand, and Rav and Shmuel on the other, about whether or not it is permitted to "verbally salute" someone "before prayer"; further complicating the matter, the terms involved have alternative interpretations. Note the symbols I insert, to abbreviate the discussion.

P: One can say hello before prayer (Sheshet).

Q: One cannot say hello before prayer (Rav & Shmuel).

(Note in passing that these propositions are modal; the type of modality involved is ethical: "can" here refers to permission, and "cannot" to prohibition.)

At first sight, P and Q are contradictory; however, it turns out that:

"*Say hello*" may mean:

a) seek out to say hello, or

b) chance to meet and say hello.

(Note that "seeking out" may be viewed as a special case of "chancing to meet"; so that P(a) implies P(b), and contrapositely Q(b) implies Q(a), for any given value of the other term (c or d).) Also:

"*Before prayer*" may mean:

c) before starting to pray, or

d) before completing prayers.

(Note that "before completing prayers" is understood as covering *all* the time before, including that "before starting to

pray"; so that P(c) implies P(d), and contrapositely Q(d) implies Q(c), for any given value of the other term (a or b).)

Each of the given theses may thus, according to the terms involved, have four meanings. Thus, P may mean P(a,c) or P(a,d) or P(b,c) or P(b,d); and similarly for Q. Our goal is now to determine which combinations of P and Q, in their various senses, are formally consistent, implying a possible marriage of the two positions. The method used is one of elimination.

If P and Q have precisely the same subscripts, they are formally mutually exclusive, since one says "can" and the other "cannot". Thus, the four conjunctions like "P(a,c) and Q(a,c)" are self-contradictory and can be eliminated from further consideration. What, however, the remaining twelve conjunctions? We can eliminate a few more of them, by using a fortiori arguments.

First, if one cannot chance to meet and say hello, then one cannot seek out to say hello. That is, P(a) and Q(b) are contraries, for a given value of the other term (c or d).

Second, if one cannot say hello before completing prayers, then one cannot say hello before starting to pray. That is, P(c) and Q(d) are contraries, for a given value of the other term (a or b).

These a fortiori arguments enable us to eliminate five more combinations of P and Q, namely: for the first reason, "P(a,c) and Q(b,c)", "P(a,d) and Q(b,d)"; for the second reason, "P(a,c) and Q(a,d)", "P(b,c) and Q(b,d)"; and, for either or both reasons, "P(a,c) and Q(b,d)". Which leaves us, so far as I can see, with seven internally consistent conjunctions of the two theses:

1. P(a,d) + Q(a,c) = one can seek out to say hello before completing prayers, but one cannot seek out to say hello before starting to pray.

2. P(b,c) + Q(a,c) = one can chance to meet and say hello before starting to pray, but one cannot seek out to say hello before starting to pray.

3. P(b,d) + Q(a,c) = one can chance to meet and say hello before completing prayers, but one cannot seek out to say hello before starting to pray.

4. P(b,c) + Q(a,d) = one can chance to meet and say hello before starting to pray, but one cannot seek out to say hello before completing prayers.

5. P(b,d) + Q(a,d) = one can chance to meet and say hello before completing prayers, but one cannot seek out to say hello before completing prayers.

6. P(a,d) + Q(b,c) = one can seek out to say hello before completing prayers, but one cannot chance to meet and say hello before starting to pray.

7. P(b,d) + Q(b,c) = one can chance to meet and say hello before completing prayers, but one cannot chance to meet and say hello before starting to pray.

This listing does not terminate the analysis. The next step would be to determine the interrelationships between these combinations. Some are incompatible, because the P part of one has the same terms as the Q part of the other; for instances, Nos. 1 and 6 are contrary to Nos. 4 and 5. Some imply others, in view of the relationship (above mentioned) between the terms a and b, or c and d. Thus, for instances, No. 2 implies No. 3; No. 4 implies No. 2, and therefore also implies No. 3; No. 5 implies No. 3. Some combinations may be neither contrary, nor involve implications, and would in that case be taken as merely compatible. We may also want to linger on each statement and consider just what it means; for instance, No. 1 seems to imply a permission to seek out to say hello in the middle of prayer.

I will not pursue these details further, but will only add: it is only *after* all such preparatory formalities, that we may begin to wonder about the positions of different Rabbis. Granting that the purpose of the whole *sugya* is to reconcile the apparently divergent opinions of Sheshet and Rav/Shmuel, logic leaves us with seven possible harmonizations; it is thereafter up to us to find ways to narrow the list yet further. What the Gemara decided, how the various Rishonim leaned, what the Acharonim say, and what precise arguments were brought in from elsewhere – all that concerns only the seven *leftover* combinations.

If the reader is confused by the above labyrinth of reasoning, it would indeed please me! Because, that would prove my point, namely that only the most exceptional minds could possibly go

through this process with certainty using only their heads, without material supports. There is no way to be sure that all alternative possibilities have been covered, without some such systematic approach. It would be hard for any normal person to honestly say that they can zip through such complex logical processes, without seeing them black on white. Even if a teacher orally described things step by step, it would be difficult for a student to retain all the details in memory from start to finish, and thus be sincerely convinced. In any case, a good background in logic theory would seem essential.

Incidentally, I have had the unfortunate experience of some Talmud teachers who rush through a *sugya*, with little concern for *communication*. They seemed more bent on an ego-trip, to appear of superior intelligence – or to hold by some arbitrarily imposed time-table (which conveniently excused their skimming over difficulties). But the goal of teachers should be, and supposedly it is the goal of most, to address the unique human minds of their students, and *effectively* transmit *convincing* information to *them*, rather than to the surrounding airspace. The value of the face to face encounter is precisely that the teacher answers the questions which bother the student. One student, be it out of naivety or obtuseness or out of greater knowledge or intelligence, may have no problem with a certain point; while another, for whichever of those reasons, has a hard time assimilating the same information in his specific knowledge-context. There is no virtue in glossing over difficulties; good thinking is relentless, it goes all the way.

Even so, while admitting the value of properly assisted learning, my appeal here is still for a thorough, written exposition and elaboration of all Halakhic arguments, *sugya* by *sugya*. Only such a review, performed by experts in both logic and Rabbinic decisions, can render the logical undercurrents of the Talmud and its commentaries entirely transparent, and make possible the demonstration of the high standards of logic involved in orthodox reasoning. I believe, out of faith, that it is possible; but in any case, the Halakhah can only gain from such a programme. For if there happen to be areas of weak logic, they will not put everything in doubt, but simply present opportunities for new debates.

More broadly, it would be of great value to methodical researchers and students of the Talmud and its Commentaries to have simply *a table of contents, an index, a concordance*. I have not seen such a document, but I am told that it already exists; if not, today with computers it should be easy to do (though perhaps expensive). There is a need of transparency, not only at the level of specific arguments, but equally at the level of making the literature as a whole susceptible to organized and systematic inquiry. For instance, assembling together all pronouncements on any topic under investigation – so as to have a true, unbiased, balanced picture of what has been said by all authorities on the subject concerned, and so as to be able to trace precisely the historical evolution of laws and attitudes.

8. THE THIRTEEN MIDOT

Drawn from Judaic Logic *(1995), chapters 10-11.*

In the present chapter, we shall indulge in a closer scrutiny and frank criticism of Talmudic/Rabbinic hermeneutics.

1. Exposition and evaluation

Traditional presentations of the principles and practice of Rabbinic exegesis consist in listing the Thirteen *Midot* of R. Ishmael (at least, though other techniques may be mentioned, in contrast or additionally), describing roughly how they work, and illustrating them by means of examples found in the Talmud or other authoritative literature.[331]

Such an approach is inadequate, first of all, because the theoretical definitions of the rules are usually too vague for practical utility, and for purposes of clear distinction between similar rules. A simple test of practicality and clarity would be the following: if well defined, the rules should provide any intelligent person with a foolproof procedure, so that given the same database as the Rabbis, he or she would obtain the same conclusions as they did. The second important inadequacy in the traditional approach is the near total absence of evaluation; there are no validation procedures, no reductions to accepted standards of reasoning. There is no denying the genius of R. Ishmael and others like him, in their ability to abstract rules of

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[331] The present analyses were made possible thanks mainly to Bergman's detailed presentation of the 13 *Midot*. Though I dislike that author's pompous tone and unquestioning fanaticism, and disagree with many of his specific positions, he is to be commended for his unusual efforts to clarify the hermeneutic principles. All too often, authors are simply content with listing examples with a minimum of reflection; he at least tries (if not always successfully) to sort out logical relations explicitly.

intellectual behaviour from the observation of their own and their colleagues' thought-processes in various situations. Nevertheless, as we shall see, their failure to treat information systematically and their lack of logical tools, yielded imperfect results.

We shall here propose some original ways to expose and evaluate Rabbinic hermeneutics (mainly, the 13 *Midot*). The most important step in our method is **formalization**; this means, substituting variable-symbols (like 'X' and 'Y') for terms or theses of propositions[332]. Formalizing an argument, note, means: formalizing all explicit and tacit premises and conclusions. The value of this measure is that it helps us to clarify the situations concerned, the Rabbinical responses to them, and the issues these raise. By this means, we move from a level akin to arithmetic, to one more like algebra. When we deal in symbols, we reduce immensely the possibility of warped judgment, due to personal attachment to some solution; all problems can be treated objectively. It should be said that logical formalization is not always the most appropriate tool at our disposal; in some cases, epistemological and/or ontological analyses are more valuable.

- We have two sets of data to thus formalize, or analyze in some manner: (a) the *theoretical pronouncements* of Rabbis (defining or explaining the rules, or guiding their utilization), and (b) the *practical examples* they give in support (illustrating or applying their statements). This work allows us to compare, and if need be contrast, Rabbinic theory and practice. As we shall see, they do not always match.
- Another utility of formalization or similar processes, is the possibility it gives us for *comparing Rabbinic conclusions to the conclusions obtained by syllogism or other such established logical techniques*. This is the ultimate goal of our study, to determine without prejudice whether or to what

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[332] The formalization of *relations* is not technically valuable (apart from saving space), and tends to alienate and confuse readers; for these more abstract features of propositions, we shall stick to ordinary language.

extent Rabbinic hermeneutics comply with deductive and inductive logic. As we shall see, they do not always parallel the course taken or recommended by ordinary logic.

In anticipation of such divergences, it is important to study the Rabbinic hermeneutic principles carefully, and distinguish between their *natural* factors and their *artificial* factors. The natural aspects are immediately credible to, and capable of formal validation by, ordinary human logic, and thus belong to secular epistemology. The artificial aspects, for which Rabbis claim traditional and ultimately Divine sanction, are controversial and require very close examination, for purposes of evaluation or at least explanation. Our task with regard to such additives is to consider whether the rationales for them offered by the Rabbis are logical and convincing, or whether these factors ought to be regarded as human inventions and errors.[333]

We shall in the rest of this chapter deal with the 13 rules of R. Ishmael under three large headings. “Inferences of information” – including rules 1-3, and 12, i.e. *qal vachomer* (a fortiori argument), *gezerah shavah* (inference by analogy), *heqesh, semukhim, meinyano, misofo* (contextual inferences), and *binyan av* (causal inference). Then “scope of terms” – including rules 4-7, referred to collectively as *klalim uphratim* (genera and species). Finally, “harmonization” – including rules 8-11, and 13, about which much will be said.

It should be clear that we have no intention, here, of masking any difficulties, but propose to engage in a “warts and all” exposé. The technicalities may be found hard-going by many people, but both secular and religious scholars, who endure through the ordeal, will be richly rewarded. They will find, not

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333 We may regard the Rabbinic principle *ain mikra yotse miyedei pheshuto* (quoted by EJ, p. 371, with reference to *Shab*. 63a and *Yev*. 24a, and there translated as "a Scriptural verse never loses its plain meaning", with the added comment "i.e., regardless of any additional interpretation"), as an implicit recognition that interpretations using the hermeneutic principles were not always natural. It may be asked how they managed to mentally accept conflicts between a *midah*-generated reading and a simple reading (*pshat*), given such a principle!

only an independent audit of Rabbinic hermeneutics, but a methodological demonstration of universal value. By the latter remark, I mean that the same method of exposition (by formalization) and evaluation (with reference to formal logic) can be applied to other movements of thought in Judaism, or outside it, in other religions or other domains (philosophy, politics, or whatever).

2. Inference of Information

We shall first consider the exegetic rules whose purpose is essentially to infer new information from passages of Scripture, rather than to elucidate or harmonize the text (the division is, admittedly, to some extent arbitrary). Included here are both deductive and inductive processes, of varying degrees of formality and certainty.

- We have treated ***qal vachomer*** (R. Ishmael's **Rule No. 1**) in considerable detail already, and need only here remind of certain details. This refers to a natural thought-process, **a fortiori inference**, the most deductive form of Rabbinic argument. The Rabbis of the Talmud and those which followed them, although they had an exceptionally well-developed understanding of this form of argument, did not have a complete understanding of it, such as one might expect in the event of Divine revelation. Their knowledge of it was not formal; they did not clearly distinguish inductive and deductive stages of reasoning; they misconstrued certain applications of the *dayo* principle[334]; and they erroneously counted the number of a fortiori examples in the Tanakh.

It ought to be remarked that R. Ishmael's formulation, just '*qal vachomer*', is very brief – at best a heading; he does not define the processes involved. The distinction between *miqal lechomer* and *michomer leqal* is not given in the list of Thirteen *Midot*; I do not know whether it is explicitly found in the Talmud or only

[334] I am referring here to the Rabbinical subdivision of the *dayo* principle discussed in a footnote to JL 4.4.

in later literature. To what extent were the Talmudic and post-Talmudic Rabbis aware of the difference between positive and negative a fortiori; did they ever note the distinction between copulative and implicational forms of the argument, did they use the secondary forms; at what point in history were the more complex Rabbinic formulations that we find in contemporary literature developed: these are all questions I ask myself, but have not researched the answer to. Historians of logic have still much work to do.

With regard to the legitimacy of the use of a fortiori argument. We validated four (or eight) primary moods, namely copulatives, subjectal or predicatal, positive or negative (and implicationals, antecedental or consequental, positive or negative) and a number of derivative secondary moods. Since the process has naturally valid moods, it follows that *if* these moods are used properly, no formal objection to their use in contexts not sanctioned by tradition is possible. Tradition can only restrict their use with reference to the inductive preliminaries (as we discussed under the heading of objections); but with reference to the purely deductive aspects, no Rabbinic legislation is possible[335]. It would be like trying to conveniently exempt oneself from the obligation of honesty or consistency!

The same freedom of thought must be acknowledged for all other purely deductive processes (or stages of processes), such as opposition, eduction, categorical or conditional syllogism, production, apodosis, and so forth. Any Rabbinic restrictions in

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335 Notwithstanding, the Sages were, in my view, very wise to reject corporeal punishment for breach of prohibitions discovered through *qal vachomer* argument, or for breach of Torah prohibitions whose penalties were inferred through *qal vachomer* argument. In practice, we can rarely if ever be 100% sure of having freed our deductions of all possible material uncertainties; and therefore some injustice might be caused. What is true of *qal vachomer*, the most deductive of Talmudic arguments, should be all the more true of the other hermeneutic principles. (According to EJ pp. 371-2, this canon concerning inferred prohibitions or penalties, is R. Ishmael's: *ain oneshim min hadin*; R. Akiba disagreed. We are referred to *J.T. Yev.* 11:1, 11d.)

such areas would be tantamount to an advocacy of antinomy, and cannot be tolerated. Rabbinic interference, on the grounds of some special Divine dispensation delivered at the Sinai revelation and transmitted by oral tradition, can only conceivably be applied to inductive processes; that is, with regard to situations which allow for *more than one* possible answers to a question, it is conceivable that there be a Divine decree as to which answer to favour in some specified situation(s) or all situations. However, we must keep in mind that the *conceivability* of such powers does not constitute proof that they exist in fact; it only makes logically possible a claim but does not justify it; and furthermore, that any controversy surrounding such powers throws doubt on their legitimacy.

- The technique of ***gezerah shavah*** (**Rule No. 2**) is also based on a natural thought-process, though a more intuitive and trial-and-error one. It consists in **inference by analogy**. The expression means "distinctive sameness", and therefore refers to the fundamental epistemological processes of *comparison and contrast*, which are jointly the basic technique of all concept formation. Applying them to textual analysis, we would quite naturally (i.e. without need of special communication or dispensation of Divine origin) look for homonyms and synonyms, to understand the language used and its conceptual references. In all discourse, we may find labels used which are analogous (similar in root, if not identical words), and apparently have similar or various meaning(s) in different contexts; or we may find different labels used in different contexts, with apparently the same meaning intended.

The scientific-minded approach to *gezerah shavah* would run somewhat as follows. The meaning of a label, i.e. a word (every letter identical) or group of words (phrase), or word-root (having certain common consonants, in the same sequence; though possibly with some different vowels and consonants which indicate, on a wider grammatical basis, varying inflexions) or group of word-roots, is suggested by the various contexts in which it appears in the text(s) concerned, as well as in other texts and current usage, and through comparative etymology.

a. **Homonymy**: If *a, b, c...* are all the occurrences of a label, and their assumed meanings (based on the above suggested

methods) coincide, and no other assumed meaning(s) would be as coherent, then it may be assumed that the proposed single meaning is the intended meaning. If in some isolated context(s) the meaning of a label is uncertain, and it is coherent everywhere else, the same meaning can in all probability be generalized to the uncertain instance(s). But if the label is *ambiguous* elsewhere, there being one assumed sense in some contexts and some other sense(s) in others, then if no clear differentiating conditions are apparent, the sense most frequent elsewhere (if any) is the most probable, though some doubt remains.

b. **Synonymy**: If *A, B, C...* are various labels and their assumed meanings (based on the above suggested methods) are unambiguous, and mutually identical or at least similar everywhere they occur, and not even conditionally dissimilar anywhere, then these labels may be considered to be equivocal and interchangeable; that is, they are different labels for the same thing. If in some isolated context(s) the meaning of a label is uncertain, and it is coherent everywhere else, the same meaning can in all probability be generalized to the uncertain instance(s).

Once the general meaning of a label or the equivalence of various labels is established, statements with the label(s) concerned may all be assumed to refer to the same subject-matter. A detailed example of the kind of analysis and synthesis here referred to may be found in our study of a fortiori in the Tanakh (JL 5-6).

A traditional example of *gezerah shavah* is given by EJ (with reference to *Pes*. 66a). The expression *bemoado*, meaning ‘in its appointed time’, is used both in Num. 9:2, concerning the Pascal lamb, and in Num. 28:2, concerning the daily offering (which includes the Sabbath); it is thence inferred that the Pascal lamb may be offered on a Sabbath (coinciding with Pessach), even though this entails activities forbidden on other Sabbaths.

It is obvious that such reasoning is highly intuitive and dependent on one’s overall context of knowledge. It is built up from the perception of words and the conception of their possible relations. The initial *insights* into possible meanings derived from immediate and wider context are conceptual acts

dependent on the faculty of imagination; and subsequent *ordering* of the data, though a relatively mechanical process, is a function of the amount of data available at the time and taken into consideration. Such judgments can in no wise, therefore, be considered to have deductive value, but are eminently inductive.

With regard to Biblical text, we have little material to refer to, other than the document itself. This means that our conclusions are virtually pre-determined, since the data available are finite, even if they constitute a sufficiently large and varied sample of the Hebrew of the time concerned. Actually, sometimes a word or phrase is only used once in the whole document, and its meaning becomes a subject of conjecture; obviously the more often a label appears in the text, the more certain its meaning. With regard to Hebrew usage later in history, it is of course very significant[336], but it must be kept in mind that it has been and still is culturally influenced by the interpretations suggested by the Rabbis, and therefore it cannot necessarily be used to further justify those interpretations.

The natural interpretative process is adductive: an idea is floated, then tested in every which way for consistency[337]. It is, for this reason, susceptible to abuse. One may too easily stress similarities and ignore significant differences; and thereby stretch the application of an idea beyond its rightful borders. Or again, one may ignore similarities and emphasize incidental differences, and thus artificially restrict an idea. This is true of all argument by analogy; and *repeated consistency-checking in an ever wider context of information provides the natural protection against error*, as in all induction.

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336 We are not here dealing with a dead language, so the job is less difficult.

337 e.g. does 'take' (*qach*) *always* signify acquisition by monetary payment, or must other meanings of the term be supposed, and if so how are they to be distinguished? It is not enough that an analogy is applied in one instance (without problems ensuing from that one application); it has to be tested in all other cases where the term appears, throughout the text at hand.

Now, such a relaxed and patient attitude can hardly be practical in a legal framework, where some decisive position may be required 'right now'. On the other hand, the necessity to decide does not logically imply an impossibility to reverse the decision taken, later, in the context of new knowledge or modified conditions. The Talmudic authorities had debated matters and come to various conclusions which seemed wise to them. However, post-Talmudic authorities, intent on preserving these very decisions, proposed additional clauses to the hermeneutic principles which were to ensure they always resulted in the same conclusions, no matter how the data-context changed.

Thus, in relation to *gezerah shavah*, they claimed that the Sages were occasionally informed by tradition as to which topics were open to legal analogy, but left to find the verbal analogy which would justify it; or again, that the Sages were in some instances informed of words which could be used for such inference, but allowed to find appropriate circumstances for their use; or again, that the Sages were told in advance the number of valid *gezerah shavah* arguments there would be![338] Now, I find all that hard to believe. Not only because it is very surprising that such alleged 'information' is (apparently) not explicitly mentioned by the protagonists themselves, but only makes its appearance in writing centuries later; but because the transmission scenario itself is unreasonable.

Is it plausible that serious teachers would pass on vital legal information to their students in the form of *riddles*? Why would they engage in such games, and not get to the point, if they had the information? One cannot imagine a functioning law system in which it is not the law and its justifications which are transmitted from generation to generation, but conundra. For then, one would have to consider that the laws in question (i.e. those to be inferred by such means) had been inoperative until their formulation in the Talmud. In which case, surely, the more basic thesis that the law has gone on unaffected by time since

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[338] The references given by Bergman for these three provisions are all post-Talmudic: *Halichos Olam* for the first two, and Rabbeinu Tam and Tosafot for the third.

Sinai – the very thesis these artifices were designed to defend – would be put in doubt. It seems obvious, therefore, that the above mentioned additional clauses are *ex post facto* constructs[339], based on no actual oral or written tradition.

The controversies surrounding yet other additional clauses to the *gezerah shavah* process, provide still more cause for suspicion that such additional clauses are not Sinai traditions, but later constructs (in this case, Talmudic)[340].

Thus, it is taught that the applicability of the *gezerah shavah* method depends on the 'freedom' of its middle term in one or both of its manifestations. This refers to whether each manifestation of the middle term involved, through which a legal factor is to be passed over from one issue to another, has already been utilized to justify some other Halakhah. Such a concern presupposes a principle that *each unit of information in the Torah can only serve for one inference*[341]; generic logic has no such restriction (a premise can be used in any number of arguments), but let us grant it to be a tradition. On this basis, three possibilities are considered: that the middle term is (a) 'free on both sides', (b) 'free on one side only', whether the source side or the target side, or (c) 'free on neither side'. Authorities say and agree among themselves that a *gezerah shavah* inference of type (a) is irrefutable. With regard to type (b), some say it is

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[339] Or, to be more explicit: pretensions, lies – made in support of a certain ideology, that of unchanging oral law. Note well the basis of my accusation: precisely in the attempt to buttress their concept of the fullness and continuity of tradition, these people are forced to acknowledge the occurrence, in the case under consideration, of incomplete transmission of information, and thus imply a loss of data in the interim and the unreliability of the transfer. The proposed formulae are therefore inconsistent with their own motive, and therefore must be inventions.

[340] EJ, p. 368, refers us to *Shab.* 64a and *J.T. Yoma* 8:3, 45a. EJ explains the development of the idea of "free" (*mufneh*) terms, as a way to prevent abuses of *gezerah shavah* in the schools; it adds that this is a R. Ishmael requirement, which R. Akiba apparently disagreed with.

[341] Not to be confused with the principle of R. Akiba that in the Torah no word is superfluous and no word-placement is accidental.

always valid, while others regard it as conditionally valid. With regard to type (c), some regard it as conditionally valid, while others say it is always invalid.

Similarly, there is a debate as to how much legal detail a *gezerah shavah* allows us to pass over from premise to conclusion. There is also a debate as to whether once legal data has been transferred in one direction, other data may be transferred in the opposite direction, so as to equalize both sides, or whether the process is more restricted. It is irrelevant to us, here, which opinions are correct in these various debates – what is significant is simply the fact that there are at all disputes on matters so crucial.

Regarding the 'freedom' (*mufneh*) concept, an interesting remark may be added: it can be viewed as an attempt, albeit a rather primitive one, to express the sort of *syllogistic* reasoning which follows the drawing of analogies. The Rabbis ask: once a term A is seen as analogous to a term B (*gezerah shavah*), can the laws applicable to A be applied to B and/or vice-versa? Their answers by means of the 'freedom' concept may be understood as follows.

If both terms are 'free', it means that they were never before used in syllogistic inferences, presumably because they are both *sui generis*; consequently, the Rabbis assume them to be mutual implicants, and allow syllogism hither and thither between them. If only one is 'free', the Rabbis presume it to be a genus or species (I am not sure which) of the other, and thus allow syllogistic inference of laws from the genus to the species, though not vice-versa. If neither is 'free', it means that they have already led separate logical lives, so the Rabbis presume that the terms are unconnected (or at least that neither implies the other), and so avoid syllogistic inference.

This perspective explains the Rabbis' concept, but does not fully justify it. For the basis of their syllogistic reasoning is too imprecise; they do not have a clear picture (even though this theory arose long after Aristotle) of the conditions of syllogistic inference. Similarity between terms and the histories of the use of such terms in inferences do not indubitably determine the implicational relations between these terms. The Rabbis lacked

a clear understanding of opposition theory, as we shall see also in the section dealing with harmonization.

- We may, in my opinion, place under one heading, namely **inference from context**, the exegetic methods known as ***meinyano*** and ***misofo*** (**Rule No. 12**) and those known as ***heqesh*** and ***semukhim*** (regarded as part of **Rule No. 2**). All these take into account the textual closeness of an expression or sentence to certain other(s), and on this basis assume that there exists a conceptual relation between the passages under scrutiny, which makes possible an inference of certain attributes from the context to the expression or sentence. There is, we might remark, a small element of inference by analogy in such processes[342], though it might be characterized as extrinsic rather than intrinsic. The differences between these four techniques are, however, less clear (to me, at least).

An example of contextual inference: the Rabbis inferred (by the rule *meinyano*) that the commandment "thou shalt not steal" in the Decalogue (Exod. 20:13), refers to kidnapping, on the grounds that the two preceding commandments, against murder and adultery, are both capital offenses, and kidnapping is the only form of stealing subject to the same penalty (EJ, which refers to *Mekh., Ba-Hodesh*, 8,5).

This argument can be formalized as follows[343]:

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[342] Note, however, that in some cases, traditionally classed as *heqesh* (see Abitbol, pp. 100-104), Scripture itself explicitly establishes the parity between the two areas of law. For instance, Deut. 22:26, which compares rape and murder, saying "for as when... even so..." (*ki kaasher... ken hadavar hazeh.*). In such cases, an inference is much more certain, though it may well have some limits, because it is analogical rather than contextual.

[343] JL, Addendum 6.

(a) Murder is a capital offense Adultery is a capital offense therefore (because textually adjacent) stealing is a capital offense	A is E and B is E but C is next to A, B therefore, C is E
(b) but also, of the kinds of stealing, only kidnapping is a capital offense therefore, as intended in the Decalogue, “stealing” means “kidnapping”	however, of all C only D is E therefore, here C means specifically D

Thus, judging from this traditional example, inferences from context can be expressed to some extent in formal terms, their common property being a proposition like “C is next to...”. However, such argument has varying force, in view of the vagueness of the copula “next to”, and its inevitable irrelevancy in some cases (as I have argued, there has to be changes of topic).

Note that only (a) is contextual inference; (b) is an additional argument, which takes off from a foregone conclusion (of here unstated source) that kidnapping is a capital offense, and infers that the term stealing in the previous segment was intended to refer specifically to theft of people.

Meinyano seems to loosely appeal to the surrounding subject-matter without precise definition of its textual position relative to the passage at hand. *Misofo* refers to a later clause or passage for the information it infers; though as some commentators have pointed out, it could equally well refer to an earlier segment of text. In these two cases, the conceptual common ground of source and target text is to some extent evident. In the case of *heqesh* and *semukhim*, however, the inference is based almost purely on textual contiguity, the contiguous passages (within the

same verse or in two adjacent verses, respectively) having little evident conceptual relation[344].

The natural justification of logistical inferences would be what we today refer to as ‘association of ideas’. When two ideas are placed next to each other in our thoughts, speeches or writings, it may be because of some logical relation between them, or entirely by accident, or again because one contains some incidental reminder of the other. This last possibility implies that in some cases, even when purely logical considerations are lacking, an inference might yet be drawn from the fact of proximity. However, the possibility of chance conjunction still remains: topic X may be entirely spent and the narrative moves on to topic Y, an entirely separate topic[345]. This alternative

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[344] *Heqesh* and *semukhim* are classified by commentators with *gezerah shavah*; but I am not sure why (except for analogies given explicitly in the text) – they are not really subcategories of it, being based on neither homonymy nor synonymy, but on textual proximity. Perhaps it is because they often involve elements of *gezerah shavah*, that they were rather grouped with it. Also note, the distinction between them is ambiguous: in text originally devoid of punctuation, like the Torah, how to tell the difference between the two parts of the same verse or two touching verses? It only becomes meaningful once the subdivisions of the text are established.

Looking further into the issue, I found some interesting remarks in *J.E.* Apparently, *gezerah shavah* initially referred to "analogies in either word or fact", but eventually was restricted to verbal analogies (homonymies), while *heqesh* became used for factual analogies (synonymies). If that is true, my presentation of these terms, based rather on Bergman's account, is inaccurate (terminologically, though not in essence). With regard to *semukhim*, it is attributed by *J.E.* to R. Akiba, quoting him as saying "every passage which stands close to another must be explained and interpreted with reference to its neighbor" (with reference to *Sifre* Num. 131); it adds that 'according to Ishmael, on the contrary, nothing may be inferred from the position of the individual sections'. In view of this, *semukhim* cannot strictly-speaking be counted as implicitly included in the 13 Midot of R. Ishmael.

[345] A case in point seems to be the above given example (Exod. 20:13): supposedly the next two commandments (against bearing false witness and coveting) are not subject to death penalty; in that case, why should stealing (or kidnapping) be a capital offense? Of course, if a proposition is surrounded on *both* sides by a certain subject-matter, it

possibility means that inference based solely on position is tenuous. The Rabbis were apparently aware of this uncertainty, and would use such processes only as a last resort, when the verse being interpreted involved a doubt which they had no other way to resolve.

R. Ishmael did not mention the exegetic methods of *heqesh* and *semukhim*, and attempts by later authorities to explain this silence have a hollow ring. Thus, Bergman (with reference to the *Sefer Hakerisus*) says of R. Ishmael that "he regarded the *hekesh* as the equivalent of an explicitly written teaching". If R. Ishmael did not even mention the subject, how can the later Rabbis know by tradition *why* he did not mention it. How can they have information on *his thoughts* on an unspoken issue? The very notion is self-contradictory: proving again that the authorities often confuse their personal *assumption* concerning some matter with a 'received tradition' (refusing to admit that R. Ishmael might not have known about these things, or that there might be no tradition concerning them, and that such issues must be resolved adductively).[346]

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becomes more likely that the common subject-matter of the two adjacent propositions somehow concerns the boxed-in proposition. Nevertheless, the possibility of *accidens* remains; there may well be significant underlying differences, which can be pointed to. An example is Exod. 21:15-17, where a law concerning kidnapping is found between two laws concerning striking and cursing parents, respectively. (Note that, as an acquaintance of mine, Dr. M. Izbicki, has pointed out, the laws on striking of parents and kidnapping both concern violent acts. Also, see Cohen, p. 474; the law assigns a penalty of strangulation for these two, but stoning for cursing parents).

[346] Regarding *heqesh* and *semukhim*, Bergman adds additional details, which we will not comment on, here, to avoid repetitions. I want only to point out that the *semukhim* inference he gives as an example at the end of the section is very odd: from (Deut. 22:11) the proximity of the *prohibition* of 'shatnez' and the prescription of 'tzitzit', the conclusion is drawn that shatnez is *allowed* in the case of the tallit! This is far from normal inference, since the conclusion is <u>an exception</u> to one of the premises, although there was no inconsistency between the premises. Formally, the argument runs as follows: 'You mustn't do X. You must do Y. Therefore, when you do Y, you may do X'. Since the conclusion formally implies 'you may do X' it is contradictory to the major premise;

Again, R. Ishmael, apparently (and as the name given to the process implies), did not regard or was not aware that *misofo* inference was equally feasible in the opposite direction (‘*mitechilato*’, if we may say so), from an earlier to a later statement or clause. Later commentators (Bergman refers to *Middos Aharon*), who considered such reverse inference possible, explain R. Ishmael’s silence by claiming, effectively, that in cases where the solution precedes the problem, the inference is so obvious that listing it would have been a redundancy. That is another anachronistic argument, whether we agree with the validity of such inference in both directions or not. The commentators must admit the possibility that R. Ishmael did not hold the same opinion, or more likely still (since he himself does not mention it) that he just did not think of the issue at all!

• Inferences of the ***binyan av*** type (**Rule No. 3**) seem to be a Rabbinical attempt at **causal inference** – using the term ‘causal’ in its widest sense, including any mode of causality; i.e. not only natural-mode causation, of motion or change, but also extensional causality, of ‘static’ (i.e. class) differences, as well as logical causality, or rational explanation[347]. Causal inference has been much clarified in more recent times by John Stuart

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such argument thus depends on an anti-literal particularization of the major premise.

[347] Our identification of *binyan av* with causal arguments may be too narrow; some examples in the literature seem like mere extrapolations with nary an underlying cause and effect thought-process (though we might construct one, ex post facto). An example given by Scherman illustrates this: Just as one may neither marry one's sister from the same two parents, nor one's father's full sister; then, since one may not marry one's sister from the same mother but different father, 'it follows that' one may not marry one's father's maternal half-sister (ref. to *Yevamos*, 54b). Scherman says *binyan av* is also known as *mah matsinu?* ("what have we found?"), though Bergman informs us that these two were counted separately in Hillel's list. I suspect the Rabbis at first engaged in generalizations with little reflection, and then gradually found it necessary to clarify conditions.

Mill[348], who identified the 'methods of agreement and difference'. It results from observation of two kinds of events or things, such that the presence of one is always accompanied by the presence of the other, and therefore that the absence of the latter is always accompanied by the absence of the former. In such circumstance, one may, from observation of the first event or thing, presume the second even when it is not observable. This is an inductive process, involving analogy and generalization. Symbolically, broadly-speaking, the essential relation between a cause C and an effect E may be expressed by a hypothetical proposition and its contraposite:

If C, then E (and if not E, then not C).

However, the Rabbinical attempts at formulation of this natural principle stressed more the side of 'agreement' than that of 'difference'. R. Ishmael refers to an inference 'from one verse' or 'from two verses'. There were subsequently disputes as to the meaning of these subdivisions (which disputes, incidentally again tend to show the lack of a clear oral tradition). Some Rabbis understood them, respectively, as follows: if two topics (X, Y) have a certain feature (A) in common, then *another* feature (B) which the one (X) has may be assumed to be had by the second (Y)[349]; or, if three topics (X, Y, Z) have a certain feature (A) in common, then *another* feature (B) which two of

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348 English logician (1806-1873), author of *A System of Logic* (1847). Mill's formulation of these methods is more complicated than the one proposed here: 'agreement' is observed constant conjunction of two phenomena, 'difference' is the constant conjunction of their negations; thus, the formal relationship is mutual, i.e. the same in both directions: this is the strongest form of causality, in which the cause is not only sufficient for the effect, but necessary or a *sine qua non* for it. Note that, in all such definitions (as Mill was aware), cause and effect are difficult to distinguish: to do so, we must look at their temporal or conceptual sequence. Note also that Mill suggested other important methods, namely 'residues' (elimination of alternatives) and 'concomitant variations' (see my *The Logic of Causation*, Appendix 1).

349 This approach is known as *Chada mechada* (Aram., 'one from one'). If the one-verse variant is so called, then the two-verse variant may presumably be called 'one from two' (but I do not know what it was actually called).

them (X, Y) have may be assumed to be had by the third (Z). Other Rabbis claimed to understand R. Ishmael's formula differently[350]. They sought for a common feature[351] (A, say) of topics under comparison (X, Y) which would *explain* their having in common some other property (B), in which case the reappearance of that same feature (A) *elsewhere* (in Z) could be taken as a sign of the same property (B) there (i.e. in Z). In fact, this formula is *formally* identical to the second of the above mentioned[352], merely adding the (valuable) comment that A is to be considered as the cause of B.

The difficulty in these statements is their emphasis on the positive, their attempt to generalize from a limited sample (X, or X and Y) without readiness to conceive the possibility of deviation from the apparently set pattern of conjunction (of A and B) in other cases, including, in particular, the case at hand (Y, or Z, respectively)[353]. Apparently sensing this weakness, the Rabbis tried to put a bit more emphasis on the negative, by pointing out differences in features between the (two or three) topics under scrutiny, thereby hoping to demonstrate other possible causes have been considered and eliminated. Thus, they might say, in the two-verse form of *binyan av*: X has C and Y lacks C, so that Z having C does not prove it has B; or again, X lacks D and Y has D, so that Z having D does not prove it has B. However, it should be clear that such statements are irrelevant to the main argument: they at best prove only that C or D *do not* cause B, but do not prove that A *does* cause B[354].

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[350] According to Bergman, this second school claimed the one-from-one inferences obvious and not needing to be included in the 13 *Midot*. How they viewed the 'one from two' formula, he does not say.

[351] Heb. tsad hashaveh.

[352] Added proof of which is the lack of distinction, in the 'common feature' approach, between one-verse and two-verse inference in accordance with R. Ishmael's formula. That is, if in this approach 'one-verse' means 'one from two', then what might 'two-verses' mean?

[353] Logicians refer to the underlying logical fallacy as *post hoc ergo propter hoc* (i.e. 'after this, therefore because of this').

[354] Unless, of course, it is already proven that A, C, D are the only alternative possible causes of B; so that the inference consists in

An example of *binyan av*, given in EJ (referring to *B.M.* 87b). The Rabbis attempt, with reference Deut. 23:25f., to determine whether a hired farm hand may eat produce, while working in fields other than those with vines or standing corn. To do so, they try to understand why the Torah allows him to eat in vineyards and in cornfields. They argue: it cannot be in relation to the obligation to leave gleanings for the poor (Lev. 19:10), since this applies to vine but not corn; and it cannot be in relation to the obligation to give the priest a portion of the dough (Num. 15:17-21), since this applies to corn but not vine; 'therefore,' it must be simply due to their being both plants, and the permission may be generalized to other produce.[355]

It appears from such redundancies that the Rabbis confused somewhat the trial and error mental process of *looking for* a cause (*ratio cognoscendi*), and the formal conditions of the objective causal relationship (*ratio essendi*). Had they known the latter clearly, they would rather have systematically first made sure they had a *complete enumeration* of the appearances of features A and B in the Torah, alone and/or separately, as well as their negations if any. Then, to make possible the inference from A to B, in situations where A is mentioned in the text but B is not mentioned, they would have to check, not only that A and B are sometimes both affirmed together (at least once, but the more the better), but also that A is never affirmed with an explicit *denial* of B (that is the missing negative element). Furthermore, the *probability-rating* of the inference would be

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elimination of two out of three possibilities. But that is not everywhere the case.

355 The logical naivety of such argument should be obvious. Say a boss calls three of his employees to his office (intending, say, to congratulate the first for his new-born son, give a raise to the second, and fire the third). No one knows the boss's reasons, but the third employee tries to guess why he has been invited, by looking for a 'common factor' in the two others. He says: "it cannot have to do with hair colour for the first is blond and the second is a brunette; it cannot have to do with honesty, because the first is dishonest and the second is honest; it must therefore have to do with nose shape, because both, and indeed I too, have the same nose shape." His whole argument is utterly fallacious and beside the point!

proportional to the frequency of conjunction of A and B, compared to that of A mentioned alone without mention of B[356]. It is possible that in the cases where the Rabbis applied this principle, they (who knew the Torah by heart) automatically performed these consistency tests and probability judgments; but they did not always do so explicitly.

My analysis of *binyan av* suggests that the Rabbis often committed the fallacy[357] of *post hoc ergo propter hoc* (i.e. after this, therefore because of this). This consists in interpreting a sequence of events as causal, rather than merely coincidental, without proper justification. This kind of thinking is hard to avoid in the context of a closed book like the Bible. Because the characters and events in it seem exemplary and final, we are tempted to *accept them as empirical data and generalize from them* to our heart's content, without regard to inductive rules. The Rabbis were conscious of the dangers of excess involved. For instance, that people might wish to imitate Pinchas, and kill out of some moral indignation[358]. In such contexts, the Rabbis would designate the event as somehow unique and limited to particular circumstances or to the time and place. The problem is of course that they were not consistently rigorous in their interpretations.[359]

It must be stated that aetiology does not insist that the cause be one event or thing, or that the effect be one event or thing; each of these (cause or effect) may itself be two or more **parallel** things or events, provided the stated rules of induction (agreement and difference) are adhered to for them all singly.

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356 For it always remains conceivable that *non-mention* of B in certain passages signifies *negation* of B, even though there are no known cases of presence of A with absence of B, which fact inductively allows us (indeed, obligates us) to generalize and say that A implies B.

357 According to the *History of Philosophical Systems*, p. 67, hermeneutics for purposes of Halakhah consist of "strict logical rules". I quote this here quite incidentally, to show how far the myth of a Rabbinic logic is spread.

358 The assassination of Y. Rabin comes to mind.

359 JL. Addendum 7 (part).

Furthermore, if the rules of induction are not invariably adhered to (whether by a single event or thing or many of them), they might still be found to apply **conditionally** or **compositely**: that is, provided we manage to identify and distinguish the conditions under which our partial causes become complete causes or our occasional effects become constant effects[360]. Consequently, too, there may be circumstances in which one event or thing is the cause of a certain effect and other circumstances in which another is so; or again, a certain event or thing has some effect in one set of circumstances, and another effect in another set.

These details of causal logic were apparently not entirely understood by the Rabbis, judging from certain limiting suggestions they made. One such Rabbinic limitation was that (with reference to the symbols introduced above)[361] if X and Y have in common yet another feature (E, say) which Z lacks, then Z cannot be assumed to have B. *I say*, viewing 'A+E' as a joint feature, this objection seems reasonable; but it still remains possible that A causes B. Another Rabbinic limitation was the rejection of the possibility that distinct features of X and Y, such as C and D (see above), may independently cause B in their respective subjects, so that Z, which has only the common feature A, but neither of the distinct features C, D, may not have B. *I say*, it is conceivable that the two compounds 'A+C+nonD' and 'A+nonC+D' might be parallel causes, while the compound 'A+nonC+nonD' is not a cause: the issue depends on the

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[360] Conditional/partial causes, considered together with their conditions or allied parts (i.e. collectively), constitute unconditional/complete causes. Occasional effects, in loosely defined surrounding circumstances, become constant effects, when the significant circumstances are more precisely pin-pointed. All such variations on the theme of causality are obvious to anyone who has studied hypothetical logic, considering multiples and compounds of antecedents and consequents, and nesting; it is no great secret (at least nowadays).

[361] Where X, Y, Z have in common A, and X, Y have in common B; and they would conclude that Z has B, also.

negative side, which they ignored in their initial definition[362]. Such attempts at exception show, to repeat, that the Rabbis were not certain as to the precise conditions of causality[363].

There is a manifest failure of theoretical research in logic, independent of any Torah related doctrines, by the Rabbinic authorities. Consequently, as may be expected, there is a lot of controversy between them on methodological issues (which, of course, ultimately affect the law); and worse still, sometimes the controversy revolves around a totally artificial issue (which naturally enough emerges from some general belief to which the disputants are all attached). What amazes me is that the existence of such controversies does not cause any of the people involved to frankly question the ‘orthodox’ doctrine that the hermeneutic principles, in their entirety, are Sinaitic revelations.

A case in point is the discussion concerning the ‘two verses coming as one’ principle, according to which if a law L is stated in relation to two subjects, S1 and S2, and logically L(S1) implies L(S2), and/or vice-versa, so that one of the statements is redundant, then L may *only* be applied to the two situations specified. This principle has no natural basis, as far as I can see; i.e. it does not formally follow that L(S1) and/or L(S2) *cannot* logically imply some other, unstated application, say L(S3). If such implication does logically occur, it cannot be inhibited by Divine or Rabbinical fiat (God does not contradict His own natural laws, nor allow them to be by-passed by humans) [364]; for

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362 It does not surprise me, therefore, that, according to Bergman, 'the *Gemara* does occasionally raise such a refutation'. He adds that 'the commentators (to *Kesubos* 32a) have formulated principles to explain these exceptions'; I have not seen these principles, but we must keep in mind that they are ex post facto rationalizations, since natural logic allows alternative causes.

363 Another issue they raise is whether the exceptions have to be 'significant' or not – claiming that refutation of a 'one from one' *binyan av* requires a legal exception ('stringency or leniency'), whereas against a 'one from two' *binyan av,* any exception (legal or non-legal) will do. I can only say that such a distinction is not made by natural logic.

364 I refer here, of course, to deductive logic; if the 'implication' is merely inductive, i.e. not *necessary* but only *recommended as*

this reason, the restriction must be classed as artificial. Analytically, it seems to be merely an outcome of R. Akiba's claim that there is no superfluous statement in the Torah; which idea is itself controversial, since R. Ishmael (theoretically) rejects it, claiming that the Torah speaks in the language of men. Whatever its source, there is controversy concerning the precise formulation of the proposed principle, from Mishnah onward. Some authorities (among them Tosafot) claim that at least two redundancies are required for such restriction. Some (among them Rashi) say that the restriction is in any case not general to all inference, but limited to attempts to extend the law concerned by means of *binyan av* inference. But I see no formal basis for these subjacent disputes, either.

The deep intellectual cause of such deviations from natural logic is, in my opinion, initially a naive *non-formalism*, gradually developing into a systematic *anti-formalism* (which is also naive, in other respects). The historical cause is an unfortunate, at first emotional and later ideological, antipathy to what they called 'Greek knowledge', which blocked any attempt to learn from the discoveries of others. For these people, *logic* has to adapt to the requirements of pre-conceived contents (the Halakhah), rather than all contents yielding to the dictates of an objective, formal logic. This Rabbinic claim of total control is evident, for instance, in Bergman's statement in this context: "The rules regarding Scriptural texts... reveal a law only in relation to the place they are applied and not elsewhere".

The doctrine of the Sinaitic origin of Rabbinic hermeneutics is not primary, but a derivative of the doctrine of the Sinaitic origin of Rabbinic law. The Rabbis thought they could manipulate logic however they saw fit, so long as they arrived at the required legal results. Controversies occurred only in relation to the necessity or efficacy of this or that manipulation, but not in relation to the underlying epistemological assumption.

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probable, it might conceivably be preempted with reference to wider considerations.

These reflections need not be taken radically. Our concern, here, is with Judaic logic as such, not with Jewish law. If we throw doubt on the former, it does not necessarily follow that all, or any, of the latter is wrong; for, as logic teaches, denial of the antecedent (in this case, some aspects of Rabbinic hermeneutics), does not imply denial of the consequent (in this case, Rabbinic law) – *unless* their relationship happens to be exclusive. A law may be correct (i.e. truly Divinely-willed), but improperly derived from the text (i.e. from the wrong place or in the wrong manner). A law may, of course, alternatively, be incorrect, as well as improperly derived. These are not matters which can be dealt with in general ways; but each case must be reviewed carefully, after which the consistency of the whole must also be verified. In any case, logic cannot itself be made an issue of faith, something optional.

A statistical note. I have not so far found out just how many times each form of exegesis described here is actually used in the Talmud and other Rabbinic literature. For the moment, here is some information gleaned from the Index Volume of the Soncino edition (1952) of the Babylonian Talmud. As we saw in JL 5.5, this index contains some 137 references to *qal vachomer* argument (under various headings). With regard to various forms of argument by analogy, there are some 161 references (analogy, deduction by, 58; comparisons, for purpose of deriving laws, 1; *gezerah shawah*, 81; *hekkesh*, 17; *semukin*, 1; texts, proximity of, 2; textual reading, 1). Whether this index is complete, and whether each reference concerns a distinct sample or there are repetitions, and whether some references relate merely to theoretical discussions, I cannot venture to say[365].

Note also that we must distinguish between use of an argument: (i) *within* the Bible itself (e.g. we know of four or five cases of *qal vachomer* in the Torah, and two dozen more in the rest of the Bible); (ii) *by* the Rabbis, especially those of the Talmud, in their efforts of exegesis *from* the Bible, as a document, of Halakhic or

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365 See also, possibly, the items: exegetical principles, 2 references; rules by which law is expounded, 2; texts, exposition of, 3; texts, implication of, 1.

Hagadic material; and (iii) *by* the Rabbis, especially post-Talmudic ones, in relation to the non-exegetic pronouncements *of* other Rabbis. Clearly, the statistical question constitutes a large and difficult research project in itself.

3. Scope of terms

Obviously, in the reading of any text, understanding the terms used is of the essence. This has two aspects: a *qualitative* aspect, which by its very nature presupposes knowledge of the language involved, and a *quantitative* aspect, which relates to determinations of scope. Rabbinic tradition has, of course, had much to say about both these aspects. The first aspect, elucidation of the denotations and connotations of terms, is in part dealt with within the hermeneutic principles, by way of inferences by analogy and context; and in part, it depends on cultural and religious tradition and the insights of commentators. The second aspect, concerning subsumptive issues, is covered by a set of hermeneutic principles which we shall now consider.

- The methods of exegesis known as collectively *klalim uphratim*[366], are efforts to interpret the effective subsumption of logically overlapping terms found in the Torah (and thence applicability of the proposition(s) involving those terms). ***Miklal uphrat*** (**Rule No. 4**) is the interpretation of a genus + species combination, in that sequence, as having a limiting effect, signifying 'only the species mentioned' (the species is mentioned for purposes of excluding others of the same genus); whereas ***miprat ukhlal*** (**Rule No. 5**) is the interpretation of a species + genus combination, in that sequence, as having an

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[366] This phrase is wrongly translated by Bergman as "generalizations and specifications"; we would prefer "generalities and particularities" or "genera and species". Strictly speaking, the term generalization, in English, refers to a mental process moving from a particular statement to a general one, and specification refers to a movement from a vague statement to a more precise one. Here, however, the issue is finding out how wide or narrow was the intent of the writer of the text.

enlarging effect, signifying ‘the species mentioned and others like it’ (the species is mentioned as a sample of those in the genus). An easy way to remember these two rules is to say that the result is equal to the second of the two given terms. Other such rules, as we shall see, have an overall limiting result.

To put us into the picture let us note that, in everyday discourse, we would (depending on the precise wording) understand the conjugate scope of logically overlapping terms as follows, granting that G is an overclass and S1, S2... one or more of its subclasses, and that G and G’ are two classes which partly intersect without either subsuming all of the other’s instances and S, say, is the entire subclass referring to the G’ part of G. A statement whose subject is “GS” or “SG” would be interpreted minimally as concerning the species “S”[367], though in some cases the genus “G” might be appropriate. “G *such as* S1, S2...” might be read as “S1, S2...” (if ‘such as’ is taken to mean ‘similar to’) or as “G” (if ‘such as’ is taken to mean ‘for examples’). A listing of the form “S1, S2... *indeed* G” would likely be intended as “G”, though without a qualifier like ‘indeed’, a doubt might subsist. Lastly, “GG’“ or “G’G” is usually intended as “G and G’“ (i.e. “S”, their common ground), though occasionally might mean “G or G’“ (including both their grounds, as well as “S” or even possibly to the exclusion of “S”).

There is evidently much vagueness in ordinary language, which logical science can easily overcome by instituting conventions. This field of inquiry is not class logic proper, but a linguistic preliminary to it. Note that a mental act of ‘reconciliation of conflicts’ is involved, insofar as the terms dealt with are in some tension, according as we understand reference to a genus as concerning the whole of it (*davqa*) or most or an unspecified portion of it (*lav davqa*), and reference to a species as concerning it at least (*lav davqa*) or it exclusively (*davqa*). When the terms are mentioned together as subjects of propositions, there is therefore doubt as to whether the result is a generality, a contingency or an indefinite particularity. The logical rule, in

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[367] Note, however, that in English an adjective usually precedes a noun, while in Hebrew if follows it.

case of doubt, is to acknowledge, by dilemmatic argument, the indefinite particularity (*at least* some) as true; deductively, we remain open-minded as to whether the generality (all) or contingency (some, but not all) is true; inductively, we opt for the generality, because it introduces no new polarity, unless or until conflicting evidence is found.

For the Rabbis, in the *klal uphrat* case, the genus is mentioned as a first approximation of the meaning intended, and the species is added to more precisely pin-point that meaning. For instance, in Lev. 1:2, "of the livestock (*behemah*), of the herd and of the flock," the general term is one of variable connotation (it could be taken to include other types of animal, such as asses perhaps) and is clarified by means of the mentioned species. To explain why the species were not simply mentioned alone, without the genus, we are told that *extensions* unintended by the writer might then have been proposed, or alternatively that certain details suggested by the genus might have been missed; opinions differ among the authorities on this point. We could accept an amalgam of both as reasonable: the genus is there, effectively, to say "but do not include with these species, other *dissimilar* species of the same genus".[368]

In the *prat ukhlal* case, some species are first listed to indicate the kind of thing intended, and the genus is added in conclusion to indicate "and other things of the same kind" to be also intended. For example, in Exod. 22:9, "an ass or an ox or a sheep, or any beast (*behemah*)," the species exemplify the things intended and the genus serves to extend the application of the law concerned to other similar things, implying the initial list not to be exhaustive. To explain why the genus was not simply mentioned alone, without the species, we are told that *exceptions* unintended by the writer might then have been proposed, or alternatively that certain details suggested by the species might

368 A way to explain the mention of the overclass is to regard it as intended to *allude* to its instances or subclasses not included in (or alluded to by) the mentioned subclass; which are to be the subject of an unstated proposition of opposite polarity, which makes the stated particular a contingent.

have been missed; opinions differ among the authorities on this point. We could again accept an amalgam of both as reasonable: the species are there, effectively, to say "and be sure not to exclude from this genus, other *similar* species of the same genus".

These methods, and other variations (mentioned below), are R. Ishmael's; R. Akiba proposed others in the same contexts: he determined the scope of statements with reference to the principles of ***ribui umiut*** and ***miut uribui*** (amplification and limitation, and vice-versa). The technical difference between these approaches is essentially one of emphasis. Whereas in *klal uphrat*, the mention of species serves to more precisely define the initial genus; in *ribui umiut*, the explicit mention of species stresses the exclusion of certain dissimilar things, not explicitly mentioned, belonging to the initial genus. And whereas in *prat ukhlal*, the final genus serves to more broadly define the full extent of the list of species, adding to those explicitly mentioned more species not explicitly mentioned, while also incidentally somewhat limiting, as all definitions do, excessive extrapolations; in *miut uribui*, the mention of the genus stresses the limits of extrapolation more, excluding certain unmentioned species of it too extremely dissimilar to the mentioned species, while also incidentally suggesting certain unmentioned species to be included[369].

These forms of interpretation seem to me natural enough in themselves. In many cases, the wording is clear and no discussion is possible, anyway. However, in some cases, the results do not seem formally inevitable: one might sometimes view genus+species as signifying 'genus, *of which* a sample

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369 Albeit the theoretical formal convergence between these approaches, they in practice often led to divergent material conclusions (with R. Akiba's often ending up as Halakhah). I would need more specific knowledge of the Talmudic debates concerned to be able to explain why. But, assuming I have correctly understood the formalities and basing myself on the few cases I have studied, I would say that such differences simply go to show the amount of subjectivity involved in the 'inferences', in practice.

species is...'[370], and species+genus as signifying 'species, *of which* the relevant genus is...'[371]; in such cases, note, the term mentioned in second place is effectively in brackets, suggesting a proposition which communicates, in passing, some incidental information (not necessarily of immediate legal relevance). Consequently, if we take the rules as *ex cathedra* pronouncements, and attempt to always tailor our interpretations to fit their given formats, we are not unlikely to be occasionally misled. Clearly, behind such regulations is the rigid mode of thought which denies stylistic license to a document of Divine origin [372]

- With regard to the other combinations and permutations of these inferences of scope (classed as **Rule No. 6**), notably ***klal uphrat ukhlal*** and (apparently a later addition[373]) *prat ukhlal uphrat*, we need only add the following comments. These

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370 e.g. 'logical arguments, syllogism, adductions, are means to knowledge' does not restrict the genus to the listed species. One might construct a sentence in this way, if one thought some auditors unable to grasp the generic subject's name without apposition of some more familiar species names.

371 e.g. 'Aristotle's syllogism, a deductive argument, yields categorical conclusions' does not intend the genus as a whole but only the species. The genus, here, serves only to place the specific subject in a larger context.

372 It is interesting to note that the rationalistic philosophy, trying to explain every word and word placement in a certain preconceived manner, which is assigned to R. Akiba, is here, and in other instances, really at the basis of R. Ishmael's inferences, as well as R. Akiba's.

373 It is noteworthy that R. Ishmael mentioned only the first of these as one of his rules, ignoring the second and also *klal-klal-prat* and *prat-prat-klal*. My explanation of such repeated gaps in R. Ishmael's list is simple: as often in the early stages of an investigation, thinkers do not initially work out an exhaustive analysis of the topic concerned with reference to *symmetries*, but rather concentrate on cases which happen to arise before them in the context of their less abstract concerns. It is only later that they, or their successors, look into other possible combinations and permutations suggested by reshuffling the terms at hand. R. Ishmael did not get around to that systematizing stage; his successors did. (All well and good; what is annoying is their attempts to justify their results by imputing them anachronistically to him.)

involve successive operation of the preceding two principles, with the *klal* stages having a broadening effect, and the *prat* stages a narrowing effect, the overall result being relatively narrow[374]. There is a proportionately greater opportunity to force the text into preconceived formats, rather than interpreting it naturally. It seems to me that we should always try to grasp the simple reading (*pshat*), and avoid deviation from it without overwhelming justification.

An example: Num. 6:3-4 forbids the Nazirite from drinking wine or strong drink or their vinegars or liquor of grapes, or eating fresh or dried grapes or anything made from the grapevine, from the kernels (*chartsanim*) to the husks (*zag*)[375]. According to Bergman, *Nazir* 34b reads this passage as *prat ukhlal uphrat*, but this seems to me unjustifiable, if 'strong drink' (*shekhar*, which can make one drunk) refers to alcoholic beverages other than wine and such. For in that case, 'wine and strong drink' cannot be wholly regarded as a *prat* in relation to 'products of the vine', which is a *klal* at best only in relation to wine and other grape-based drinks, fresh or dried grapes, and kernels and husks. The way all these items are listed is natural enough, in three classes grouping together alcoholic drinks (not all grape-based), normally eaten forms of grape, and parts normally wasted by the consumer, respectively, and additionally mentioning a wider class which most (*but not all*) of the items fall under. To insist on fitting them into the format *prat ukhlal uphrat* is artificial and inaccurate.[376]

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[374] A technical distinction suggested by the Rabbis between the two stated principles is that, quoting Bergman, the first "dictates that every item which bears even one similarity to the specification is included," whereas in the second "the item to be included must resemble the specification in at least two aspects." He adds: "How significant the resemblance had to be was left for the Sages to determine. Occasionally, they considered several aspects as one." Here again, I must say, I see no natural basis for these added details.

[375] These words are variously understood by the Rabbis.

[376] Another kind of example is Num. 18:16, which according to Bergman is interpreted in *Shevuot* 4b as *klal ukhlal uphrat*. Here, the forcing consists in reading a subject, predicate and qualification of

- We should also mention here the principles ***miklal hatsarikh liphrat*** and ***miprat hatsarikh likhlal*** (general term requiring a particular [complement], and particular term requiring a general [complement]), which R. Ishmael's list groups together as one (**Rule No. 7**)[377]. We may classify these, as Bergman does (presumably following previous authorities), with the *klalim uphratim*. The distinction between them is, he suggests, effectively: whereas *klal uphrat* and *prat ukhlal* and their ilk concern the collective effect of separately clear terms, the *hatsarikh* rules relate to vague terms whose precise meaning is only clarified by their mutual impact on each other. This distinction is very fine indeed, and rather forced judging by the examples given in the literature[378].

I would say, rather, that a case could be made for distinguishing between functionally independent terms (broadly speaking, classes of entities, which may however have a hierarchical relation; e.g., 'animals' and 'bulls') and dependent terms (more precisely, a relatively independent term, like 'bulls', and its complementary clauses; e.g. 'the horns *of*' or 'the goring of people *by*'). The relation between independents is at best simply subsumptive (bulls are animals), whereas the relation between dependents is a more complex one, like possession or action (bulls have horns and bulls gore people)[379]. The former

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predicate as classes (broad, broader and narrower), ignoring entirely their relative positions (logical roles) in the sentence.

377 Why he should do so, when he separated *klal uphrat* and *prat ukhlal*, is a mystery to me; or alternatively, why were not the latter two and their multiples grouped together, similarly? I would suggest, here again, a failure to stand back from accumulated knowledge and re-order and systematize the results obtained.

378 For instance, the example from Lev. 1:2 given earlier would, according to Bergman's definitions, constitute a *klal hatsarikh liphrat* rather than a *klal uphrat*, as well as I can tell. Note, however, that Bergman hints that 'there are many varying opinions' concerning the definition of *hatsarikh* processes; so, we might reserve judgment.

379 This distinction is reminiscent of that which logicians make, between *categorematic* and *syncategorematic* terms, though not exactly identical. Note that, unlike independent terms, dependent terms

supplement each other, the latter *complement* each other. I do not mean to say that the Rabbis did classify their inferences under this or that heading on the basis of the distinction I am proposing (though perhaps they were trying to), but rather that if they insisted on making some kind of subdivision of the phenomena at hand, they might relatively usefully have selected it instead of the above mentioned[380]. I say 'insisted', because my distinction too is not radical enough to justify the formulation of additional hermeneutic rules. For one can usually (and much formal logic is based on this operation), perform what is known to logicians as a 'permutation'[381], and change the complementary term into an independent one (bulls are 'horn-having things' and bulls are 'goring things').

A note on statistics. The Soncino general index has 77 references to the topic of *klalim uphratim* (supposedly, but I did not check). These come under various headings: amplification, 5; amplification and limitation, 15; amplification following amplification, 2; extension in exegesis, 5; general principles and exceptions, 1; general rulings, 2; generalisation, 2; generalisation and specification, 28; limitation in exegesis, 6; rule, general and particular, 1; rule, extension and limitation, 1; *ribbui*, 1; *ribbui umiut*, 1; specification, 1; specification as exegetical rule, 2; specification and generalisation, 4. As before remarked (in the discussion of Talmudic a fortiori), to what extent such a list is exhaustive and non-repetitive, is hard to say without further investigation. In any case, it does not tell us precisely how many times each rule is actually used.

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are not conjoined by a mere 'and', but by more intricate relations like 'of', 'by', 'for', 'through'.

380 A Torah example might be Num 18:16: "according to your valuation, five silver shekels" (mentioned in an earlier note), where 'five silver shekels' makes no sense by itself, apart from the concept of 'valuation' (in this case, for redemption purposes).

381 It should be noted, however, that certain terms, which are colloquially put in a similar format (notably, 'capabilities of' and 'metamorphosis of') cannot be freely permuted without causing eventual contradictions. But such issues cannot be addressed in so narrow a context; they are fields of logic in themselves.

4. Harmonization

Broadly put, the five remaining hermeneutic principles, Rules 8-11 and 13, which we shall label 'harmonization rules', serve to resolve apparent redundancies, discrepancies, doubts, tensions or inconsistencies between propositions. In some cases, their results are identical with those of formal logic; in some cases, they favour a course which is only a possibility among others according to formal logic; and in some cases, they suggest a course which formal logic would not have recommended. Note that these principles constitute units of thought-process, which may be operative individually in simple situations, or eventually successively in complex combinations.

Note that my formal analysis in this section is based on a possibly limited sample, drawn from the derivative literature on the topic that I have consulted. The few examples which are there presented as representative of the Rabbinic tradition may not be fully representative of that tradition. Furthermore, even if these examples are fully representative, it remains possible, indeed likely, that direct and thorough empirical research into the Talmud and other Rabbinic literature would reveal a much larger variety of forms of thinking, legitimate or not, in actual use[382]. The observations of the Rabbis of the past 2,000 years interested in these matters, and their conceptualizations and classifications of what they noticed, need not be taken for granted. On the contrary, as we show here, their failure to use formal methods make it very probable that they missed some of the available data and misjudged the data they had. Much work can still be done, and it is hoped that my initial efforts will be pursued further by others.

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[382] A case in point was indicated in an earlier footnote (to 8.2): the inference, from the prohibition of shatnez and the prescription of tzitzit, that shatnez is allowed in the case of the tallit. But also, previously and further on, we find many tacit inferences in Rabbinic thought, which though allied to explicited principles, are not themselves aspects of those principles.

It should be noted that none of the harmonization rules here dealt with are mentioned in the Soncino index[383]. So, I have no inkling how often these rules are actually used in the Talmud.

Our interest here, note well, is not in the legal issues as such, but in the logical structure of the exegesis. I have no Halakhic ax to grind; my purpose is to institute a *methodology* for clarifying, classifying and evaluating Rabbinic exegesis, with reference both to its theoretical and practical aspects (that is, R. Ishmael's rules and their explanation by Rabbis, on the one hand, and examples of their application in Talmud and other Rabbinic literature, on the other hand). Our empirical data consists of traditional pronouncements and actions, but our analytic approach to this data will be strictly objective and scientific.

We shall now deal with the first three (actually, four) of the hermeneutic principles which begin with the phrase ***kol davar shehayah bikhlal veyatsa...*** (**Rules No. 8-10**), which means literally 'anything which was in a generality and came out...'[384]. Broadly put, in formal terms, these rules are concerned with the following exegetic situation:

Given:

All S1 are P1 (major premise),

and All S2 are P2 (minor premise),

where All S2 are S1, but not all S1 are S2 (subjectal premise)[385],

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383 Though possibly "text, superfluous", which has only one reference, applies.

384 Note that these rules differ from the *klalim uphratim* in that, rather than concerning the mutual impact of *terms*, they concern the mutual impact of *propositions*, estimated by careful scrutiny of the subjects and predicates they involve, as well as their various other formal features (polarity, quantity, modality, etc.).

385 Note carefully that it is the narrower subject S2 that implies the wider subject S1; for that reason, we say that S1 is subaltern to S2. On the other hand, since S1 includes S2, we say that S2 is subordinate to S1.

and P1 and P2 are in some relation *f*{P1, P2} (predicatal premise).

What are resulting relations:

between S1 and P1, and between S2 and P2, other than the above given;

and between S1 and P2, and between S2 and P1 (conclusions)**?**

This, then, concerns two subalternative subjects (S1 and S2, whose genus-species relation is defined in what we shall call the 'subjectal premise'), which are found in Scripture separately related to two distinct predicates (P1 and P2, whose relation is defined in what we shall call the 'predicatal premise') [386]. The given relation of the genus (S1, the major subject) to its predicate (P1, the major predicate) will be called the major premise; while that of the species (S2, minor subject) to its respective predicate (P2, the minor predicate) will be called the minor premise. The question asked is, what information can be inferred concerning the various subjects and predicates (conclusions)? *For us, this question is two-fold: (a) what conclusions does **Rabbinic tradition** propose, and (b) what conclusions does **pure logic** propose; comparing these sets, we might find them to coincide or intersect or entirely diverge.*

The major and minor premises are given explicitly in Scripture (presumably, though it is conceivable that they be only implicit, provided they are derived from the text *purely* deductively). The subjectal premise may be textually given (or, again, strictly implied), or, as often happens, it may simply be obvious (natural knowledge); likewise, for the predicatal premise. The form of the latter relation, *f*(P1, P2), varies from rule to rule, and of

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[386] If two propositions have identical (or at least, logically implicant) subjects (both S, say), these rules do not apply. In such case, we are dealing with ordinary 'oppositional logic', so that the opposition of the propositions is in principle identical with the opposition of the predicates. However, if the quantity differs in the two premises, then it might be argued that their subjects are not technically equivalent, but merely subalternative (all S = S1 and some S = S2). Whether in the latter case the Rabbis would apply the rules in question, I do not know.

course will affect the conclusions drawn. One of P1 and P2 may be subordinate to the other, or they may imply each other (being identical, or logically implicant); or P1 and P2 may be otherwise compatible (subcontrary or unconnected), or they may be incompatible (contradictory or contrary).

As for the ‘conclusions’ proposed, we shall see how they vary, and are generated, as we proceed; note that they may be inductive, as well as deductive. It should be remarked that in Rabbinic exegesis, one or more of the premises may be altered in the course of the argument: an initially general proposition may end up as contingent or as exclusive; such changes must be counted as ‘conclusions’ (or part of the overall ‘conclusion’), too.

Needless to say, the Rabbis never formulated their rules in such formal terms; I have expressed them in this manner to clarify them and evaluate them with certainty. R. Ishmael’s definitions (roughly, but passably) specify the major, minor and subjectal premises, as well as (though not always clearly) the putative ‘conclusions’, in ordinary language. But they do not specify, or do not more than hint at, the predicatal premises, which must be more or less guessed at, with reference to traditional examples; *our hypotheses in this regard are confirmed by the symmetry and exhaustiveness of the combinations they postulate*. As for logical evaluation, R. Ishmael and his contemporaries and successors do not make any effort at, or demonstrate any skill in, formal analysis of the processes; we will endeavor to fill the gap.

Furthermore, I very much doubt that these hermeneutic procedures were mechanically applied wherever their respective formal conditions were found; rather, I suspect, they were treated as a set of tools, which could be used, or ignored, as convenient, provided the Rabbis all approved. It is hard to imagine how they could proceed otherwise, because as we shall see the conclusions they draw are more often than not logically unnecessary (if not, in some contexts, illogical); whence it follows that inconsistencies are bound to arise in some cases, calling for a retreat from previous exegetic acts which caused the trouble. But to prove this prediction, one would have to study the Talmud in much more detail than I have done; ideally, one

would need a well-ordered list of all the cases where exegesis took place.

Now, *by means of syllogism*, we can without further ado make the following inferences (side conclusions)[387]:

From the minor and subjectal premises, **Some S1 are P2** (mood **3/AAI**).

From the major and subjectal premises, **All S2 are P1** (mood **1/AAA**).

Yet other formal syllogisms may be possible, depending on the predicatal premise involved; such eventual inferences will be pointed out as we proceed.

In some cases, these various deductive inferences lead to no antinomy and are accepted by the Rabbis, though they may go beyond them and recommend some inductive process (for instance, an *a-contrario* reading or a generalization). In some cases, they lead to no antinomy, but are refused by the Rabbis (for reasons we shall see), who inhibit them in some way (for instance, by means of an anti-literal reading of the text or a particularization). In some cases, deductive logic from the given data results in a conflict, which must be resolved; and here again, the Rabbis may favour one reconciliation over another.

We have above considered, and will continue to do so, only the **copulative** forms of *kol davar shehayah bikhlal*; that is, forms involving *categorical* propositions. However, it should be clear that **implicational** forms of same are equally conceivable; that is, forms involving *conditional* propositions. Both types are used in Rabbinic examples, though perhaps the former more so than the latter. As shown below, the overall format of implicationals is similar to that of copulatives; all results are presumably the same, *mutatis mutandis*. We need not, therefore, treat both types; nor will we do so, to avoid repetitions. The significant difference between them is that, while copulatives involve four *terms*, implicationals involve four *theses*. Instead of the subjects (S1, S2) and predicates (P1, P2), we are concerned with antecedents

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[387] Actually, I realized later, one more inference is possible. This is shown in the next section.

(P1, P2 – not to confuse with the preceding symbols for Predicates; here P stands for Proposition) and consequents (Q1, Q2), respectively. Thus, for the record, we have, broadly put:

Given:

If P1 then Q1 and If P2 then Q2 (major and minor premises)**,**

where P2 implies P1, but P1 does not imply P2 (antecedental premise)**,**

and Q1 and Q2 are in some relation *f*{Q1, Q2} (consequental premise)**.**

What are resulting relations:

between P1 and Q1, and between P2 and Q2, other than the above given;

and between P1 and Q2, and between P2 and Q1 (conclusions)**?**

The common phrase "*kol davar shehayah bikhlal veyatsa...*" can now be interpreted more precisely. "*Kol davar*" refers to the minor term (S2); "*shehayah bi-*," to the latter's subsumption under the major term (S1, through the subjectal premise 'S2 is S1'); "*-khlal*," to the major premise (S1 is P1); and "*veyatsa*," to the minor premise (S2 is P2). Note that in all these rules, the underlying subject is, normally, a person or persons (even if a beast, plant or mineral is ever mentioned, the ultimate subject, to whom any law might be addressed, is human). The effective predicate is clearly a law or set of laws, by which we must in this context understand some prescription, prohibition, permission and/or exemption. Let us now look at the hermeneutic principles concerned in detail.

- **Rule No. 8** completes the said common phrase with the words ***...min haklal lelamed, lo lelamed al atsmo yatsa, ela lelamed al haklal kulo yatsa***. Translated literally, the principle states: "anything which was in a generality and came out of the generality, is to be taught: it is not to be taught 'about itself, it came out'; but it is to be taught that 'about the whole generality, it came out'".

We may suggest the following interpretation: "A subject (S2), by virtue of its subsumption under another (S1), was included in a generality (All S1 are P1); then it (S2) was treated distinctively

(All S2 are P2). In such case, the distinctive predicate (P2) is to be taught: do not just teach it (P2) with reference to the singled-out species (S2), but also teach it (P2) with reference to the whole genus (S1) [so that All S1 are P2]“. Thus, “*atsmo*” refers to the minor term (S2); “*yatsa*,” to the minor predicate (P2); and “*haklal kulo*,” to the major term (S1).

Although R. Ishmael’s principle itself does not specify the following point, *judging by some examples given in the literature*, the rule of *lelamed* concerns cases ***where the minor predicate P2 is subordinate to the major predicate P1***. Thus, in this context, the predicatal premise undefined in our earlier general formula is:

> **All P2 are P1, but not all P1 are P2** (predicatal premise),

and the main conclusion apparently suggested by R. Ishmael is:

> ***All* S1 are P2** (main conclusion).

According to deductive logic, the said predicatal premise does not provide us with any additional inferences, other than the ones already obtained by other means (see above). Therefore, R. Ishmael’s suggested conclusion is at best inductive. Deductive logic allows that a genus may have a generic predicate and a species of that genus have a more specific predicate; it does not insist that the genus follows suit and have the more specific predicate, too. R. Ishmael, on the other hand, apparently considers that, with regard to the Torah, the minor premise, or more precisely, the implication of the minor and subjectal premises, ‘Some S1 are P2,’ has to be generalized to ‘All S1 are P2’.

The example, reported by Bergman, on which I based the above formalization is: Exod. 22:18 sentences a sorceress to death (generality), while Lev. 20:27 sentences a male or female medium or necromancers (“in whom is a ghost [*ov*] or familiar spirit [*yidoni*]“) to death by stoning (particularity); whence, granting mediums and necromancers to be included in the category of sorceresses (the textual basis for this subsumption is not given, note; also, commentators include sorcerers, arguing that the feminine is used only because most are women), it is inferred by such *lelamed* exegesis that sorceresses (of all kinds)

are to be stoned. I noticed that the predicate change consists in adding a further precision (by stoning) to the original predicate (death sentence); and assumed this to be a *sine qua non* condition of application of this rule.

Note well that, according to natural logic, R. Ishmael's suggested conclusion is not impossible (no antinomy ensues from it); it is just a non-sequitur (not formally inevitable). The minor premise's implication is *lav davqa*, and may with equal possibility turn out to be general or contingent. Also, no redundancy would be involved in a *davqa* reading of 'Some S1 are P2,' contrary to R. Ishmael's generalization, i.e. such that 'Some S1 are not P2'. The suggested course is therefore an artificial one, recommended by a religious authority claiming Divine sanction. It is not essentially an inference, but a proposal that the minor premise *not* be read as exclusive.

Why the text did not simply say 'All S1 are P2' (instead of 'All S2 are P2') in the first place, if that is what it intended, is not explained; perhaps it would have been *contextually* inappropriate, suggesting false inferences from the surrounding context. Also, why the proposed inference is made, *rather than* reading the particularity as an exceptional provision, so that species of S1 other than S2 are *not* P2, though they are P1, is not explained. I would predict that the alternative reading of the particular, as a contingent, sometimes does occur in Rabbinic practice; but I have not searched for examples[388]. In any case, *deductively*, either outcome is formally acceptable; the proposed mood can only therefore be considered as an *inductive* preference, claimed as peculiar to Biblical exegesis.

- Bergman informs us that above is one version of the rule of *lelamed*, where the particular law teaches "about itself as well as the general law". In another version, according to him, it teaches (not about itself but) "only about the general law". From the example he gives, however, I would strongly disagree with

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388 Frankly, in my view, the *davqa* reading would seem the more likely of the two (though not inevitable), because that would immediately explain why Scripture did not simply say 'All S1 are P2'.

his rendering of the latter version, while quite willing to grant that it exists in Rabbinic literature. But before discussing our differences, let me present this additional version in formal terms.

Let us first look at Bergman's example. Lev. 22:3 sentences he who approaches holy offerings while impure to the 'cut-off' (excision, *karet*) penalty (generality); Lev. 7:20 sentences he who eats peace-offerings while impure to the same penalty (particularity); peace-offerings are listed as among other holy offerings in Lev. 7:37 (to be precise, this verse does not mention the general category of holy offerings, but only lists various kinds of offerings: burnt, meal, sin, guilt, consecration and peace). It is thence inferred that the consumption (or approach?) of offerings of lesser holiness than peace-offerings, such as those for Temple maintenance (Bergman does not specify where in the text this distinction in degree of holiness is established), are *not* subject to cut-off.[389]

Although neither R. Ishmael nor his successors specify the following point, *judging by some examples given in the literature*, the variant rule of *lelamed* concerns cases ***where the major predicate P1 is subordinate or identical to the minor predicate P2***. Thus, in this context, the predicatal premise undefined in our earlier general formula is:

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389 Note in passing that Scherman (p. 51) uses the same area of the text to illustrate the first variant of *lelamed*. From Lev. 7:19, which allows the ritually pure to eat [sacrificial] meat (and, therefore, supposedly, granting an exclusive reading of the text, forbids the impure from doing so), and v. 20, which decrees a penalty of *karet* for an impure person who eats peace-offerings, he infers the same penalty for *all* [holy] offerings. It is interesting that this sweeping conclusion is in disagreement with Bergman's more nuanced result obtained by means of the second variant of *lelamed*! I do not know which of them is considered Halakhically correct. However, my reading of v. 19 is that it refers to peace-offerings, since not only the previous verse but the two after concern these offerings, in which case Scherman's argument is not really a first-variant *lelamed*, but simply a generalization from peace offerings to all offerings (which does not mean Bergman is right, of course).

All P1 are P2 (predicatal premise),

and the main conclusion apparently suggested by Rabbis is:

Some S1 are *not* P2 (main conclusion).

Now, let us consider the syllogistic inferences we can make given this predicatal premise; there is only one, shown below. Notice that the result below is the same as the main conclusion of the original version of *lelamed*, except that here it is obtained by deduction, without need of an inductive extension.

From the major and predicatal premises, **All S1 are P2** (mood **1/AAA**).

Note that 'All P1 are P2' does not tells us whether all P2 are P1 or not all P2 are P1; either possibility is acceptable in the present variant, presumably. In the case where P1 and P2 imply each other (i.e. are identical or logically equivalent), nothing more can be deduced from the given premises.

There is a formal ***exception*** to the application of the second variant of *lelamed*, namely in situations where the rules of the *klalim uphratim* type are applicable. For the compound propositions 'G and S are P' and 'S and G are P', where S is subordinate to G, are each formally equivalent to a conjunction of the two simple propositions 'G are P' and 'S are P'. And according to R. Ishmael, the conclusions to be drawn in these situations are, respectively, 'Only S are P' (*davqa*, by rule No. 4) and 'All G are P' (general, by rule No. 5). It follows that, when we come across subalternative subjects with the same predicate, we must first decide which rule is applicable. According to Rashi (*Shevuot*, 7a), the *klalim uphratim* rules would be used when the subalternative subjects are close to each other in the text (in the same verse), while the said variant of *lelamed* would come into play when the propositions are relatively far apart. The conclusion obtained is different from that of *lelamed* variant two, note well, in the case of 'SG are P'; but in any case, the process as such is different even in the case of 'GS are P'. Similar comments apply to other forms of *klalim uphratim*.

We thus see that, in this second variant of *lelamed*, the 'conclusion' postulated by the Rabbis, 'Some S1 are not P2,' is precisely the *contradictory* of the conclusion required by

deductive logic (taking the premises at their face-value)! I am therefore very tempted to entirely reject this form of reasoning as antinomial. In any case, I would bet that this procedure is not invariably followed in the situation concerned, since it is very likely to lead to eventual inconsistencies; but I have not sought for demonstrative examples. However, we must try and understand what prompted the Rabbis to propose such twisted logic, and how it can be formally expressed.

Apparently, what prompted the Rabbis to opt for such a convolution, is the fact that the major predicate (P1) is less extended than the minor predicate (P2), or of equal extension, whereas the major subject (S1) is more extended than the minor subject (S2). Why would Scripture do so, rather than say 'All S1 are P2' in the first place, knowing that we could automatically draw such an inference? Therefore, the Rabbis supposedly reasoned, Scripture does not want us to draw such an inference.

With regard to logical means for such a position: granting the predicatal premise, which distinguishes this *midah* from the others and defines it, the only way we can prevent the conclusion 'All S1 are P2' from being drawn, is to deny the major premise, 'All S1 are P1'. Note well that if we do so and say:

> **Some, *but not all*, S1 are P1** (particularization of major premise),

then the side conclusion that 'All S2 are P1' no longer follows, and the relation between S2 and P1 remains problematic.

Objections which can be raised to this Rabbinical position are the following. If the Rabbis are surprised in the present case that the text did not immediately say 'All S1 are P2,' why were they not equally surprised in the previous case that the text did not directly say it, if that was its intention?

Furthermore, in the case where P1 is subordinate to P2, there could be a *contextual* reason for giving the major premise a more specific predicate, to avoid some unwanted inference (such as a first variant *lelamed* from another minor premise) which could otherwise be drawn from a generic predicate. In the case where P1 and P2 are one and the same, the Rabbinical surprise can only be due to the different extensions of the subjects, S1 and S2; here again, a contextual explanation could be adduced: it is

conceivable that undesirable inferences might have been drawn from a misplaced generic subject or specific subject.

God, the writer of the Torah, may have thought: 'I can allow Myself such wording, since the Rabbis will recover My final intention eventually anyway, by syllogism through the predicatal premise.' The mere facts that the text is considered as written by a conscious Being and that syllogism is easy, does not prove that God intended what the Rabbis say He intended. An alternative course is sustainable, so their discomfort with the apparent redundancy was not justified. So much for evaluation; let us go back to description.

In the new variant of *lelamed*, the putative 'conclusion' denies the major premise. It is not a deduction (since in deduction, a conclusion can never contradict a premise), nor a particularization in reaction to textual inconsistency (since there was no contradiction between the premises, no conflict calling for reconciliation). Strictly-speaking, therefore, it cannot be called an inference, but at best a reading motivated by a vague discomfort with the logistics of the text. The Rabbis arbitrarily (without formal motive) reject literal reading of the major premise, 'All S1 are P1,' and tell us that it is not *davqa* general, but really contingent. Their alleged conclusion, that 'Some S1 are not P2,' is the cause, rather than the effect, of such reading. The anti-literal reading becomes necessary to prevent absurd consequences, only once the desired 'conclusion' has been artificially chosen; furthermore, that 'conclusion' does not necessarily follow such reading, it is only made possible by it.

Thus, the second variant of *lelamed* ends, rather than starts, with particularization of the major premise; no process is involved in getting to its main conclusion. Note that, in this context, the syllogistic inference from the original major premise (All S1 are P1) and the supposed predicatal premise (All P1 are P2), namely 'All S1 are P2', is Rabbinically interdicted.

It follows incidentally, from the main 'conclusion', as the Rabbis claim, that 'there is at least one species of S1 unlike S2, call it S3, which is not P2'; i.e. that the minor predicate is applicable only to the minor subject (and eventually others like it); the trouble with this eduction, however, is that it adds no concrete

knowledge, since it cannot tell us *in what respect* other species are 'like' or 'unlike' the given species[390]. In effect, then, though the minor premise as such (All S2 are P2) remains unaffected, it becomes exclusive:

Only **S2 are P2** (additional conclusion).

Note well that this exclusive proposition is not formally required as such, but is approximately true granting some leeway for the subject to expand somewhat (i.e. 'S2' here may include other species of S1 like S2, but in any case excludes some species of S1 unlike S2). The syllogistic inference that 'Some S1 are P2', from the minor premise and the subjectal premise (All S2 are S1), remains valid; and is of course to be conjoined to the Rabbis' conclusion 'Some S1 are not P2', to form a contingent proposition.

To repeat, the proposal of the Rabbis is logically untenable, unless we doctor the premises in a convenient manner. To *prevent* contradiction, the major premise 'All S1 are P1' has to be denied, i.e. particularized to 'Some, but not all, S1 are P1'. However, this measure does *not* result in the desired main 'conclusion' being inferred deductively; it remains a 'foregone conclusion' (a thesis without justification in the premises, old or new). All that the adjustment of the major premise does, is render the main 'conclusion' formally conceivable; its preference by the Rabbis remains an inductive act. ***This act would be acceptable to science, if put forward as a tentative hypothesis to be tested by other data; however, pronounced as a fixed fiat, not open to review, it becomes, from the scientific point of view, an arbitrary act.*** The Rabbis, of course, claim Divine sanction for it; but we must point out that such a claim is not verifiable by scientific means. We shall leave the matter at that and move on.

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[390] By definition, every species is in some respects different from, as well as in some respects the same as, other species of the common genus. In practice, the Rabbis rather arbitrarily propose divisions, without adductive control.

We can now return to criticism of Bergman's formulation. The distinction between the two variants of *lelamed* which he proposes is incorrect. In the first variant, we could, indeed, say that the particular law teaches "about itself as well as the general law," insofar as the minor predicate is Rabbinically applied to the major subject. However, it cannot be said, in the second variant, that the particular law teaches (not about itself but) "only about the general law". The particular law is in fact unaffected by the process, and the general law does not come to resemble it. The best we can say is that the particular law is viewed by the Rabbis as an *exception* to the general law; it makes the latter cease to be general. The minor predicate is reserved for the minor subject (and others eventually 'like' it), and other members of the major subject ('unlike' the minor subject) are deprived of the minor predicate.

Let us see, now, how we would have to interpret R. Ishmael's *lelamed* formula, so that it covers the second variant. To adapt the sentence "*kol davar shehayah bikhlal veyatsa min haklal lelamed lo lelamed al atsmo yatsa ela lelamed al haklal kulo yatsa*", we must read into it something to the effect that "A subject (S2), by virtue of its subsumption under another (S1), was included in a generality (All S1 are P1); then it (S2) was treated distinctively (All S2 are P2). In such case, the distinctive treatment (All S2 are P2) was intended to teach us something. It was not done just to teach us something about itself (S2) that the species was differentiated (in All S2 are P2), but also to teach us something [**else**] about the whole genus (S1) from which it was differentiated [**namely, that Not *all* S1 are P2**]".

In this modified version, we read the implicit word "else," meaning "other than the distinctive treatment," *into* the formula, so that the 'conclusion' be different for the genus than it was the species. Here, "*yatsa*" refers to the whole minor premise, rather than to the minor predicate, note.

Thus, we might distinguish the two variants of *lelamed*, by labeling the first "***lelamed oto hadavar leshar haklal***" (teach the *same* thing, P2, with regard to rest of the genus, S1), and the second "***lelamed hefekh hadavar leshar haklal***" (teach the *opposite* thing, notP2, with regard to the rest of the genus, S1). Compare this to Bergman's differentiation, "as well as the

general" and "only the general," and you can see that he was inaccurate.

Let us now review the technical similarities and differences between these two versions of *lelamed*, other than their common grounds with the other rules of the type *kol davar shehayah bikhlal veyatsa*. (a) In both, the predicatal premise, which serves as the distinctive condition to application of the rule, asserts implication between the predicates; however, in the first version, which we have called *lelamed oto hadavar*, the minor predicate is subordinate to the major predicate; whereas in the second version, called *lelamed hefekh hadavar*, the major predicate implies the minor predicate. (b) The main conclusion of the first is general positive (All S1 are P2), while that of the second is particular negative (Some S1 are not P2); they agree, however, that Some S1 are P2.

Finally, (c) they involve distinct thought-processes: *lelamed oto hadavar* proceeds by inductive generalization of a particular implication of the minor premise (viz. Some S1 are P2), whereas *lelamed hefekh hadavar* proceeds by arbitrarily postulating a conclusion contradictory to an implication of the major premise (viz. All S1 are P2) and consequent reconciliatory particularization of the major premise itself. Neither process is called-for or necessary according to natural logic, neither constitutes deduction from the predicatal premise which prompts it; but the artifice involved in the former is relatively straightforward, while that involved in the latter is more twisted.

In view of the similar predicatal premises, the traditional classification of *lelamed hefekh hadavar* with *lelamed oto hadavar* seems sound. But at the same time, in view of the radical differences in process and conclusion, we may well doubt that the second variant was intended in the original definition of R. Ishmael. I suspect its formulation was a later development, even if it was used unconsciously earlier. It could equally well have been instituted as a distinct rule of the *kol davar shehayah bikhlal veyatsa* type. It resembles the rule of the *liton toan acher, shelo kheinyano* type (see below) in that it involves a particularization of the major premise, though for quite different reasons.

The next two rules (Nos. 9 and 10) continue the common phrase *kol davar shehayah bikhlal veyatsa...* with the words ***...liton toan acher***. We shall now analyze these.

- Let us first deal with **Rule No. 10**, which is easier. It completes the preceding clauses with the phrase ***...shelo kheinyano, yatsa lehaqel ulehachamir***, and may be translated literally as "anything which was in a generality and came out to posit another thesis, which is *in*compatible, came out to lighten and to harden". The expression '*shelo kheinyano*' tells us that the major and minor predicates are, by their very nature (or by virtue of some other part of the text, perhaps), incapable of conjunction in one and the same subject. They are not merely different, but mutually exclusive; there is a radical cleavage between them.

Thus, although neither R. Ishmael nor his successors specify the following point, *judging by some examples given in the literature*, the rule *liton toan acher, shelo kheinyano* concerns cases ***where the major predicate P1 and the minor predicate P2 are contrary or contradictory***. Thus, in this context, the predicatal premise undefined in our earlier general formula is, minimally:

No P1 is P2 (and No P2 is P1) (predicatal premise).

Note that this gives a minimal definition of the incompatibility between P1 and P2 referred to. The bracketed clause is redundant, being implied anyway. In the case of contradictories, we must additionally say: **No nonP1 is nonP2** (which implies No nonP2 is nonP1). While in the case of contraries, we must add: **Some nonP1 are nonP2** (which implies Some nonP2 are nonP1).

A comment should be made here regarding *compound predicates*. If one predicate X consists of two concepts a + b, while the other predicate Y consists of only one of these concepts (say, a), *without mentioning the other* (b), then three readings are possible[391].

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[391] If more than two concepts are involved, we can easily reduce them to two. Thus, for instance, if X = 'a + b + c' and Y = 'a + b', then 'a

i) X = ‘a + b’ and Y = ‘a + b’ *or* ‘a + notb’. Here, knowing that either event may actually occur; the result is that X is included in Y, or in other words, Y is a *genus* of X (as well as of some other species, Z = a + notb). Therefore, we would apply the rule *lelamed*; opting for the variant *hefekh hadavar* if P1=X and P2=Y, or the variant *oto hadavar* if P1=Y and P2=X.
ii) X = ‘a + b’ and Y = ‘a + b’. Here, we have generalized factor ‘b’ from the ‘a’ in the case of X, to ‘a’ in all cases, including that of Y; the result is that X and Y are *identical*. Therefore, whether P1=X and P2=Y, or P1=Y and P2=X, we would apply the rule *lelamed hefekh hadavar*.
iii) X = ‘a + b’ and Y = ‘a + *not*b’. Here, we have generalized from the *non-mention* of ‘b’ with regard to Y, to the *actual absence* of ‘b’ in Y; the result is that X and Y are *incompatible*[392]. Therefore, whether P1=X and P2=Y, or P1=Y and P2=X, we would apply the rule *shelo kheinyano*.

Often, as Bergman acknowledges, Scripture displays a discrepancy, not *by commission* (assigning incompatible predicates to subalternative subjects), but *by omission* (as just described). As the above analysis shows, in the latter case, before we can apply one of the hermeneutic rules, a decision process must be followed[393]. Thereafter, if the compounds involved are found incompatible, we apply *shelo kheinyano*; otherwise, one of the variants of *lelamed*. It is noteworthy that

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+ b' are effectively one concept and 'c' the other, for our purposes. However, note well, if there is, as well as a missing element in one of the compounds, any explicit incompatibility within them (for instance, X = 'a + b + c' and Y = 'a + notc'), then they (i.e. X and Y) are automatically contrary.

392 Note that, *granting 'a' to be true*, 'a+b' and 'a+notb' are no longer merely (indefinitely) incompatible, but become contradictory (i.e. not only they cannot be both true at once, but they cannot be both false at once).

393 The decision depends, in part, on the known relationships between the elements 'a' and 'b'. They must be compatible, since 'a+b' occurs, in our situation. If 'a' implies 'b', then 'just a' implies 'a+b'. In all other cases, the combination 'a+notb' remains logically possible, though in some cases it may be *materially* absent or even impossible, for natural or Scriptural reasons.

the rule *shehu kheinyano*, as defined further on, never comes into play in this context![394]

Now, let us consider the syllogistic inferences we can make given the said predicatal premise, 'No P1 is P2':

From the minor and predicatal premises, **No S2 is P1** (mood **2/EAE**),

From the major and predicatal premises, **No S1 is P2** (mood **1/EAE**).

No additional inference is possible with the additional clause (No nonP1 is nonP2) of contradictory predicates, nor with that (Some nonP1 are nonP2) of contrary predicates, note. Now, comparing these new results to the implications of the major and minor premises in conjunction with the subjectal premise, namely 'All S2 are P1' and 'Some S1 are P2', we see that they are respectively contrary and contradictory propositions. Thus, if, in the text, we come across subjects in a genus-species relation which have incompatible predicates, we are facing a situation of *formal inconsistency*. This is not an antinomy due to a Rabbinic interpretation, but one inherent in the text, note well. A formal resolution of the conflict is absolutely required.

It is a principle of inductive logic that harmonization is to be sought by effecting the *minimum* retreat from generalities, necessary to restore consistency; this is the most likely

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[394] However, the situation of *shehu kheinyano* can indeed be predicted *in a wider perspective*, which consists in defining the two predicates, initially, as P1='a' and P2='b', then considering the logical possibilities of conjunction between the various combinations of a, b, and their negations. For P1 may equal 'a+b' or 'a+notb' or 'a+b *or* a+notb', while P2 may equal 'a+b' or 'nota+b' or 'a+b *or* nota+b'. These 3+3 combinations (of which 2 are disjunctive) imply nine conjunctions. Of these conjunctions, five are between incompatibles (*shelo kheinyano*), and four are between compatibles; of the latter, one yields 'P2 implies P1' (*lelamed oto hadavar*), one yields 'P2 is implied by P1' and one yields 'P2, P1 imply each other' (*lelamed hefekh hadavar*), and, finally, one (namely, the conjunction of the two disjunctions) admits of 'P2 being unconnected or subcontrary to P1'. This last case allows for *shehu kheinyano.*

outcome[395]. If it can be shown that the subjects are not subalternative and/or that the predicates are not incompatible, we are of course no longer in the same situation and some other process may be appropriate. But, granting that the subjectal and predicatal premises are correct, the *only* way to achieve the required result is to *particularize the major premise*. With regard to the minor premise, if it is particularized alone, a conflict remains; it may of course also be particularized, but that does not affect the result. That is, logic indisputably demands that:

> **Some, *but not all*, S1 are P1** (resolution of conflict, leading conclusion).

The proof of what we have just said will now be presented:

- If we particularize only the minor premise, so that ‘Some, but not all, S2 are P2’, and we keep the major premise, then the following sorites remains possible: ‘All S2 are S1’ (subjectal) and ‘All S1 are P1’ (major) and ‘No P1 is P2’ (predicatal), therefore ‘No S2 is P2’; but the latter conclusion disagrees with ‘Some S2 are P2’ (from minor); therefore, we still have an inconsistency.
- On the other hand, if we particularize only the major premise, so that ‘Some, but not all, S1 are P1’, and we keep the minor premise, then the following sorites remains possible: ‘Some S1 are S2’ (converse of subjectal) and ‘All S2 are P2’ (minor) and ‘No P2 is P1’ (converse of predicatal), therefore ‘Some S1 are not P1’; and the latter conclusion agrees with ‘Some, but not all, S1 are P1’ (altered major); therefore, this measure resolves our contradiction.
- If we particularize both premises, no such sorites can be constructed. The results are equally acceptable; but this measure involves a more radical reaction than necessary, it goes beyond logical necessity. Thus, the minor premise might or might not be denied; what counts is denial of the

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395 We cannot go into the complex proof of this principle here. It has to do with factorial analysis (see my work *Future Logic* on this topic).

major premise. The difference in behavior is due to the minor term being narrower than the major term.

That is, we must say that the text, which at first sight led us to believe 'All S1 are P1', was not intended to be taken literally, but only to suggest that 'a great many, perhaps most, but not all' of S1 are P1. The syllogistic consequences of this new result on the relations between S1 and P2 and between S2 and P1 are as follows.

From the minor and subjectal premises, **Some S1 are P2** (**3/IAI**).

From the major and predicatal premises, **Some S1 are not P2** (**1/EIO**).

From the major and subjectal premises, **no conclusion** (**1/IA?**).

From the minor and predicatal premises, **Some S2 are not P1** (**2/EIO**).

The latter consequence is true whether the minor premise is particularized or not. If the minor premise *is not* particularized, we can moreover infer '**No S2 is P1**'; if, however, it *is* particularized (for independent reasons, for we have here no reason to do so), then whether 'No S2 is P1' or 'Some S2 are P1' remains an open question, formally. These consequences, together with the altered major premise (Only some S1 are P1), constitute our conclusions, according to formal logic. Now, let us turn to the Rabbis, and see what they say.

An example of *liton toan acher shelo kheinyano* given by Scherman: Exod. 21:2-6 presents a set of laws relating to the release of a Hebrew slave (*eved ivri*, this is taken to refer to a thief sold by the courts to repay his theft, as per Exod. 22:2; for the self-sold poor, see Lev. 25:39-43); then Exod. 21:7-11 presents a very different set of laws for the release of a daughter sold as maid-servant (*amah*); conclusion, the initial set was for

male Hebrew slaves only, and the laws of each group cannot be applied to the other group.[396]

Thus far, the formal conclusions apparently suggested by R. Ishmael are *identical* to those of natural logic, in the present rule. However, the above example suggests that the Rabbis take a more definite position and additionally conclude:

No S2 is P1 (additional conclusion).

Whether the Rabbis invariably go that far, or only occasionally, I cannot say without a full list of examples; but offhand, it seems pretty typical. This conclusion can be due to either of two policies. Either the Rabbis consider that the minor premise ought to be kept general, i.e. as ‘All S2 are P2’; in which case, the said additional conclusion follows from the minor and predicatal premises deductively. Or the Rabbis consider that the minor premise ought to be particularized; in which case, their arrival at the additional conclusion is due to a generalization from the implication ‘Some S2 are not P1’ of the minor and predicatal premises. The first alternative is preferable to formal logic, in that no unnecessary doctoring of given data is involved. The second alternative, if used by the Rabbis, would constitute an inductive act (regarding which we can reiterate the remarks previously made in similar circumstances; namely, that such an act is arbitrary, if presented as a fixed rule; though scientifically acceptable, if presented as a tentative hypothesis).

- **Rule No. 9** completes the common phrase *kol davar shehayah bikhlal veyatsa...* with the words ***...liton toan acher, shehu kheinyano, yatsa lehaqel velo lehachamir***, and may be translated literally as “anything which was in a generality and

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396 This is not a very good example, in my view, since the text describes the slave as possibly having a wife (implying him a male), and concerning the maid-servant says "she shall not go out *as the men-servants do*" (referring apparently to the preceding verses concerning the Hebrew slave), so that the subjects obviously do not overlap and the proposed inference is unnecessary. I wonder, too, if female thieves are sold by the courts; in any event, the daughter is not sold by the courts. However, ignoring all that, we may use the differing laws of release as a partial illustration. Better examples are given further on.

came out to posit another thesis, which is compatible, came out to lighten and not to harden". The expression '*shehu kheinyano*' is at first unclear; but we can arrive at its intended meaning by a process of elimination. '*Shelo kheinyano*' (see rule No. 10, above) clearly refers to an incompatible predicate; so, '*shehu kheinyano*' must refer to some kind of compatible predicate; however, it cannot refer to a minor predicate which subalternates or mutually implies or is subalternated by the major predicate, as such relations have already been treated under the headings of *lelamed*; therefore, '*shehu kheinyano*' must specifically refer to a subcontrary or an unconnected predicate. That is, here, though the two predicates are by their natures different, in the sense of distinguishable, they are not mutually exclusive, but *conjoinable*.

Traditionalists may not agree with this definition of *shehu kheinyano*. They might distinguish it from *shelo kheinyano*, by saying that both concern somewhat divergent predicates, the former's are 'of similar subject-matter', while the latter 'of different subject-matter', or something to that effect. But such a distinction is of little practical value, because it is difficult to determine by its means what is "different, but not very" and what is "very different"; the distinction in practice becomes pure guesswork, or (they might say) a matter of 'oral tradition'.

Though I try my best, I see no way to enshrine such a distinction in formal terms. It cannot, for instance, be ascribed to the issue of compound predicates (see above). A genetic explanation may be the relation between two degrees of a concept X, say X1 and X2, and an incompatible of it, say Y (implying nonX): we could say that the greater X (X2) is further than the lesser X (X1) to nonX (considered as X=0); but both X1 and X2 remain in conflict with Y. The notion of "less" or "more" incompatible is, strictly speaking, a mixed bag. For formal logic, all incompatibilities are equivalent, without degrees; things either *cannot* coexist, or they *can* coexist (under certain conditions).

The examples which commentators usually give for the two processes are clearly identical from a formal point of view: substitute symbols for the terms, and you will see that the predicates are formally incompatible in both sets of examples. It follows that there is no way to justify different procedures for

the two situations. Furthermore, if both rules of *liton toan acher* indeed referred to incompatible predicates, then R. Ishmael's hermeneutics would be short of a comment on compatibles (in the sense, unconnecteds or subcontraries).

Thus, although neither R. Ishmael nor his successors specify the following point, we can say that the rule *liton toan acher, shehu kheinyano* concerns cases ***where the major predicate P1 and the minor predicate P2 are unconnected or subcontrary***. This hypothesis is based on the said process of elimination, and *hopefully will eventually be confirmed by some examples given in the literature*. In this context, then, the predicatal premise undefined in our earlier general formula is, minimally:

Some P1 are P2 and some P1 are not P2, and

(some P2 are P1 and) **some P2 are not P1** (predicatal premise).

Note that this gives a minimal definition of the sort of compatibility between P1 and P2 referred to. The clause 'Some P1 are P2' serves to eliminate incompatibilities, which are dealt with under the heading of *shelo kheinyano*; the bracketed clause 'Some P2 are P1' is implicit in it, and so could be left out. The clauses 'Some P1 are not P2' and 'Some P2 are not P1' serve to eliminate implicational relationships, which are dealt with under the heading of *lelamed*. In the case of subcontraries, the clause '**All nonP1 are P2**' (which implies 'All nonP2 are P1') would have to be added; in that case, the clauses 'Some P1 are not P2' and 'Some P2 are not P1', being both implied by the larger clause, could be left out. In the case of unconnecteds, the clause '**Some nonP1 are not P2**' (which implies 'Some nonP2 are not P1') would be added, instead.

Now, let us consider the syllogistic inferences we can make given the said (compound) predicatal premise. In conjunction with the major premise, all we can formally infer is that **Some P2 are not S1** (mood **2/OAO**). However, this information tells us nothing of the relation of S1 to P2 (in that order), other than what we already know from the minor and subjectal premises, viz. that Some S1 are P2 (which is indefinite, note). Similarly, we can infer, from the predicatal and minor premises, that **Some**

P1 are not S2; but this information tells us nothing of the relation of S2 to P1 (in that order).[397]

Before we can present and evaluate, by formal means, the conclusion(s) proposed by the Rabbis in such case, we have to find a statement or example which somewhat clarifies the matter, as we did in other cases. The problem, here, is that the statements and examples I have so far come across concerning the present rule are ambivalent[398]. So, we have to proceed in a different manner, and look for an example which, had the Rabbis been more aware of the formal issues involved, they might well have classified under this heading. This proposed approach is admittedly highly hypothetical. For the present research project is not essentially prescriptive, but descriptive; its purpose is primarily, not to tell the Rabbis how they *should* interpret texts, but to discover how they *do* interpret texts. We wish to evaluate *their* methods, not invent methods for them. A value-judgment is ultimately intended, but only after we have something of theirs to evaluate.

Nevertheless, remember, we arrived at our hypothesis concerning the form of *shehu kheinyano*, not out of the blue, but by a gradual discovery of the forms of the other subdivisions of *kol davar shehayah bikhlal veyatsa*. Our hypothesis was therefore grounded in Rabbinic practice to that extent, being the only leftover form available. It is, of course, conceivable that R. Ishmael and his successors never had to deal with the situation of compatible (but not subalternative or implicant) predicates in practice, and therefore had no need to develop a hermeneutic response and corresponding rule. This empirical issue is hard for

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[397] For the record, note also that, in the case where P1 and P2 are subcontrary, nothing more can be deduced from the given premises.

[398] An acquaintance of mine, Mr. S. Szmerla, pointed out to me, when I asked him for examples, that it is quite possible that some of the hermeneutic rules have only one or two actual instances. It is therefore not at all sure that we will find a sample, which is recognized by both the Rabbis and logicians like me as *shehu kheinyano*. A systematic listing and analysis of all exegetic acts in the Talmud is highly desirable, evidently.

me, personally, to resolve at this time, since I do not have a full inventory of the instances of Rabbinic exegesis at hand. However, I have found a couple of examples in the literature, in which the predicates are *objectively* in the required relation, even though they are classified differently by tradition (see JL, Appendix 6).

Objectively, these examples should be classed as *shehu kheinyano*; but traditionally, one of them is classed as *shelo kheinyano* (rule No. 9, above), and the other as *lidon badavar hechadash* (rule No. 11, below; but note, regarding the latter example, that it may also be classed as *shelo kheinyano*, according to how the major premise is read). Thus, the conclusions they yield vary in form. But we cannot, in any case, presume to predict, on the basis of such reclassifications, what the formal conclusions preferred by the Rabbis might be for *shehu kheinyano* situations; for if they had been aware of the compatibility of the predicates in the suggested examples, they may have proposed other conclusions than those they proposed while unaware. To know for sure, we need an example which is both objectively *shehu kheinyano* and regarded as such by tradition, which to date I have not found.

The issue must therefore be left open, pending the gathering of more data. That is not a big problem, because, whatever the response of the Rabbis happens to be, we have by now made clear the method by which such response is to be treated: it is to be formalized (substituting symbols for content) and compared to the results syllogistic logic.

We shall now venture some remarks regarding the final clauses of R. Ishmael's *liton toan acher* rules, concerning **leniencies and severities**. Rule No. 9, *shehu kheinyano*, ends with the phrase ...*yatsa lehaqel velo lehachamir* (meaning: was singled out to alleviate *and not* to aggravate); and rule No. 10, *shelo kheinyano*, ends with the phrase ...*yatsa lehaqel ulehachamir* (meaning: was singled out to alleviate *and* to aggravate). Traditionally, these phrases are taken to characterize the result of exegesis, by comparing the general and particular law.

Examples. (a) 'Alleviation and not aggravation': Scripture prescribes the death sentence for killing someone, except in a

case of manslaughter, for which the sentence is exile instead of death; thus, for manslaughter, the sentence is lighter and not heavier. (b) 'Alleviation and aggravation': Scripture prescribes payment of a ransom for his life to the master of an ox which kills someone, except in a case where the victim is a slave; in the latter case, the ox's master pays the slave's master a fixed sum (30 silver shekels), whatever the market value of the slave; since the market value of the slave may be more or less than the fixed sum, the latter sentence involves both leniency and severity.[399]

These characterizations have no formal moment, according to our analysis. We cannot predict, on *formal* grounds, how the general and particular laws, so-called, will compare with respect to leniency or severity. It is clear that such characterizations are essentially ex post facto summaries based on *material* data[400]. If it so happens that wherever *shehu kheinyano* or *shelo kheinyano* exegesis has been used, the results are found to have this or that

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399 Example (a) is from Scherman. Example (b) is Abitbol's. However, it should be clear that, in the latter example, the focus of comparison is incorrect: we should not be comparing the fixed sum to the market value of the slave (as Abitbol does, following tradition, presumably), but to the ransom for the ox master's life. If the ransom for a free man's life is uniformly greater than the fixed sum for a slave, then the law for the slave case 'alleviates but does not aggravate'. If the ransom may be greater or smaller than the fixed sum, then we might say the fixed sum 'alleviates and aggravates', in this sense (instead of Abitbol's). Another criticism: in any event, none of these interpretations allows the phrase 'alleviate *and* aggravates' to be used; the accurate rendering would have to be 'alleviates *or* aggravates', judging by this traditional example. However, this may be judged an issue of translation, since '*ve-*' is in other contexts read as 'or' as often as 'and'. All that goes to show the approximativeness and unreliability of Rabbinic thinking.

400 Another example worth noting. Concerning the Hebrew slave and maid-servant case, considered earlier: Scherman explains that the maid-servant benefits from certain leniencies and stringencies denied to males, such as that she may go free even before six years of service and her master can betroth her against her will. But, I say, these differentia are given by the text, they are not outcomes of exegesis; it would change nothing to the reasoning process if there were *only* comparative leniencies or *only* comparative stringencies, *so long as* at least one pair of predicates was incompatible.

character, the summaries are true; otherwise, not. It is conceivable that Scripture and Rabbinic exegesis happen to conform to those patterns, but there is no logical necessity that they do. For as far as logic is concerned, anything goes in this respect. This means that the phrases in question do not play a role in getting us to the conclusions; they are technically useless in determining the Halakhah.

With regard to the material issue, I have no direct interest. But it is worth pointing out that R. Ishmael's said clauses do not seem to be based on *complete enumeration*, as they ought to be, but on *generalization* from a few instances. This is suggested by Bergman's comment concerning *shehu kheinyano* that "(Although the formulation of this rule states 'to be more lenient rather than more severe,' the converse also holds true.) If the item is specified for purposes of stringency, it is not given the leniencies of the general law." It is also evident, in several Rabbinic examples, that the characterizations are often forced, in an effort to fit R. Ishmael's statements. Clearly, R. Ishmael based these phrases on overly hasty generalization, from observation of a limited sample of cases. Therefore, they are not only formally unjustifiable, but empirically inaccurate. Consequently, R. Ishmael's formulations are overly restrictive, in practice.

Nevertheless, let us look further and see whether we can anyway draw some useful information from R. Ishmael's last clauses, of a formal or methodological sort.

A possible formal interpretation is the following.

If we consider the overall outcome of *shelo kheinyano* exegesis, what essentially happens is that the major and minor premises are respectively narrowed down and made exclusive, so that the major and minor subjects end up with *separate* predicates. We could say, loosely speaking, that this result 'both alleviates and aggravates', in that, whatever they are, the leniencies and stringencies of the major premise are not applied to the minor term and the leniencies and stringencies of the minor premise are not applied to the major term. Thus, the final clause of R. Ishmael captures the 'spirit' of this rule, though not its 'letter'.

If, now, we turn to the *shehu kheinyano* rule, and R. Ishmael's final clause 'alleviates but does not aggravate', and we assume that, here too, he was referring to the 'spirit', rather than the 'letter', of this type of exegesis, we might suppose that the conclusions he would recommend, in situations where subalternative subjects have compatible predicates, are such that the minor premise ends up 'lighter' than the major premise. A relatively formal interpretation of this (with reference to a number of predicates), would be that the minor subject ends up with only its own predicate exclusive of the other predicate, while the major subject exclusive of the minor subject ends up with both predicates[401].

I offer this remark very speculatively, without even looking for examples; I very much doubt that that was R. Ishmael's formal intention. Note that, in any case, some residue from the original text must remain: at least some S1 have to be P1 and at least some S2 have to be P2[402].

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[401] A more material interpretation (ignoring Bergman's above-mentioned comment), would be the following. If P2 is *more lenient* than P1, then people in group S2 should not receive the greater burden of P1, but remain P2 only; while the rest of those in group S1 may remain P1 only, or be both P1 and P2; this is the most fitting case, of course – probably just what R. Ishmael had in mind. However, if P2 is *more stringent* than P1, then either people in group S2 should have their burden decreased, by being both P2 and P1, while the rest of those in group S1 remain P1 only; or alternatively, people in group S2 remain P2 only, while the rest of those in group S1 should have their burden increased, by being both P1 and P2; but in either of these cases, note, the burden of S2 people is still greater than that of the rest of S1 people, at the end. (Taking Bergman's comment into account, the predicates in the latter event would be kept separate, as in the former case.) It is evident, in view of the multiplicity of possible hypotheses, that R. Ishmael's phrase 'alleviates but does not aggravate' is very ambiguous, and therefore no sure guide.

[402] This is true in all exegesis: it is granted by the Rabbis, who said *ain miqra yotse miyedei feshuto* ("a Scriptural verse never loses its plain meaning", EJ referring us to *Shab.* 63a, *Yev.* 24a). In formal contexts, 'simple meaning' refers to the minimum necessary implication of any proposition, namely an indefinite particular.

Our best bet is a *methodological* interpretation, which goes as follows. This explanation refers to advice broader in scope than the concerns of deductive or formal-inductive logic.

With reference to *shelo kheinyano*, we could impute R. Ishmael as saying that, since the major premise has been proven, by ensuing inconsistencies, not to be universal, we must henceforth proceed very carefully and, unless or until otherwise demonstrated, look askance at any *other* statement we encounter in the text concerning the major term, before extending it to the minor term (through some other exegetic rule). This is reasonable and wise advice. As examples show, such a recommendation does not exclude in advance the possibility that the major and minor terms have some legal predicate(s) in common (they are bound to at least have some non-legal predicates in common, else they would not be subalternative); it only serves to instill caution in the exegetic process.

Our usual epistemological approach is to accept appearances or statements at their face-value, barring reason to deny them; this might be called 'the easygoing approach'. In the *shelo kheinyano* situation, however, in view of our having encountered one inconsistency, we have grounds to expect others; so, we would be wise to withhold immediate credulity from subsequent appearances or statements, barring reason to affirm them; this might be called 'the cautious approach'. These approaches may be analogized to the ways people can be judged: as 'innocent until proven guilty' or 'guilty until proven innocent'. The former gradually excludes certain items (which prove untenable), the latter gradually includes certain items (which prove tenable). In practice, we operate somewhere in the range between those two extremes.

With reference to *shehu kheinyano*, accordingly, since no inconsistency is implied, the appropriate approach would be 'easygoing'. Obviously, whatever leniency or stringency is introduced by the minor premise, exempts its subject from incompatible stringencies or leniencies applicable to the major subject in other propositions; but such exemptions emerge from distinct arguments, under the *shelo kheinyano* rule; so, they are not, properly speaking, a direct outcome of the *shehu kheinyano* rule. However, residual factors specified or implied somewhere

in the text with regard to the major subject, which have not been explicitly or by implication eliminated by the minor premise, may reasonably be assumed to remain applicable to the latter's subject, unless or until we have reason to believe otherwise.

In this perspective, the phrase *lehaqel velo lehachamir*, used for *shehu kheinyano*, is especially intended to *contrast* with the phrase *lehaqel ulehachamir*, used for *shelo kheinyano*, with respect to this issue of methodology.

- **Rule No. 11**, the last of the principles starting with the common phrase *kol davar shehayah bikhlal veyatsa...*, completes it with the words ***...lidon badavar hechadash, y ata yakhol lehachaziro likhlalo, ad sheyachazirenu hakatuv likhlalo beferush***. Translated literally, it says: "anything which was in a generality and came out to be dealt with within a new matter, you cannot return it to its [initial] generality until Scripture returns it to its [initial] generality explicitly". This rule, albeit superficial appearances is very different from the preceding three. It may be stated as 'if a member of a certain class, subject to certain predicate(s), *becomes* a member of a new class entirely, subject to other predicate(s), then again *becomes* apparently subsumed under its initial classification, it should not recover the predicates of that classification, except in the event that Scripture clearly grants such recovery'. In symbolic terms, this definition says the following:

(i) at first, **x, an individual, is S1, a subject-class**,

and All S1 are P1, a predicate (whence x is P1)**;**

(ii) later, **x ceases to be S1 and becomes S2, another subject-class,**

and All S2 are P2, another predicate (whence x is P2)**;**

(iii) yet later, **x ceases to be S2 and becomes S1** (though No S2 is S1)**;**

(iv) in such eventuality,

though x is (again) **S1, it is *not necessarily*** (again) **P1, and**

though x is not (any longer) **S2, it is *not necessarily* not** (any longer) **P2.**

A note on terminology, with regard to this rule. It consists of three (compound) premises, with an underlying subject (x), two

subject-concepts (S1, S2) and two predicates (P1, P2). We shall refer to the premises as the major (i), minor (ii) and middle (iii), though their conceptual levels are independent; and to the respective subjects and predicates of the major and minor premises accordingly. The (compound) 'conclusion' (iv) is a modal statement (of the logical type), forewarning us *not to* draw certain hasty inferences from the premises.

Let us analyze this situation. We are concerned, here, not with the various classifications of different individuals (extensional modality), but with actual travels of an individual from one class to another and back (natural modality). In the preceding three hermeneutic rules (Nos. 8-10), the issue was how to handle a static situation, where Scripture treats subjects belonging to a subclass seemingly somewhat differently from the way they are treated in the framework of an overclass. The individual subjects *are* members of the two classes simultaneously; they are not undergoing change, in the sense of *becoming*, actually ceasing to be one thing and then reemerging as something else. In the present rule, we confront the issue of metamorphosis, which has very distinct logical properties[403]; specifically, the issue is a circular movement: membership in one class, then shift over to a *new* class, and finally *return* to the original class.

I derived my reading of the rule from an illustration given by Scherman. Lev. 22:10-11 inform us that common Jews (non-priests) and tenants or hired servants of priests are forbidden to consume 'holy things', while servants bought by priests or born in their house may do so. We know (either by a *davqa* reading of the latter verses, or a *qal vachomer* from home-born servants, or from an unstated verse) that a priest's daughter (our symbol, x), whether as a member of her father's household before she marries a commoner or as the wife of another priest (S1), is permitted such food (P1). Verses 12-13 tell us that it is, however, forbidden (P2) to her (x) while married to a commoner (S2); though if she is thereafter widowed or divorced... and returns to her father's house, as in her youth (S1), she may consume it (P1).

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403 See our logic primer, JL 1.2.

In our example, Scripture happens to explicitly grant reentry of the daughter under the category of priest's household for the purpose of eating holy things; but the fact that this had to be specified is in itself significant, implying that it could not be simply presumed from the mere fact of her return home (or coupled with a fortiori from v. 11 concerning bought servants, who are newcomers to the household).

In the rule of *lidon badavar hechadash*, unlike the others, *the categories of subject (S1, S2) are not overlapping, they are at variance (they have a common member, x, but at different times)*; as for the predicates (P1, P2), their mutual relationship is irrelevant, here. The major predicate (P1) applies to our individual *qua* (in his capacity as, by virtue of) his belonging to the first subject-concept (S1); similarly, the minor predicate (P2) comes to apply to it *qua* the second subject-concept (S2). With reference to the third premise, a legitimate question arises, was the original subject-class (S1) intended broadly enough to include returnees from an alternate subject-class (like S2), so that the earlier predicate (P1) again applies; or does the later predicate (P2) remain in force (or, perhaps, some third predicate come into play)?

From the point of view of syllogistic logic, granting the premises at their face-value, the general element of the major premise, 'All S1 are P1', combined with the final element of the middle premise, 'x is (again) S1', would formally yield the conclusion 'x is (again) P1'. As for the elements 'x is no longer S2' of the middle premise and 'All S2 are P2' of the minor premise, they do not clarify whether x has remained P2 or is no longer P2 (of course, if P1 and P2 are incompatible, x must cease to be P2; but if they are compatible, the final predicate of x is undetermined). R. Ishmael is clearly aware of these two logical consequences; however, he forewarns us not to blindly follow the first (though, concerning the second, he and formal logic agree).

If we accept the first premise as literally general, our conclusion has to be that the first predicate again comes into force. However, in view of our knowledge that (a) *changes of the kind considered do occur in nature and Scripture,* and keeping in mind that (b) *the intent of general statements in the Torah is occasionally not literal*, we cannot presume such an automatic

conclusion, and are wise to leave the question open, awaiting Scripture's answer (directly or indirectly). The literal option is deductive, the anti-literal one is inductive. This hermeneutic rule, instead of advocating some conclusion, preempts any eventual conclusion; its purpose is to ensure that deductive logic is not mechanically used, when the events described take place, unless the text justifies it.

More precisely, according to this rule, if Scripture reiterates the subsumption of the ambulant individual under the major premise (after the said changes), then the major premise's generality is confirmed; if, however, Scripture fails to do so explicitly, the suggested reaction is, effectively, to *particularize the major premise* to 'Not *all* S1 are P1'. These alternative further proceedings (confirmation or particularization of the major premise) constitute a finite conclusion; so, the process *lidon badavar hechadash* can be said to have conditional conclusions (rather than merely inhibiting any conclusion).

The above treatment of the rule is different from the traditional, but I think there is no possible doubt that the situation we have described is what R. Ishmael was trying to project. His use here of the qualifier *chadash* (new), rather than *acher* (other) as in the preceding two rules, confirms my view, as it suggests actual change of something, instead of a mere intellectual separation between different things. In any event, it would certainly be a wise rule to have; and traditional formulations, as we will now show, do not add anything of practical value to the previous rules and so cannot be appropriate.

If we read this rule as traditionally done, the formalities are indistinguishable from those of the rule *shelo kheinyano*, if not also the rule *shehu kheinyano*[404]. But there is no way for formal logic to discriminate between 'degrees of difference' between incompatible classes, so that any principle formulated on such

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[404] The traditional reading of *shehu* is formally indistinguishable from *shelo*; so, in that reading both are indistinguishable from *lidon badavar hechadash*. But if we read *shehu* as concerned with compatible predicates, as I do, then it is not comparable to the traditional reading of *lidon*.

basis is bound to be subjectively used. The traditional reading is thus, for all practical purposes, indistinguishable and useless. If we are to assume R. Ishmael to have been saying something meaningful and valuable, the reading I have proposed (based, note well, on an accepted example) seems a better candidate.

It has to be said that ***the forms ascribed to material cases by the Rabbis are often wrong***. Because of their lack of formal tools, the Rabbis often misread the hermeneutic principles; that is, they misplace examples, and since their understanding of the principles is largely based on examples, they are often at a loss to clarify the whys and wherefores of their reasoning processes and to distinguish them from each other. One might have supposed that, since *they* formulated the principles in the first place, they ought to know more than anyone else just what they mean by them and be free to classify examples under the headings of their choice. But the issue is more complicated than that.

It is evident that the theory and practice of Rabbinic exegesis developed in tandem, over time. The Rabbis observed themselves thinking in a certain manner in certain situations, and subsequently were encouraged to think in the same manner again in other situations. Very often, the similarity between the situations was 'forced', and we can see a very artificial effort to jam the example into a mold, to make it fit-in to the desired format[405]. The fact that the formats were themselves rather vaguely defined, facilitated such square-peg-in-a-round-hole antics. But also, we see an uncertainty concerning the opposition of terms or theses: 'different' is often confused with incompatible; incompatibility is thought to have degrees; the formal opposition of compounds is not analyzed; and so forth.

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[405] This effect is sometimes achieved by *passing over some relevant detail* in the written text, as we see in an example given further on. We might regard this as a non-formal issue; or refer to it as a failure to take into consideration the full context of information available. There are no doubt other ways 'molding' occurs. The reason for this practice is that it 'legitimizes' an argument, gives it a semblance of being traditional.

All this is further complicated by the existence, in Rabbinic thought processes, of implicit (hidden or not consciously acknowledged) generalizations and exclusive readings, which are just taken for granted. The claim of Sinaitic tradition which gradually developed, and the intimidation it occasioned (the reluctance to question past authorities for fear of rejection by one's peers), caused the accumulation and perpetuation of such errors, because the process of repeated peer review which normally would uncover and correct errors was considerably inhibited. At best, we can call it incompetence; at worst (to the extent that the authors concerned sensed that they were misrepresenting the principles or contriving the compliance of examples) deception and manipulation.

As a consequence of the various circumstances just described, exegetic acts are wrongly classed, under rule 10 instead of 9 or 9 instead of 10, or 11 instead of 9 or 10, for instances (examples of such misclassification are presented and analyzed in JL. Appendix 6[406]).

Before closing the discussion of the five *kol davar shehayah bikhlal veyatsa...* rules, I want to again emphasize that my analysis was ***based on formalization of a limited number of examples***. It therefore depends on generalization; for it is not inconceivable that examples exist where the Rabbis have drawn conclusions of objectively other forms than those here encountered (whatever their theoretical claims). Ideally, our study should have been based on *comprehensive enumeration* of all Talmudic (and post-Talmudic) exegetic acts; such a feat is beyond my reach, since I lack the necessary linguistic tools (Hebrew and Aramaic) and since as far as I know no one has drawn up the required listing (let alone in English) – but I hope

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[406] I apologize to readers for going into such detail, but it is necessary, to substantiate my serious accusations. I hope one day someone takes the trouble to analyze all extant Rabbinic arguments in equal, and indeed greater, detail; it bothers me when people get away with fallacious reasoning. It should be clear that it is not the *content* that concerns me, I do not care what the Halakhic outcome is; what is important is that the *process* be valid.

someone will one day perform the feat. Nevertheless, what is reasonably certain is that I have formalized the examples available to me accurately, so that we now have an at least partial formal picture of actual Rabbinic thinking processes, enough to formulate a verdict of sorts (comparing the empirical data to Rabbinic pronouncements and to formal logic).

In any case, this research at least has served to establish ***a clear and sure methodology for the independent audit of Rabbinic harmonization rules and acts***. That is in itself a highly important finding, which took time and effort to develop, since no one had done it before and it was not immediately evident.

- Finally, we come to **Rule No. 13**, which states: ***vekhen, shnei khetuvim hamakhechishim zeh et zeh ad sheyavo hakatuv hashlishi veyakhriyaa beneihem***. This means, clearly, 'two writings which deny each other until a third comes which reconciles them'. It refers to a situation where we come across two propositions in Scripture, say P and Q, which appear conflicting; the *midah* recommends we find a third proposition in the text, R, which somehow or other resolves the disagreement between them. Such reconciliation may logically result in neither, or either, or both, the initial two propositions being modified by the third, depending on the role the latter plays:

> **P and Q remain finally unaffected by R; but R shows that *the presumed conflict* does not in fact occur in their case.**

An example given in EJ: according to Exod. 19:20, "the Lord came down upon Mount Sinai", and according to Deut. 4:36, "out of heaven He made you hear His voice". These passages seem to imply that God was both *down* close to the Earth and *up* in the heavens; but the apparent antithesis is dissolved, by *Sifra* (1:7), which alleges[407], with reference to Exod. 20:19, "ye yourselves have seen that I have talked with you from heaven,"

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[407] The reading in *Sifra* is by no means that I can see obvious; so, this is not an example of Scriptural reconciliation, but merely one of Rabbinical reconciliation. See further on.

that God brought the heavens down with Him when He spoke. Here, the assumption that the heavens stayed in their normal place (up), which was the source of conflict, is denied.

> **P and Q are finally admitted to be in conflict; but R shows P and/or Q to be *more limited* than presumed, one or both being in fact conditional rather than (as apparent) categorical, or contingent rather than (as apparent) general.**

An example given by Bergman, Num. 7:89 says that "Moses went into the Tent of Meeting" to speak with God, whereas Exod. 40:35 says that he "was not able to enter into" it, adding "because the cloud dwelt thereon". The latter clause was needed to resolve the contradiction between the first two statements, making them both conditional: Moses came in and spoke with God *when* the cloud departed, and he stayed out *when* it was there.

Note the distinct symbolization used in the present rule, in comparison to the other hermeneutic rules: here, we refer to whole propositions (P, Q, R) of whatever form, rather than to propositions of specified forms (as with a fortiori argument or with the preceding rules of harmonization), or to terms (as with *klalim uphratim*). The 13th rule is the least structured and mechanical of the harmonization rules: we must look all over the text for a premise which is not formally pre-defined, so that our intuitive faculty is more active. Whereas in the other rules, the result is arrived at (for good or bad) more directly and virtually automatically.

The processes involved here are perfectly natural inductive processes, widely used to harmonize apparent divergences in the ever-changing context of empirical and rational knowledge. In natural contexts, they serve to restore consistency when it seems momentarily lost, adducing that either the apparent conflict was illusory for some reason, or that one or both of the conflicting theses were over-generalized or under-particularized or otherwise off-the-mark. In a Scriptural context, it is hopefully the text itself which provides the solution to the problem, informing us of some natural event or specification, or in certain

cases a miracle, which modifies our reading of the situation and removes any antinomy.

Note that, according to JE, R. Akiba considered the resolution to be adoption of one of the conflicting propositions, whereas R. Ishmael opted for the view that both are to be modified. But I stress that, formally speaking, there are many possible resolutions, as here specified.

It has to be said that the conflict may not be immediately obvious; often, it is only noticed centuries after the Talmud, sometimes by a picky commentator out to make some point. Also, as originally formulated, the rule of *shnei khetuvim* predicts that a third proposition, *hakatuv hashlishi*, will be found in the text to restore the lost equilibrium. However, that is often not literally the case; often, the conflict is actually resolved only by Rabbinic intervention, with reference to a commentary well-established in the oral tradition or by means of a new commentary (with, in many cases, different commentators making different suggestions). In my view, such external intervention requires no special dispensation, since the process, as already noted, is quite legitimate according to generic logic; provided, of course, that it is properly carried out, that is to say, *flexibly willing to revise postulates which eventually cause difficulties of their own*.

Some commentators (Bergman cites *Tosefos Haazarah*) have felt a need to justify Rabbinic intervention, and did so with reference to the phrase *vekhen*, which begins the formulation of this rule by R. Ishmael. They read *vekhen* as "and, similarly," and refer it to the preceding rule (No. 12), claiming that the present rule concerns situations where no harmonization is given by the immediate context (*meinyano* or *misofo*), and empowers the Sages to decide the issue[408]. However, this attempted justification does not account for the reference to a third

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[408] In other words, according to this view, rule No. 13 concerns, not explicit (*meforash*) reconciliations, by the Torah itself, but implicit (*satum*) ones, by the Sages. Bergman adds, characteristically, "and the Torah requires us to follow their determinations", but he does not state where it does so.

Scriptural passage (*hakatuv hashlishi*). Indeed, according to that view, when Scripture explicitly resolves the conflict, no exegesis has actually taken place, and the rule only refers to situations where Scripture remains silent!

But, in my view, the phrase *vekhen* could equally well, and more credibly, be read as "and, also," and taken to refer loosely to all the preceding hermeneutic rules, merely implying that the present rule is the last in the list (or, perhaps, last but not least). When Scripture provides a solution of the problem, it is still exegesis, insofar as we have to find the relevant passage; the rule, in such case, serves to remind us to look for it. As for where Scripture does not seem to provide a solution, why not say that such cases are dealt with using R. Ishmael's other rules of harmonization. In practice, it is a very fine line which divides the two situations: many allegedly Scriptural resolutions are not automatic, but presuppose a certain Rabbinic reading of the text (e.g. the *Sifra* reading in the above given example).

The last of the Thirteen *Midot* is the prototype for the series of rules concerned with harmonization, in that it most clearly depicts the form of reasoning known as **dialectic**, whose pattern is *thesis-antithesis-synthesis*[409]. Its hierarchical position is ambivalent. It should, in a way, have been listed first among them, because it is the one most deeply anchored in the text (*lidon badavar hechadash* has a similar distinction). Before applying any other form of harmonization, we would naturally try to find *within the text itself* some resolution of the perceived conflict. Failing to find an explicit remark directly or indirectly capable of resolving the difficulty, we might then apply more mechanical procedures, especially that of *shelo kheinyano* (since *lelamed*, *shehu kheinyano* and *lidon* relate to perceived

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409 With regard to this three-word description of dialectic, the following is worth noting. At first sight, "thesis" and "antithesis" refer to the two ideas in conflict, and "synthesis" to their reconciliation. But we could also say, upon reflection, that "thesis" refers to *both* the ideas in conflict, "antithesis" to the *realization that* they are in conflict, and "synthesis" (as before) to the resolution of the conflict.

redundancies, discrepancies, doubts or interpretative tensions, rather than formal inconsistencies).

However, the Rabbis also, apparently, occasionally appeal to the 13th rule to justify more intuitive reconciliations. In that sense, it is also a last resort, and is well placed in the list. If we wish to explicitly acknowledge such reasoning in cases where no Scriptural passage explicitly, or indirectly through one of the other rules of exegesis (assuming them not to be exhaustive), settles the observed difference between two passages, we would have to add a clause to the 13th rule, to the effect that, 'under those conditions, some credible and consistent reconciling postulate needs to be found'. I think it is fair to say that this added clause has been tacitly accepted and used by all commentators, including R. Ishmael himself. As already said, the pattern of thought involved is natural, and therefore needs no special certification in Biblical contexts, *if properly used*.

The way certain postulates have come to be preferred to others over time, is simply through the process of peer group review; this consisted in debate among experts to ensure the credibility and consistency of such postulates. That kind of process is, in principle, normal and healthy, effectively a process of collective knowledge development, a *garde fou* found in every scientific discipline. Of course, peculiar to Rabbinic thinking (and similar enterprises in other religions), are its historically evident authoritarian aspects.

The above comments are based on the data I have for the 13th rule. However, it may be that, with a larger data base, we could formulate the rule with more precision. Among the possible outcomes or alternative theories are the following:

- It could be that rule 13 is concerned, distinctively, with cases *where the subjects (or antecedents) of the conflicting propositions are one and the same* (or, though different concepts, logically mutual implicants). This is confirmed by the above given two examples; and would distinguish it from rules 8-10, where the major and minor subjects (or antecedents) are subalternatives, and from rule 11, where they are incompatible. In that event, the 13th rule would be defined more precisely, as an argument where 'All S are P1'

(major premise), ‘All S are P2’ (minor premise), ‘No P1 is P2’ (predicatal premise), whose conclusion consists in denying at least one of those three premises.

- Alternatively, the rule in question may be wider than that in application, and include all cases where the predicates are incompatible (whatever the relation of the subjects). In that event, *shelo kheinyano* would be a special case of *shnei khetuvim hamakhechishim*, and the latter would cover additional situations, such as where the corresponding predicatal premise is denied or where the subjects are identical.
- It is also possible that rule 13 was intended to cover, not merely inconsistencies in the strict sense, but in the wider sense understood by the Rabbis, who look upon any discrepancy or redundancy or source of doubt as calling for a harmonizing response of some sort. This outlook was evident in the rules of *lelamed*, *shehu kheinyano* and *lidon badavar hechadash*. In that event, rule 13 would add to rules 8-11 the function of ‘conflict resolution’ by alteration of subjectal or predicatal premises. It might similarly embrace the *klalim uphratim* rules and others still[410].

We must also keep in mind that, from a formal point of view, the conclusions recommended by the Rabbis in many of the previous rules are not logically necessary. It follows that they are likely to occasionally lead to inconsistencies, and must be regarded as at best tentative. The resolution of such a derivative inconsistency, merely by retreat from the results of application of an unnecessary *midah*, might have been intended by R. Ishmael as subsumed under the present rule.

Concerning **adduction**, which we saw (in JL 2) is a Torah-given reasoning process, though one not noticed as such by the Rabbis, nor enshrined by them as a hermeneutic rule. It might be argued

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[410] For instance, the weird *semukhim* argument, offered by Bergman (see earlier footnote of the present chapter), might be regarded as a "resolution of conflict" of sorts (though one of very doubtful validity).

that, since adduction is *harmonization between conceptual prediction and empirical findings*, it belongs under Rule 13. However, to there subsume it, we would have to expand R. Ishmael's statement, since the latter relates specifically to textual harmonization – it does not discuss confrontations and reconciliations between the Book, or interpretations thereof (by Rabbis or other people), and external reality. Nevertheless, if the rule is adapted, as above suggested, to allow for harmonization by human (at least, Rabbinic) insight, then it may be considered as also including adductive issues.

5. Diagrams for the Midot

Some of the 13 hermeneutic rules of R. Ishmael can be represented graphically, at least in some respects.

• R. Ishmael's **Rule No. 1**, concerning a fortiori argument, can be represented by a *triangular star*, at the center of which is the middle item (R) through which the three other items, P, Q, and S are related to each other.

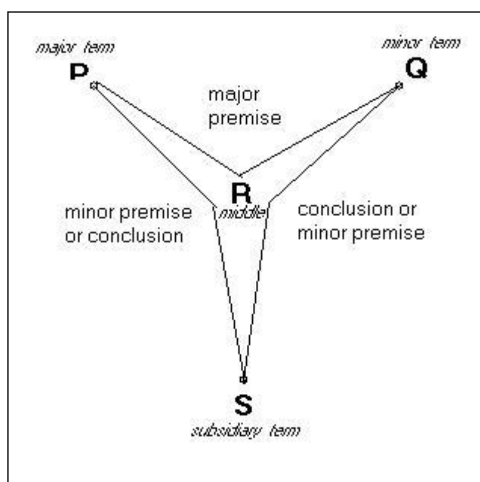

Diagram 8.1

• R. Ishmael's **Rules Nos. 4 and 5**, concerning the intended scope of terms, can be represented as follows. In the first case, the intent is narrow; in the second case, the intent is broad.

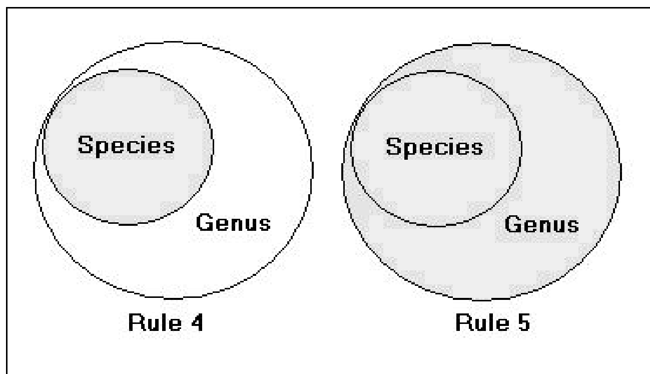

Diagram 8.2

• Rabbi Ishmael's **Rules Nos. 8-9-10**, which are some of the Talmud's harmonization rules**,** are all concerned with the following logical problem, formulated with reference to the following diagram: *knowing the lateral relations between four items (the terms or theses, S1, P1, S2, P2, in the four premises a, b, c, d), what are the diagonal relations between them (i.e. the conclusions, e)?*

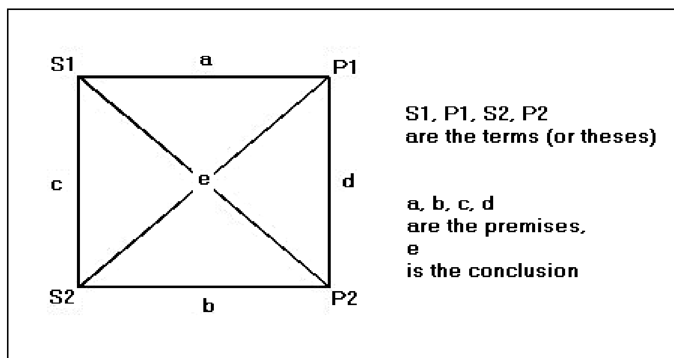

Diagram 8.3

Such arguments appear much simpler, if viewed as successions of Aristotelian syllogisms (which involved three items, in two premises and one conclusion). They may then be graphically represented, using Euler diagrams. Their formally valid conclusions are then manifest for all to see; and the invalidity of some Rabbinic conclusions is then apparent.

- We suggested (in the previous section) a general formula for the first three (actually, four) of the hermeneutic principles which begin with the phrase ***kol davar shehayah bikhlal veyatsa....*** The first three premises can be individually depicted as follows:

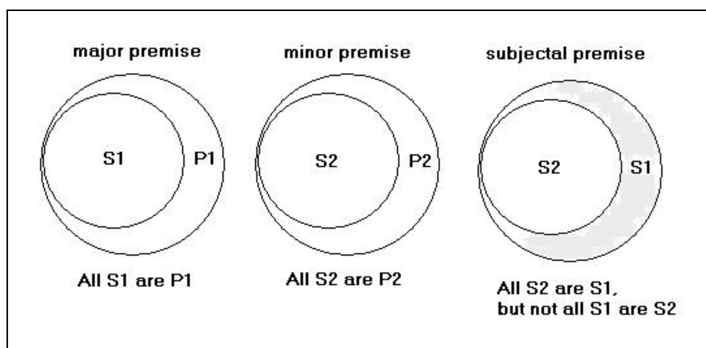

Diagram 8.4

Note that the first two premises leave open the possibility that subject and predicate may be co-extensive, so that the circles labeled S1 and P1 might be equal in size, and likewise the circles labeled S2 and P2 might be one. On the other hand, the relation between S2 and S1 can only be as above depicted, with S2 smaller than S1.

As for the remaining (predicatal) premise and the conclusion(s), we shall consider each case each in turn. But first, let us consider what general conclusions can be drawn from the common premises of all such arguments. Given the major and subjectal premises, we can at the outset, without resort to the other

premises, make the following syllogistic inferences and graphic presentation:

1/AAA	3/OAO
All S1 are P1	Some S1 are not S2
All S2 are S1	All S1 are P1
So, all S2 are P1	So, some P1 are not S2

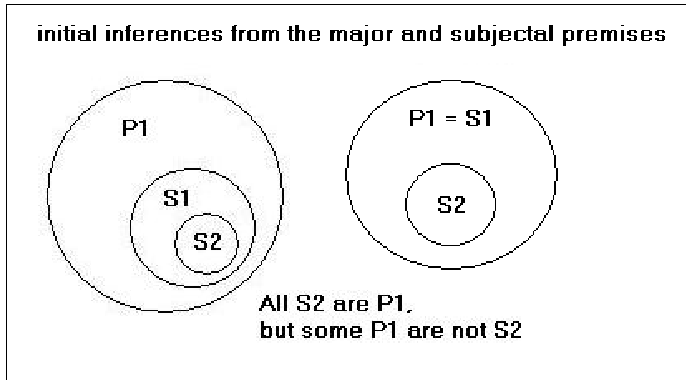

Diagram 8.5

Note: I did not mention the above 3/OAO syllogism in my original treatment (in the previous section).

It should, however, be pointed out that in the case of Rule 10, since the major premise is particularized in an effort to restore consistency, these initial inferences become annulled.

Similarly, given the minor and subjectal premises, we can at the outset, without resort to the other premises, make the following syllogistic inference and graphic presentation:

<u>3/AAI</u>

All S2 are P2

All S2 are S1

So, some S1 are P2

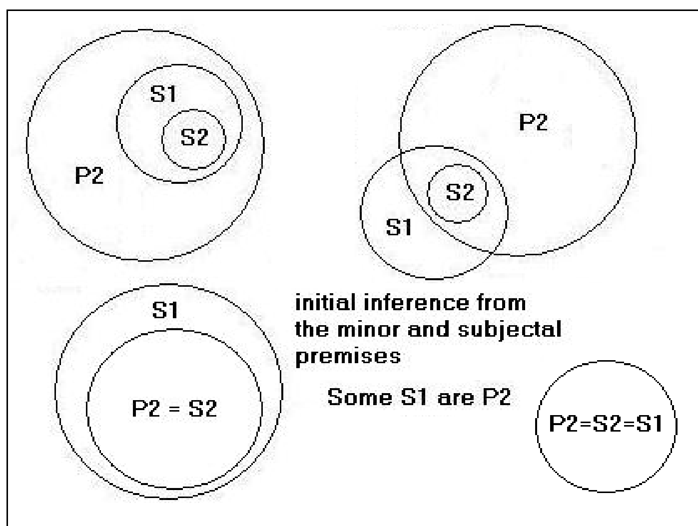

Diagram 8.6

This conclusion is an indefinite particular, note – i.e. in some cases, we may find "All S1 are P2"; and in others, "Only some S1 are P2".[411]

- R. Ishmael's **Rule No. 8(a)** – "*lelamed oto hadavar*" – the generalizing version of "*lelamed*", may be depicted as follows, since its fourth premise is:

  All P2 are P1, but not all P1 are P2 (predicatal premise).

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[411] Quite incidentally, I notice while writing this that in *Future Logic* (p. 37), I state that the mood 3/AAI is a derivative of 3/AII; but it could equally be derived from 3/IAI. Similarly, 3/EAO could be derived from either 3/EIO (as stated) or 3/OAO.

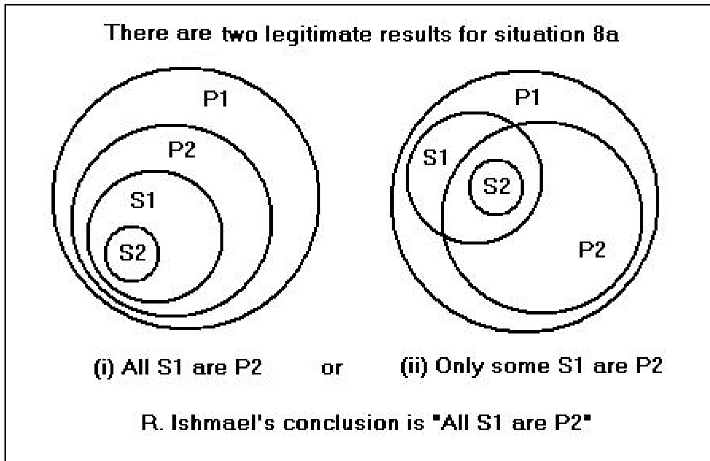

Diagram 8.7

The four premises formally yield the conclusion "Some S1 are P2" (etc.), which is compatible with the two outcomes shown in our diagram.

Rabbi Ishmael concludes (more generally and more specifically) that "All S1 are P2", which means that he at the outset generalizes the formal conclusion, and precludes the other formal alternative (some S1 are not P2). No reason is given for this hasty action. Thus, note well, although the Rabbinical conclusion is in this case compatible with the formal one, it is not identical with it. Strictly speaking, it is a *non-sequitur*. The best we can say for it is that it is a legitimate inductive preference to select the more general alternative; however, the Rabbis should remain open to occasional particularization of their conclusion, if it is found to lead to some contradiction elsewhere.

- R. Ishmael's **Rule No. 8(b)** – "*lelamed hefekh hadavar*" – the particularizing version of "*lelamed*", may be depicted as follows, since its fourth premise is (note the reversal of order of the terms, in comparison to the preceding case):

  All P1 are P2 (predicatal premise).

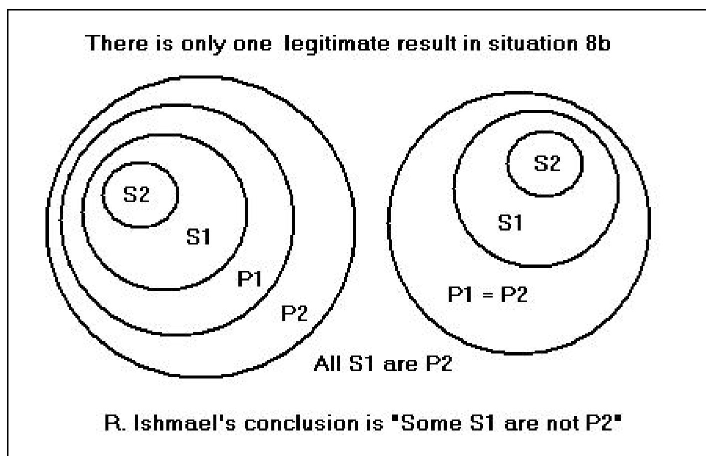

Diagram 8.8

The four premises formally yield the conclusion "**All S1 are P2**" (etc.).

Yet R. Ishmael draws the very opposite conclusion "Some S1 are not P2"! Why this upside down logic? Apparently, he mentally considers the premises in conflict, due to some perceived redundancy in the text, and seeks to harmonize them by excluding all S1 other than S2 from being P2. But such particularization is logically illegitimate, since there was in fact no formal conflict between the premises, and textual repetitions can hardly be considered as such. Judge for yourself.

- R. Ishmael's **Rule No. 10** – "*shelo kheinyano*" – is difficult to depict since it concerns a conflict resolution. Its fourth premise is:

  No P1 is P2 / No P2 is P1 (predicatal premise).

As the following first diagram shows this premise is in conflict with the others, since if the circles representing P1 and P2 cannot overlap at all, then the circles S1 and S2 cannot satisfy all the given conditions regarding them. The problem can be faced in a number of ways:

(a) That is, if S2 is wholly in S1, and S2 is wholly in P2, then S1 cannot be wholly in P1. We could accept this and

propose that S1 is partly in P1 – and partly (to an extent at least enough for S1 to cover S2) in P2.

(b) Alternatively, if S2 is wholly in S1, and S1 is wholly in P1, then S2 cannot be wholly in P2. We could accept this and propose that S2 is partly in P2, and partly in P1; but if we say so, we must also assume S2 is not entirely (but only partly) within S1.

(c) We might also resolve our dilemma by assuming S1 and S2 not to at all overlap, like P1 and P2.

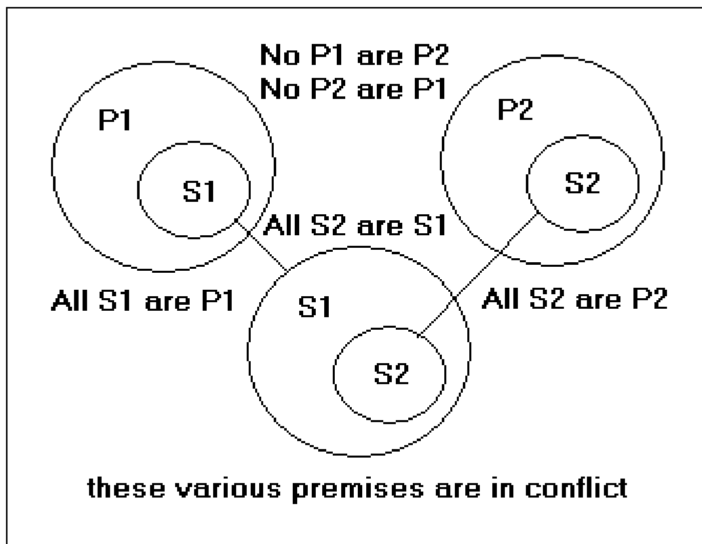

Diagram 8.9

R. Ishmael's preferred option, for resolving the conflict dealt with by Rule No. 10**,** seems to have been (a). That is, he kept the subjectal and predicatal premises, and even the minor premise, unchanged and chose to tinker only with the major premise, concluding: "**Some, but not all, S1 are P1**". Diagrammatically, this Rabbinical resolution of the conflict looks as follows:

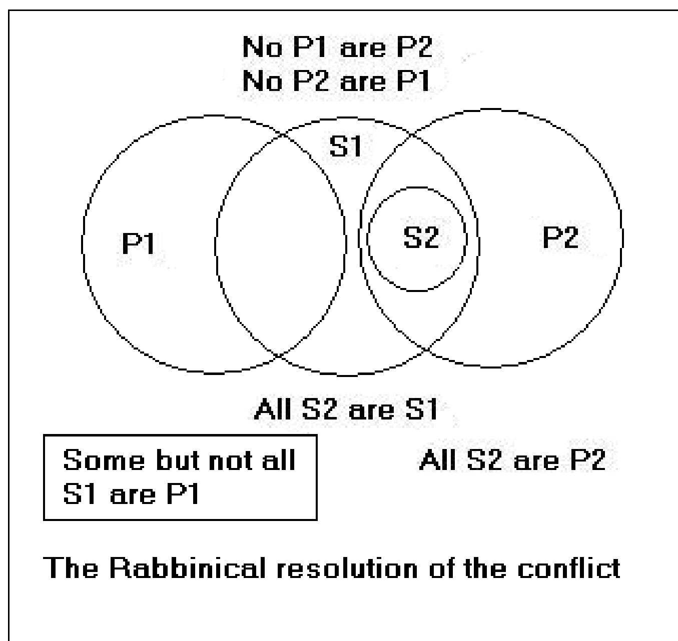

Diagram 8.10

This is a formally acceptable option, even though not the only conceivable option. That is, though the Rabbinical response is not per se in error, it should be kept in mind by them that other inductive responses are possible if the need arise, i.e. if this response later prove undesirable for some reason.

- R. Ishmael's **Rule No. 9** – "*shehu kheinyano*" – presumably has as its fourth premise:

  Some P1 are P2 and some P1 are not P2, and

  some P2 are P1 and some P2 are not P1 (predicatal premise).

This situation, where P1 and P2 only partly overlap, may be graphically represented as follows:

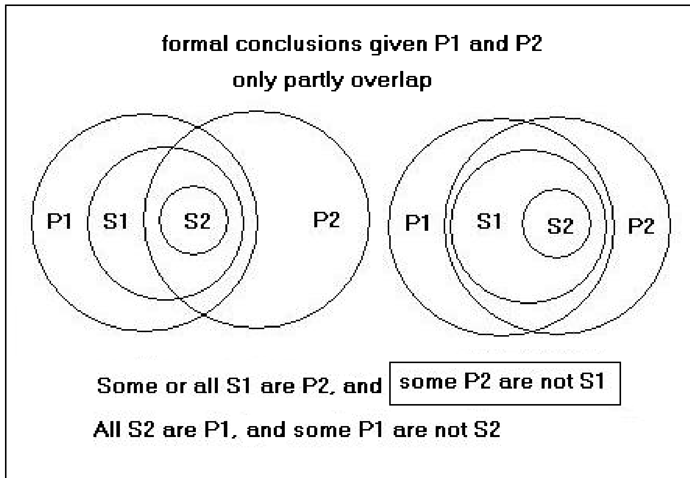

Diagram 8.11

The conclusions we can formally draw are obvious enough. Since “Some S1 are P2”, as well as, “All S2 are P1” and “some P1 are not S2”, are general conclusions possible from the first three premises, without resort to the predicatal premise – the only formal conclusion *specific to the current predicatal premise* is “**Some P2 are not S1**”.

It is not clear (to me so far, at least) what R. Ishmael proposes to conclude in such cases.

- R. Ishmael’s **Rule No. 11** – “*...lidon badavar hechadash*” – can also to some extent be represented graphically. Do not refer in the present case to the earlier common premises and conclusions (for Rules 8-10) – this is an entirely different situation. Here, we are initially given the premises:

All S1 are P1 and **All S2 are P2**

And we are told that an individual, say ‘x’, changes over time from membership in the class S1 to membership in the class S2. Whence, incidentally, by singular syllogism, x is initially P1 and later P2. Later still, x leaves S2 and returns to S1. Formally speaking, granting the given premises constant, there is no doubt as to the outcome of such return: **x must again be P1**. As to x’s relation to P2, it depends on further conditions; for we are not

told in the way of a general premise whether P1 and P2 overlap or not.

These formal considerations are illustrated in the following diagram (assuming here, for the sake of argument, that P1 and P2 are mutually exclusive):

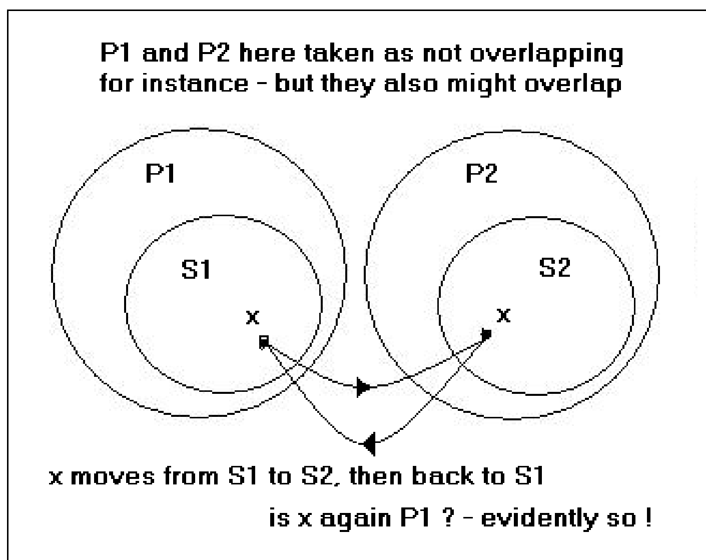

Diagram 8.12

However, R. Ishmael conceives the possibility that when x returns from S2 to S1, the relation of S1 to P1 may in the meantime have changed to “Only some S1 are P1”, so that we can no longer syllogistically infer from x being S1 that x is P1.

Alternatively, the original premise “All S1 are P1” may have from the start been less general than apparent; that is, it may have more specifically been intended to refer to “All *first-time* members of S1”, so that we cannot be sure whether P1 applies “returnees to S1” like x.

Thus, the preceding diagram might conceivably be revised as follows:

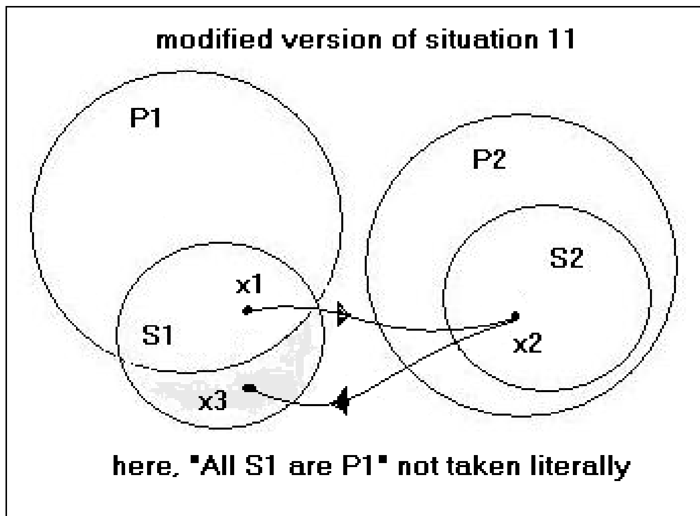

Diagram 8.13

Anyhow, R. Ishmael considers the issue open, and recommends the matter be verified in the Biblical text.

• R. Ishmael's **Rule No. 13**, the last in his list, covers many different cases, most of which cannot readily be illustrated. However, the following diagram illustrates *one example* of the dialectic often involved, where thesis and antithesis are both narrowed, and replaced by their synthesis or common ground.

This illustration is symbolic, note well, because strictly speaking (in class logic) the propositions "All S are P" and "Only some S are P" should overlap – and their common ground, the indefinite "Some S are P", would be their area of overlap.

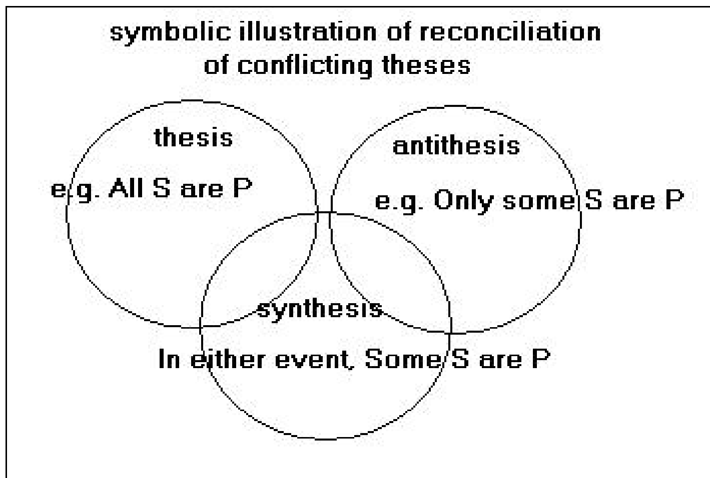

Diagram 8.14

This is just one example – the most ‘deductive’ – of how these conflicting theses might be reconciled. Other inductive possibilities would be to asymmetrically favor one or the other given theses – in which case, the selected one would constitute our synthesis.

In some (other) cases, too, it is possible to argue that the theses are not in as real a conflict as at first appears.

9. THE SINAI CONNECTION

Drawn from Judaic Logic *(1995), chapter 12.*

We shall now look into the issue of the Sinaitic origin of Talmudic/Rabbinic hermeneutics.

1. Verdict on rabbinic hermeneutics

I have no doubt that certain doctrinaire defenders of Judaism will be very upset with me for the devastating deconstruction of Rabbinic hermeneutics in the preceding chapter. But I have to say that my conscience is clear: facts are facts, logic is logic. I did not set off with the intention to discredit Jewish law; quite the opposite, I was hoping to find it valid. However, I resolved to make an objective assessment of the processes involved, unmoved by any considerations but truth, applying my logical know-how to the full. I imagine that God approves, since I believe the Rabbinic characterization of Him as the *God of Truth* literally. I admit that the religious consequences of the results obtained are many and complex, and not all good. But that is none of my business, which is only methodological; I have neither the ability, nor the inclination, to sort out the religious consequences.

No doubt, too, I will be accused of being “haughty and unlearned”, and said to “interpret the teaching according to [my] personal desires”, to use the words of R. Simlai[412]. It is true that I have at most a superficial knowledge of Jewish law, having studied the Talmud very little (in large part due to finding its reasoning processes frustrating). However, just as a theoretical physicist, say, need never enter into a laboratory, but may work

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[412] Quoted by Bergman (p. 99), with reference to *Yerushalmi* to *Pesachim* 5:3. This statement concerned the teaching of Hagadah to 'Babylonians or people from the South'.

with the results of experimental research by others; so, in my case, I have built up my analysis of Rabbinic reasoning on the basis of data made available by relative experts in the Talmud. *Division of labour* is virtually inevitable in the collective pursuit of knowledge; each worker has his special abilities. My gift – I humbly thank God for it, for I do not see how I might have deserved such a gift – is logic; and I have chosen to apply it to this domain, confident that I would make some valuable contributions (and perhaps sensing a certain naivety and bias in my predecessors).

My method simply consisted in analyzing traditional data, examples and principles put-forward by Judaism itself, with reference to scientific logic. A better method, admittedly, would have been to study the Talmud and other Rabbinic literature directly, and build up a thorough data-base of independent observations of actual thought processes, for evaluation by logic. However, the former approach does not exclude the latter approach from being eventually performed; and the latter approach's desirability does not diminish the value of, or invalidate, the former approach. We can compare this to chemical analysis, when samples of a body are taken and their chemical compositions are correctly identified; that conceivably and quite probably other samples, not yet taken, may have other chemistries, does not mean that the samples already analyzed were not properly analyzed. In our case, additionally, the processes we have analyzed are regarded by tradition (rightly or wrongly) as representative[413].

Let us summarize, very briefly, the results of our research into the 13 *Midot*, with a view to distinguishing their natural and artificial aspects. Note first that all the rules suffer to some extent

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413 Though not necessarily exhaustive. For anyone who might want to pursue similar research further, I pass on interesting the information given by *J.E.* that Malbim, in *Ayelet haShachar*, collects "all the hermeneutic rules scattered through the Talmudim and Midrashim," which are reckoned as 613 in number. I did not look into this source, which is likely to be rich. But, however rich it is, we are not exempted by it from looking into the matter with our own eyes and attitudes.

from vagueness and ambiguity, which means that they are bound to be applied with some amount of anarchy.

- ***Qal vachomer***, as we have shown, is a natural and valid form of reasoning. It was reasonably well-understood and competently-practiced by the Rabbis (this is not of course intended as a blank-check statement, a blanket guarantee that all Rabbinic a fortiori arguments are faultless[414]), without weird embellishments. So, we can say that this first *midah* has essentially no artificial components; though Rabbinic attempts to reserve and regulate use of this *midah* (see further on) must be viewed as artificial add-ons.
- ***Gezerah shavah*** is based on a natural thought-process, comparison and contrast, which applied to textual analysis pursues equations in meaning (synonymy) or wording (homonymy). Analogy is scientifically acceptable, though only insofar as it is controlled by adductive methods, namely ongoing observation of and adaptation to available data. While the Rabbis demonstrated some skill in such inference by analogy, they did not clearly grasp nor fully submit to the checks and balances such reasoning requires. Instead of referring to objective procedures, they tried to reserve and regulate use of this *midah* (again, see further on) by authoritarian means; and moreover, they introduced logically irrelevant provisions, on the "freedom" of the terms or theses involved. Thus, this rule, though it has a considerable natural basis, eventually developed quite a large artificial protuberance, and should not in practice be trusted implicitly.
- Inferences from context, including ***heqesh***, ***semukhim***, ***meinyano*** and ***misofo****,* are like arguments by analogy, in that the primitive mind accepts them immediately, just because they appear reasonable. But, upon reflection, we must admit

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414 In particular, though the *dayo* principle was formulated by Rabbis, some other Rabbis resisted it; as we saw, there were good reasons on both sides, meaning that it is sometimes imperative and sometimes avoidable, so that this theoretical controversy can be excused. However, there were in practice some inexcusable breaches of that principle – inexcusable, within the given context.

the need for verification procedures; and, ultimately, the only scientific means we have is adduction (repeated testing, and confirmation or elimination, of hypotheses). In any event, proximity is not, even in theory, always significant; so, one cannot formulate a hard and fast rule about it. It follows that the Rabbinic attempt to do so is bound to be rather artificial, to the extent that it is presented as more than just a possibility among others.

- ***Binyan av*** is, as we have indicated, a Rabbinic attempt at causal logic. The induction of causes and effects is, of course, a natural and legitimate process, when properly performed, by observing the conjunction or separation of phenomena, tabulating the information and looking for behaviour patterns. The Rabbinic attempt at such reasoning was, I am sorry to say, less than brilliant. The Rabbis seem to have grasped the positive aspect of causal reasoning, but apparently could not quite grasp the negative aspect[415]. In practice, they may have often intuited causal relations correctly; but they had difficulty analyzing the relationship theoretically, in words. The outcome of such relative failure, is that *binyan av* efforts must be viewed with suspicion, and classed among the artificial aspects of Rabbinic exegesis.
- The various ***klalim uphratim*** rules (including both R. Ishmael's and R. Akiba's variants) reflect a natural aspect of exegesis, but insofar as they rigidly impose interpretations which have conceivable alternatives, they must be judged as somewhat or occasionally artificial. This regards theory; regarding practice, we can go much further. In many cases,

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415 I wonder how many of them would pass the "Wason test", which is described as follows (based on Michael Thompson-Noel, in *Financial Times*, 15-16/4/1995): we are shown four cards labeled A, D, 3, 6, and told that cards with a vowel on one side always have an even number on the reverse side; the question is, which cards (at least) should be turned over to check the truth of the foregoing generality? The correct answer is (*WAIT! test yourself before reading on!*): the cards A (to verify that an even number is written on the reverse side) and 3 (to verify that there is *not* a vowel on the reverse side); D and 6 being irrelevant.

these rules are applied very artificially, being used as mere pretexts for contrived acts which have no real relation to them. If we regard every such false appeal to these principles as an effective instance of them (viewed more largely), then their artificial component is considerably enlarged.

- With regard to the first few rules starting with the phrase ***kol davar shehayah bikhlal veyatsa***, we found their common properties to be their concern with subalternative subjects (or antecedents) with variously opposed predicates (or consequents). Where the predicates are in a parallel relation compared to the subjects, the conclusion generalizes the minor predicate to the major subject (***lelamed oto hadavar***). Where the predicates are in an anti-parallel relation compared to the subjects, the conclusion renders the minor premise exclusive and particularizes the major premise (***lelamed hefekh hadavar***). Where the predicates are incompatible, the conclusion is similar in form to the preceding, though for different reasons; and perhaps additionally, it renders the minor subject and major predicate incompatible (***liton toan acher shelo kheinyano***). With regard to situations where the predicates are otherwise compatible (***liton toan acher shehu kheinyano***), our research has not determined the Rabbinic conclusion and left the issue open.

Now, in all these cases, *except for* the main conclusions of *shelo kheinyano*, which resolve significant inconsistencies in accord with natural logic, the Rabbinic conclusions are deductively unnecessary: they are at best inductive preferences. However, since they are viewed by the Rabbis, not as tentative hypotheses open to testing, but as laws to be followed come what may, they must be considered as arbitrary and artificial. Furthermore, while we have attempted to determine the exact forms of these laws, the Rabbis themselves are not always clear on this issue, and occasionally misplace examples; this is an additional reason to regard their activities under these rubrics (except, to repeat, for legitimate harmonization) as suspect and artificial.

- The rule ***lidon badavar hechadash***, which the Rabbis were not sure how to distinguish, was found by formal methods with reference to examples to concern movements of individuals from one class to another and back; it was

intended by R. Ishmael to raise a question with regard to corresponding changes in predication. While a literal approach to text would reject such a question, within a more open-minded exegetic system, it seems reasonable enough. Epistemologically, this rule instills exceptional caution in the situations concerned, making inferences conditional on reconfirmation. However, even if we do not classify this rule as overly artificial on theoretical grounds, we must regard some of its alleged applications with considerable suspicion, in view of the evidence that the Rabbis are unclear about it.

- Lastly, the rule ***shnei khetuvim hamakhechishim***, viewed as a wide-ranging harmonization principle, may be classed as an important aspect of natural logic. However, this essential validity does not automatically justify every dialectical act found in Rabbinic literature; quite often, Rabbinic interventions under this guise are rather forced. Furthermore, this rule may not, in fact, have been intended by R. Ishmael to cover every conflict resolution (or at least every conflict not resolved by preceding rules); its scope may have been intended to be premises with a common subject (or antecedent) and variously opposed predicates (or consequents). Such uncertainties in definition call for caution, too. In sum, this rule, as with most of the previous, in practice if not in theory, contains artificial factors.

This summary makes clear that *we cannot define in one sentence the distinctive features of Rabbinic 'logic'*, i.e. those aspects of it which are not granted universal validity by natural logic. Broadly speaking, **the Rabbis developed distinct modes of thought due to lack of formal tools, consequent vagueness in theoretical definitions, and resulting uncertainties in practical applications**. Their natural logic was gradually thickened by an agglutination of diverse artificial elements, which became more and more difficult to sort out, and more and more imposing. Being manifestly unjustifiable by natural means, these extra elements had to be defended by intimidation, with appeal to Divine sanction and the authority of Tradition.

The verdict on most of Rabbinic hermeneutics, emerging from our precise logical analysis has to be, crudely put, *thumbs-*

down[416]. In the last analysis, **whatever it is, it is not a teaching of pure logic**[417]. There are, to be sure, many aspects of it which are perfectly natural and logical[418]. But certain distinctive aspects of it, which we may refer to as peculiarly Judaic 'logic', must be admitted to be, for the most part, either non-sequiturs or antinomial; in all evidence, products of very muddled thinking. We could, with an effort, make allowance for many of the latter processes, if they were viewed as *ab-initio* tentative hypotheses, inductive first-preferences, subject to further confirmation or at least to non-rejection by the remaining body of knowledge. But they are traditionally presented as irrevocable certainties, quasi-deductive processes, not subject to critical review (at least, without a special license granted to a privileged few). So, we must evaluate them in that given framework.

Whatever traditional claims, according to logic it is virtually inevitable that, in a large body of information, the adoption of unnecessary postulates and the arbitrary contradiction of given data will result in hidden, if not obvious, inconsistencies. All the more so, where the proof-text itself is rather ambiguous,

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416 I was myself so shocked by this surprising negative verdict that I renamed the book. Originally, I had intended to call it *Jewish Logic*, out of pride in my people's early progress in certain aspects of logic, such as adduction, a fortiori and dialectic. But after completing analysis of all the hermeneutic principles, it became clear that I could only call the book *Judaic Logic*!

417 I guess I am indulging in a bit of irony here. I mean, either Rabbinic hermeneutics is intended as a teaching of logic, in which case it is pseudo-logic; or it is not so intended, in which case it is misleading to present (as often done) Rabbinic arguments as processes of *reasoning* which lead to a conclusion: every argument must be viewed as a mere *decree*. But anyhow, we cannot have it both ways. It is significant that *midot* is translated as 'principles of logic' in many bilingual Jewish prayer books; Lewittes, p. 66, n. 61, informs us that this is a decision of the Rabbinical Council.

418 This proves nothing in itself, since (as Rabbis themselves have said) *there is always a kernel of truth in a false statement*. It has to be so: without some reality to lean on, illusion cannot exist at all; no one would at all believe a false statement if it did not contain some truth. The issue is always to separate the husk of falsehood, and weigh it against the kernel of truth.

disorderly and confusing, as is the Torah, so that one must proceed very carefully. To arrive at a consistent result, using artificial processes like R. Ishmael's rules, it is essential to have a certain leeway, a possibility to retreat as well as advance. If each rule has to be applied rigidly and irreversibly, the end-result is bound to be untenable, and only capable of being sustained by lies and self-delusion. Even a simple, natural generalization of some Scriptural statement, through say a *lelamed oto hadavar*, may turn out to be in conflict with some other textual statement; how much more so with a complex, twisted paralogism, like say a *lelamed hefekh hadavar*. In such cases, we must either retract or modify the text: on what basis we are allowed to do the latter, without absolute logical need, I have no idea; it would seem much more justifiable to do the former. Surely, our primary axiom must be that the Torah is more reliable than Rabbinic constructs.

The only conceivable defense against the results of the present research is to say that the rules of Rabbinic exegesis constitute ***a secret code***, by which instructions in the Torah are to be transformed into valid legal statements. This thesis suggests that God deliberately wrote the Torah in a misleading way, not wanting everyone to have access to His real intentions, but only a select few (the Jewish Rabbis), to whom *a conversion table*, the hermeneutic principles, was specially revealed for decoding purposes. Thus, according to this idea, God said (in effect) "when, for instance, I assign an implying predicate to a subordinate subject in the Torah, you must contradict the Torah statement where I assigned the implied predicate to the subaltern subject (*lelamed hefekh hadavar*)". Put in clear terms, this is effectively the defense proposed by the orthodox establishment. They put it more romantically, with reference to "allusions and hidden mysteries" which "defy literal interpretation"[419], but that is what they mean.

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[419] I quote Bergman again (p. 99), who uses this language with reference to Hagadic statements of the Rabbis; but I have seen similar language used with reference to the Torah.

Thus, *in that view, the Torah can, and often does, mean more or less than what it says*. For this is what happens: when, without logical necessity, the Rabbis generalize a particular statement or read a statement exclusively[420], they ***add*** to the law; and when, likewise, they particularize a general statement, they ***subtract*** from the law. This thesis is not inconceivable, but it is rather far-fetched and difficult to believe. One may well wonder why God would want to engage in such shenanigans, and not speak clearly and straightly. If His purpose was to illuminate humankind in general, and the Jewish people in particular, with a perfect law, full of Divine wisdom and love, justice and mercy, purity and spirituality, why not say just what He means? Why would He need to mask His true intentions, and give the key to them only to the Rabbis?[421]

All this concerns, note well, especially situations which do *not* logically entail or call for the Rabbinic responses. In situations where logic clearly demands a certain inference or resolution of conflict, there is no need of special revelations; everyone is (more or less) in principle naturally endowed with the required intellectual means. Rabbinic hermeneutics, as a Divinely-granted privilege, come into play, essentially, wherever logic is faced with a *problematic* issue, because Scripture, taken as a whole, does not answer some question, but leaves a gap. The gap may be an indefinite particular proposition: should we read it as general or contingent? In natural knowledge, the preferred course[422] would be generalization. Alternatively, the gap may consist in total silence about some subject, without even a

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420 Crediting the rest of, or the negation of, the subject with the negation of the predicate, beyond the license given by eductive logic.

421 I am not a crypto-Karaite, nor belong to any other sect or religion; this is a candid and honest question by a 'normal Jew', who practices *tant bien que mal* the religion of his forefathers, so far. Another question worth asking is: why would God not wish to teach us logic and orderly thinking; what advantage would He have in confusing and epistemologically incapacitating people? As far as I can see, only a clerical class can gain from such assumptions.

422 Based on factorial induction theory; see my work *Future Logic*, again.

guiding particular proposition. In natural ethics, we might opt for permissiveness, or at best a conventional law.

When dealing with a presumably Divinely *revealed* database, such as the Torah, instead of knowledge naturally developed in the minds of human beings, scientific logic cannot predict with certainty what the intent of the Law-Giver was, in the event of gaps. It is, arguably, more likely that an indefinite particular proposition be read as contingent, and it is conceivable that more radical gaps are to be filled by the decision of Divinely-appointed judges (as Deut. 17:8-13 suggests). The latter possibility would justify *additions* to the law (pronouncing an indefinite particular to be exclusive, or generalizing it, or formulating a completely new provision, are all references to previously unaddressed instances); but it would not justify *subtractions* from the law (other than particularizations called for by manifest contradictions, which cannot be resolved otherwise).

Yet the Torah *explicitly* frowns on additions (*tosafot*) to, as well as subtractions (*geronot*) from, the Written Law, in passages like the following[423]:

> *"Ye shall not add unto the word which I command you, neither shall ye diminish from it, that ye may keep the commandments of the Lord* (Deut. 4:2).

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423 These two sentences, of course (being from Deuteronomy), are spoken by Moses. Our basic premise is that he utters them with full authority from God, as a mere mouthpiece, rather than as the very first Rabbi. Another viewpoint entirely, is to regard Deut. as the first Rabbinic work, i.e. the first transcription of oral law. (Indeed, reading this work, I imagine Moses, now the aging leader of a well-established new order, sitting in his tent, dictating as they occur to him words of wisdom to his personal secretary. The image is suggested by the casual style, the digressions, the repetitions, the scattered subject-matter....) In any case, it could be countered that 'the word' Moses refers to, which may not be modified, includes not only the written law, but also the oral law. However, how can adherence to unwritten law be ensured? What, in such case, would addition or subtraction constitute? How would the boundaries be defined?

> *All this word which I command you, that shall ye observe to do; thou shalt not add thereto, nor diminish from it* (Deut. 13:1)."

Such passages could be interpreted literally, to imply that even where gaps are found, no human legislator or legislative body may presume to try and fill them. The very human, and particularly Rabbinic, tendency to legislate about almost everything would seem to be illegal[424]. In this perspective, when the written Divine law is obscure, albeit all efforts of pure logic made to clarify it, there is effectively no Divine law (on the subject at hand). The appointment of judges is then merely intended for the *application* of Divine law; that is, to decide in each case whether Divine law has been broken, or in whose favour Divine law leans, and impose the sentence, if any, required by those same laws. There is no delegation of powers to construct legislation with nearly Divine authority. All non-Divine legislation is subject to natural ethics or human convention, and thus possibly open to variation under appropriate circumstances.

In any case, the 'secret code' rationale is very fragile. It was intended, remember, as a last resort explanation of ***the illogic of the Midot*** (as above exposed). But this only holds together at best temporarily; since, as of the moment the code is broken and ceases to be secret, as done in this volume, the whole argument falls apart. One can, only so long as a mystery remains, argue

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[424] Lewittes (p. 90), with reference to these two passages of Deut., comments: "Nevertheless, the masters of Jewish Law, in particular the Sages of the Talmud, did not hesitate to add new legislation to the corpus of Jewish Law. They interpreted the Biblical injunction quoted above to apply to each mitzvah in itself; i.e. not to add to a mitzvah a feature not prescribed for it by the Torah.... Furthermore, it was not considered a violation of this injunction if the additional legislation was clearly denoted as Rabbinic and not Biblical in origin." However, that explanation does not sincerely solve the problem; many laws *in fact* fall outside its scope one way or the other. It is just a smoke-screen: if we consider the final legislation point by point, we undeniably find many additions and subtractions.

that God wrote the Torah down differently than He intended it to be read, giving exclusively to Moses and his successors (the Rabbis) a codebook (the *Midot*) to translate His intentions. But, once the implied equations are made transparent and accessible to all, the idea that God expresses Himself in such uselessly tortuous ways becomes ridiculous.

All esoteric claims are equally vain in the long run. Thus, similarly: the Oral Law as a whole stops to be a special privilege as soon as it is written down (as in Mishnah and all subsequent Halakhic works), and so one may well wonder why it was not handed down to us in writing to start with.

It is thus easy to suppose that, from the first appearance of the *midot* (meaning near Talmudic times), they were simply the Jewish equivalent of Sophist argumentation[425], products of the logical incompetence and intellectual dishonesty of the speakers, and of the relative ignorance and gullibility of their listeners. The fact is that the artificial aspects of Rabbinic hermeneutics give enough of an illusion of being complex logical arguments, to bamboozle into intellectual submission, anyone who feels unselfconfident in his or her logical abilities and/or who for emotional reasons is all too willing to be persuaded. The 'secret code' rationale plays only a supporting role, as eventual backup in debates with philosophers. In everyday practice, Rabbinic hermeneutics 'work', i.e. they are 'convincing', because the defense against them demands a logical lucidity and expertise most people lack (be they Rabbis or laypersons).

The power of persuasion of the *Midot* was, of course, greater in the past than it is today; though some people, even educated people, continue to be moved by them. One non-negligible reason for the continuing credibility, is the desire of Jews to hook up with the genuine, ages-old tradition of Judaism. They are not looking for absolute truth; they are looking for roots and wish to belong. They are willing to force their minds into the unnatural thought-processes of the Rabbis, because they regard

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[425] Historically, we should perhaps rather make a comparison to the Stoic preachers of Roman times.

their own current thought processes as equally artificially induced, by modern society and its media. But the pursuit of happiness must not be confused with that of truth.

Judaic logic (together with the logics of other religions and mysticisms) is often conveniently tolerant of contradiction, in contrast to Aristotelian and scientific logic which uncompromisingly rejects contradiction. This is a fundamental distinction, due to attachment of the former to certain given beliefs, texts, doctrines and persons.

The religious construct their world view by tacitly accepting all manners of contradiction: between different passages of the Torah and Nakh, between competing statements of Rabbis in the same or different periods, between tradition and scientific discoveries, and so on. They imagine and posit as an article of faith *that* a resolution somehow exists, whereas the scientific demand a resolution to be found *before* accepting that there is one. Or perhaps more precisely, the religious presume a resolution compatible with their dogmas to exist, whereas the scientific presume a resolution exists but not necessarily one compatible with their pet theories.

I am sorry to say that Talmudic dialectic often makes me think of the liar who covers up his lie with another lie, and the latter with yet another, and so forth, till he has confused his adversary into silence. Each generation of Rabbis constructs an *evasive scenario*, to dilute the difficulties they find in the Biblical text or in previous Rabbinical discussions, and make them more palatable. Of course, such dissolution instead of solution, or explaining-away instead of explaining, has to more or less fit the prevailing orthodox views (though sometimes it does shock a bit initially).[426]

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[426] JL, Addendum 9.

2. Artificial blocks to natural development of the law

The existence of an oral legal tradition is suggested within the (written) Torah in various passages, already mentioned. It is perfectly reasonable, as the story in Ex. 18:13-26 makes clear: following the advice of Yitro, an overburdened Moshe appointed judges to apply (and therefore to some extent interpret) the law in his place, reserving for himself only the most difficult cases. Effectively, Moshe became a theoretician, one in communication with God, and left most of the practical work to others. This would have had to be done sooner or later, to ensure the perpetuation of the new legal system after his decease. With the departure of Moshe, and eventually the disappearance of prophecy, the reference to Divine decision in difficult cases stopped, and the law could only develop with reference to pre-established parameters.

But while the above general proposition is justified and reasonable, it does not automatically follow that every particular claim of tradition is equally well-supported. Concentrating more specifically on the hermeneutic principles, it seems very unlikely that they were entirely transmitted from Sinai. The suggestion that the game rules of Talmudic discourse were known all along is especially difficult to swallow. What is empirically evident, rather, in Mishnah and Gemara (and thereafter), is the gradual development of game rules, by trial and error, through disputes and compromises between the players. We encounter a lot of evidence to that effect throughout the present work.

It is worth quoting JE in this regard: “The Talmud itself gives no information concerning the origin of the middot, although the Gaonim regarded them as Sinaitic...This can only be correct if the expression [*Halakhah leMoshe miSinai*] means nothing more than “very old,” as in the case of many Talmudic passages[427]. It is decidedly erroneous, however, to take this

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[427] It is interesting to note that the expression *Halakhah leMoshe miSinai* is acknowledged by no less an authority than the Rosh to be not always literally true, according to Lewittes p. 142.

expression literally and to consider the middot as traditional from the time of Moses on Sinai."

At first glance, the proposed rules would seem quite conceivably to be of Mosaic origin, in some form or other. But when we look more closely at them and see:

- *that there are disputes concerning their validity and conflicting lists are offered,*
- *that the lists are incomplete and imperfectly organized,*
- *and most importantly that there are disagreements in the interpretations of the individual principles themselves,*
- *and many exceptions and extensions are proposed for them...*

– we must be extremely careful, especially since at issue are *methodological* guidelines for interpreting the Divine law. If (or to the extent that) these guidelines are at all in doubt, then all work done with them becomes open to doubt, too.

Ethical laws, whether relating to religious ritual, personal and social morality, or juridical and political matters, *can* logically be optional or conventional, and thus have 'seventy facets', in the sense that *there may be many means which achieve the same goal equally well*, and the factor of Rabbinic decision may reflect the necessity in such contexts of a common and uniform choice, a consensus. With regard to hermeneutics, it is conceivable that God wrote the Torah is such ways that a number of intellectual connections are possible from one batch of data, each to one of the optional ethical laws; and that the limitations set by tradition to such thought-processes represent the conventional aspect of religious law and logic. However, this measure of leeway and control in interpretation is only a small fraction of the world of exegesis, which remains bound by a great many absolute rules of logic.

In relation to the rules of natural logic there are no ifs and buts. Rabbis cannot *choose to ignore* such rules, no more than they can *choose to follow* them; they are universal truths, irrefragable realities, for which no 'seventy facets' hypothesis can be postulated. ***Rabbinic 'logic' cannot permit what natural logic forbids, nor exempt from what it demands***. These remarks, of course, principally concern deductive logic; with regard to

inductive logic, or epagogic, preemptive rulings inhibiting directions of thought which might otherwise eventually be taken are not totally excluded. The Rabbis might conceivably, as just implied, with reference to Torah text, forbid or make imperative an interpretative process which is *contingent* according to the science of logic. They would have to claim Divine sanction, of course – something difficult to prove or disprove, and something which anyone else could just as well eventually claim, if claims are blindly accepted. But in any case, their credibility depends on respect for the objective boundaries set by natural logic.

Nevertheless, the Rabbis have made efforts to both *reserve* and *regulate* use of the hermeneutic principles, occasionally in ways which seem unjustified or unjustifiable. Hints of this tendency may be found in the Talmud[428], but it has developed greatly in post-Talmudic literature. We quote Bergman[429], first with reference to Biblical interpretation (for Halakhic purposes): "**we are no longer empowered to interpret the Written Torah using any of the thirteen rules of exegesis** (*Maharik Shoresh* 139; *Ra'ah* to *Ketubos* cited in *Yad Malachi* 144)"; and similarly, with reference to interpretation of the Talmud, giving Rashi on *Shabbat* 132a as his reference: "**the Oral Law cannot be interpreted with any of the thirteen hermeneutic rules**".

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428 We may as an example point to the sentence *ain adam din gezerah shavah meatsmo*, translated by *J.E.* as "no one may draw a conclusion from analogy upon his own authority" with reference to *Pes.* 66a and *Niddah* 19b. *J.E.* explains (p. 32) that this canon was formulated to prevent contradictions emerging from unrestricted use of *gezerah shavah* argument, and suggests that the decision on use in each case was not (as Rashi claimed) necessarily based on Sinai tradition, but on Rabbinic consensus. I would suggest that the purpose of this canon was not immutability, nor even collective assent, but to ensure that an individual Rabbi proposing a *gezerah shavah* did so with consideration for the full context of knowledge (an inexpert individual could easily ignore or forget relevant data); the collective assent and immutability would be consequences of such proper inductive thinking, which convinces everyone for all time.

429 All quotations from Bergman, here, are from ch. 13 (pp. 120-156).

The first of these sentences reserves use of the hermeneutic principles for the interpretation of Scripture to the Sages of the Talmud exclusively; the second sentence prevents their use for the interpretation of Talmudic and other texts by anyone. Logically, both sentences presume that such legislation is objectively possible, as if the modes of thought involved have no formal necessity! But the truth is that no human can legislate laws of logic out of existence, and exegesis is largely composed of such natural laws. So, certainly, at least the natural aspects of exegesis are beyond the jurisdiction of Rabbis to reserve; no Divine authority can be claimed by them: the proof that God wanted the laws of logic (like those of mathematics, physics, etc.) is that He created them as part of nature. As to the artificial aspects, they are welcome to them; that is, *since they are illogical, the less they are used by anyone, the better*.

What is interesting, in these general limits, and more specific equivalents, is that the authorities quoted by Bergman are *post*-Talmudic, and furthermore that he repeatedly reports *controversies* among them with regard to the truth, or precise formulation of, such limiting principles[430].

To obtain a proper perspective on the issue of tradition, we must always keep in mind the various time spans involved. Fundamentalist students of Jewish law tend to ignore the time factor, and behave in their thinking as if all the players were contemporaries. Effectively, they claim to know with certainty that during a first span of over a millennium, there was perfect oral transmission of the Sinai tradition without loss or distortion of data and without innovations. Then, suddenly more endangered[431] than ever before, during half a millennium, it was

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430 Bergman, needless to say, draws no negative conclusions from these or any other issues; all criticism expressed here is the author's own.

431 Danger is implied by the persecution of those who remember the oral tradition; they may all be killed off and the tradition thus be forgotten. If *any part* of an oral tradition is known to have been forgotten, then surely *all* the remaining parts of it become suspect, for the missing parts may be crucial in making such or such inference, and without them the entire law becomes actually or possibly distorted – permitting the

all (or almost all) put into writing; and those who performed the job had special exegetic powers and rights, which passed away with them. Finally, hundreds and hundreds of years later, we find authorities writing down 'oral traditions' which, apparently, no-one in the interim (even though there was a well-developed culture of written law since the Talmud) had found worthy of mention. This transmission scenario, proposed by the Rabbis, is not credible.

It should be noticed that there is another inherent logical difficulty in the proposed limit on inference from the Written Torah. Mishnaic discussions started about *1200 years* after the Sinai Revelation; the Talmud as a whole was completed some *600 years* later; the classical commentators were active *several hundred years* after that. It is difficult to conceive that hermeneutic principles were delivered at Sinai with a built-in 'self-destruct' clause, permitting Rabbinic authorities living specifically between 1200 and 1800 years later to use certain methods of inference, and forbidding those living after that period from using them. How would such a clause have been formulated? Did Moses say: "In about 1800 years, after some 600 years of writing down of the Oral Torah, when the Talmud is closed, you will no longer be allowed to infer law from the Written Torah"? There is no evidence of such a tradition; it is all too obvious that the limitation was a *non*-Traditional phenomenon, merely the work of certain rigid-minded individuals.

With regard to the proposed limit on inference from the Oral Law, we might try to justify it by saying that whereas the Written Torah is a Divinely-dictated document, the Oral Torah (written down as the Talmud) is a human product[432]. But, upon reflection,

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forbidden, forbidding the permitted, and so forth. For this reason, it cannot be suggested that some parts of our tradition were actually lost (as, I seem to recall, some passages of the Talmud suggest).

432 Funnily enough, some Rabbis seem to consider the Divine as more accidental, less purposeful, than the human, judging by a comment in Bergman, p. 135, according to which: "*R' Betzalel Ranshburg...* quoting *Ravan,* maintains that R' Yehudah interpreted *semuchim* only in *Deuteronomy*. This is because the other four books

such an argument has its difficulties, too. If the Oral Torah was, as per orthodox claims, also Divinely given, then the Talmud should be a virtually verbatim transcript of it and could assumably also be used as a source of inference using similar processes. To deny such perfection to the Talmud would be to put in doubt its continuity with the Sinaitic oral tradition! And even if it is admitted that not all the laws are Divinely given, it is claimed that they are, if only indirectly, Divinely sanctioned; in such case, too, inference should be possible.

It should, in any case, be noted that the Rabbis of the Talmud, in discussing each other's theses, and their successors, in discussing the Talmud and each other's theses, do in fact use at least the natural aspects of the hermeneutic principles. When a Rabbi, for instances, *as often happens*, constructs a *qal vachomer* argument from another's statements, or understands another's thesis as *davqa*, or tries to resolve a conflict between two Rabbinic theses, he is undeniably using exegetic methods. It cannot therefore be claimed that the theoretical interdiction of such methods in oral law is obeyed by the authorities in practice. The interdiction is obviously intended specifically for laypersons, to prevent them from putting Rabbinic decisions in question.

The truth of the matter, then, is that the *natural* thought-processes, through which we all understand *any* documentary or oral legal exposé, cannot be avoided or controlled, whether in the case of Torah or Talmud or later Rabbinic law. The proposed restrictions can only conceivably concern additional, *artificial* clauses: but, as we have just argued, such clauses, whether

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of the Pentateuch were dictated by the Almighty and were not recorded in any particular order, whereas Moses arranged the sections of Deuteronomy in a certain sequence for the purpose of interpreting them." It seems to me that such a position, puts in doubt the R. Akiba principle that the order of things in the Torah is intentional, on which principle many contextual inferences are made, and furthermore, and more importantly, it puts in doubt the Divinity of the laws found in Deuteronomy but not in the preceding four books.

assumed to be Divinely inspired or the inventions of humans, can hardly be formulated with a time limit, anyway.

How such artificial clauses have in fact developed over time is suggested in the JE article on Talmud hermeneutics. It would seem that, for example, the Rabbis might initially make a *gezerah shavah* between two instances of a term, without taking into consideration other manifestations of the same term in the Torah. Later, *in order to inhibit the same inference from being extended to such other cases, without however abandoning the initial inference*, an artificial rule had to be constructed, individually designating as "traditionally-accepted" the case(s) to which such inference was to be limited.

A natural approach would have required either extending the same inference to all other cases, or at least finding for the desired case some inner distinction justifying its special treatment, or abandoning the initial inference. But the Rabbis, aware of the inconsistencies likely to arise from free extension, and not finding any convincing distinguishing character in the accepted cases, and ideologically reluctant to revise previous judgments, opted for institution of an arbitrary rule, defining allowable cases *indicatively* (i.e. merely saying "this, but not that"). This is effectively an attempt to *rig* exegetic methods, so they arrive at preferred results. To err is human and natural; but to institutionalize error is to lie.

Two broader assumptions should be mentioned in this context: that (i) **the Torah laws were intended by God as eternal**, and that (ii) **the laws derived from the Torah by the religious authorities are immutable**[433]. These canons have, of course, been of great significance to the Jewish law system, removing from it all temporal considerations, all possibility of change. They did not, however, need to be brought up repeatedly in legal

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433 Note that I refer here to "laws derived from the Torah by the Rabbis" in a broad sense, including any legislation not explicitly obvious in the Torah. The tradition calls "Rabbinic law" only a small segment of the Halakhah, namely *taqanot* (if I remember rightly); but I am including here all oral traditions and interpretations.

debates, being so universally accepted. Various remarks may be made concerning them.

The first canon seems very reasonable, at first sight. But, upon reflection, it stems from an excessive rationalism; for it is not *inconceivable* that God intended certain laws with reference to specific socio-cultural contexts, allowing for their evolution with historical change. Indeed, the Torah seems to allow for change in God's legislation (compare before and after the Deluge, and before and after Sinai); also, some Divine instructions were punctual (for instance, many relating to the first Passover). This only means that Divine decrees are permanent *until, if ever, God Himself repeals, replaces or modifies them*. Needless to say, to acknowledge this as a possibility, is not to recognize every specific claim that this in fact occurred, such as the Christian and Moslem claims.

Furthermore, there are instances where Torah law was temporarily suspended, which the religious authorities concede (for instance, the prophet Eliahu's animal sacrifice on Mt.-Carmel, against the law which legitimates only the Temple for such rituals). Moreover, the religious authorities have occasionally adapted the law, more constantly, to changed historical conditions (for instances, the laws relating to release from debts and to payment of interest). They argued that the adaptations were foreseen by the original law, in the way of loopholes in it; but we must regard the matter phenomenologically: there was effective change in the accepted legal mores. Also, some commentators have seemingly suggested the relativism of some laws (I am thinking of Maimonides, who suggested that animal sacrifice was *passé*).

The second canon seemed to the Rabbis to be a natural extension of the first. Given the Rabbi's claim of Divinely delegated authority (based on certain statements in the Torah, which we have seen); their belief that God granted many of them special powers of insight (prophecy, the holy spirit, great wisdom); as well as their great trust in their powers of reasoning, due to the assumption that their inferences were overwhelmingly deductive, rather than inductive – it was inevitable that they would regard the whole Halakhah (that is, all interpretations of the Torah developed collectively over time by the Rabbis) as

immutable once established. If Torah statements were eternal, and the inferences therefrom were technically faultless operations, then, surely (they thought), the results they obtained must be incontrovertible and final.

However, as often demonstrated in the preceding chapters, though Rabbinic reasoning was frequently powerful, it was neither omniscient nor infallible. The second canon does not logically follow from the first. Even if we grant the full intention of the first, we need not automatically grant the full intention of the second. Seeing that it concerns *humans*, all we can say with surety is that *where* their arguments are logically tenable and convincing, and *so long as* they remain so, in changing objective circumstances and knowledge context, we must admit them. But if good reason is found, within the letter and spirit of Torah law, changes in derivative law ought to be admitted by the Rabbis. It is absurd, contrary to reason, to lock the door and throw away the key.

In any case, let us note that, in its extension to the whole Halakhah, the concept of immutability has introduced great technical complications in the process of legislation. I refer to the travail of orthodoxy, the ever-narrowing room for maneuver of legislators as the volume of established commentary grows. This phenomenon (and its devastating effects on the people to whom the law is addressed) is not peculiar to the Jewish religion: a similar rigidity may be observed in many periods and sects of the Christian and Moslem religions. But we may contrast it to secular law within a democracy (the *état de droit*). In the latter law-systems[434], even constitutional laws may be changed,

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[434] The contrasts to secular law made here are not my own insights. I found them in Abitbol, in his discussion of the 13th *midah*. He also mentions that conflicts between divergent laws may be resolved with reference to widely admitted general principles. Note that we may regard Torah law as having constitutional status, and Rabbinic derivations of law as equivalent to ordinary legislation, with the newer superseding the older because it has taken it into account. However, the contrast remains, despite such analogies, because we cannot in principle change Torah law, nor in practice change Rabbinic derivations.

according to the surrounding conditions and current understanding of things. Furthermore, these display certain characteristics absent or less prominent in the former; for instances, constitutional law overrides divergent ordinary legislation, newer laws or provisions may override divergent older laws or provisions which were not explicitly repealed. As a consequence, the law can evolve (sometimes, admittedly, in sorry ways; but often, surely, for the good).

The Rabbinic restrictions on use of the hermeneutic rules (to certain persons, in certain domains) do not affect the actual operation of these rules where the Rabbis allow them to be used. On the other hand, there are general principles which affect exegesis in action, causing many of the rules to produce results they would not otherwise produce. I am thinking especially of the **principle of economy**, as it might be called, which is attributed to R. Akiba, and which might be stated, broadly-speaking, as: **in the Torah, no choice or placement of word(s) is accidental and no repetition of word(s) is superfluous**[435]. This viewpoint derives from a rationalistic thought that God would not, in so important a document as the Torah, His main verbal link with humanity, misuse, misplace, or waste a single word, phrase or sentence.

Note, however, that the principle of economy was somewhat mitigated by a principle that "**there is no early and late in the Torah**" (*ain muqdam umeuchar baTorah*[436]), which allowed commentators to occasionally chronologically reorder events narrated in the Torah. However, this has had a lesser effect, if any, on Halakhah, since the sequence in which laws were given does not affect their contents or relative strength.

Incidentally, while there is no doubt that the principle of economy has been used by the Rabbis with reference to a great many of the words and word-placements, it has never so far as I

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435 A fuller statement of this principle would also attach significance to: a pleonasm (i.e. a grammatically redundant word); the absence of a word present in a similar statement elsewhere; a redundant phrase or sentence; an extra or missing letter in a word.

436 *Pes.* 6b, quoted by EJ p. 371.

know been confirmed with reference to all of them. No one seems to have made a systematic research in all possible sources, to see if, indeed, *every* item in the Torah subsumed by this principle has been accounted for by the Rabbis, even conjecturally; or to count the proportion accounted for.

In this deterministic perspective, there are inferences to be drawn from every verbal peculiarity in the Torah; and as we have seen it had a strong effect on Rabbinic exegesis, often causing very far-out 'inferences' to be made. It must be stressed that, as a theoretical position, this was not universally accepted; R. Ishmael favoured a more poetic approach, saying that "**the Torah speaks in the language of men**" (*Sifre* on Num. 112, quoted by *J.E.*). It should be noted, however, that (as we have seen) in actual practice, R. Ishmael very often tacitly adhered to the same mode of thought as R. Akiba. One might reflect that it is very hard for human beings to avoid rationalism, even when they may try to!

If the principle of economy has been contested by high authorities of Mishnaic times, it surely cannot be claimed to be absolute, Divinely given and traditionally irreproachable. Even if it was in practice used more often than ignored, it must at best be viewed as an ex post facto summary, a heuristic principle, rather than as a guiding, hermeneutic principle. A serious problem with it, is the difficulty of defining it precisely, in a way which ensures that it operates in formally predictable ways. It cannot be expressed as a hard and fast rule, echoing the law of identity, that the Torah 'means what it says', for a literal and rigid interpretation of this document leads to contradictions (and, anyhow, the Rabbis do not always favour literal interpretation, as we have seen).

Furthermore, the 'language of men' hypothesis, which conceives a poetic license for God, according to which His choice of words may vary, and He may repeat words, and He may use words in surprising positions, without thereby necessarily intending to affect the law – is not unreasonable. Such liberties of style do not have to signify a lack of order in God's thinking, but could be assigned to other motives, like beauty, emphasis and narrative requirements, reflecting also the intellectual limits and emotional needs of the human addressees of the Divine message.

Therefore, the economy principle is not the only logically acceptable position.

The truth is, I daresay, somewhere in between functionalism and art. If we understand R. Ishmael's postulate as noncommittal, i.e. as merely a denial of R. Akiba's hard and fast rule, then we need not seek further for a golden mean: it is it. We can then say that the correct approach, in view of the lack of consensus, on so basic an issue, among top level carriers of tradition, and in view of the technical difficulty of defining the principle of economy in such a way that it can be applied without controversy, is to rely on natural, generic logic. That is, to judge each situation on its merits, using the whole palette of inductive and deductive procedures logic makes available to us, flexibly and unassumingly.

It may seem paradoxical that while, in their theoretical attitudes, R. Akiba seems more rationalistic and R. Ishmael more poetic – in their practice of exegesis, as pointed out by EJ, the former's method is "less confined", more logically permissive, the latter's "more restrictive", more logically demanding. As I see it, R. Akiba uses the seemingly strict economy principle as an excuse for almost any flights of fancy; whereas R. Ishmael's language-of-men hypothesis and resultant caution in action are evidence of a deeper empiricism and rationalism.

We must, in any case, stress that *a distinction must be drawn between the general principles formulated by R. Akiba and R. Ishmael, and the particular inferences claimed to have been made on these bases (by these same Rabbis or others)*. Just because someone claims that in performing a certain 'inference' they are applying this or that accepted principle, does not certify that the principle was indeed the logical basis of the 'inference'. There is a big difference between justification and rationalization. There might be a loose, analogical relation between the pretexted principle and the alleged application, yet not in fact be a strict logical relation. Blah-blah is often a smoke-screen.

Another canon, in the same rationalistic vein, that affected exegesis was that **each unit of information in the Torah can only serve for one inference**. It must be stressed that this notion

is very peculiar to Judaic logic. Generic logic has no such restriction: a premise *can* be used repeatedly, in any number of arguments, without being thereby disqualified. Moreover, a premise *should* be re-used as often as possible, wherever its terms or theses make such use possible, to ensure its consistency and integration with the whole body of one's knowledge. I imagine that the Rabbis' idea was conceived as a corollary of the principle of economy, a sort of extension from the statics to the dynamics of Torah study. But I see no justification for it whatsoever, and to repeat it has no basis in formal logic.[437]

Yet another restrictive canon of this sort, proposed by R. Ishmael, was that the **hermeneutic principles mayn't constitute chains of arguments** (sorites), such that the conclusion of one is used as a premise of the next. This canon was not accepted by R. Akiba, who considered that one may "learn from a matter itself derived from Scripture" (*lamed min halamed*).[438] As may be expected, I would in this case favour R. Ishmael's restriction, with respect to the artificial outcomes of the hermeneutic principles; though defend R. Akiba's position, with respect to the natural outcomes of exegesis. The artificial parts are to be avoided as much as possible; the natural logic parts cannot be interdicted.

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437 In fact, the Rabbis do, if only implicitly, re-use premises. Examples may be found in our analysis of "*kol davar shehayah bikhlal*" exegesis, where each of the four premises (major, minor, subjectal and predicatal) is combined with the remaining three to elicit information and check for consistency.

438 See EJ p. 371, which refers to *Zev.* 57a. Bergman also mentions R. Ishmael's principle (though not R. Akiba's), though he seems to limit it to laws concerning the holy offerings; but he adds that "several distinctions may be made" in this regard and refers us to *Zev.* 50b. (Note incidentally that if R. Ishmael's position here is accepted, so that all the premises of hermeneutic arguments must be obtained directly from within the text itself, it follows a fortiori that his 13th rule cannot be interpreted as allowing the resolution of conflicts to come from outside Scripture!)

3. How "tradition" keeps growing

In the pursuit of objective truth in religious matters, or as near to it as we can get, it is important, as we have seen, to first of all control one's mental attitudes, and avoiding all psychological and social pressures, concentrate on the facts and logic of the case at hand. Additionally, one should be aware of various pitfalls, some of which may be found in all domains and some of which are more likely to be found in the particular domain of religious thought.

We realize, today, the extent to which imagination plays a role in scientific thought. Mach, Einstein are among those who have stressed this fact. Knowledge depends on hypothesis-building and verification. To build hypotheses means *to imagine* new ideas, by means of the images and echoes of past experiences and rational insights, whose concrete and abstract elements are combined and reshuffled in ways never before tried. Our imaginations are *variously extended and limited*. The same person, under different conditions, and especially in different knowledge-contexts, has varying facilities and constraints of imagination. Different persons, coexisting in a historical epoch and culture, have different facilities and constraints; likewise, and all the more so, persons in different times or milieux.

All this is as true in mathematics as in physics or biology: ***our ability to conceive of explanations or solutions always depends on our imaginativeness***, which is a function of the faculty of imagination as such (the factors in our brain which make possible the projection of novel structures and permutations), as well as of our perceptiveness, the intelligence of our insights and our acquired context of information (which together provide the elements manipulated by the imagination). Effort and perseverance play a role, too, of course. If this is true in the 'exact' sciences, it is all the more so in disciplines like history, where facts are much harder to come by, being relatively unique and non-reproducible, and the share of postulates is consequently much greater. Likewise, as we shall presently show in more detail, *religious thought depends on the imaginativeness of those who engage in it.*

If we look at religion, not only the Jewish religion but also the other major religions, we see certain recurring patterns of behavior. One of the most common ways to legitimatize new propositions in a religion is to project it into the past; to claim it has always been there, to attribute it to some authoritative person(s), to refer its transmission into the present to subterranean (oral, esoteric) channels. This may be called the **argument by anachronism.** To repeat, because it is important to realize it, such ways are not peculiar to Judaism, but common to all the major religions. Within Jewish culture, many works were written in Biblical style and under antique pseudonyms during the pre-Talmudic centuries, which the Talmud sages themselves nonetheless rejected for various reasons. Some people claim the book of Daniel to be such a later work, which the Rabbis however kept in the canon. More recently, a classical example is the *Zohar*[439].

Some people, naturally, question the antiquity of the Torah itself (i.e. the Five Books of Moses), suspecting it to be a cumulative work of many authors and editors spread over several later centuries, which was attributed by them to an ancient, perhaps merely legendary, character called Moses. Some people claim to have textual indices to that effect (I have not studied these claims). That, of course, is a very radical approach. But even granting, in its main lines, the traditional presumptions regarding the Torah itself, and later books of the Bible (the Nakh), it is important to realize that the argument by anachronism is repeatedly and very frequently, implicitly if not explicitly, used in the Talmud and thereafter. The trouble with this argument, is

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439 According to historians, including Gershom Scholem, this work was written mainly by Moses de Léon (13th cent., Spain), who pseudoepigraphically attributed it mainly to R. Shimon Bar Yochai (2nd cent., Holy Land). Although the work suddenly appeared on the stage of history, many Jews were soon convinced of its authenticity, and many still are today. So much so, that it has even affected Halakhah in two or three instances. For example, according to what I was taught, the exemption from wearing tefillin (phylacteries) during the intermediate weekdays of Pessach and Succoth is based entirely on the authority of the *Zohar*.

that it is usually as difficult to disprove as to prove. There is usually an iota of conceivability, however much the evidence or lack of evidence militates against the notion concerned.

The Torah period of Jewish history is virtually inaccessible, it seems, to historians (though, of course, quite a bit is known about surrounding cultures). The period of Jewish settlement (Judges, Kings) to the First Exile and Return (Ezra), is more accessible, thanks to the Nakh itself and archeological discoveries (few of them documentary) in the Holy Land and beyond. The period of the Second Temple, to the beginnings of the Mishnah, is, surprisingly, a relatively dark age of Jewish history with regard to documentary material; perhaps little was written and much was destroyed. Then comes a strong Rabbinic movement, starting with the Mishnah and growing with the Gemara; a vocal movement, full of advocacies and certainties, with its peculiar conventions and methods. But even in this Talmudic phase, it is relatively difficult to firmly establish the historicity, or myth, of certain claims.

How, then, can anachronism be checked and countered? The answer is to refer empirically to more recent Rabbinic discussions. As historical evidence increases, the probability of error in our evaluations of anachronistic claims decreases. It is easy to invent fairy tales (very unlikely stories) when the data in question is well out of reach; but manipulatory constructs become unacceptable, when the data is available, or when it ought to be but is not available. If we analyze how contemporary or relatively modern Rabbis develop Judaism, we can safely extrapolate our findings to their predecessors. Here, the processes involved *in fact* are made evident:

1. A legal problem arises, **not explicitly foreseen** by previous religious authorities (from Torah through Talmud and beyond). If the issue concerned had been explicitly foreseen, or even could easily be deduced from available law, there would be no discussion about it today. Our concern here is,

by definition, with such cases: for example, the use of electrical equipment on the Sabbath[440].

2. It cannot be said that the present Rabbis already know the answer, through some sort of oral or written transmission, since they are all **evidently looking for it,** and debating possible answers among themselves. Note well the logical impossibility of anachronistic claims nowadays: in the Talmud, oral transmission could be claimed, knowingly or by supposition, and there was little possibility of verification[441], *but since then, the "oral" law has in fact become more and more exclusively **written**, and therefore subject to objective scrutiny.*
3. For each Rabbi addressing the problem, the process of answering is the same: bound by his well-absorbed Jewish cultural standards and inhibitions, and informed by his broad knowledge of official Jewish methodology and law, and some knowledge of ambient living conditions and science, and aided by his personal level of intelligence (penetration and breadth of insight, intellectual rigour) and imaginativeness, **he proposes a possible solution** (or a number of them) for consideration by his peers, and a dialectic is put in motion. This is very normal inductive procedure, practiced in all fields.
4. The proposed solutions to a problem made by the various Rabbis involved, are of course made in the framework of past Jewish law, as much as possible with reference to precedents and analogies found in the literature. Nevertheless, since

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440 Current electricity was virtually unknown to us until the end of the 18th cent., and the discoveries by L. Galvani in 1796 and A. Volta in 1800.

441 A Rabbi could honestly claim having received some belief from his teacher; but who can say whether what his teacher taught him was in turn received from *his* teacher, or was a personal insight? The intermediate teacher may have simply omitted to specify the fact either way, and his successor presumed it was an old tradition! The degree of veneration in which ancients held their teachers has to be taken into consideration. Multiply this uncertainty by the number of generations from Sinai to Talmud, and it grows exponentially.

neither question nor answer were previously known and dealt with, we have to rely on **the possibilities which occur in the minds of the people concerned**. Granting that these people have perfect credentials, with regard to piety and knowledge of Jewish law, there still remains the issue, for each one, of his acquaintance with secular knowledge to date and his honesty about it, and his intelligence and imaginativeness. This is the human element in decision-making, in Jewish law as everywhere else, and there is no escaping it. Even if these people are in fact saints, the rest of us are still required to consider it.

5. Now, the next step is in fact the most interesting. The solution proposed by an authority may be universally accepted, or it may be accepted by some of his colleagues and refused by others. It may end up integrally or in modified form in the Halakhah – or it may even be totally excluded from the Halakhic domain in question. But, being the suggestion of a respected Rabbi, it remains potent in Jewish culture, and several centuries later it may suddenly be revived, in relation to a very different issue, by virtue of some possible analogy. The fact that it was said by an authority (i.e. someone who won *other* legal debates) and *a long time ago*, gives that proposal of his **the status of being a "tradition".**
6. This status, irrespective of the fact that the idea had a human origin, and that its originator was functioning on a more limited scientific database and may even not have won the debate of the time, is passed on to any subsequent ideas, in whatever other contexts, which manage to claim some reliance on the "tradition". Moreover, not only does the old proposal become a **springboard** for new ideas, but it also sets up **boundaries** for subsequent discussion. That is to say, subsequent discussions must take that "tradition" into account, and remain somewhat consistent with it and not exclude it absolutely. It becomes 'raw data', effectively, with all the potential for growth and limitations implied.

This pattern of growth, which we have just depicted, is actual, observable fact. Follow any Rabbinic debate and these elements should be evident to you. "Tradition", paradoxically, keeps growing. Even if much uncertainty surrounds Talmudic

traditions, whether or not they all came from Sinai – we can show with certainty that in more recent times, new "traditions" are first formed by the faculty of imagination of some individual and after some time acquire the status of icons. By extrapolation, it is reasonable to suppose that similar processes occurred in less accessible historical time[442].

I personally find it hard to imagine that all the words on Jewish law spoken or written in the past 3,300 years could have all been uttered first by one man, Moses, and from then on repeated from generation to generation. Surely, no human being would have enough *time* in a lifetime to just *say* all these words, let alone follow their meaning. Even if the first transmission from God to Moses was miraculously fast, and miracles attended the transmission from Moses to other men; we must still account for the subsequent stages of transmission. Furthermore, the powers of human memory must be empirically considered: how much it can absorb in a certain amount of time, how much it tends to forget over time, and also the possibilities and statistical probabilities of mistaken "remembering". It is very reasonable to assume that Moses transmitted *some* oral teachings besides his written legacy; and conceivable that *some* of these teachings were transmitted through the centuries; but *how much* and *which* of his oral teachings have reached us is moot.

It should be remembered that there are indications in the Bible itself that transmission of the law was occasionally interrupted, the most touted of which is the story in 2 Kings 22:8-13 (and its parallel in 2 Chronicles 34:14-21). It is there told that, during king Josiah's reign, the High Priest Hilkiah "found the book of Torah (*sefer haTorah*)" in the Temple. The definite article *the* in this statement signifies that *a specific* scroll of Torah was found. Some commentators suggest that this was *the original* scroll, written by Moses; and they explain Josiah's alarm as due, not to

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442 The story of Moses sitting at the back of a R. Akiba class, and being surprised by the new laws taught in his, Moses', name, show that the Talmudic Sages were already aware of this paradox (*Menachot* 29b; according to Lewittes, p. 57). By definition, tradition must be static: the notion of a dynamic tradition is a contradiction in terms.

his (and everyone else's) total ignorance of the law at the time, but to the fact that the scroll found was positioned at an unfavourable passage. Others, however, explain the "the" as reflecting Hilkiah's knowledge that, though all other copies of the Torah had been destroyed in the preceding idolatrous period, *one last* copy (even possibly the said original) had been hidden, and he had hoped to find it.

The first opinion, being less tortuous, sounds more credible to me. But the second is conceivable in the context of data available. Note that further on the king is told that Hilkiah found "*a* book", which may either mean that, unlike Hilkiah, the speaker and the king were unaware of loss of the original scroll; or, alternatively, be indicative of surprise and gladness that a scroll, *any* scroll, was found, whereas they had assumed all scrolls lost. Thus, there is a logical possibility that the Torah was, if not entirely forgotten by most people, largely ignored, for an extended period, maybe some 70 years (during Manasseh's reign, 55; Amon's, 2; and the first 10 of Josiah's). If, as some commentators suggest, the book in question was only Deuteronomy, that still represents almost a third of the 613 commandments (200 of them, of which 77 positive and 123 negative).

If the written Torah was wholly or partly out of circulation for a long time, the oral law must surely have suffered considerably. There was evidently not a complete black-out, since loyalists like Hilkiah and Huldah the prophetess, and various cultural vestiges, remained; but gaps in knowledge of the law may well have resulted.

The *plurality* of conflicting "traditions" tends to confirm the thesis that, even in Talmudic times, new ideas were being variously developed or had only recently been variously developed. But orthodox commentators, in the face of this plurality, have advanced the comforting counter-thesis that God wished to stimulate discussion and leave room for decision-making and so gave the Torah tradition 'seventy facets'. Thus, the fact of plurality in itself proves nothing either way. However, there are other indices that conflicting schools of thought were a cultural development of Talmudic times: in the earlier Tanakh literature, there is little hard evidence of similar legal disputes,

and moreover (as shown with regard to a fortiori argument in JL) there is no evidence of a sufficiently developed logical language.

10. THE LOGIC OF ANALOGY

I analyzed in some detail the basic formalities of the argument by analogy close to ten years ago in my book *A Fortiori Logic*. I there showed in what ways it resembles and differs from a fortiori argument. However, I left the matter at that, and did not consider the inconsistencies one can easily come across in the use of analogical argument. I also did not sufficiently investigate, as I should have, the use of such argument in scientific and legal (and in particular in Talmudic) discourse. In the present essay I try to broaden and deepen my investigation. The material presented below is original; no one has, to my knowledge, surprisingly, ever investigated the formal logic of analogy in such detail.

1. Qualitative analogy

To begin with, let us review some of the main findings of my past research regarding analogical argument and see where we can improve upon them. The following text is mostly drawn from my book *A Fortiori Logic* (chapter 5.1), but with some significant editing.

Qualitative analogical argument consists of four terms, which we may label P, Q, R, S, and refer to as the *major, minor, middle and subsidiary terms*, respectively (remember the nomenclature). The major premise contains the terms P, Q, and R; the term S appears in both the minor premise and conclusion. The names major term (P) and minor term (Q), here, unlike in a fortiori argument, do not imply that P is greater in magnitude or degree than Q. For this reason, we can *conventionally* decide that the minor term will always be in the minor premise, and the major term will always be in the conclusion; meaning that all moods will have the form of so-called ‘from minor to major’

arguments.[443] This means that any valid 'minor to major' mood could, in principle, be reformulated as a valid 'major to minor' mood.[444]

The argument by analogy may then take the following four *copulative* forms (with a positive major premise, to start with).

a. The **positive subjectal** mood. *Given that subject P is similar to subject Q with respect to predicate R, and that Q is S, it follows that P is S*. We may analyze this argument step by step as follows:

> Major premise: P and Q are alike in that both have R. Note that this premise is fully convertible; it has no direction.

This implies both 'P is R' and 'Q is R', and is implied by them together.

> Minor premise: Q is S.

The term S may of course be any predicate; although in legalistic reasoning, it is usually a legal predicate, like 'imperative', 'forbidden', 'permitted', or 'exempted'.

> Intermediate conclusion and further premise: All R are S.

This proposition is obtained from the preceding two as follows. Given that Q is S and Q is R, it follows by a substitutive third figure syllogism that there is an R which is S, i.e. that 'some R are S'. This particular conclusion is then *generalized* to 'all R are S', provided of course we have no counterevidence. If we

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[443] In my book *A Fortiori Logic*, where my treatment of analogical argument was aimed at comparison with a fortiori argument, I had to impose the same forms as in the latter to the former. That is, positive subjectal and negative predicatal moods were 'minor to major', and negative subjectal and positive predicatal moods were 'major to minor'. Here, where my treatment of analogical argument is independent, such distinctions are irrelevant; and it is wiser to make all moods 'minor to major' or all moods 'major to minor', and the former choice (with the minor term always placed in the minor premise) is easier to remember.

[444] But when dealing with *quantitative* analogy (see further on) we must tread carefully, and distinguish between superior, inferior and equal terms.

can, from whatever source, adduce evidence that some R (other than Q) are *not* S, then of course we cannot logically claim that all R are S. Thus, this stage of the argument by analogy is partly deductive and partly inductive.

Final conclusion: P is S.

This conclusion is derived syllogistically from All R are S and P is R.

If the middle term R is known and specified, the analogy between P and Q will be characterized as 'complex'; if R is unknown, or vaguely known but unspecified, the analogy between P and Q will be characterized as 'simple'. In **complex analogy**, the middle term R is explicit and clearly present; but in **simple analogy**, it is left tacit. In complex analogy, the similarity between P and Q is indirectly established, being manifestly due to their having some known feature R in common; whereas in simple analogy, the similarity between them is effectively directly intuited, and R is merely some indefinite thing assumed to underlie it, so that in the absence of additional information we are content define it as 'whatever it is that P and Q have in common'.

Quantification of terms. Let us next consider the issue of quantity of the terms, which is not dealt with in the above prototype.

In the singular version of this argument, the major premise is 'This P is R and this Q is R', where 'this' refers to two different individuals. The minor premise is 'This Q is S', where 'this Q' refers to the same individual as 'this Q' in the major premise does. From the minor premise and part of the major premise we infer (by syllogism 3/RRI[445]) that there is an R which is S, i.e.

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[445] Here, the symbol R refers to a singular affiRmative proposition, as against G for a singular neGative one. I introduced these symbols in my book *Future Logic*, but singular syllogism is not something new. The Kneales (p. 67) point out that Aristotle gives an example of syllogism with a singular premise in his *Prior Analytics*, 2:27. The example they mean is supposedly: "Pittacus is generous, since ambitious men are generous,and Pittacus is ambitious" (1/ARR). Actually, there is another example in the same passage, viz.: "wise men [i.e. at least some of

that some R are S – and this is generalized to all R are S, assuming (unless or until evidence to the contrary is found) there is no R which is not S. From the generality thus obtained and the rest of the major premise, viz. this P is R, we infer (by syllogism 1/ARR) the conclusion 'This P is S', where 'this P' refers to the same individual as 'this P' in the major premise does.

In the corresponding general version of the argument, the major premise is 'all P are R and all Q are R' and the minor premise is 'all Q are S'. From the minor premise and part of the major premise we infer (by syllogism 3/AAI) that some R are S – and this is generalized to all R are S, assuming (unless or until evidence to the contrary is found) there is no R which is not S. From the generality thus obtained and the rest of the major premise, viz. all P are R, we infer (by syllogism 1/AAA) the conclusion 'all P are S'. Note that the minor premise *must* here be general, because if only some Q are S, i.e. if some Q are not S, then, if all Q are R, it follows that some R are not S (by 3/OAO), and we cannot generalize to all R are S; and if only some Q are R, we have no valid syllogism to infer even that some R are S.

As regards the quantity of P and Q, there is much leeway. It suffices for the major premise to specify only that some Q are R; because, even if some Q are not R, we can still with all Q are S infer that some R are S (3/AII), and proceed with the same generalization and conclusion. Likewise, the major premise may be particular with respect to P, provided the conclusion follows suit; for, even if some P are not R, we can still from some P are R and all R are S conclude with some P are S (1/AII). Needless to say, we can substitute negative terms (e.g. not-S for S) throughout the argument, without affecting its validity.

It is inductive argument. Thus, more briefly put, the said analogical argument has the following form: Given that P and Q

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them] are good, since Pittacus is not only good but wise" (3/RRI). Note that the reason I did not choose the symbol F for aFfirmative was probably simply to avoid confusion with the symbol F for False. In any case, some symbols were clearly needed for singular propositions, since the traditional symbols A, E, I, O only concern plural propositions.

are alike in having R, and that Q is S, it follows that P is S. The validation of this argument is given in our above analysis of it. What we see there is that the argument as a whole is *not entirely deductive, but partly inductive*, since the general proposition 'All R are S' that it depends on is obtained by generalization.

Thus, it may well happen that, given the same major premise, we find (empirically or through some other reasoning process) that Q is S but P is not S. This just tells us that the generalization to 'All R are S' was in this case not appropriate – it does not put analogical argument as such in doubt. Such cases might be characterized as 'denials of analogy' or 'non-analogies'. Note also that if 'All R are S' is already given, so that the said generalization is not needed, then the argument as a whole is not analogical, but entirely syllogistic; i.e. it is: All R are S and P is R, therefore P is S. Thus, *analogy as such is inherently inductive*. And obviously, simple analogy is more inductive than complex analogy, since less is clearly known and sure in the former than in the latter.

Note well: inductive does not mean arbitrary. Induction is a logical process with its rules, even if it is more indulgent than deduction. One cannot just make a claim or mere speculation and give it credibility by characterizing it as 'inductive'. Its logical possibility and consistency must first be considered, and then ways of validating it found. Any 'analogical' argument not here specifically formally justified may be considered as invalid, until and unless some precise formal justification for them is put forward.

Other moods. The above, prototypical mood was positive subjectal. Let us now consider the other possible forms of analogical argument.

b. The **negative subjectal** mood. *Given that subject P is similar to subject Q with respect to predicate R, and that Q is not S, it follows that P is not S*. This mood follows from the positive mood simply by obversion of the minor premise and conclusion, i.e. changing them to 'Q is non-S' and 'P is non-S' (since the negative term 'non-S' is included in the positive symbol S of the positive mood). This argument is of course just as inductive as the one it is derived from; it is not deductive.

c. The **positive predicatal** mood. *Given that predicate P is similar to predicate Q in relation to subject R, and that S is Q, it follows that S is P*. We may analyze this argument step by step as follows:

> Major premise: P and Q are alike in that R has both. Note that this premise is fully convertible; it has no direction.

This implies both 'R is P' and 'R is Q', and is implied by them together.

> Minor premise: S is Q.

> Intermediate conclusion and further premise: S is R.

This proposition is obtained from the preceding two as follows. Given that R is Q, it follows by conversion that there is a Q which is R, i.e. that 'some Q are R', which is then *generalized* to 'all Q are R', provided of course we have no counterevidence. If we can, from whatever source, adduce evidence that some Q are *not* R, then of course we cannot logically claim that all Q are R. Next, using this generality, i.e. 'all Q are R', coupled with the minor premise 'S is Q', we infer through first figure syllogism that 'S is R'. Clearly, here again, this stage of the argument by analogy is partly deductive and partly inductive.

> Final conclusion: S is P.

This conclusion is derived syllogistically from R is P and S is R.

Note that the generalized proposition here (viz. all Q are R) concerns the minor and middle terms, whereas in positive subjectal argument it (i.e. all R are S) concerned the middle and subsidiary terms.

Let us now quantify the argument. In the singular version, the major premise is: this R is both P and Q, and in the general version it is: all R are both P and Q. The accompanying minor premise and conclusion are, in either case: and a certain S is Q (or some or all S are Q, for that matter); therefore, that S is P (or some or all S are P, as the case may be). We could also validate the argument if the major premise is all R are P and some R are Q; but if only some R are P, i.e. if some R are not P, we cannot do so for then the final syllogistic inference would be made

impossible[446]. Such argument is clearly inductive, since it relies on generalization. No need for us to further belabor this topic.

d. The **negative predicatal** mood. *Given that predicate P is similar to predicate Q in relation to subject R, and that S is not Q, it follows that S is not P*. This mood follows from the positive mood by reductio ad absurdum (we cannot here use mere obversion as with subjectal argument): given the major premise, if S were P, then S would be Q (since analogical argument is non-directional, P and Q are interchangeable in it); but S is not Q is a given; therefore, S is not P may be inferred. This argument is of course just as inductive as the one it is derived from; it is not deductive.

Moods **with a negative major premise**. All the above-mentioned moods could equally well have a negative major premise (expressing non-similarity or dissimilarity, which mean the same), and yield a corresponding valid conclusion – one, as we shall now show, of opposite polarity to the preceding. We may refer to such movements of thought as **disanalogy**.

The **positive subjectal** mood would be: *Given that subject P is not similar (i.e. is dissimilar) to subject Q with respect to predicate R, and that Q is S, it follows that P is not S*. Here, the major premise means either (a) P is R but Q is not R; or (b) P is not R but Q is R. The minor premise is given as Q is S, and the conclusion is the negative P is not S. This can be validated as follows: (a) given Q is S and Q is not R, it follows that there is a S which is not R; this may (in the absence of counterevidence) be generalized to 'no S is R'; whence, given P is R, we infer that P is not S. Alternatively, (b) given Q is S and Q is R, it follows that there is a S which is R, i.e. some S are R; this may (in the absence of counterevidence) be generalized to 'all S are R'; whence, given P is not R, we infer that P is not S. The **negative**

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[446] However, if we know that some R are P, and do *not* know that some R are not P, we can generalize the positive particular to obtain the 'all R are P' proposition needed to infer the final conclusion. In that case, the argument as a whole would be doubly inductive, since involving two generalizations.

subjectal mood follows by obversion, and has as its minor premise that Q is not S and as its as its conclusion that P is S.

The **positive predicatal** mood would be: *Given that predicate P is not similar (i.e. is dissimilar) to predicate Q in relation to subject R, and that S is Q, it follows that S is not P.* Here, the major premise means either (a) R is not P but R is Q; or (b) R is P but R is not Q. The minor premise is given as S is Q, and the conclusion is the negative S is not P. This can be validated as follows: (a) given R is Q and S is Q, it follows that there is a S which is R; and given R is not P, we may (in the absence of counterevidence) generalize to ‘no R is P’; whence we infer that S is not P. Alternatively, (b) given R is not Q and S is Q, it follows that there is a S which is not R; given R is P, we may (in the absence of counterevidence) generalize to ‘all P are R’; whence we infer that S is not P. The **negative predicatal** mood follows by reductio ad absurdum, and has as its minor premise that S is not Q and as its conclusion that S is P.

We can call analogical argument with a positive major premise (expressing similarity) **comparison**, and that with a negative major premise (expressing dissimilarity) **contrast**. As we shall see further on, such arguments may result in conflicting conclusions, when they are compounded with different middle terms.[447]

We can similarly develop an equal number of **implicational** moods of analogical argument, where P, Q, R, S, symbolize *theses* instead of terms and they are related through implications rather than through the copula ‘is’. The positive antecedental would read: *Given that antecedent P is similar to antecedent Q with respect to consequent R, and that Q implies S, it follows that P implies S*. The negative antecedental would read: *Given the same major premise, and that Q does not imply S, it follows that P does not imply S*. The positive consequental mood would read: *Given that consequent P is similar to consequent Q in*

447 I briefly mentioned moods with a negative major premise in my past treatment of the topic; but I did not fully analyze them. I now view them as more important than I realized at the time, having lately become aware of the issue of compounding comparison and contrast.

relation to antecedent R, and that S implies Q, it follows that S implies P. The negative consequental mood would read: *Given the same major premise, and that S does not imply Q, it follows that S does not imply P*. Moods with negative major premises can similarly be formulated; but the minor premise and conclusion will have opposite polarity, i.e. if the minor premise is positive, the conclusion will be negative, and vice versa. All implicational moods are, of course, partly inductive arguments since they involve generalizations. Validations of the implicational moods should proceed in much the same way as those of the copulative moods.

2. Quantitative analogy

Analogy may be qualitative or quantitative. The various moods of analogical argument above described are the qualitative. In special cases, *given the appropriate additional information*, they become quantitative. For quantitative analogy, as for qualitative analogy, since the major and minor terms (P and Q) are functionally interchangeable, we may conventionally consider all moods as 'minor to major'. However, in the context of quantitative analogy, where there are underlying quantities, we must nevertheless distinguish between 'inferior to superior', 'superior to inferior', and 'equal to equal' inferences.[448]

a. The **positive subjectal** moods of quantitative analogy would read:
    - Given that subject P is *greater* than subject Q with respect to predicate R, and that Q is S (Sq), it follows that P is *proportionately more* S (Sp) (argument from inferior to superior).
    - Given that subject P is *lesser* than subject Q with respect to predicate R, and that Q is S (Sq), it follows that P is

[448] My treatment here of quantitative analogy differs somewhat from that in my book *A Fortiori Logic*. The present treatment should be regarded as more accurate.

proportionately less S (Sp) (argument from superior to inferior).

- Given that subject P is *equal* to subject Q with respect to predicate R, and that Q is S (Sq), it follows that P is *proportionately as much* S (Sp) (argument from equal to equal).

Note that each of these quantitative major premises implies the qualitative major premise 'subject P is similar to subject Q with respect to predicate R'; for this reason, we already know by qualitative analogy that, in conclusion, P is S; what the quantitative analogical argument does is provide an additional quantitative specification in the conclusion, telling us whether P is proportionately (compared to Q, with respect to R) more, less or as much S.

The **negative subjectal** mood of quantitative analogy is then simply:

> Whether it is given that subject P is greater or lesser or equal to subject Q with respect to predicate R, and it is given that Q is *not* S, it follows that P is *not* S.

Note that this has here been expressed as one mood, but it could equally be presented as three moods by repeating it for each of the three major premises. The proposed conclusion here is not quantitative; it does not merely deny that P is proportionately more, less or equally S – it denies that P is S to any degree, just as the minor premise denies that Q is S to any degree. This means that this mood is essentially qualitative, and not quantitative. Its operative major premise is 'subject P is similar to subject Q with respect to predicate R'. The validity of this negative mood is thus established, as previously, by mere obversion of the negative subsidiary term.

b. The **positive predicatal** moods of quantitative analogy would read:
   - Given that predicate P is *greater* than predicate Q in relation to subject R, and that S (Sq) is Q, it follows that *proportionately more* S (Sp) is P (argument from inferior to superior).
   - Given that predicate P is *lesser* than predicate Q in relation to subject R, and that S (Sq) is Q, it follows that

proportionately less S (Sp) is P (argument from superior to inferior).

- Given that predicate P is *equal* to predicate Q in relation to subject R, and that S (Sq) is Q, it follows that *proportionately as much* S (Sp) is P (argument from equal to equal).

Note that each of these quantitative major premises implies the qualitative major premise 'predicate P is similar to predicate Q in relation to subject R'; for this reason, we already know by qualitative analogy that, in conclusion, S is P; what the quantitative analogical argument does is provide an additional quantitative specification in the conclusion, telling us whether S is proportionately (in relation to R) more, less or as much P (compared to Q).

The **negative predicatal** mood of quantitative analogy is then simply:

> Whether it is given that predicate P is greater or lesser or equal to predicate Q with respect to subject R, and it is given that S is *not* Q, it follows that S is *not* P.

Note that this has here been expressed as one mood, but it could equally be presented as three moods by repeating it for each of the three major premises. The proposed conclusion here is not quantitative; it does not merely deny that S is proportionately more, less or equally P – it denies that S is P to any degree, just as the minor premise denies that S is Q to any degree. This means that this mood is essentially qualitative, and not quantitative. Its operative major premise is 'predicate P is similar to predicate Q in relation to subject R'. The validity of this negative mood is thus established, as previously, by reductio ad absurdum.

Obviously, for the positive moods of both subjectal and predicatal analogy, the reasoning depends (though often tacitly) on an *additional premise* that *the ratio of Sp to Sq is the same as the ratio of P to Q (relative to R).* Very often in practice, the ratios are not exactly the same, but only roughly the same (this of course affects the argument's validity strictly speaking, though we often let it pass). Also, the reference to the ratio of P to Q (relative to R) should perhaps be more precisely expressed as the ratio of Rp to Rq. Note that this argument effectively has

five terms instead of only four (since the subsidiary term S effectively splits off into two terms, Sp and Sq). Of course, the additional premise about proportionality is usually known by inductive means. It might initially be assumed, and thereafter found to be untrue or open to doubt. In such event, the argument would cease to be quantitative analogy and would revert to being merely qualitative analogy. Thus, quantitative analogy is inherently even more inductive than qualitative analogy.

Note that the arguments here are, briefly put: (i) just as P > Q, so Sp > Sq; (ii) just as P < Q, so Sp < Sq', (iii) just as P = Q, so Sp = Sq. In other words, positive quantitative analogy may as well be from the inferior to the superior, from the superior to the inferior, or from equal to equal; it is not restrictive regarding direction. In this respect, we may note in passing, it differs radically from a fortiori argument. In the latter case, the positive subjectal mood only allows for inference from the inferior to the superior, or from equal to equal, and excludes inference from the superior to the inferior; and the positive predicatal mood only allows for inference from the superior to the inferior, or from equal to equal, and excludes inference from the inferior to the superior. All this seems obvious intuitively; having validated the qualitative analogy as already shown, all we have left to validate here is the idea of ratios, and that is a function of simple mathematics.

We can similarly develop the corresponding forms **with a negative major premise** (i.e. the 'contrast' or 'disanalogy' forms) as follows.

Regarding **subjectal** argument. (a) In cases where it is known that qualitatively 'subject P is similar to subject Q with respect to predicate R', then the quantitatively negative major premise 'P is *not* greater than Q with respect to R' can be restated positively as 'P is either lesser than or equal to Q with respect to R'; 'P is *not* lesser than Q with respect to R' can be restated positively as 'P is either greater than or equal to Q with respect to R'; and likewise, 'P is *not* equal to Q with respect to R' can be restated positively as 'P is either greater or lesser than Q with respect to R'. The conclusions follow as already above detailed. That is, with a positive minor premise, not-greater implies a proportionately less or equal conclusion; not-lesser implies a

proportionately more or equal conclusion; and not-equal implies a proportionately more or less conclusion. With a negative minor premise, the conclusion is simply negative. But (b) in cases where it is known that qualitatively 'subject P is *not* similar to subject Q with respect to predicate R', then the three quantitatively negative major premises are irrelevant, and the minor premise 'Q is S' yields the conclusion 'P is not S', or alternatively 'Q is not S' yields the conclusion 'P is S' (as earlier seen). Therefore, (c) in cases where it is not known whether the underlying relation of P and Q relative to R is positive or negative, the conclusion is moot.

Regarding **predicatal** argument. (a) In cases where it is known that qualitatively 'predicate P is similar to predicate Q in relation to subject R', then the quantitatively negative major premise 'P is *not* greater than Q in relation to R' can be restated positively as 'P is either lesser than or equal to Q with respect to R'; 'P is *not* lesser than Q with respect to R' can be restated positively as 'P is either greater than or equal to Q with respect to R'; and likewise, 'P is *not* equal to Q with respect to R' can be restated positively as 'P is either greater or lesser than Q with respect to R'. The conclusions follow as already above detailed. That is, with a positive minor premise, not-greater implies a proportionately less or equal conclusion; not-lesser implies a proportionately more or equal conclusion; and not-equal implies a proportionately more or less conclusion. With a negative minor premise, the conclusion is simply negative. But (b) in cases where it is known that qualitatively 'predicate P is *not* similar to predicate Q in relation to subject R', then the three quantitatively negative major premises are irrelevant, and the minor premise 'S is Q' yields the conclusion 'S is not P', or alternatively 'S is not Q' yields the conclusion 'S is P' (as earlier seen). Therefore, (c) in cases where it is *not* known whether the underlying qualitative relation of P and Q relative to R is positive or negative, the conclusion is moot.

We can similarly develop the various corresponding **implicational** moods of quantitative analogy. Thus, all moods of qualitative analogical argument can be turned into quantitative ones, provided we add additional information attesting to 'proportionality'.

3. Terms of unequal breadth

The issue of quantitative analogy brings to mind the issue of analogies involving terms which are not co-extensive, but one is broader than and includes the other, as a more generic term includes a more specific term or as an unconditional term includes a conditional one[449]. This is still qualitative analogy, note well. It concerns the scope of terms, not their magnitude or degree as subjects or predicates.

Consider, for a start, **positive subjectal** analogy such that the middle predicate R is not identical for the major subject P and the minor subject Q. We are given that 'P is Rp' and 'Q is Rq', but we do not yet have a comparative major premise with which to construct an analogical argument. To obtain one, we have to find the operative common property of P and Q. Clearly, it is *the more inclusive* (*or less conditional*) predicate of the two we were given (viz. Rp and Rq).

That is to say: (a) if Rp includes Rq, so that Rq is Rp (but not vice versa), then the effective middle term is the *broader* one, Rp, and the major premise is 'subject P is similar to subject Q with respect to predicate Rp', from which, given that Q is S, it follows that P is S. Note well that we cannot in such case build an analogical argument (of minor to major form) from the narrower middle term Rq.

On the other hand: (b) if Rq includes Rp, so that Rp is Rq (but not vice versa), then the effective middle term is the broader one, Rq, and the major premise is 'subject P is similar to subject Q with respect to predicate Rq', from which, given that Q is S, it follows that P is S. Note well that we cannot in such case build

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[449] Note that in some cases, though the two terms compared are specific/conditional, they may still resemble each other sufficiently to be considered as one and the same term for the purposes of analogical argument. It is only when the terms are not so identified, but must be differentiated, that the issue of unequal scope arises.

an analogical argument (of minor to major form) from the narrower middle term Rp.

It might seem paradoxical to say in (a) that we can infer from Rp but cannot infer from Rq, and in (b) that we can infer from Rq but cannot infer from Rp, and yet with the same minor premise 'Q is S' obtain the same conclusion 'P is S'. But we should keep in mind that the basis of analogy, the middle term Rq or Rp used in the major premise, is different in each case, so that arguments (a) and (b) are quite distinct claims; and anyway, we are here dealing with inductive argument.[450]

The corresponding **negative subjectal** moods have the same major premises, and both infer from the minor premise 'Q is not S' the conclusion 'P is not S'.

With regard to **positive predicatal** analogy, where the middle term is a subject and the major and minor terms are predicates, we begin with two propositions 'Rp is P' and 'Rq is Q', from which we need to build a comparative major premise. Here, the basis of analogy is the subject for which both P and Q can be predicated. Clearly, it is *the less inclusive* (*or more conditional*) subject of the two we were given (viz. Rp and Rq).

That is: (a) if Rp includes Rq, so that Rq is Rp (but not vice versa), then the effective middle term is the *narrower* one, Rq, and the major premise is 'predicate P is similar to predicate Q with respect to subject Rq', from which, given that S is Q, it follows that S is P. Note well that we cannot in such case build an analogical argument (of minor to major form) from the broader middle term Rp.

But: (b) if Rq includes Rp, so that Rp is Rq (but not vice versa), then the effective middle term is the narrower one, Rp, and the major premise is 'predicate P is similar to predicate Q with respect to subject Rp', from which, given that S is Q, it follows that S is P. Note well that we cannot in such case build an

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[450] Of course, we can draw a conclusion based on the narrower, less inclusive, middle term, Rq in case (a), and Rp in case (b), by proceeding from major to minor. But our standard form, conventionally, is minor to major.

analogical argument (of minor to major form) from the broader middle term Rq.

Again, it might seem paradoxical to say in (a) that we can infer from Rq but cannot infer from Rp, and in (b) that we can infer from Rp but cannot infer from Rq, and yet with the same minor premise ‘S is Q’ obtain the same conclusion ‘S is P’. But we should keep in mind that the basis of analogy, the middle term Rp or Rq used in the major premise, is different in each case, so that arguments (a) and (b) are quite distinct claims; and anyway, we are here dealing with inductive argument.[451]

The corresponding **negative predicatal** moods have the same major premises, and both infer from the minor premise ‘S is not Q’ the conclusion ‘S is not P’.

The same principles apply to analogical arguments **with a negative major premise**, even though they involve major and minor terms that are dissimilar, rather than similar as above. This is because the contrasting major premise must be a negative mirror image of the comparative major premise, with the same middle term. Thus, all the moods here resemble those above, except that their major premises will be negative (indicating disanalogy) and their conclusions will be contradictory to the foregoing (granting that the minor premises remain the same). There is no need for us to belabor this issue further.

Likewise, **quantitative** analogies involving middle terms of unequal breadth follow the rules already established once we have determined the operative middle term in each case.

What about cases where the two middle terms Rp and Rq are not equal and neither fully overlaps the other, i.e. where they merely *intersect*. In such cases, we have the conjunction ‘Rp and Rq’ as our operative middle term, R. Given a major premise with this compound middle term, we can use it in any kind of analogical argument already established as valid. Remember that

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[451] Of course, we can draw a conclusion based on the broader, more inclusive, middle term, Rp in case (a), and Rq in case (b), by proceeding from major to minor. But our standard form, conventionally, is minor to major.

analogical argument is inductive, so there is no restriction on the scope of the middle term; any middle term which happens to be true is valid.

However, while this seems simple enough at first sight, the plot thickens when we consider the other terms in such analogical arguments and quantify them. Thus, in subjectal argument, if all P are Rp and all Q are Rq, only some P and only some Q are *both* Rp and Rq, whence the minor premise and conclusion must be formulated as concerning ‘certain Q’ and ‘certain P’ respectively; which makes it practically useless. Again, in predicatal argument, while we can say of the compound R that it is all both P and Q, we cannot in the validation process generalize from ‘some Q are R’ to ‘all Q are R’, as we need to do if we wish to infer from the minor premise ‘S is Q’ that ‘S is R’, and thence (via ‘R is P’) the conclusion ‘S is P’; so, here analogy is effectively invalid. Thus, we can say without going into more detail that argument by analogy is not applicable in cases involving intersection.

We have thus far dealt with middle terms of different scope, but what about **subsidiary terms** of different breadth?[452]

In positive subjectal argument, the operative subsidiary term is the predicate in the minor premise (Sq, say); the subsidiary term in the conclusion may be different (Sp, say), if and only if the primary conclusion ‘P is Sq’ implies the further conclusion ‘P is Sp’; and this is possible only provided that ‘Sq is Sp’, meaning that Sp must be *broader* than Sq.[453] Likewise, in the

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[452] I must say, I am surprised by the results shown here for subsidiary terms, because they lack symmetry. We have here one mood requiring that Sp be broader than Sq, and three moods where Sp must be narrower than Sq. This, in my experience, is unusual. It seems to me that either all four moods should be the same, or two moods one way and two the other way. But try as I might I do not see any error in my treatment here; so, I must accept this finding.

[453] Syllogism: all P are Sq, all Sq are Sp, so all P are Sp.

corresponding negative mood, if ‘P is not Sq’ is to imply ‘P is not Sp’, Sp must be *narrower* than Sq.[454]

In positive predicatal argument, on the contrary, the operative subsidiary term is the subject in the minor premise (Sq, say); the subsidiary term in the conclusion may be different (Sp, say), if and only if the primary conclusion ‘Sq is P’ implies the further conclusion ‘Sp is P’, and this is possible only provided that ‘Sp is Sq’, meaning that Sp is *narrower* than Sq.[455] Likewise, in the corresponding negative mood, if ‘Sq is not P’ is to imply ‘Sp is not P’, Sp must be *narrower* than Sq.[456]

4. Conflicting analogies

We have thus seen that analogical argument has numerous moods, which are formally expressible and capable of validation. We shall now consider the issue of *conflicting analogies*, by considering two or more middle terms, i.e. R1, R2, etc., which yield different or conflicting conclusions. One analogy may be more credible or weighty than another. This refers to compound analogical argument *comprising both comparison and contrast* (instead of each in isolation from the other). We must here focus our attention on four compounds, which combine two like forms (not just any pair of forms, note). We may call either argument (the comparison or the contrast) ‘the argument’ and the other ‘the counterargument’ (although I here place the comparison before the contrast, the opposite order would do just as well of course).

<u>First compound: positive subjectal moods.</u>

> Comparison: given that subject P is similar to subject Q with respect to predicate R1, and that Q is S, it follows that P is S.

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[454] Syllogism: all P are nonSq, all nonSq are nonSp (= all Sp are Sq), so all P are nonSp.

[455] Syllogism: all Sq are P, all Sp are Sq, so all Sp are P.

[456] Syllogism: all Sq are nonP, all Sp are Sq, so all Sp are nonP.

Contrast: given that subject P is *dis*similar to subject Q with respect to predicate R2, and that Q is S, it follows that P is not S.

Second compound: negative subjectal moods.

Comparison: given that subject P is similar to subject Q with respect to predicate R1, and that Q is not S, it follows that P is not S.

Contrast: given that subject P is *dis*similar to subject Q with respect to predicate R2, and that Q is not S, it follows that P is S.

Third compound: positive predicatal moods.

Comparison: given that predicate P is similar to predicate Q in relation to subject R1, and that S is Q, it follows that S is P.

Contrast: given that predicate P *dis*similar to predicate Q in relation to subject R2, and that S is Q, it follows that S is not P.

Fourth compound: negative predicatal moods.

Comparison: given that predicate P is similar to predicate Q in relation to subject R1, and that S is not Q, it follows that S is not P.

Contrast: given that predicate P is *dis*similar to predicate Q in relation to subject R2, and that S is not Q, it follows that S is P.

Here we see that by referring to different aspects of P and Q, namely R1 and R2, we may obtain conflicting conclusions, and therefore finally no conclusion. Note that the minor premise is made identical in both cases, and the two major premises are not formally in conflict (since their middle terms differ), and the two argument forms are equally valid. Yet the conclusions are contradictory! Such conundrum is, of course, made possible by the fact that analogical argument is not purely deductive, but in part inductive. Its conclusions are suggestive, not decisive.

To be sure, in some cases we may be able to resolve the contradiction by refuting the analogy (i.e. the similarity or dissimilarity) claimed in the argument or the counterargument, or both; but this is of course not always possible. In some cases,

even after an analogy relative to some middle term is found weak, we may still be able to posit the same analogy relative to another middle term which more strongly supports the putative conclusion; in which case, the conundrum remains.

Obviously, as when faced with any contradiction, we are called upon to carefully check our premises and ensure their credibility. And clearly, while some analogies may not resist criticism, and finally fall, or at least remain inconclusive, others may stand with relative ease, being objectively credible. So, it is inevitable for us, in the pursuit of knowledge, to be faced with such conundrums.

A special case of conflicting analogy is when R1=R2, i.e. when there is only one middle term R. In such cases, the two major premises in the four above compounds are contradictory, and the comparison and contrast arguments cannot both be valid. Also, if either of R1 and R2 implies the other, but not vice versa, then the two major premises are contrary[457], and the conflicting arguments cannot be both valid.

In any case, it should be emphasized that *no two things are the same in all respects*, or they would not be two but one; and *no two things are different in all respects*, or they would not be in the same universe. This means that the above-listed compound arguments are applicable to all things, and the problem of distinguishing significant similarities and dissimilarities from less significant ones is unavoidable. It follows that we constantly estimate by some means or other, in each context, which similarities and dissimilarities are the most significant.

This thought suggests that we should, ideally, for any two items (the subjects or predicates labeled P and Q), systematically find and list all the ways (i.e. the middle terms R1, R2, etc.) in relation to which they are similar or dissimilar. We would then verify, for each middle term considered, how the minor and

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457 This is easily proven. If R1 implies R2, then the two major premises are incompatible through R2; if R2 implies R1, then they are incompatible through R1. But since either case is possible, neither is necessary; so, the two major premises are merely contrary, not contradictory.

major terms (P and Q) relate to the subsidiary term S. Where the relation of S to Q is known and to P is not, we would infer the latter from the former as shown above. Where the relation of S to P is known and to Q is not, we would infer the latter from the former in the same way.

Then, at the end of this systematic research process we would have some idea as to how often the conclusion is positive rather than negative, or negative rather than positive. But of course, such *complete enumeration*, though ideal and theoretically conceivable, is usually not possible in practice. There is just too much similarity and difference between any pair of things. In practice, we investigate and refer to the relations between things as and when they happen to come to our attention. Our knowledge evolves gradually as our experience (whether obtained by passive observation or active experiment) grows and our theoretical insights concerning it become more complex and accurate. Over time, then, our views may change regarding which conclusion is the most significant.

5. Statistics-based analogical arguments

The difficult question we need to try and answer here is: how to decide which of the two opposed arguments is the most convincing? I suspect that in everyday practice *intuition* plays a large role in most cases – our perceptions of which common factor, R1 or R2 (or others still), is the most ‘significant’ in the context concerned. A more formally expressible way to answer our question may, however, be to multiply the number of comparisons and contrasts (not limiting ourselves to two middle terms), and then base our final conclusion on the more numerically weighty side. This is a statistical method.

The principle would here be: If two things (P and Q) are alike in numerous ways (collectively, R1) and differ in numerous ways (collectively, R2), and they are alike more often than they differ, then we may assume that a subject or predicate (S) found to relate to the one (say, Q) probably also relates to the other (P) - the degree of probability being determined by the ratio of similarity to dissimilarity. If the major premise is that they are

different more often than they are alike, then the probability is instead in favor of the conclusion being opposite to the minor premise.

The justification for such statistical argument is generalization: a relation that we found to hold in a majority of *known* cases may, by extrapolation, be assumed to hold in most *unknown* cases; inversely, if the relation holds only in a minority of known cases, there is no reason to expect it to hold in subsequent unknown cases. There is admittedly no certainty here, only probable expectation; but there is some justification: the conclusion is more likely to be thus than otherwise. The greater the probability the more trustworthy our conclusion.

We can thus propose the following four moods of what we may characterize as *statistics-based* analogical argument. Such forms of argument are clearly logically fuller than the forms initially proposed, because they consciously deal with the issue of conflicting analogies. Note that I have conventionally put the minor term in the minor premise and the major term in the conclusion in every case, although I could equally well have opted for the opposite ordering; this was done just to facilitate remembrance. In subjectal argument, the major term P is subject of the conclusion and the subsidiary term S is predicate; whereas in predicatal argument, S is subject of the conclusion and P is predicate. In positive argument, the conclusion has the same polarity as the minor premise; while in negative argument, the conclusion has the opposite polarity to the minor premise.

<u>Positive subjectal analogical argument:</u>

> Given that subject P is like subject Q with respect to *considerably many* predicates (collectively, R1), and that Q is S (some new predicate), it follows that P is probably S too. For, given that subject P is *un*like subject Q with respect to *relatively few* predicates (collectively, R2), and that Q is S, it does *not* follow that P is probably not S. Conclusion: P is probably S.

<u>Negative subjectal analogical argument:</u>

> Given that subject P is *un*like subject Q with respect to *considerably many* predicates (collectively, R1), and that Q is S (some new predicate), it follows that P is

probably not S. For, given that subject P is like subject Q with respect to *relatively few* predicates (collectively, R2), and that Q is S, it does *not* follow that P is probably S. Conclusion: P is probably not S.

Positive predicatal analogical argument:

Given that predicate P is like predicate Q in relation to *considerably many* subjects (collectively, R1), and that (some new subject) S is Q, it follows that S is probably P too. For, given that predicate P is *un*like predicate Q in relation to *relatively few* subjects (collectively, R2), and that S is Q, it does *not* follow that S is probably not P. Conclusion: S is probably P.

Negative predicatal analogical argument:

Given that predicate P is *un*like predicate Q in relation to *considerably many* subjects (collectively, R1), and that (some new subject) S is Q, it follows that S is probably not P. For, given that predicate P is like predicate Q in relation to *relatively few* subjects (collectively, R2), and that S is Q, it does *not* follow that S is probably P. Conclusion: S is probably not P.

The middle terms R1 and R2 are here referred to as 'collective' with the intent that each of them represents numerous unspecified middle terms for which the stated proposition applies. In subjectal moods, the middle terms are predicates of the major premises; while in predicatal moods, they are subjects. Obviously, if the expressions "considerably many" and "relatively few", applied to the middle subjects or predicates (the Rs), can be more precisely quantified, and the bigger number grows and the smaller number shrinks, the probabilities of the conclusions increase.

Needless to say, all problematic conclusions arrived at here are inductive, meaning that they are valid only until and unless new empirical findings or deductions or stronger probabilities override them. They are not fixed, final results, but the best available results in the given context.

6. A scientific illustration

Needless to say, analogy is very often used in everyday thought, and therefore (though perhaps, ideally, more rigorously) in scientific thinking. All conceptualization (and therefore all knowledge, ultimately) is, of course, based on analogy, since we need to become aware of the apparent similarities and differences of things in order to decide whether to classify them together or apart.

I found a scientific illustration of analogical thinking in a recently published book on paleontology[458], which I happened to have purchased and started reading (with no purpose other than pleasure) just as I was developing the above thoughts on analogy. It is worth examining this illustration in some detail (without delving very deeply in the paleontological details) to see what logic can be learned from it.

There we are told that the hunting behavior of dinosaurs, for instance, is induced from other known features of dinosaurs with reference to "modern analogues" chosen, not randomly by referring to just any other predators, such as wolves or sharks, but by means of "**bracketing**." This consists in comparing dinosaurs more specifically to extant *close relatives* of theirs in the evolutionary tree, namely birds and crocodiles. The basis for analogy between 'close relatives' is, clearly, that they are already known (or even merely believed at that stage) to share many *distinctive* characteristics. The author explains:

> "If crocodiles *and* birds share some detail… then dinosaurs had it too. We can't say dinosaurs had feathers simply because birds have feathers – crocodiles do not have feathers, so dinosaurs are not bracketed as far as that character is concerned."[459]

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[458] Michael J. Benton. *The Dinosaurs Rediscovered: How a scientific revolution is rewriting history.* London: Thames & Hudson, 2019-20.

[459] See pp. 16-17. Reasoning by bracketing was first proposed by Larry Witmer in 1995. The resort to 'analogy with living forms' (p. 189)

Putting this argument in more formal terms we obtain the following:

> Subject A (dinosaurs) is known to have many characteristics (middle terms, left tacit here, e.g. genetic or morphological traits) in common with subjects B (birds) and C (crocodiles), therefore, with regard to some feature D (say, an anatomical detail or a behavior pattern): if both B and C have D, then A probably has D too, or if both B and C lack D, then A probably lacks D too; but if B has feature D whereas C lacks it, or if B lacks feature D whereas C has it, we cannot (with equal certainty) predict whether A has or lacks D.

This is, of course, merely probable reasoning – for it remains conceivable, and may well happen on occasion, that A differs as regards D from the indications *suggested by* B and C. It remains true that A may have some unique, novel trait D while B and C both lack it; or A may distinctively lack D while B and C both have it; or A and B may both have D while C lacks it; or A and B may both lack D while C has it; and so forth. Nevertheless, the proposed method of bracketing provides us with some direction, due to the major premise that A is already established as having many distinctive features (which are left tacit here, but together constitute the logically operative middle term) in common with both B and C.

Note that the form of this argument is positive subjectal, with A as the major term, B and C as two minor terms, the unspecified properties they all share as middle terms, and D as the subsidiary term. What is not mentioned here is the mass of differences between A on the one hand, and B & C on the other, although being non-identical they are bound to have many differences. This can be seen if we cast the argument more explicitly in the form of a standard statistics-based analogy:

> Given that subject P (A, dinosaurs) is like subject Q (comprising both B and C, birds and crocodiles) with

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to interpret aspects of fossil forms was an established method long before that, of course.

> respect to *considerably many* predicates (collectively, R1 – here unspecified), and that Q is S (some predicate D), it follows that P is probably S too. For, given that subject P is *un*like subject Q with respect to *relatively few* predicates (collectively, R2 – here unspecified), and that Q is S, it does *not* follow that P is probably not S. Conclusion: P is probably S (i.e., in our example, A is probably D).

Clearly, the second part of the compound shown above (i.e. the negative counterargument) was *left tacit* in the above example, it being presumed that the differences between A and B & C, with respect to another set of middle terms (unspecified), which could point us to an opposite conclusion, were *insufficiently frequent to stand out and matter*. The counterargument is, no doubt, at least subconsciously considered by scientists in practice, drawing on their vast stores of individual and collective knowledge. But to be on the safe side, in practice scientists should always consciously consider and determine the relative likelihood of the counterargument. Because in fact, both sides of the full argument are logically relevant.

It should be obvious that the use of two minor terms (B and C), in preference to only one (either B or C alone), is that this increases the probability of the conclusion about A, which effectively is impressed on us convergently, twice instead of only once. Moreover, if the analogues B and C point to divergent conclusions (both D and not D), we are left with doubts concerning A. As already suggested, the terms A, B, and C should preferably be closely related, as this increases the probability of the result. If they have some characteristic(s) in common, that is good; but if they have some *distinctive* characteristic(s) in common, that is much better, for that fact ties them more closely together, and increases the chances (though of course, still does not ensure) that they will also share the concluded characteristic (D).

Obviously, too, this kind of compound reasoning can be pushed further, by involving more than two modern analogues. *The more analogues the merrier*, since this (to repeat) increases the probability of the conclusion. That is, if subject A is correlated with several more analogues (instead of just B and C) and they

are also found to have D, the probability grows that A is also D. This, then, is one important lesson we can learn from the technique of bracketing – viz. that the probability of the conclusion can be increased by referring, not just to more numerous middle terms (as earlier remarked), but also to more numerous minor terms.

As regards probability ratings, that is not just talk here. It is true that in ordinary discourse, probabilities are very roughly 'estimated' based on personal experience and memory, and even bias, and people may well disagree as to their directions and magnitudes. But in scientific discourse, the issue is taken much more seriously, and great effort and expense are invested to determine probabilities as accurately as possible. Contemporary scientists[460] use a wide array of more and more sophisticated observational and experimental techniques, marvelous technological tools and measuring instruments, ingenious mathematical and computational methods, and extremely powerful computers, to obtain the data they seek. Their professional credibility and reputation depend on their rigor. The consequence is certainty increasing over time, sometimes at an exponential rate.

Modern researchers are admirable in the amount of care and effort they put in to arrive at their conclusions. This is well illustrated in the book on dinosaurs we have here mentioned[461]. By the year 2000, some 500 species of dinosaur had been discovered and named in the world. Scientists wished to classify them relative to each other, in a complete evolutionary tree, as accurately as possible. They collected, merged, and tabulated all known information from hundreds of published papers; and using complex software and powerful computers managed to find the statistically most likely classifications for hundreds of known species. More recently, they have started to reexamine specimens stored in museums and universities across the world, looking for the presence or absence of 457 anatomical characters

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[460] Such as the paleontologists in the referenced book.

[461] Pp. 76-77, 82-83.

in each case, to obtain a still more complete and more accurate tree.

Obviously, such a tree facilitates bracketing, among other things. It is a brief, visual repository of large numbers of comparisons and contrasts.

7. Use of analogy in making and applying law

Analogical argument is common not only in everyday thought and discourse by everyone, and in more scientific contexts, but it is also quite widespread in legal contexts. It is an instrument of law development and application used in all legal systems. Examples are easily found in ancient systems (like the Greek, the Roman or the Talmudic), in medieval systems (like the Christian, the Islamic or the Rabbinic), and in modern systems (like the British, the American or the French). It does not matter whether the political system involved is essentially dictatorial (as, say, in Russia or China today) or essentially free and democratic (as in Western countries today) – reasoning by analogy by legislators or judges is widespread.

Legislators aim to enact new laws, producing ‘statutory law’, while judges aim in principle to apply the laws the latter hand down to them, although, by establishing binding precedents, courts effectively amplify the law, producing ‘case law’, and moreover some supreme courts take this interpretative power far beyond the manifest original intent of legislation and get quite ‘creative’.

Analogical argument helps maintain some degree of consistency and uniformity in the law. If analogies and disanalogies were ignored, a law system might include a smorgasbord of relatively contradictory laws, which could be used to arbitrarily form lenient or stern judgments, as judges please, depending on their political or other personal prejudices or even just their current moods. Such *à la carte* legislation is obviously contrary to justice.

The argument by analogy may be used in legal contexts in several ways: (a) we may formulate new laws on the basis of

general ethical or political principles[462]; (b) we can derive specific laws from constitutional guidelines; (c) we can make new laws by imitation of existing laws for comparable situations; (d) we can argue for the application of an existing law to a particular case under consideration; (e) we can make use of legal precedents, examining past cases resembling the present case, and proposing a like judgment for it; or (f) we can resort to some combination of these ways. For each of these ways, or a combination of them, an argument by analogy can be constructed, provided we perceive (and preferably make explicit) some significant commonality between the source and target situations. The argument would look something like the following (positive subjectal, comparing):

> Since [major premise] the situation under consideration (= major term, P) *resembles* the situation envisioned by such and such general ethical or political principles (a), or constitutional guidelines (b), or existing laws (c, d), or legal precedents (e) (= minor term, Q), with respect to this and that (= middle term, R),
>
> and [minor premise] this source (Q) prescribes some legal course of action[463] (= subsidiary term, S),
>
> it follows by analogy that [conclusion] for the target situation (P) we ought to establish or apply a like legal course of action (S).

Needless to say, while the analogy may be *prima facie* quite convincing, it might eventually be credibly contested; because such argument is never logically decisive, but at best indicative. It might be argued that P does not resemble Q sufficiently or in significant respects R, or that while it is comparable with respect to R, it is rather different with respect to certain other factors

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462 For instance, arguing that since a man has a natural right to life and liberty, he cannot be executed or imprisoned at will (but only eventually under specific conditions, i.e. following demonstrated criminal behavior punishable by law, and after due process). The legislation is intended to give concrete, practical expression to the abstract, philosophical principle.

463 Such as an appropriate verdict or penalty.

(another middle term), and therefore that the formulation for P of a law or judgment S similar to that previously settled for Q is not wise. Such counterargument can also be formulated in standard form, as follows (negative subjectal, contrasting):

> Since the situation under consideration (P) *does not* resemble the situation envisioned by such and such general ethical principles (a), or constitutional guidelines (b), or existing laws (c, d), or legal precedents (e) (Q), with respect to this and that (R), or with respect to certain other factors, and this source (Q) prescribes some legal course of action (S), it follows by disanalogy that for the target situation (P) we ought *not* establish or apply a like legal course of action (S).

Analogical argument should not be confused with a fortiori argument, which is more complex (see my work *A Fortiori Logic* for a thorough treatment of such argument, and for its comparison and contrast to analogical argument). At this point, we should of course propose numerous examples from various historically and geographically different legal systems[464]. I shall, however, be content with the presentation of one Talmudic example, which I find intellectually interesting and challenging because of the convoluted thinking it involves. The reader would do well to read it carefully, even if indifferent to Talmudic content, as there is much to gain in logical acuity and skill from this demanding exercise.

8. A Talmudic illustration

We shall now examine a Talmudic illustration of the sort of more complex analogical reasoning we introduced earlier, with reference to a discussion found in the Babylonian Talmud, tractate *Baba Kama*, pp. 20a-21a. My attention was drawn to this long *sugya* (pericope) by R. Louis Jacobs, who presents a

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[464] The reader can, I assume, readily find many such examples through legal websites or in libraries.

detailed literary analysis of it in one of his works[465]. I here only present a small of part of the discussion, and that as briefly as possible, because I am not really interested in the specific legal issue under discussion, but merely wish to illustrate and evaluate the use of analogy in the halachic discourse of the Talmud. My account is based on the Soncino English translation of the Talmud[466] as well as on Jacobs' reading; but all logical analyses and eventual critical comments are entirely my own.

It is evident from this lengthy example that analogical argument plays a large role in Talmudic (and later, rabbinic) reasoning. We learn from it that when the rabbis wish to establish a new legal ruling, they resort to various analogies found in Mishnaic (or, in other contexts, in Biblical or otherwise traditional proof-texts, or even as a last resort in authoritative statements by rabbinic deciders[467]), as the possible basis of that proposition – and this is where the issue of differing or even conflicting analogies comes into play. The issue being: which of a set of proposed analogies is the most apt, the one to prefer? The problem here, as against in more scientific contexts, is the

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[465] R. Louis Jacobs. *Structure and Form in the Babylonian Talmud.* Cambridge: Cambridge UP, 1991. See chapter 5 (pp. 56-64). Indeed, it is through reading that essay that I realized that my presentation of analogical argument in *A Fortiori Logic* was far from complete, and I was moved to write the present more thorough essay. The aim of Jacobs' analysis is to show how the Talmud collects and orders information and arguments from different sources and times to form an instructive literary unit; it does not randomly or chronologically report discussions but organizes them purposely in a seemingly logical progression. My aim here is very different: it is to study the logical discourse used.

[466] The full text can be found in Halakhah.com. The explanatory comments in square brackets are given there, too.

[467] In some cases, even within this *sugya*, they just seem to rely on the greater authority of some exponent. This is, of course, *ad hominem* argument, although its intent is positive. The authorities referred to are so considered because they are viewed as bearers of the oral traditions handed down since the time of Moses. However, there is no denying that they are in fact often at odds. Traditional commentary on this fact asserts that they are nevertheless (somehow) all right.

difficulty in evaluating the relative relevance of conflicting analogies.

The central question posed by our *sygya* is the following. A certain rabbi, R. Hisda, wonders whether "*one who occupied his neighbour's premises unbeknown to him would have to pay rent or not*." I shall here call, for the sake brevity and clarity, the occupier 'the squatter' and the owner of the premises 'the landlord'. The Gemara[468] offers the following clarification of the issue:

> "But under what circumstances? It could hardly be supposed that the premises were not for hire [and would in any case have remained vacant], and he [the one who occupied them] was similarly a man who was not in the habit of hiring any [as he had friends who were willing to accommodate him without any pay], for [what liability could there be attached to a case where] the defendant derived no benefit and the plaintiff sustained no loss? If on the other hand the premises were for hire and he was a man whose wont it was to hire premises, [why should no liability be attached since] the defendant derived a benefit and the plaintiff sustained a loss? — No; the problem arises in a case where the premises were not for hire, but his wont was to hire premises."

From which we know that in the case under consideration the squatter benefits (since he lacked somewhere to stay free of rent), but the landlord does not suffer a loss (since he allowed the place to remain empty at that time, even if he usually sought to rent it) – in Hebrew this case is referred to as *zeh neheneh ve-*

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[468] The Talmud includes Mishna and Gemara. Each Mishna passage is presented verbatim, then discussed by the Gemara, though other topics might also be treated in passing. The term 'Gemara' refers to the anonymous editor(s) who compiled discussions, associated somehow with the stated Mishna, by various named rabbis in various periods, putting those discussions in some purposeful order, usually with a commentary binding them together. Other commentators, such as Rashi or Tosafot, may come into play long after the Gemara, asking questions or clarifying points not found explicitly treated by the Gemara. The Mishna is dated at c. 200 CE and the Gemara at about c. 500 CE.

zeh lo-haser (= this one benefits and that one does not suffer loss). After the fact, the landlord might say to the squatter "Since you have derived a benefit [as otherwise you would have had to hire premises], you must pay rent accordingly;" while the squatter might refuse to pay rent to the landlord, arguing "What loss have I caused to you [since your premises were in any case not for hire]?"

The answer to the question is sought through consideration of the legal rulings made in other contexts involving a protagonist/defendant (like the squatter) who benefits from something and an antagonist/plaintiff (like the landlord) who does not suffer a loss, i.e. having the same *zeh neheneh ve-zeh lo-haser* scenario. If in such comparable situation the ruling was that the protagonist is liable to pay something to the antagonist, it is assumed that the same ruling of liability can be applied to 'our' case (i.e. the above-mentioned case of landlord versus squatter). If in such comparable situation the ruling was non-liability, then in our case that will be assumed to be the applicable ruling. The analogical argument pursued here is thus the following:

> Just as, in the proof-text, where the protagonist benefits and the antagonist does not suffer loss, the law was that the former is obligated (or not obligated, as the case may be) to pay some compensation to the latter;
>
> likewise, in our case, where the protagonist benefits and the antagonist does not suffer loss, the law must be that the former is obligated (or not obligated, as the case may be) to pay some compensation to the latter.

Call these two sentences the source of analogy and the target of analogy. Note well that both cases involve the scenario *zeh neheneh ve-zeh lo-haser*; this is what binds them together, their common ground. The first paragraph provides a hypothetical proposition (the source) that in a previous case involving this scenario (the antecedent) the ruling was so and so (the consequent); the second paragraph formulates a like if-then statement (the target) for the new case, arguing that since it has the same antecedent, it may be assumed to have the same consequent. In this way, a ruling is proposed for the new case. It

must be stressed, however, that this inference is inductive, not deductive; it is not logically inconceivable that the ruling might turn out to be different in the two cases on other, more plausible, grounds.

We can rephrase this argument in the standard format for (positive subjectal) analogical argument as follows:

> Given that our case (= major term, P) is similar to the proof-text case (= minor term, Q) in involving the scenario *zeh neheneh ve-zeh lo-haser* (= middle term, R), and that in the proof-text case (Q) the law was so-and-so (obligation to pay, or not, as the case may be) (= subsidiary term, S), it follows that in our case (P) the law should likewise be so-and-so (obligation to pay, or not, as the case may be) (S).

A putative example in our *sugya* of such analogical argument-form is the following. Another rabbi, Rami bar Hama, claims that the solution to the problem posed by R. Hisda is to be found in Mishna *Baba Kama* 2:2, which reads[469]:

> "In what case is this statement applied, that one pays the full value of the food eaten by the animal? It is a case where the animal ate the food on the property of the injured party; but if the animal ate food in the public domain, the owner of the animal is exempt from liability. And even if the animal ate food in the public domain, if the animal derives benefit from eating another's produce in the public domain, the owner pays for the benefit that it derives, just not for the full cost of the food."

This passage of the Mishna comprises three sentences. The first is a reference to a law given in Exodus 22:4. This Torah passage states that "If a man cause a field or vineyard to be eaten, and shall let his beast loose, and it feed in another man's field; of the best of his own field, and of the best of his own vineyard, shall

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[469] I here quote the three sentences in the Mishna of interest to us using the translation in Sefaria.org because it is clearer than the one given in the Soncino ed.

he make restitution."[470] The second sentence in our Mishna is derived from the first by a *davka* (just so) reading, taking it to mean that the liability exists *only if* the loose beast feeds illicitly in a private domain; whence it is inferred that if the problem arose in the public domain, there is no liability (although, logically, partial liability is also a possibility). Note that this is a Mishna ruling based on inference; it is not an explicit Torah given.

The pattern of *davka* inference is always like this: if the proof-text specifically mentions case X ("in another man's field," in the present context), and does not explicitly mention cases other than X (i.e. non-X), then it is assumed that the intent of the omission must have been *to exclude* non-X (namely, here, the public domain). This is a common form of reasoning in Talmudic and rabbinic logic. It should be clear that *davka* inference is inductive, not deductive, since it is logically conceivable (though in fact not the case here) that another text might have been found that included non-X without this implying contradiction (i.e. there could well have been another Torah passage specifying that in the public domain, too, there is liability).

Indeed, even if no Torah passage is found that explicitly provides the missing information, it does not follow that *davka* inference is inevitable and sure. An opposite form of reasoning is possible, and indeed is sometimes practiced; it is called *lav davka* (not just so). One could have in the present context, for example[471], argued that the reason the Torah did not mention an animal eating food in the public domain was because it considered it obvious enough that in such case the animal's owner is liable to pay the food owner full compensation. That is, the argument goes, the Torah only mentioned the case of an animal eating food in the private domain requiring full

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[470] Translation taken from Mechon-mamre.org.

[471] Needless to say, I am not here advocating the use of *lav davka* reasoning in the present context. I am merely illustrating the form that a *lav davka* reading would have taken in the present context. I have no interest in contesting the *davka* reading implied in the Mishna.

compensation because it considered that it was not so obvious. In this perspective, anything left unattended in the public domain is 'obviously' protected by law, whereas in the private domain the property owner might well be expected to protect all objects therein, say by fencing or a guard dog; and the Torah comes forth to say: "No, even in the private domain the law must protect unattended objects." Such thinking is quite conceivable; so, *davka* reasoning is not deductive, but merely inductive. Likewise, of course, for *lav davka* reasoning.

The second sentence in our Mishna, then, informs us that if a domestic animal illicitly eats food left unattended in the public domain, the animal's owner is not liable to pay the food's owner for his loss. The third sentence informs us that the protagonist (the animal owner) is nonetheless obligated disburse to the antagonist (the food owner) what feeding his animal *would have* cost him, i.e. the amount of money he saved due to his animal feeding illicitly (presumably, a much lesser amount).[472]

We thus have two Mishna rulings that seem contradictory at first blush: the first states that there is no liability (but it means: not the full liability occurring in the private domain); the second states that there is some liability (but it means: a minimal liability equal to the usual cost of ordinary feed). Rami focuses on the last sentence to build his argument. The analogy, as he sees it, is as follows:

> Just as, in Mishna *Baba Kama* 2:2, where the animal owner benefits and the food owner does not suffer loss (in a *de jure* viewpoint, because what he did in fact lose was lost in the public domain), the law was that the former is obligated to pay the latter the minimal cost of feeding (even though he is not liable to pay full compensation);

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[472] The exact basis of this additional ruling by the Mishna is not, as far as I can see, explicitly stated or immediately apparent. It could simply be rabbinical fiat. Maybe its basis is obvious to cognoscenti, but I don't know what it is.

> likewise, in the R. Hisda case, where the squatter benefits (since he disposed of no other place) and the landlord does not suffer loss (since he was content to leave the place empty), the law should be that the former is obligated to pay the latter a minimal rent (even though he is not liable to pay full compensation).

Or putting it in standard form (positive subjectal analogy):

> Given that our case (P) is similar to the Mishna *Baba Kama* 2:2 case (Q) in involving the scenario *zeh neheneh ve-zeh lo-haser* (R), and that in the Mishna case (Q) the law was that the protagonist (animal owner) is obligated to pay the antagonist (food owner) the amount of his benefit (S), it follows that in our case (P) the law should likewise be that the protagonist (squatter) is obligated to pay the antagonist (landlord) the amount of his benefit (S).

As we shall see, such argument can be opposed in various ways. The most obvious counterargument to it would be as follows (positive subjectal analogy with a negative major premise):

> Given that our case (P) is *not* similar to the proof-text case (Q) in involving the scenario *zeh neheneh ve-zeh lo-haser* (R), and that in the proof-text case (Q) the law was so-and-so (obligation to pay, or not, as the case may be) (S), it follows that in our case (P) the law should on the contrary *not*-be so-and-so (obligation to pay, or not, as the case may be) (i.e. *not*-S).

Indeed, in the Talmudic narrative under consideration, a third rabbi, Rava, rejects the analogy proposed by Rami, arguing that "in the case of the Mishnah the defendant derived a benefit and the plaintiff sustained a loss, whereas in the problem before us the defendant derived a benefit but the plaintiff sustained no loss." Thus Rava argues (in a more *de facto* spirit than Rami) that in the Mishna the food owner has, objectively, suffered a financial loss (the real value of the food eaten minus the smaller compensation due from the animal owner), whereas in the case at hand the landlord has not done so (since he would not, in fact, have received rent at that time if his place had not been squatted).

This means that Rava does not agree with Rami that the landlord is due compensation from the squatter. Rava thus proposed the following counterargument, put in standard form:

> Given that the present case (P) is *not* similar to the Mishna *Baba Kama* 2:2 case (Q) in involving the scenario *zeh neheneh ve-zeh lo-haser* (R), and that in the Mishna case (Q) the law was that the protagonist (animal owner) is obligated to pay something to the antagonist (food owner) (S), it follows that in our case (P) the law should on the contrary be that the protagonist (squatter) is *not* obligated to pay anything to the antagonist (landlord) (*not*-S).

According to Rava, then, the scenario of the Mishna referred to is that of *zeh neheneh ve-zeh ken-haser* (= this one benefits and that one *does* suffer loss); and this does not correspond to the putative scenario of the case at hand, which is *zeh neheneh ve-zeh lo-haser*. As we have seen earlier, the Gemara explicitly states that in such case, i.e. where the protagonist benefits and the antagonist suffers loss, the former must indeed pay compensation to the latter. For it is obvious, in its view, that if the squatter had no other premises to occupy and the landlord wished to rent the place at that time, there is indeed need to pay rent[473].

Notice that we have come across, here, examples of both a positive argument (similarity between cases) and a negative counterargument (dissimilarity between cases). We thus apparently have, in this *sugya*, examples of two related moods of the argument (analogy and disanalogy of positive subjectal form). Since they involve the same middle term, their major premises are contradictory and they cannot both be valid. Note

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[473] The Gemara also considers that in the event of 'no benefit for the one and no loss for the other', the former is not liable to pay the latter. The scenario of 'no benefit for the one and loss for the other' is not addressed in the Gemara, but (I gather from Jacobs' account, n.3) there is a Tosafot commentary about it. Such a scenario is conceivable; one could for instance refer it to a vandal damaging vacant premises.

that Rami and Rava were contemporaries; they were third generation Amoraim (fl. c. 300 CE).

At his point, it should be noted that the Talmud comes to the defense of Rami by means of the following remark: "Rami b. Hama was, however, of the opinion that generally speaking fruits left on public ground have been [more or less] abandoned by their owner [who could thus not regard the animal that consumed them there as having exclusively caused him the loss he sustained, and the analogy therefore was good]." (Note that the explanations given in square brackets in the Soncino edition water down somewhat the position of the Gemara.)

The Gemara is here trying to 'rescue' Rami's argument from Rava's objection by claiming that the food left in the public domain was effectively *hefker*, i.e. mentally given up on by its owner, so that the latter could not blame the animal for its loss; whence, when the Mishna ruled that the animal owner had to pay a small amount, it was not as compensation for a loss sustained by the food owner (as Rava claimed) so much as payment for the benefit received by the animal owner. In this perspective, then, the Mishna precedent was indeed a case of *zeh neheneh ve-zeh lo-haser* (as Rami claimed) and not a case of *zeh neheneh ve-zeh ken-haser* (as Rava claimed).

The Gemara is here projecting (maybe a couple of centuries later) a thought into Rami's mind that he did not openly express, so as to make him seem to have anticipated Rava's objection and taken it into account. However, the Gemara's intervention turns out to be weak. Jacobs, in an endnote (n.6), informs us of an interesting objection to it by a Tosafist that, in Jacobs' words, "the Talmud cannot mean that the owner has automatically and totally abandoned the food since, if that were the case, there would be no payment at all, the food no longer being his." This observation effectively neutralizes the Gemara's attempted refutation of Rava's counterargument.[474]

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[474] There would be no reason for the animal owner to pay anything to the food owner if the latter did not own the food any longer at the time the animal ate it. Jacobs suggests that perhaps the meaning is "not that he [the food owner] has abandoned the food, but that the Torah has

So, this additional discussion turns out to be something of a useless digression. We are left with an argument by Rami and a counterargument by Rava, and we need to know which of the two to prefer. Both seem convincing, at least superficially, and it is hard to choose between them. The Talmud is evidently not wholly satisfied with the arguments of Rami and Rava, or even with its own defense of Rami against Rava, since it goes off looking for other arguments that might more convincingly answer the question put by R. Hisda; but it does not make clear why it does that.

For our part, the following **critical remarks** seem relevant. Please note well that I have no halakhic axe to grind. I am not trying to prove the Talmud, or any rabbi mentioned in it, right or wrong. I do not care what the legal outcome of the discussion might be, though I am of course concerned with the logical propriety or inadequacy of the arguments encountered. My ultimate interest in examining this Talmudic passage is to see what lessons can be learned from it for formal logic (and, as will be seen, I did indeed learn some lessons).

As already shown in our theoretical treatment of conflicting analogy, there is no formal way to resolve the conflict between a comparison and a contrast; formally, either thesis might be right. One has to dig deeper into the problem at hand and try to find reasons to prefer one thesis or the other. In the discourse under scrutiny, we can certainly point out that one possible flaw is the variable (or ambiguous or equivocal) use of terms. Each of the predicates ‘benefits’, ‘suffers loss’, ‘is liable’, and their

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abandoned it in declaring that there is no *shen* [i.e. no liability] in the public domain.” However, I do not see any significant difference between the Torah abandoning and the food owner abandoning, since the latter would naturally follow from the former. If the food owner abandoned, it was surely because he knew that the Torah abandoned; if he did not know the Torah (or more precisely, the *davka* inference from it), he would have no reason to regard his property as being as good as lost the moment he left it unattended – he would naturally assume or at least hope he would readily recover it upon his return (or else would not leave it unattended). The resulting neutralization of the Gemara’s argument is therefore unaffected.

negations, although on the surface seemingly uniform in meaning, is in the course of this discussion (and again as it is extended later on in post-Talmudic commentaries) used in selected restrictive ways, which can be characterized as conventional (or even as subjective or as arbitrary).

Thus, the squatter in R. Hisda's narrative is regarded by the Gemara as having 'benefited' only if, when he occupied the premises, he had no alternative place to stay at his disposal; i.e. only if he needed the place he squatted. (Needless to say an invited guest is not a squatter.) But objectively, one could argue that *the mere fact* that the squatter voluntarily occupied that place implies that he considered doing so as of some value to himself (else he would not have done it). In which case, *all* squatting is benefiting somewhat, and *no* scenario involving squatting could be truly said to involve no benefit to the protagonist. The same can be said for the animal owner (in the Mishna referred to): as of the moment his animal has fed, whether in the private or public domain, he has objectively (albeit fortuitously) benefited somewhat.

Again, the landlord is regarded by the Gemara as having 'suffered loss' only if he was actively seeking or at least mentally desired to rent the place out; otherwise, if he was apparently content to leave the place vacant, he is viewed as not having suffered loss. But one could reasonably argue that he has suffered loss by *the mere fact* that his property was used without his knowledge or permission, even if he was not actively seeking or even desiring to find a tenant (he might perhaps have been keeping the place vacant in case his mother-in-law came to visit). In which case, *all* squatting causes loss, and *no* scenario involving squatting could be truly said to involve no loss for the antagonist. The same thinking applies to the food owner: as of the moment his food has been eaten, whether in the private or public domain, he has objectively suffered loss (even if the law, whether Torah or Mishna, conventionally denies it).

On this basis, i.e. when we insist on *uniform terminology*, both the Mishna case and the R. Hisda case necessarily involve the scenario 'this one benefits, and that one suffers loss' – and Rami is wrong to view them as both *zeh neheneh ve-zeh lo-haser*; while Rava, though partly right in viewing the Mishna case as

zeh neheneh ve-zeh ken-haser, is partly wrong in viewing the R. Hisda case as *zeh neheneh ve-zeh lo-haser*. Note that it is the Gemara which interprets the squatter as benefiting *restrictively*, only if he had no other premises to occupy, and the landlord as losing *restrictively*, only if he was hoping or trying to rent the place at the time. But since the Gemara's interpretations are restrictive, and it allows for other possible scenarios (notably, 'no benefit for the one and no loss for the other', and eventually 'no benefit for the one and loss for the other'), it is not arguing (as I am here doing) in favor of uniform terminology.

So much for the antecedent scenario (serving as the basis of analogy). As regards the consequent legal obligation (or not), here too we can observe variety in meaning. In the Mishna, following a *davka* (just so) reading of Ex. 22:4, the animal owner is declared exempt from compensating the food owner for the food lost, although the latter is nonetheless, by additional Mishnaic ruling, required to pay the former the (presumably relatively small) amount he would have had to disburse to feed his animal (had not that animal illicitly satisfied its hunger with the more expensive food it found unattended). Here, then, the protagonist is considered as being strictly-speaking 'not liable', even while he is legally obliged to pay the antagonist something; the smaller amount he is required to pay is not considered as falling under the term 'liable'. This is a conventionally *restricted* use of the term 'liable'[475]. Objectively, of course, any obligation to pay any amount is a liability. In that event, the Mishna's verdict is effectively that there is liability, even if one smaller than it might have been. Whence, in the case brought forward by R. Hisda, the verdict ought to be that the squatter must pay the landlord a minimal amount of rent (the minimum market rate for such a property at that time and place).

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[475] The fiction being that the antagonist cannot, for his loss, make a financial *claim* (on the protagonist); but the protagonist nevertheless has a *duty* to pay the money he saved (to the antagonist). This is a fanciful distinction because, surely, given the latter legal duty, a legal claim could be made in court.

Granting all these considerations, it appears that the correct application of the Mishna precedent (taken as a whole) to the case at hand would be that the scenario involved is 'benefit for the one and loss for the other', and the resulting legal ruling should be partial compensation[476]. The food owner does objectively suffer loss, and the animal owner is objectively liable to pay something; and the landlord can also be viewed as suffering loss, and on that basis the squatter can be regarded as liable to pay something. In that event, *neither* Rami's argument by analogy *nor* Rava's counterargument by disanalogy can be claimed to be as accurate as they initially seem. Putting our novel thesis in standard form, we obtain:

> Given that our case (P) is similar to the Mishna *Baba Kama* 2:2 case (Q) in involving the scenario *zeh neheneh ve-zeh ken-haser* (R), and that in the Mishna case (Q) the law was that the protagonist (animal owner) is obligated to pay the antagonist (food owner) the amount of his benefit (S), it follows that in our case (P) the law should likewise be that the protagonist (squatter) is obligated to pay the antagonist (landlord) the amount of his benefit (S).

The Talmud does not take into consideration this simple alternative interpretation, based on uniform terminology. From the start of its reflection, it binds itself to a more complicated approach, from which various logical possibilities arise. Perhaps it opts for this tortuous path because it is not really looking for a solution to the problem (determining a particular legal principle or law) but using the narrative as a convenient occasion to explore different situations and opinions. In that event, it has to keep the issue open and unresolved, even if somewhat

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[476] *Some* compensation is at least implied. The compensation is not *full* because the Mishna has ruled that it cannot be, on the basis of a *davka* reading of Ex. 22:4. But had this Torah passage been read *lav davka*, compensation could well have been full, note. So, the compensation is necessarily *partial*. An additional rabbinical judgment makes it equal to the *minimal* amount the protagonist would have had to disburse had not the events described occurred.

artificially, so as to keep the conversation going. (We have seen a clear example of this in the Gemara's gauche attempt to rescue Rami from Rava.) The Talmud's motive is evidently primarily academic and didactic rather than exclusively focused on law-making.

But, so doing, the Talmud misses out on the said additional logical possibility! It never conceives it, let alone propose some credible reason to eliminate it. As we have seen above, the Gemara defines the problem needing solution from the get-go as a search for a precedent in which the protagonist benefits and the antagonist does not suffer loss. It arrives at that putative definition by claiming outright that the two scenarios, in which the former does not benefit and the latter does not suffer loss (for which there would be no liability) or the former does benefit and the former suffers loss (for which there would be liability), are not applicable to the case at hand. And it does not mention or eliminate the third possible scenario (which a Tosafist noticed), viz. that wherein the protagonist does not benefit and the antagonist suffers loss.

The Gemara does not tell us on what basis it has eliminated the said two alternative scenarios it mentions, nor explain why it does not mention the third possible scenario. Yet it adheres with impressive certainty to the fourth scenario (viz. 'this one benefits and that one does not suffer loss'). Most readers allow such offhand (or sleight of hand) claims to pass uncritically because they believe the Gemara has total knowledge and therefore absolute authority. But surely, if the Gemara resorts to reason at all, it must do so consistently and explain all its positions. It must convincingly justify the certainties it displays.

One can readily agree with the Gemara that a squatter who usually pays rent elsewhere would be liable to pay rent to this landlord too, assuming the latter was looking for or wishing for a paying tenant; but *why* would this liability of the squatter disappear if the landlord was not looking to rent his place out and had not given permission for free occupation of his premises? And *why* would a squatter who could have stayed in a friend's place free of charge not be nonetheless liable to pay rent for staying in this landlord's place uninvited, even if the latter was not looking for or wishing for a paying tenant? The

Gemara does not justify its fancy fine distinctions, even though they are far from axiomatic.

Step back a moment and consider the absurdity of the Gemara's claim here in the light of common moral standards. Can it be supposed that a homeless vagrant can freely enter and live in (or otherwise use) premises belonging to a homeowner without the latter's knowledge and permission? Surely that would constitute *theft* of private property, even if temporary and subject to certain conditions (namely, that the squatter could have stayed at other places free of charge and the landlord's place was currently not up for rent). It would be as surely theft as if a stranger cheerfully 'borrowed' someone's automobile for a while without the owner's okay, arguing that his pals usually let him do that and the car was standing idle! Clearly, the Gemara's claim here is effectively a denial of property rights, and a sanction of gross dishonesty. Maybe in those days social norms were that different, but I doubt it.

The only credible statement, I'd say, is that someone squatting a place without permission is always liable to pay some compensation to the landlord, *irrespective of* any conditions relating to either the one or the other. Indeed, he should additionally be prosecuted for trespass! The Gemara nowhere considers or refutes (as it should have) this obvious proposition. Of course, one can imagine a *force majeure* situation – say someone lost in a snowstorm who comes across an empty, potentially lifesaving, cabin – certainly in such an exceptional situation squatting would be morally acceptable. But the Gemara does not refer its permissiveness to mortal danger.

It is admittedly very unorthodox to criticize a Talmudic argument without leaving it an escape hatch. Normally, students of the Talmud take for granted whatever it says; and if some 'difficulty' in what it says is found, some convoluted 'resolution' is quickly suggested so as to maintain its overall credibility. But my interest here is not to defend, or even to attack, this document. I am not engaged in 'virtue signaling'. I am just concerned with the logic of the discourse, whatever its purpose or result. My sole intent here is to show that arguing by analogy from a judicial precedent to establish some new legal

principle or law is a complex process involving much thought and discussion.

As regards my proposed alternative thesis, viz. that the case under scrutiny (landlord *vs.* squatter) can be derived by analogy from the Mishna case (food owner *vs.* animal owner) through the middle term *zeh neheneh ve-zeh ken-haser* (the subsidiary term then being partial liability), it should be emphasized that I consider this still an *inductive* conclusion. I am not suggesting that it is not open to eventual challenge. There might be some other proof-text or some other inference that belies it or at least surpasses it in credibility. There might, for instance, be analogical argument(s) from some other Mishna(s), arguing though some other middle term(s) and yielding some contrary conclusion(s). We must then somehow weigh the alternatives and decide which is the most convincing. For example, we might find numerically more reasons that support this conclusion rather than that one. Analogy is inductive, not deductive, argument. It involves trial and error.

The above observations have significance for the formal logic of analogy. An important question they raise is: is an analogy valid if the terms used are analogous only conditionally or in specific instances? There is surely a formal difference between the general term ‘benefits’ and the narrower term ‘benefits under such and such conditions’ (for example, ‘the squatter benefits provided that he has no alternative lodgings at his disposal’). Likewise, the terms ‘suffers loss’ and ‘suffers loss under conditions so and so’ (e.g. ‘the landlord suffers loss provided he looked for or at least wished for a tenant’) are not equivalent but differ in breadth. Again, the terms ‘liable’ and ‘liable conditionally’ (e.g. ‘the squatter is liable to the landlord only if the law is that he has to pay as rent the full value of the place, not if he only has to pay a lesser rent) – these are not identical terms.

As we have seen in our earlier theoretical treatment of analogical logic, the mere claim that there is an analogy is not necessarily true, even if made sincerely. There may be ambiguity or equivocation in the terminology (whether done innocently or with intent to deceive) which invalidates the attempted inference. The apparent middle term may not be identical for the

major and minor terms, and likewise the subsidiary term may lack uniformity. Such problems of scope can be overcome under certain precise conditions, but not always.

Let us try and draw a lesson in analogical logic from the Talmudic example. That is, let us determine under precisely what terminological conditions analogy can be claimed and an argument involving it be declared formally valid. We must first determine whether we truly have a major premise with a middle term (R) true of the whole extensions of the major and minor terms (P and Q); and we must also make sure that the subsidiary term (S) is the same in the conclusion (concerning the major term) as it is in the minor premise (concerning the minor term), or if not, determine what the justification for a difference might be. I deal with the purely theoretical aspects of this issue in detail earlier on in the present essay (in section 3) under the heading of 'Terms of unequal breadth'[477].

In the above Talmudic arguments, the putative middle term is the conjunction '*zeh neheneh ve-zeh lo-haser*'. However, as we have just seen the terms 'benefits' (say, K) and 'does not suffer loss' (say, L) may not be used uniformly. The question is: what happens when the putative middle term is a compound (K + L) composed of more specific or conditional elements? And more to the point, what happens if instead of the generic and unconditional pair of elements K and L, we are faced with more specific or conditional pairs of elements, say K1 and L1 (for the source), or K2 and L2 (for the target). Likewise, what if the subsidiary term, call it M in generic/unconditional form, has different specific/conditional values, say M1 and M2, in the source and target propositions? In such events, our analogical argument would look as follows:

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[477] Note for the record that I got involved in the theoretical study of this issue in response to the quandaries posed by the present Talmudic *sugya*. I placed my abstract analysis earlier on in the text to stress its formal significance for all analogical logic, not just for analogy in the Talmud.

> Source: just as, in the proof-text, where the protagonist has K1 and the antagonist has L1, the law was so and so (say, M1).
>
> Target: likewise, in our case, where the protagonist has K2 and the antagonist has L2, the law must be that so and so (say, M2).

We can reformulate these sentences as if-then propositions, i.e. the source as ‘if (K1 + L1), then M1’; and the target as ‘if (K2 + L2), then M2’. As we saw earlier on, in our theoretical investigation of positive subjectal analogical argument, these two if-then propositions cannot give rise to a valid analogy if the terms they involve are truly unequal. Precise logical rules are applicable in such event, and they cannot be ignored. Putting the argument in standard (positive subjectal) form, we obtain with the generic terms (K, L, M) the following analogy:

> Given that our case (P) is similar to the proof-text case (Q) in involving the scenario (K + L) (R), and that in the proof-text case (Q) the law was M (S), it follows that in our case (P) the law should likewise be M (S).

But as we shall see, the only valid specific form for this argument is the following ‘from minor to major’ mood:

> Given that our case (P) is similar to the proof-text case (Q) in involving the scenario (K1 + L1) (R), and that in the proof-text case (Q) the law was M1 (S), it follows that in our case (P) the law should likewise be M1 (S).

The proof of this statement is as follows. Here, the operative middle term must be (K1 + L1), because the minor premise has (and must have) the proof-text case (Q) as its subject. As we have learned earlier, in our theoretical investigation of terms of unequal breadth, the effective middle term (R) must be the broader (more generic, less conditional) one. Therefore, the above argument is valid only in cases where (K1 + L1) is broader than or equal to, and includes, (K2 + L2). In which event, of course, (K2 + L2) must imply (K1 + L1), and the specific compound (K1 + L1) is effectively the generic compound (K + L). If these conditions are met, the argument indeed has a functioning middle term and a working major premise. But if on the contrary (K2 + L2) is broader than and includes (K1 + L1),

or if those two terms intersect but do not overlap, or do not even intersect, then the argument is invalid, because it lacks a functioning middle term and a working major premise.

As regards the subsidiary term, since the predicate of the precedent Q in the minor premise has to be M1, the predicate of our case P must also be at least M1. It can however also be M2, provided M2 is broader than or equal to, and includes, M1. In which case, M1 implies M2, and the specific term M2 is effectively the generic term M. In such case, note, we are merely following up the above analogical argument with a syllogistic argument; the analogical argument *per se* is not changed. However, if on the contrary M1 is broader than and includes M2, or if those two terms intersect but do not overlap, or do not even intersect, then the argument cannot conclude with M2 for case P.

It is possible and even likely, given the stringency of these rules of formal logic, that some of the arguments found in the Talmudic *sugya* under consideration, and other narratives, do not constitute logically valid analogies, because they are contrived by means of ambiguities or equivocations, and wrongly treat some specific/conditional (middle and/or subsidiary) terms as generic/unconditional ones. Analogical argument is not arbitrary rhetoric, but reasoning subject to strict law. Wherever these logical laws are disobeyed, the argument is fallacious.

Let us now apply the above formal tests on Rami's analogical argument as explicated by the Gemara. Rami apparently reasoned as follows.

> Just as, in Mishna *Baba Kama* 2:2, where the animal owner benefits (in that his animal has been fed, and he saved the price of feed) (K1) and the food owner does not suffer loss (he doesn't *de jure* by *davka* inference from the Torah, although he does *de facto* as the Mishna admits) (L1), the law was that the former must pay the minimal cost of feeding (by Mishnaic ruling, albeit not obligated to pay the full price of food consumed to the latter *de jure* by *davka* inference from the Torah) (M1);

> likewise, in our case, where the squatter benefits (but only, according to the Gemara, if he was a habitual tenant and had no other place to go for free) (K2) and the landlord does not suffer loss (provided, according to the Gemara, he was content to leave the place vacant) (L2), the law should be that the former must pay the minimal market value of rent (but is not obligated to pay full rent to the latter) (M2).

Notice that Rami ignores (or puts in brackets) a number of things (specified on his behalf by the Gemara), so as to increase impressions of resemblance. Examining this, it appears as if K1 is broadly intended, while L1 is narrower in scope than it is made to seem (since the word ‘loss’ is not applied to all loss); as for K2 and L2, they are both clearly conditional (since the words ‘benefit’ and ‘loss’ are not applied to all events of squatting). K1 could perhaps be viewed as englobing K2, but L1 certainly cannot do the same for L2 (since the limiting conditions are not similar). Thus, the conjunction (K1 + L1) cannot, as formally required, be implied by (K2 + L2). So, I would say that there is an illicit process in this inference; that is, Rami’s argument by analogy (as the Gemara presents it) is formally invalid since it lacks an inclusive middle term. As regards the subsidiary term, M1 is more restrictive than it looks, but its restriction could be passed on to M2 *mutatis mutandis*, so there is no problem there.

We have thus shown, by means of one example, that the Talmud can include invalid reasoning by analogy. This is not surprising for, as already said, analogical argument does have complex theoretical rules not always easy to apply in practice. Anyone might well make errors with it, unless very prepared and very careful. As we have seen, Rava rejects Rami’s argument; but he does not do so for the reasons of scope here pointed out. Nor does the Gemara show awareness of these problems, although it tries to shore up Rami’s argument in reply to Rava’s criticism.

Even so, the Talmud evidently senses, if only vaguely, that there is some inadequacy in the arguments by analogy and disanalogy formulated by Rami, Rava, and even the Gemara itself, with reference to Mishna *Baba Kama* 2:2. This is evident, as already pointed out, from the fact that it goes searching for other possible precedents.

The Talmud next attempts to solve the problem posed by R. Hisda with reference to another case, discussed in Mishna *Baba Batra* 1:3, in which the protagonist is the owner of a field, surrounded on all four sides by fields owned by the antagonist; here again, after a long back and forth discussion, the conclusion is moot. The Talmud then refers to yet another discussion, found in Mishna *Baba Metzia* 10:3, in which the protagonist owns the upper storey of a house, while the antagonist owns the ground floor; and again, the analogies proposed are open to debate and inconclusive. Many more stories, authoritative opinions, and arguments are brought to bear with apparently no indisputable final conclusion.[478]

This results (as often in the Talmud) in unfortunate prolixity. The central issue posed (viz. whether the apparent scenario of *zeh neheneh ve-zeh lo-haser* implies liability or nonliability) is almost lost in a sea of superfluous detail and the reader's mind easily may lose the thread. We have already suggested that the reason for the Talmud's digressions from the primary issue at hand may be that it sees the discussion as an opportunity to communicate in passing other (loosely associated) information it considers worthy of interest in a wider perspective. It is not trying to get to the point, so much as trying to intellectually scan the area around it.

Another important observation is that the discussion (again, as often in the Talmud) does not always result in clear intermediate conclusions, let alone in a practical terminal result that can be posited as halakha. Some statements end effectively with an

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[478] R. Louis Jacobs comments (p. 64) that "After the whole *sugya* has eventually arrived at the conclusion that A [the squatter] is not liable, R. Nahman's case is presented for discussion in that, on the surface, it seems to contradict the conclusion towards which the rest of the *sugya* has been leading." But my own impression is that, in view of the mixed *chronology* of the discussion, no definitive final conclusion can really be claimed; if such had been achieved at some point in time, all discussion would have ceased thereafter. Assuming the historicity of the account, it must be ordered chronologically (rather than in a logical or literary progression) to see more clearly and objectively its direction and result.

ellipsis… their finality is left open. (The effective inconclusiveness of the Rami-Rav debate is a case in point.) The writer(s) of the Talmud may have thought the unstated conclusions obvious; but it obviously was not so since subsequent commentators (i.e. Rashi, Tosafot, and many others) are forced to try and elucidate the missing information, and often disagree as to what it might be.

In truth, looking at the above example, albeit armed with a formal analysis of analogical argument in general (which the Talmud authors lacked), I do not offhand see any way to definitively solve the particular problem at hand. The various arguments given in this long Talmudic debate all seem, more or less, reasonably credible to me at first reading. But as shown above with reference to the first set of analogical arguments (Rami's and Rava's), and the Gemara's take on them, closer scrutiny may reveal certain flaws in the reasoning. I must therefore regard the different points of view as all having an element of arbitrariness or subjectivity. The contestants put forward interesting arguments in support of their respective viewpoints, but none apparently settles the matter decisively. My guess is that finally, in this kind of situation, a halakhic ruling is imposed by majority or by authority or by traditional practice, rather than by pure logic.

There is in this Talmudic discourse, then, a lot of obscurity, ambiguity, equivocation, and uncertainty, which makes difficult a finite and definite reading, even if it does have considerable value as thought-provoking and educational material. But such deficiencies need not concern us here, since we were not really interested in solving the specific legal problem at hand, but rather sought to observe the use of analogical logic in the Talmud, and evaluate it by formal means, and perhaps learn lessons from it.

I have here written many pages discussing only the first debate in the present *sugya*. There are many more debates in it, and it would take very many more pages (possibly a whole book) to fully analyze them in equal detail. However, to repeat, my goal here is not to thoroughly analyze the whole *sugya*, but merely to demonstrate through at least one example in it that the Talmud, like many other legal traditions, ancient and modern, near and

far, resorts to analogical argument from precedents to derive new legal principles or laws. Having already achieved this goal, I can in good conscience stop the analysis here; indeed, must do so since I would otherwise be ranging too far off topic (namely, analogical logic in general).

9. More about analogy in the Talmud

Based on the above example, and other readings of Talmudic discourse over the years, I think it is safe to say offhand that the Talmud (including both Mishna and Gemara, in both the BT and JT) makes widespread use of such reasoning. But of course, this proposition still needs to be demonstrated by an exhaustive listing and competent detailed analysis of each and every instance of logical discourse in this massive work[479].

I have already pointed out, in my book *Judaic Logic* (2004), the undercurrents of analogical reasoning in some of the 13 *Midot* (hermeneutic principles) of Rabbi Ishmael, notably in the rules called *kal vachomer* (a fortiori argument), *gezerah shavah* (analogy based on homonymy or synonymy), *binyan av* (causal reasoning), and *heqesh, semuchim, meinyano, misofo* (analogies based textual proximity).

Additionally, in my later book *A Fortiori Logic* (2013), I have listed some Torah passages which can be interpreted as analogical arguments, notably Ex. 2:11-14 (which suggests *gezerah shavah*) and Lev. 10:9-11 (which resembles *binyan av*). The Nakh (the rest of the Jewish Bible) can be expected to contain many examples, too.

I have written extensively about *kal vachomer*, the first rule of R. Ishmael, in my past works and will not repeat myself here. See especially *A Fortiori Logic*, chapter 5.1, where I compare and contrast analogical argument and a fortiori argument.

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[479] I hope, and expect, some scholars will eventually dare attempt such an ambitious project; for my part I am already too old to take up the challenge, although I have tried to do a small share of the work.

The second rule of R. Ishmael, the principle of *gezerah shavah*, which is based on the terms having some Biblical wording or intent in common, may be said to constitute simple analogy. This is because (evident) same wording, or (assumed) same 'intent' of different wordings, do not provide a sufficiently substantive explicit predicate (R) in common to the subjects compared (P and Q). Words are explicit, but they are incidental to what they verbalize; therefore, the assumption that the Torah intends them as significant enough to justify an inference is open to debate.

In other words, the traditional Judaic belief (for some people, a dogma) that names are part of the nature of the things they name, if not their very essence, is – as far as formal logic is concerned – only a theory. There is nothing obvious or axiomatic about it. It is a hypothesis that must remain open to scrutiny and testing like any other. Modern linguistics would deny this hypothesis in view of the demonstrable fact that all languages, including Hebrew, have evolved over time. Things do not change in nature just because we change their names.

In any case, *gezerah shavah* inference suggests an argument by analogy of roughly the following (positive subjectal) form: since text P and text Q, found in the Torah, are similar in literal wording or in verbal intent (R), then given that Q implies some information S, it follows that P implies the same information S.

This brings to mind *gematria* and other systems of 'numerology' found in Judaism, which compare the 'numerical value' (variously calculated) of two words, phrases or sentences, and regard their equality (or sometimes, near-equality) as a basis of analogical inference. These exegetic techniques seem to date from Talmudic times (some claim earlier), though they were greatly developed later. They are used in haggadic (non-legal) contexts, rather than halakhic ones[480]. I have personally no faith

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480 They are often used as homiletic tools in the synagogue. As they make possible surprising connections between narratives or ideas, they grab the attention of auditors in the way a magical trick would. This seems quite acceptable to my mind, provided it is intended playfully, not seriously.

in them[481], and have argued in the past[482] that their probable absurdity could be demonstrated systematically by drawing up a list of the numerical values (under each of the different systems) of every word in the Hebrew dictionary and then grouping all words with the same numerical value together (which should reveal enough contradictory equations, I wager, to dissuade believers).

The third rule of R. Ishmael, the principle of *binyan av*, falls squarely under the heading of complex (positive subjectal) analogy. In fact, our description of complex analogy is an exact description of *binyan av* reasoning. When the rabbis want to extend the scope of a Torah law (S), they show that some new subject (P) has some feature (R) in common with the Torah-given subject (Q), and assuming that this feature is the reason for the law (this assumption constitutes a generalization, even if it superficially may seem to be a direct insight), they carry the law over from the given case to the unspecified case. However, note, sometimes the common ground is not identified explicitly; in which case, of course, the analogy is simple.

As regards the twelfth rule of R. Ishmael, which refers to contextual inferences (*meinyano* and *misofo*, *heqesh* and

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[481] I have no faith in them as realistic systems of inference. However, I do personally, like many fellow Jews, use a couple of traditional numbers as *merely conventional symbols*. When I see the number 26 (the primary numerical value of the Tetragrammaton), say on a clock, I am by choice habitually reminded of God and of His mercy. Or again, when I give charity I tend to do so in multiples of 26, or alternatively of 18 (the numerical value of *chai*, the Hebrew word for life), with the intent to benevolently wish mercy or life to the recipients. In my mind, these numbers are mere words, constructed arbitrarily out of numerals instead of letters; I do not imagine a real connection between them and their putative objects, nor refer them to a general system of numerology. Therefore, I do not use them (or any others) superstitiously as lucky numbers, nor use them for any sort of serious inference.

[482] Over 25 years ago, in *Judaic Logic*, Appendix 3. No one, to my knowledge, has in the meantime followed up on the idea of a systematic study for the purpose of scientific verification or falsification. Not knowing Hebrew well enough, I cannot do the job.

semuchim, and the like), here is how I describe such reasoning in my book *Judaic Logic* (chapter 10.2): “All these take into account *the textual closeness* of an expression or sentence to certain other(s), and on this basis assume that there exists a conceptual relation between the passages under scrutiny, which makes possible an inference of certain attributes from the context to the expression or sentence.” Inference based on context is simple analogy, since it is without explicit explication.

Contextual inference can be cast as positive subjectal analogy, roughly as follows: since text P and text Q are similar in their being placed close together in the Torah narrative (R), then given that Q implies some information S, it follows that P implies the same information S.

Here, the analogy is based on the incidental fact of location of text relative to other text within a Biblical document, not on any substantive motive. Granting that the Torah is Divinely given or inspired, adjacence of texts is not in itself an incredible basis of analogy; it is a formally acceptable basis. However, there is a problem with it, insofar as contextual analogy is not considered throughout the document, but only evoked selectively, in cases where it is convenient for the justification of some legal principle or ruling. This objection would no doubt be rejected by the rabbis, through an argument that there are surely reasons for the close location of all verses in the document even if we humans are not aware of them all. But this is, of course, an appeal to faith, not a proof.

In some cases, of course, analogy is explicitly proposed in the Torah. For instance, in Deut. 22:26, which compares rape and murder, saying "for as when... even so..." (*ki kaasher... ken hadavar hazeh*). Such analogy is evidently more substantive, and the common ground it suggests might readily be made explicit. It would be interesting to make a listing of all such cases in the whole Jewish Bible (the Torah and the Nakh), as I and others have done for a fortiori argument.

Clearly, analogical argument plays a considerable role in Judaic logic (see my past works for more details and examples). And no doubt similarly in other religious logics, Christian, Islamic, Hindu, Buddhist, and so forth. A lot of work is needed to find all

its instances and examine the skill and credibility of each instance. It is also important to know not just the practice of analogy in different traditions, but also just how consciously it is done, i.e. how far each tradition has gone in theoretical reflection on and understanding of what it was doing. In Judaism, we have (as above shown) some theoretical exposition of analogical reasoning in the hermeneutic principles expounded in different lists, although these lists are not as thorough and formal as they could and should have been.

10.Subsumption in analogical terms

Subsumption is the inclusion of a particular instance in a class, or of a narrower class in a wider one. All concept-formation is based on subsumption, and proceeds by identifying the similarities and differences between things, and then grouping together those with certain characteristics in common, and distinguishing them from things without such characteristics. We normally think of subsumption in a positive syllogistic thought process, following Aristotle, and quite rightly, as follows:

> Anything that has certain characteristics B is C;
>
> this item A1 has characteristics B;
>
> therefore, A1 is C.

This informs us that all Bs are C, so that having property B is a *sufficient* condition for the subsumption of an item like A1 under C. The relation of subsumption is stronger in cases where the characteristic B is exclusive to C; that is, where it is additionally given that no non-B are C, so that *only* Bs are C. This implies a negative syllogism, for items like A2 that do not have property B, as follows:

> Anything that lacks certain characteristics B is not C;
>
> this item A2 lacks characteristics B;
>
> therefore, A2 is not C.

In such cases, having the property B is a *necessary* condition, a *sine qua non*, for belonging (as an instance or subclass) to concept C. Where B is both a sufficient and necessary condition

for classification as a C, B can be used (if need be) as a defining characteristic of C.

Clearly, all conceptual knowledge is based on this thought process that we call subsumption. Clearly, too, subsumption involves analogical thinking. We can restate the above syllogisms as analogical arguments, forcing things a bit, as follows:

> Given (as above) that A1 has certain characteristics B, it is similar to certain other things which also have B (so far unnamed, call them D); and given (as above) that all B are C, it follows (by syllogism, through all D are B) that all D are C, and thence by analogy that A1 is also C (although we could have obtained the same conclusion syllogistically directly through all B are C, bypassing D). Here, the commonality (viz. that A1 and D have B in common) is the driving force of the (positive) inference.
>
> Given (as above) that A2 *lacks* certain characteristics B, it is *dis*similar to certain other things which *do* have B (so far unnamed, call them D); and given (as above) that all B are C and no non-B are C, it follows (by syllogism, through all D are B) that all D are C, and thence by *dis*analogy that A2 is distinctively not C (although we could have obtained the same conclusion syllogistically directly through no non-B are C, bypassing D). Here, the distinctiveness (viz. that D has but A2 distinctly lacks B) is the driving force of the (negative) inference.

Note that our casting the two arguments, here, in the form of analogy or disanalogy is somewhat artificial, since the syllogistic path is shorter and clearer (and we are still resorting to syllogism to arrive at the desired results). Not only that, but the two analogical arguments are logically weaker than the two preceding syllogisms, since the syllogisms yield deductive conclusions whereas the analogies yield merely inductive conclusions. However, my purpose here is merely to show the analogical undercurrent of the syllogistic thought; it is not to suggest preference of the analogical statements over the syllogistic ones.

Perhaps if we distinguish between complex and simple analogy the role of such argument in subsumption may be enhanced. There are two kinds of definition in forming concepts. In 'deductive' definition, we form the concept C by defining it from the start through some specified property B; and in such case, the syllogisms shown above are obviously the most natural instruments of subsumption of instances like A1. However, in the case of 'inductive' definition, we do not clearly know at the outset how precisely to define the putative concept C; we sense that there is some property in common and exclusive to certain instances, but we cannot yet say just what it is; so, we coin a term 'C' for a start and then proceed to gradually look for a definition 'B' of it, one capable of subsuming instances like A1 and excluding instances like A2. In the latter case, it is obvious that analogical argument plays a more prominent role, because simple analogy can proceed without explicit specification of the middle term.

My point is just that putting individuals in a class, or subclasses is a wider class, depends on 'seeing' the similarities and differences between the items under consideration, and that underlying thought process is manifestly analogical, whether explicitly or tacitly. How this 'seeing', or direct insight, occurs is something of a mystery. Indeed, it is a big epistemological mystery; and perhaps, precisely because it is such a fundamental power of human consciousness, it is an unsolvable mystery. But what is sure is that if we could not tell the similarities and differences between things, we could not form any concepts.

Man's power of abstraction depends on this faculty of insight into similarities and differences; and subsequent conceptualization depends on consciously differentiating, grouping and naming things on its basis. Animals (at least the higher ones) no doubt can likewise tell similarities and differences between things, since they can recognize edible foods or dangerous predators. But in their case, this faculty seemingly does not proceed on to concept-formation, but remains at a relatively concrete level of sensory memories (sights, sounds, smells, tastes, touch-sensations).

MAIN REFERENCES

Abitbol, Gabriel. *Logique du droit talmudique*. Paris: Sciences Hébraïques, 1993.

Aristotle. *The Works of Aristotle*. Ed. William David Ross. Chicago: Encyclopædia Britannica, 1952.

Avraham, Michael. "The 'Kal Vachomer' as a Syllogism – Arithmetic Model" (in Hebrew). In: *Higayon: Studies in Rabbinic Logic* (vol. 2, pp. 29-46). Ed. Moshe Koppel and Ely Merzbach. Jerusalem: Aluma, 1992. Pp. 29-46.

Babylonian Talmud, The. Index Volume. Ed. Rabbi Dr. I. Epstein. London: Soncino, 1952.

Benton, Michael J. *The Dinosaurs Rediscovered: How a scientific revolution is rewriting history.* London: Thames & Hudson, 2019-20.

Bergman, Rabbi Meir Zvi. *Gateway to the Talmud.* New York: Mesorah, 1985.

Blau, Lajos. "*Die hermeneutische Analogie in der talmudischen Litteratur* par Adolf Schwarz" (Vienna, 1897). In: Revue des Études Juives, Tome 36e. Paris: Durlacher, 1898. Pp. 150-159.

Carmel, Aryeh. *Aiding Talmud Study.* Rev. ed. Jerusalem, New York: Feldheim, 1991.

Chavel, Charles B. *Encyclopedia of Torah Thoughts.* New York: Shilo, 1980.

Cohen, Rev. Dr. A., ed.

- *The Soncino Books of the Bible.* London: Soncino, 1949 (*Samuel*), 1950 (*Kings*).
- *The Soncino Chumash: The Five Books of Moses with Haphtaroth.* 2nd ed. London: Soncino, 1983.

Encyclopaedia Judaica (EJ). Jerusalem: Keter, 1972. Also, Michael Berenbaum and Fred Skolnik, ed. 2nd ed. Detroit: Macmillan Reference USA, 2007.

Encyclopaedia Talmudit (vol. 7, in Hebrew) (ET). Jerusalem: Yad HaRav Herzog Torah Institute, 1990.

Feigenbaum, R. Yitzchak. *Understanding the Talmud: A Systematic Guide to Talmudic Structure and Methodology.* 2nd rev. ed. Jerusalem: Darche Noam, 1988.

Guggenheimer, Heinrich. "Logical Problems in Jewish Tradition." In: *The Great Society: Confrontations with Judaism. A Symposium.* Ed. Philip Longworth. London: Blond, 1966.

History of Philosophical Systems. Vergilius Ferm, ed. Paterson, N.J.: Littlefield Adams, 1961.

Jacobs, Louis.

- *Studies in Talmudic Logic and Methodology*. London: Vallentine Mitchell, 1961. (Republished as paperback, 2006.)
- "The Talmudic Argument." In: *Essential Papers on the Talmud*. Ed. Michael Chernick. New York: NYU Press, 1994. Pp. 429-460. (Orig. ed. 1984.)
- *Structure and Form in the Babylonian Talmud.* Cambridge: Cambridge UP, 1991.
- *The Jewish Religion: A Companion*. Oxford: OUP, 1995.
- *Religion and the Individual.* Cambridge: CUP, 1992.
- *A Tree of Life: Diversity, Flexibility and Creativity in Jewish Law*. 2nd ed. London: Littman, 2000.
- *Rabbinic Thought in the Talmud*. London: Vallentine Mitchell, 2005.

Kelemen, Lawrence. *Permission to Believe: Four Rational Approaches to God's Existence.* Southfield, Mich.: Targum, 1990.

Kunst, Arnold. "An Overlooked Type of Inference." In: *Bulletin of the School of Oriental and African Studies*, Vol. X, Part 4, pp. 976-991 (1942).

Lalande, Pierre André. *Vocabulaire technique et critique de la philosophie*. Paris: Alcan, 1926. Paris: PUF, 1972.

Lewittes, Mendell. *Principles and Development of Jewish Law.* USA: Bloch, 1987.

Lieberman, Saul. "Rabbinic Interpretation of Scripture." In: *Essential Papers on the Talmud*. Ed. Michael Chernick. New York: NYU Press, 1994. Pp. 429-460. (Orig. ed. 1950.)

Luzzatto, R. Moshe Chaim.

- *The Ways of Reason* (orig. *Derech Tevunot*). Trans. Rabbis D. Sackton and Ch. Tscholkowski. Jerusalem: Feldheim, 1989.
- *The Book of Logic (orig. Sepher haHigayon).* Trans. Rabbis D. Sackton and Ch. Tscholkowski. Jerusalem: Feldheim, 1995.

Maccoby, Hyam. *The Philosophy of the Talmud.* London: Routledge Curzon, 2002.

Maïmonide. *Terminologie Logique* (*Makala fi sana'at al mantik – Milot haHigayon*). Trans. Moise Ventura. Paris: Librairie Philosophique, 1935. Reprinted, 1982.

Maimonides, Moses.[483]

- *Guide for the Perplexed.* Trans. M. Friedlander. 2nd ed. New York: Pardes, 1946.
- *Commentary on the Mishnah.* Trans. Fred Rosner. Northvale, N.J.: Aronson, 1995.

Malbim, R. Meir Leibush. *Malbim on Mishley: the Commentary of Rabbi Meir Leibush Malbim on the Book of Proverbs.* Trans. R. Charles Wengrov and Avivah Gottlieb Zornberg. Jerusalem: Feldheim, 1982.

Mielziner, Moses. *Introduction to the Talmud.* 3rd ed. New York: Bloch, 1925. (1st ed. 1894.)

Mitchell, T.C. *The Bible in the British Museum: Interpreting the Evidence.* London: British Museum, 1988.

Neusner, Jacob. *Rabbinic Literature: An Essential Guide*. Nashville, Tenn.: Abingdon, 2005.

---

483 Maimonides is also known as the Rambam, an acrostic of his Hebrew name, R. Moshe ben Maimon.

Plato. *The Dialogues of Plato*. Trans. Benjamin Jowett. 3rd ed. Oxford: Oxford UP, 1892.

Rabinowich, R. Nosson Dovid. *M. Mielziner's Talmudic Terminology*. Jerusalem: Ahavath Torah, 1988.

Ravitsky, Aviram. "Aristotelian Logic and Talmudic Methodology: The Commentaries On The 13 Hermeneutic Principles And Their Application Of Logic." In: *Judaic Logic*. Ed. Andrew Schumann. Piscataway, N.J.: Gorgias, 2010.

Rodkinson, Michael L. *The Rodkinson Edition of the Babylonian Talmud* (1903). Seattle, Wash.: Kindle, 2003.

Saadia Gaon.

- *Œuvres Complètes de R. Saadia ben Iosef al-Fayyoumi* (vol. 9). Ed. Joseph Derenbourg, Hartwig Derenbourg and Mayer Lambert. Paris: Leroux, 1897.
- *The Book of Doctrines and Beliefs*. Abridged ed. Trans. Alexander Altmann. Oxford: Phaidon, date not specified.
- *The Book of Beliefs and Opinions* (Vol. I). Trans. Samuel Rosenblatt. New Haven: Yale, 1948.

Samely, Alexander. *Rabbinic Interpretation of Scripture in the Mishnah*. Oxford: Oxford UP, 2002.

Shereshevsky, Esra. *Rashi: The Man and His World.* New York: Sepher-Hermon, 1982.

Scherman, R. Nosson, ed. *The Complete ArtScroll Siddur.* 2nd. ed. New York: Mesorah, 1986. [484]

Scholem, Gershom. *On the Kabbalah and Its Symbolism.* Trans. R. Manheim. New York: Shocken, 1969.

Schroeder, Gerald L. *Genesis and The Big Bang.* New York: Bantam, 1990.

Schumann, Andrew (Ed.). *Judaic Logic*. Piscataway, N.J.: Gorgias, 2010.

---

484 With commentaries by the editor.

Schwarz, Adolf. *Der Hermeneutische Syllogismus in der Talmudischen, Litteratur*. Vienna: Israelitisch-Theologischen Lehranstalt, 1901.

Soncino Babylonian Talmud. Ed. Rabbi Dr. I. Epstein. London: Soncino, 1952.

Steinsaltz, R. Adin. *The Talmud. The Steinsaltz Edition. A Reference Guide*. Trans. and ed. R. Israel V. Berman. New York: Random, 1989.

Talmud Bavli: Tractate Bava Kamma. Vol. I. Ed. R. Yisroel Simcha Schorr. Brooklyn, N.Y.: Mesorah, 2010.

Talmud Bavli: Tractate Kiddushin. Vol. I. Ed. R. Hersh Goldwurm. Brooklyn, N.Y.: Mesorah, 2010.

The Jewish Encyclopedia (JE). New York: Funk, 1968. Also, 2nd ed. New York: Funk & Wagnalls, 1901-1906. (Also, freely available online.)

Ury, Yisrael. *Charting the Sea of Talmud: A Visual Method for Understanding the Talmud*. Jerusalem: Mosaica, 2012.

(Some additional references are mentioned in footnotes. Note that the above list is not meant as a bibliography, but simply details the books referred to within the text.)

Works by Avi Sion

Avi Sion is the author of several works on logic and philosophy: *Future Logic* (1990); *Judaic Logic* (1995); *Buddhist Illogic* (2002); *Phenomenology* (2003); *The Logic of Causation* (1999, 2003, 2010); *Volition and Allied Causal Concepts* (2004); *Ruminations* (2005); *Meditations* (2006); *Logical and Spiritual Reflections* (2008-9); *A Fortiori Logic* (2013); *Exposing Fake Logic* (2018).

These works can be freely studied at: www.TheLogician.net and www.AviSionBooks.com.

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