STATEMENTS PARTLY ABOUT OBSERVATION

David Lewis
Princeton University

Some statements are entirely about observation. An uncompromising empiricist might say that these statements alone are meaningful; but in that case, theoretical science shares in the downfall that was meant for metaphysics. An uncompromising empiricist might tough it out: science is indeed meaningless, but yields meaningful theorems; or it is entirely about observation, after all; or some of each. But it seems, rather, that science is partly about observation and what we can observe, and partly about the hidden causes and minute parts of what we can observe. And it seems also that science is a package deal, which cannot credibly be split into one part that is meaningful and one part that isn't.

The sensible empiricist, therefore, will retreat. Statements entirely about observation may remain at the core of the meaningful, but scientific statements also will be admitted. Collectively, and even individually, these are at least partly about observation. For an empiricist who wants to be a friend to science, that had better be good enough.

I

One empiricist who sought to eliminate metaphysics but spare science was A.J. Ayer.[1] Meaningful statements need not be entirely about observation.

> . . . the question that must be asked about any putative statement of fact is not, Would any observations make its truth or falsehood logically certain? but simply, Would any observation be relevant to the determination of its truth or falsehood? And it is only if a negative answer is given to this second question that we conclude that the statement under

1

consideration is nonsensical. (p. 38)

Dissatisfied with this use of the notion of evidential relevance, he offers a 'clearer' formulation.

Let us call a proposition which records an actual or possible observation an experiential proposition. Then we may say that it is the mark of a genuine factual proposition . . . that some experiential propositions can be deduced from it in conjunction with certain other premises without being deducible from those other premises alone. (pp. 38-39)

The criterion collapses: any statement whatever turns out to be either 'factual' or 'analytic', and meaningful in either case. Let S be any statement and let O be an experiential proposition. Then O follows from S in conjunction with the premise 'if S then O'; and thereby S qualifies as factual unless O follows from the premise alone. But O follows from 'if S then O' just when O follows from 'not S'. So if S is not factual, every experiential proposition must follow from 'not S'; and in that case, given the safe assumption that some two experiential propositions are incompatible, S must be analytic.

In his introduction to the second edition, Ayer notes the collapse.[2] (p. 11) Therefore he emends the criterion, and it is this second try that I shall be discussing henceforth.

I propose to say that a statement is directly verifiable if it is either itself an observation-statement, or is such that in conjunction with one or more observation-statements it entails at least one observation-statement which is not deducible from these other premises alone; and I propose to say that a statement is indirectly verifiable if it satisfies the following conditions: first, that in conjunction with certain other premises it entails one or more directly verifiable statements which are not deducible from these other premises alone; and secondly, that these other premises do not include any statement that is not either analytic, or directly verifiable, or capable of being independently established as indirectly verifiable. (p. 13)

A statement is meaningful, by the new criterion, if and only if it is directly or indirectly verifiable, or else analytic.

Church soon showed that the new criterion also collapses.[3] Subsequent emendations, proceeding by the one-patch-per-puncture method, have led to ever-increasing complexity and ever-diminishing contact with any intuitive idea of what it means for a statement to be empirical.[4] Even if some page-long descendant of Ayer's criterion did escape collapse, provably admitting more than the observation-statements and less than all the statements, we would be none the wiser. We do not want just any class of statements that is intermediate between clearly too little and clearly too much. We want the right class. And to understand what we want, we need more guidance than just that good science should be in but the life and times of the Absolute should be out. Therefore we might do well to return to Ayer's criterion, unpatched, and try to see better not only why it fails, but also why it seems as if it should have worked.

To that end, I introduced the story with a tendentious twist. I said that the aim was to admit as meaningful a class of statements 'at least partly about observation'. It is unlikely that the empiricist himself would state his aim in this way—certainly Ayer does not. For he might well regard the notion of aboutness as unclear and dispensable: resistant to analysis (at lease in austerely logical terms), perhaps ambigous in ways that escape notice, and therefore best avoided in any official statement of his position. But if in an unofficial mood he were willing to speak of aboutness at all, then I think he might accept my statement of his aim. I have put words in his mouth, but they sound not out of place.

I suggest that the reason why Ayer's criterion seems as if it should have worked is that it conforms to correct principles about partial aboutness. The reason why it fails is that the principles are not correct together. 'Partly about' is indeed badly ambiguous. We can distinguish two conceptions of partial aboutness, quite different but equally worthy of the name. One of the principles built into Ayer's criterion is right for the first conception, wrong for the second. Another is right for the second, wrong for the first. By combining these conflicting principles, we get collapse.

There is also a third conception of partial aboutness. Neither

of the conflicting principles is right for it. However, it is the one that fits Ayer's preliminary suggestion that we should ask whether any observation would be relevant to determining the truth or falsehood of a putative statement of fact. There is also a fourth conception, which is probably irrelevant to our present interests.

I do not venture to guess whether Ayer had thoughts of partial aboutness at the back of his mind; still less, whether he was misled by conflating three different conceptions of partial aboutness. That hypothesis may offer one neat explanation of his criterion, but surely not the only explanation and very likely not the best.

Be that as it may, I think an empiricist in search of intuitive guidance *ought* to take up the idea that the desired class of empirical statements consists of statements that are, in some sense, at least partly about observation.

And not only an empiricist. Delineating the empirical need not be a prologue to debunking the rest. You might have any of many reasons for wanting to delineate a class of statements as empirical, and needing therefore to distinguish different senses in which a statement might be partly about observation. You might, for instance, want to *oppose* the thesis that empirical statements alone are meaningful; which you could not do unless you had some idea of what it meant to be empirical.

The empiricist himself may not be in the best position to delineate the empirical. Since he thinks that beyond the empirical all is nonsense, he requires a sharp and fixed boundary between the empirical and the nonsensical. The rest of us can settle for something messier. We need not worry if our delineation of the empirical turns out to be ambiguous, relative, and fuzzy, because we do not ask it to serve also as our line between sense and nonsense. The empiricist (unless he allows the latter line also to turn out messy) must perforce be less tolerant. Therefore our success need not advance his project.

The collapse of Ayer's criterion, and then the sorry history of unintuitive and ineffective patches, have done a lot to discredit the very idea of delineating a class of statements as empirical. That is reason enough why, if we think some appropriate delineation (albeit a messy one) can after all be

had, we should revisit the criterion in search of principles we can salvage as correct.

II

However, the criterion as it stands is too concise. It runs together steps that we shall need to see as based on separate principles. So we must start by transforming the criterion into an equivalent formulation. That may arouse suspicion: the criterion collapses, therefore it is equivalent to anything else that collapses. But we shall give it only a very gentle, unsurprising transformation. Then it will be fair enough to say that the principles of the new formulation were there already in the original.

We build up the class of verifiable statements stepwise. (Actually, thanks to the collapse, it turns out that there is nothing left to add after the first few steps.) The first three steps together give us Ayer's *directly verifiable* statements.

(0)   Begin with the class of all observation-statements.

(1)   Admit all nonanalytic conditionals of the form 'If 0_1 & ..., then 0' in which the antecedent is a conjunction of one or more observation-statements and the consequent is an observation-statement.

(2)   Admit all statements that entail previously admitted statements.

Steps (1) and (2) together replace Ayer's compressed condition that we are to admit any statement P such that P, in conjunction with one or more observation-statements 0_1, ..., entails an observation-statement 0 which is not deducible from 0_1, ... alone.[5] Ayer's condition admits P iff our conditions (1) and (2) together do.

Proof. Left to right. Suppose that P, in conjunction with 0_1, ..., entails 0, but 0 is not deducible from 0_1, ... alone. Then we admit the conditional 'If 0_1 & ..., then 0' at step (1) because it has the proper form and is not analytic; and then

we admit P at step (2) because it entails the conditional.

Right to left. First case: we admit P at step (2) because it entails observation-statement 0. Then *a fortiori* P in conjunction with any 0_1 still entails 0, and we choose 0_1 to be any observation-statement from which 0 is not deducible. Second and third cases: we admit P at step (1) because it is a nonanalytic conditional of the form 'If 0_1 & ..., then 0'; or else we admit P at step (2) because it entails some such conditional. Then, either way, P in conjunction with 0_1, ... entails 0, but 0 is not deducible from 0_1, ... alone. *QED*

A further sequence of steps gives us Ayer's class of *indirectly verifiable* statements. We decompress as before: each pair of our steps corresponds to one use of Ayer's condition stated in terms of entailment with the aid of extra premises. Where Ayer speaks of premises 'directly verifiable, or capable of being independently established as indirectly verifiable' we speak rather of statements previously admitted. This has the desired effect of preventing circles in which each of two statements is admitted only because the other is, yet it allows each indirectly verifiable statement to assist in the admitting of other indirectly verifiable statements after it has itself been admitted.

(3)   Admit all nonanalytic conditionals of the form 'If V_1 & ..., then D' in which the antecedent is a conjunction of one or more previously admitted statements and the consequent is a directly verifiable statement.

(4)   Admit all statements that entail previously admitted statements.

And so *ad infinitum:* from here on, all odd-numbered steps are exactly like (3) and all even-numbered steps are exactly like (4).

III

The even-numbered steps give us one guiding principle: a closure condition for the class of verifiable statements under the relation of converse entailment.

ENTAILMENT PRINCIPLE. If any statement entails a verifiable statement, then it is itself verifiable.

The Entailment Principle has a corollary which is highly plausible in its own right:

EQUIVALENCE PRINCIPLE. If two statements are equivalent in the sense that each entails the other, then both are verifiable if either is.

I shall henceforth use the Equivalence Principle tacitly, just by declining to distinguish equivalent statements; and I shall not count this as use of the more questionable Entailment Principle.[6]

The odd-numbered steps suggest quite a different guiding principle: closure of the class of verifiable statements under certain sorts of truth-functional composition. At first it seems that we have only a quite special case.

SPECIAL COMPOSITIONAL PRINCIPLE. If $V_1, \ldots$ are verifiable and D is directly verifiable, then unless it is analytic, the conditional 'If V_1 & ..., then D' also is verifiable.

But in fact we have something a good deal more general.

SPECIAL COMPOSITIONAL PRINCIPLE, REFORMULATED. If $V_1, \ldots$ are verifiable and D is directly verifiable, and if $T(V_1, \ldots)$ is any truth-functional compound of the V's, then unless it is analytic, the disjunction '$T(V_1, \ldots)$ or D' also is verifiable.

The two formulations are equivalent. The old formulation follows instantly from the new one. The converse takes some proving.

Proof. Fix D. Consider the condition: being such that its disjunction with D is either analytic or verifiable.

First, if P is verifiable, then P satisfies the condition. For by the old formulation, 'If P, then D' is either analytic or

verifiable; if 'If P, then D' is analytic, then 'P or D' is equivalent to D, which is verifiable; and if 'If P, then D' is verifiable, then by the old formulation 'If (if P then D) then D' is either analytic or verifiable, and 'If (if P then D) then D' is equivalent to 'P or D'.

Second, if P satisfies the condition, so does its negation. For if 'P or D' is analytic, then 'Not-P or D' is equivalent to D, which is verifiable; if 'P or D' is verifiable, then by the old formulation, 'If (P or D) then D' is either analytic or verifiable, and 'If (P or D) then D' is equivalent to 'Not-P or D'.

Third, if P and Q both satisfy the condition, so does their disjunction. For by the previous case, 'Not-P' and 'Not-Q' also satisfy the condition. If 'Not-P or D' and 'Not-Q or D' both are analytic, then '(P or Q) or D' is equivalent to D, which is verifiable. If 'Not-P or D' and 'Not-Q or D' both are verifiable, then by the old formulation the conditional 'If (not-P or D) & (not-Q or D), then D' is either analytic or verifiable, and this conditional is equivalent to '(P or Q) or D'. If 'Not-P or D' is analytic and 'Not-Q or D' is verifiable, then by the old formulation the conditional 'If (not-Q or D) then D' is either analytic or verifiable, and this conditional is equivalent to '(P or Q) or D'. Likewise *mutatis mutandis* if 'Not-P or D' is verifiable and 'Not-Q or D' is analytic.

All truth functions are generated from negation and disjunction. Therefore we conclude that any truth-functional compound of verifiable statements satisfies the condition. This goes for any directly verifiable D. *QED*

I claim that the Entailment and Compositional Principles are separately acceptable, but should not be mixed. If we shun all mixing (except for our tacit appeals to Equivalence) we can go no further.

But now I bend my rules: one small bit of mixing turns out to do no harm, and enables us to simplify the Compositional Principle. Assume that there is at least one observation-statement 0, and consider the contradiction '0 & not-0'. '0 & not-0' entails 0, and therefore is admitted as verifiable by the Entailment Principle; in fact, it is admitted already at step (2), and therefore is *directly* verifiable.[7] Now let $V_1, \ldots$ be verifiable

and let $T(V_1, \ldots)$ be any truth-functional compound of the V's; applying the Special Compositional Principle as reformulated, '$T(V_1, \ldots)$ or $(0 \ \& \ \text{not-}0)$' is verifiable unless it is analytic; however we can simplify by dropping the contradictory disjunct. So we get a principle that applies to all forms of truth-functional composition, and that no longer uses the distinction between direct and indirect verifiability.

COMPOSITIONAL PRINCIPLE *SIMPLICITER*. If V_1, ... are verifiable, and if $T(V_1, \ldots)$ is any truth-functional compound of the V's, then unless it is analytic, $T(V_1, \ldots)$ also is verifiable.

To make Ayer's long story short, his verifiable statements turn out to be the class we get if we start with the observation-statements (of which we assume there is at least one) and we close both under converse entailment and under truth-functional composition.[8]

IV

No collapse comes from the Compositional Principle by itself. (That is why no harm was done when I mixed the principles to a limited extent in advancing from the Special Compositional Principle to the Compositional Principle *Simpliciter*.) If we start with the observation-statements and close under truth-functional composition, we do not get the class of all (non-analytic) statements.[9]

Take a miniature language as follows: we have two observation-statements, 'It's dark' and 'It's light'; they are exclusive, since 'It's not both dark and light' is analytic; but they are not exhaustive, since 'It's dark or light' is not analytic. (Twilight is acknowledged as a third possibility, but doesn't have an observation-statement of its own.) Also we have two other statements, 'The Absolute is cruel' and 'The Absolute is crafty' which are independent of the two observation-statements and of each other. We admit five new statements by applying the Compositional Principle to the observation-statements: 'It's dark or light', 'It's neither dark nor light', 'It isn't dark', 'It isn't light', and the contradictory 'It's dark and

light'. But we don't admit 'The Absolute is cruel', or even such conjunctions as 'It's dark and the Absolute is cruel'.

No collapse comes from the Entailment Principle by itself; or even from the Entailment Principle applied after we have first applied the Compositional Principle. Mixing is not always fatal. In the first case, what we admit are exactly the entailers of observation-statements.[10] Likewise in the second case we admit exactly the entailers of truth-functional compounds of observation statements. So if we start with the observation-statements and close under converse entailment, we admit 'It's dark and the Absolute is cruel' because it entails 'It's dark'. If we start with the truth-functional compounds of observation-statements and close under converse entailment, we also admit 'It isn't dark and the Absolute is cruel' because it entails 'It isn't dark'; we admit 'It's dark or light and the Absolute is crafty' because it entails 'It's dark or light'; and so on. But in neither case do we get the class of all statements. For instance we do not admit 'The Absolute is cruel', and we do not admit 'Either it's dark and the Absolute is cruel or it's light and the Absolute is crafty'.

But the next step is the fatal one. Suppose we begin with the observation-statements, then apply the Compositional Principle, then the Entailment Principle, then the Compositional Principle once more. This is the mixing that yields collapse. First we have 'It's dark'; then 'It isn't dark'; then we have both 'The Absolute is cruel and it's dark' and 'The Absolute is cruel and it isn't dark' (so far, so good); then the disjunction of these, which is equivalent to 'The Absolute is cruel'. And in place of 'The Absolute is cruel' we may likewise admit whatever (non-analytic) statement we like.

To state the point in general form, foresaking our miniature example, let us suppose as Ayer implicitly does that the class of verifiable statements is closed both under converse entailment and under truth-functional composition. Assume that we have at least one verifiable statement V and, further, that V is not contradictory. (In other words, 'Not-V' is not analytic.) We could safely assume, for instance, that there exists at least one non-contradictory observation-statement.[11] Then any statement S whatever, unless it is analytic, is verifiable.

Proof. 'Not-V' is verifiable by the Compositional Principle. Each of 'S & V' and 'S & not-V' entails a verifiable statement and so is itself verifiable by the Entailment Principle. Then the disjunction '(S & V) or (S & not-V)', unless it is analytic, is verifiable by the Compositional Principle. The same goes for S itself, by the Equivalence Principle, since S is equivalent to this disjunction. *QED*

So much for our two principles taken together.[12]

V

Before we return to take them separately, we must explore alternative senses in which a statement might be partly about a subject matter. And before that, we must ask what it means for a statement to be entirely about a subject matter.

I suggest that this is a matter of supervenience: a statement is entirely about some subject matter iff its truth value supervenes on that subject matter. Two possible worlds which are exactly alike so far as that subject matter is concerned must both make the statement true, or else both make it false. Contrapositively, if one world makes the statement true and the other makes it false, that must be because they differ with respect to the subject matter. If the statement is entirely about the subject matter, no difference that falls outside that subject matter could make a difference to the truth of the statement.

It is simplest if we take possible worlds to be things of a kind with the cosmos that we ourselves are part of,[13] and if we take a subject matter that picks out parts of some of these worlds. For instance the 17th Century is a subject matter; the thisworldly 17th Century is a temporal part of this world, and likewise various otherworldly 17th Centuries are parts of various other worlds. Then two possible worlds are exactly alike with respect to the 17th Century if the 17th Century that is part of one is an exact intrinsic duplicate of the 17th Century that is part of the other (or if, for one reason or another, neither world has a 17th Century); and otherwise the two worlds differ with respect to the 17th Century. So a statement is entirely about the 17th Century iff, whenever two worlds have duplicate 17th Centuries (or both lack 17th Centuries), then both worlds give

the statement the same truth value. Similarly for more scattered parts, such as the totality of all the world's styrofoam. A statement is entirely about styrofoam iff, whenever all the scattered styrofoam of one world is a duplicate of all the scattered styrofoam of the other world (or neither world contains any styrofoam), then both worlds give the statement the same truth value.[14]

It is otherwise for other subject matters. For instance, consider the subject matter: how many stars there are. Two possible worlds are exactly alike with respect to this subject matter iff they have equally many stars. A statement is entirely about how many stars there are iff, whenever two worlds have equally many stars, the statement has the same truth value at both. Maybe an ingenious ontologist could devise a theory saying that each world has its *nos-part,* as we may call it, such that the nos-parts of two worlds are exact duplicates iff those two worlds have equally many stars. Maybe—and maybe not. We shouldn't rely on it. Rather, we should say that being exactly alike with respect to a subject matter may or may not be a matter of duplication between the parts of worlds which that subject matter picks out.

Further, even for the easy cases of the 17th Century and styrofoam, maybe some reader will take issue with my supposition that possible worlds are things of a kind with the cosmos we are part of; or with my supposition that things have scattered and disunified parts.

So it may be best, once the easy cases have shown what kind of notion of aboutness I am driving at, if we reintroduce it in a more abstract and metaphysically neutral fashion, as follows. Whatever the nature of possible worlds may be, at any rate there are many of them. With any subject matter, we can somehow associate an equivalence relation on worlds: the relation of being exactly alike with respect to that subject matter. Now, unburdened of any contentious account of what that relation and its *relata* are, we proceed as before. A statement is entirely about a subject matter, iff, whenever two worlds are exactly alike with respect to that subject matter, then also they agree on the truth value of the statement.[15]

This treatment does not, in general, give us an entity which we may naturally take to *be* the subject matter. Sometimes we

have a suitable entity: we could take the subject matter styrofoam to be the totality of all the styrofoam throughout all the worlds. Then it picks out, by intersection, the styrofoam (if any) of any given world. But we cannot rely on doing the same in all cases, as witness the subject matter: how many stars there are. What we do have, in all cases, is the equivalence relation. We might dispense with subject matters as entities, and get the effect of quantifying over subject matters by quantifying instead over equivalence relations. (Perhaps over all equivalence relations on worlds; perhaps only over those which can suitably be regarded as relations of being alike with respect to a subject matter.) Or, if we don't mind artificiality, we could simply identify a subject matter with its equivalence relation. I shall do so henceforth.

If a statement is entirely about the 1680's, then *a fortiori* it is entirely about the 17th Century; if entirely about blue styrofoam, then entirely about styrofoam; if entirely about whether there are finitely or infinitely many stars, then entirely about how many stars there are. The reason, in each case, is that the first subject matter is in some sense part of the second. In special cases, we could explain this in an especially simple way: the totality (through all the worlds) of blue styrofoam is part of the totality of styrofoam. But for the sake of generality, and to avoid contentious ontic commitments, it is better to explain part-whole relations of subject matters in terms of the equivalence relations, as follows. If two worlds are alike with respect to the entire 17th Century, then *a fortiori* they must be alike with respect to the 1680's; if alike with respect to styrofoam generally, then alike with respect to blue styrofoam; if alike with respect to how many stars there are, then alike with respect to whether there are finitely or infinitely many. In general, if subject matter M is part of a more inclusive subject matter M^+, then whenever two worlds are exactly alike with respect to M^+—for short, M^+-*equivalent*—then they must also be M-equivalent. Identifying the subject matters with the equivalence relations: M is *part of* M^+ iff M^+ is a subrelation of M.[16] We could also say that M *supervenes on* M^+. Supervenience is transitive: when the truth value of a statement supervenes on M, and M supervenes on M^+, then the truth value of the statement supervenes on M^+. So a

statement entirely about some part of subject matter M is also, *a fortiori*, entirely about M; and any statement entirely about M is also entirely about every subject matter that has M as a part.

For any subject matter M, the class of statements entirely about M is closed under truth-functional composition. If any two M-equivalent worlds give the same truth value to P then also they give the same truth value to 'Not-P'; if they give the same truth values to both P and Q, then also they give the same truth value to 'P & Q'; and so on.

Any two worlds whatever, and *a fortiori* any that are M-equivalent for some subject matter M, must give the same truth value to an analytic statement or a contradictory statement. In this trivial way, any analytic or contradictory statement turns out to be entirely about every subject matter. Not to worry: we should not expect distinctions of subject matter to apply in any very intuitive way to analytic and contradictory statements, so we may be content with whatever stipulation falls out of definitions that work in the cases that matter.

VI

Now take the subject matter: observation. Two worlds may or may not be exactly alike with respect to observation—for short, *observationally equivalent*. A statement is entirely about observation iff both of any two observationally equivalent worlds give it the same truth value.

It is unclear whether any part of this world, or another, may be called the totality of all the world's observation. Such a totality might be a totality of many events of observing. Some theories treat events as parts of worlds in which they occur; others do not.[17] Observational equivalence might be like the relation of having duplicate 17th Centuries, or duplicate totalities of styrofoam; or it might be more like having equally many stars. No matter; so long as it is an equivalence relation on worlds, we can go on.

You have surely spotted the vexed questions I am ignoring. Suppose two worlds look just alike to all observers, but differ because very different things are being observed. Observationally equivalent? Or suppose that in two worlds, observers

respond differently not because of any difference in what stimulation they get from their surroundings, but entirely because they are primed with different preconceptions: different theory-laden concepts, different questions in mind, different training in how to observe, or just different degrees of attentiveness. Observationally equivalent? Or suppose there are two worlds where human observers are aided by instruments—maybe mere spectacles, maybe telescopes, maybe remote controlled spacecraft—and there is no difference in what ultimately reaches the humans, but plenty of difference in what reaches the instruments. Observationally equivalent? Or suppose two worlds are alike so far as the actual. observations in each world go, but differ in their counterfactuals about observation. Observationally equivalent? Or .... Whenever we have questionable cases of observational equivalence, we can have questions about whether a statement is entirely about observation; because the statement might differ in truth value between worlds that are questionably equivalent, but never between worlds that are *un*questionably equivalent.

It is not my business to answer these questions. I agree, nay I insist, that the notion of observational equivalence is rife with ambiguities. Therefore, so is the notion of a statement entirely about observation. I said that we need not worry if our delineation of the empirical turns out to be ambiguous, relative, and fuzzy. It turns out that we meet ambiguity already at this stage, even before we advance from entire to partial aboutness. All this ambiguity will stay with us when we go on. But I shall disregard it henceforth. What I want to examine is the *added* ambiguity in the notion of a statement partly about observation: the ambiguity that accrues because we have several ways to go from entire to partial aboutness.

Recall that Ayer defines an observation-statement (originally, 'experiential proposition') as a statement which 'records an actual or possible observation'. It is safe to say that such a statement is a statement entirely about observation. But probably not all statements entirely about observation are observation-statements. Recall that in our miniature language we provided only two observation-statements, 'It's dark' and 'It's light' (exclusive but not exhaustive), but also we had six

truth-functional compounds of these two (one analytic, one
contradictory, and four more). Those six statements also are
entirely about observation. Since statements entirely about
observation are closed under truth-functional composition,
they would seem to include statements which record not
observations but *non*-observations; not observations but very
prolonged sequences of observations; not observations but
conditional or biconditional correlations of observations; and
so on. If such a statement were said to record *an* observation,
that would be a stretch of usage, though I think not an
altogether absurd stretch. At any rate, we will have statements
that cannot be quickly and decisively tested by observation,
and yet are entirely about observation. 'Whenever it's dark, it
will later be light' is entirely about observation (if we take it to
refer to observed dark and light). Yet no sequence of dawns is
long enough to settle that endless night will not come at last,
and no night is long enough to settle that dawn will never
follow. We can restate the example with infinite conjunctions
and disjunctions in place of the quantifiers, and we can
approximate it with long finite ones.

VII

Now that we know, near enough, what it means to be entirely
about observation, what could it mean to be (at least) partly
about observation? How are we to tackle this question? Not by
consulting our linguistic intuition about the ordinary use of the
phrase 'partly about', I think. Because, after all, that phrase
doesn't get a lot of ordinary use. Rather, we should see how the
modifier 'partly' operates, and operate accordingly on the
notion of being entirely about a subject matter.

    The recipe for modifying X by 'partly' is something like this.
Think of the situation to which X, unmodified, applies.[18] Look
for an aspect of that situation that has parts, and therefore can
be made partial. Make it partial—and there you have a
situation to which 'partly X' could apply. If you find several
aspects that could be made partial, then you have ambiguity.
Maybe considerations about what it could be sensible to mean
will help diminish the ambiguity.

Example. On a cloudy day, clouds cover the sky. Then what could a partly cloudy day be? Well, what in the situation has parts? First, the clouds have parts. Maybe a partly cloudy day is one on which cloud-parts cover the sky? But cloud-parts, or anyway the most salient ones, are just clouds; so there's no difference between cloud-parts covering the sky and clouds covering the sky; so this would be a pointless thing to mean; so it's understandable that the phrase never does mean this. Second, the day has parts. Maybe a partly cloudy day is one on which clouds cover the sky for part of the day?—Yes, the phrase can mean that. But it's still a bit pointless, since so often we could just say 'a cloudy morning' or whatever. Third, the sky has parts. Maybe a partly cloudy day is one on which clouds cover part of the sky?—Yes, and in fact this is what the phrase most often means.

When a statement is entirely about a subject matter, we have, first, the content of the statement, given by the class of possible worlds that the statement excludes. We have, second, the subject matter, given by an equivalence relation on worlds. We have, third, the supervenience of the truth value of the statement (determined by the content) upon the subject matter. And we have, fourth, the statement itself. Each of these can be taken, in some direct or some devious sense, to have parts. Therefore we have four ways to cut back from entire to partial aboutness, yielding four different conceptions of partial aboutness. I think that each of the four does indeed yield a possible meaning for the phrase 'partly about'. But whether that is so scarcely matters. What does matter is that we get four different lines of retreat from the idea that an empirical statement is entirely about observation, and three of the four can be linked to Ayer's discussion.

VIII

First, we have the *part-of-content* conception: a statement is partly about a subject matter iff part of its content is entirely about that subject matter. So far, we have been talking of aboutness for statements, not contents, but that should not detain us: if content is given by a class E of excluded worlds, E

is entirely about subject matter M iff both or neither of any two
M-equivalent worlds belong to E. A part of the content is a
subset of E: it does part of the excluding that the whole of E
does. So a statement S is partly about subject matter M, in the
present sense, iff there is some subset of its content that
contains both or neither of any two M-equivalent worlds.

Assume that for any content whatever, some statement has
exactly that content. That could be because we have a liberal
enough notion of statements to permit statements not
expressible in any available language; or it could be because we
have available some very rich language. Then we have simpler
equivalents of the previous definition. S is partly about M, in
the present sense, iff S is equivalent to a conjunction 'P & Q'
where P is entirely about M and Q may be about anything.
When we expand S into any equivalent conjunction, the
content of each conjunct is part of the content of S; so another
way to think of a part of the content of S is just to think of a
conjunct of some conjunctive expansion of S. Simpler still: S is
partly about M iff S entails some statement entirely about M.

For instance, in our miniature example, 'The Absolute is
crafty and it's dark' is partly about observation. The part of its
content that excludes it's being light or twilight is entirely
about observation. The statement is equivalent (or identical)
to the conjunction of 'The Absolute is crafty' and 'It's dark';
thereby it entails 'It's dark'; and 'It's dark' is entirely about
observation.

S entails 'Not-0' iff 0 contradicts S; 'Not-0' is entirely about
observation iff 0 is; so S is partly about observation iff some
statement entirely about observation contradicts S. What we
have is a liberal formulation of Falsificationism, the thesis that
a statement is empirical iff it could be falsified by observation.
The liberality consists in reading 'falsified by observation' as
'contradicted by a statement entirely about observation' rather
than 'contradicted by an observation-statement'. That means
that the falsification is not required to be at all quick and
decisive.

Being partly about observation, in the sense of the part-of-
content conception, obeys the Entailment Principle. (And
consequently obeys the Equivalence Principle as well.) For if
S_1 entails S_2, and S_2 is partly about observation, then S_2 entails

some statement 0 that is 'entirely about observation. By transitivity S_1 also entails 0, and therefore is partly about observation.

But in return, the Compositional Principle is violated. If 0 is entirely about observation, so is 'Not-0'; then both 'S & 0' and 'S & not-0' are partly about observation. But their disjunction is equivalent to S, which might be anything. S need not be analytic, and need not be partly about observation. S might be 'The Absolute is cruel.' It is false that the disjunction of two statements partly about observation, unless it is analytic, must be partly about observation.

As a delineation of the empirical, being partly about observation in the part-of-content sense seems acceptable, though I think not uniquely acceptable. As a standard of meaningfulness it is absurd; because even when part of the content is entirely about observation, the rest of the content may be about anything whatever.

IX

Second, we have the *part-of-subject-matter* conception: a statement is partly about a subject matter iff it is entirely about a certain suitable larger subject matter M^+ which includes M as a part.

The restriction to a 'suitable' larger subject matter is essential. Without it, we could use gerrymanders to show that anything is partly about anything. We have a statement entirely about wallabies; it is therefore entirely about the larger subject matter, wallabies and tax reform; so it is partly about tax reform! As ordinary usage, that is absurd. And a conception of partial aboutness that allows it, whether ordinary or not, is so undiscriminating as to be useless.

(If we had a large mixed corpus of statements, some entirely about wallabies and some entirely about tax reform, it would not be bad to say collectively of them that they are partly about tax reform. This might be the part-of-content conception, applied to the content of the corpus as a whole. Or we might just be saying that some of the statements in the corpus are entirely about tax reform.)

The remedy is to say that the gerrymandered subject matter,

wallabies and tax reform, either is no genuine subject matter at all, or else is an unsuitable subject matter for use in establishing partial aboutness. The second alternative is better, because after all we might want to say that some peculiar book is entirely about wallabies and tax reform. So we'll count it as a subject matter; but the trouble with it is that there are no salient relations between wallabies and tax reform. Everything is related to everything, of course, in countless gruesome ways. But if a subject matter is held together only by relations that we normally ignore, then that subject matter itself is best ignored—at any rate for present purposes. What we want is a *close-knit* subject matter: a package deal, with its parts well interrelated in many important ways. The more close-knit the subject matter X-*cum*-Y is, the more natural it is to say that a statement entirely about X is thereby partly about Y. It seems not bad to say that a statement entirely about Buda is partly about Pest, if the life of Budapest pays no heed to the division.

It would not seem so good, however, if we also said that a statement entirely about Buda was thereby partly about each little street in Pest. So it seems we need another constraint on what is to count, for present purposes, as a 'suitable' subject matter.[19] This time, it will have to be a relative constraint: Budapest is a suitable subject matter relative to Pest, but not relative to each street in Pest. That suggests that if a statement is partly about M by being entirely about M$^+$, M must be a sufficiently *large* part, or a sufficiently *important* part, of M$^+$. Pest is a large and important part of Budapest; not so for each street in Pest. In this easy case, we can at least begin with an ordinary comparison of the sizes of material objects. In harder cases, where a subject matter does not pick out parts of worlds, we cannot. We shall have to require, in general, that the relation of M$^+$-equivalence does not partition the worlds too much more finely (or, too much more finely in important respects) than the relation of M-equivalence does. It would be good to spell the constraint out more exactly, but I leave that problem open.[20]

Consider the whole subject matter of science: observation, the things observed and other things of the same kind, their hidden causes and their minute parts. Call this subject matter 'observation$^+$'. Here is a larger subject matter including

observation. It is eminently 'suitable'. It is well interrelated by causal relations, relations of sameness of kind, and even relations of part and whole. Observation seems (so far as we can tell without spelling out a criterion exactly) to be a large and important part of it. It is a sufficiently suitable larger subject matter, I submit, that any statement entirely about it thereby qualifies as partly about observation. Of course we can say of scientific statements collectively that they are partly about observation. But an individual scientific statement also is partly about observation, even one that is entirely about 'unobservables'. Science is a package deal, observation is central to the package, and that is good enough.

Being partly about observation, in the sense of the part-of-subject-matter conception, obeys the Compositional Principle when we hold fixed the larger subject matter observation⁺. Recall that being entirely about a given subject matter is closed under truth-functional composition. So any truth-functional compound of statements that are partly about observation by being entirely about observation⁺ is itself entirely about observation⁺, and thereby partly about observation. The Compositional Principle makes an exception for analytic truth-functional compounds; the exception turns out to be unnecessary, since they too will be entirely about observation⁺ and thereby partly about observation.

The Equivalence Principle also is obeyed. If two statements are equivalent, they must supervene on exactly the same subject matters. So both or neither of them will be entirely about observation⁺; so both or neither of them will thereby be partly about observation.

But the Entailment Principle is violated. If a statement is partly about observation by being entirely about observation⁺, it does not follow that an entailer of that statement also is entirely about observation⁺. 'It's dark' is entirely about observation, and *a fortiori* entirely about observation⁺; 'It's dark and the Absolute is cruel' entails 'It's dark'; but 'It's dark and the Absolute is cruel' needn't be entirely about observation⁺, and indeed its truth value needn't supervene on any suitably close-knit subject matter that includes observation as a large and important part.

As a delineation of the empirical, being partly about

observation in the part-of-subject-matter sense seems
acceptable when, and of course only when, we fix on a suitable
larger subject matter. Whether a subject matter is suitable is, of
course, a matter of degree, and a matter of judgement. The
subject matter of science—observation, the things observed
and other things of the same kind, their hidden causes and their
minute parts—is one eminently suitable subject matter, but
not necessarily the only one. Maybe some still larger subject
matter might be just as suitable. If delineating the empirical
means finding out what else might fall in with observation in
some suitable subject matter, the task will be no mere formal
exercise. Horrors!—Even the life and times of the Absolute
might turn out to be partly about observation. And we could
not decide without knowing just what the Absolute is
supposed to be and do. This conception, like the first, cannot
yield a standard of meaningfulness. We could not hope to
dismiss metaphysics as meaningless before attending to its
meaning.

X

Third, we have the *partial supervenience* conception: a
statement is partly about a subject matter iff its truth value
partially supervenes, in a suitably non-trivial way, on that
subject matter. Let us say that the truth value of a statement
supervenes on subject matter M *within* class X of worlds iff,
whenever two worlds in X are M-equivalent, they give the
statement the same truth value. Supervenience within the class
of all worlds is supervenience *simpliciter*. Supervenience
within a smaller class of worlds is partial supervenience.

The restriction to partial supervenience 'in a suitably non-
trivial way' is essential. Without it, we could select classes of
worlds within which anything supervenes on anything. For
instance, any S supervenes on any M within the unit class of
any single world; or within a class of worlds none of which are
M-equivalent; or within the class of all S-worlds; or within the
class of all S-worlds, plus any one extra world, minus any
S-worlds that are M-equivalent to the extra world. To exclude
these trivial cases, we need to impose a condition roughly as
follows: the class X must contain a majority of the worlds

where S is true, and also a majority of the worlds where S is false. Henceforth when we speak of partial supervenience, let us always mean partial supervenience within a class that satisfies this condition of non-triviality.

But what should we mean by 'a majority'? If there were finitely many worlds, we could just count; but there are infinitely many worlds. We could require a difference in cardinality, infinite or otherwise; but that would make the condition altogether too stringent.

Instead, we make the bold conjecture that we are given a certain probability distribution over the worlds, call it 'Prob', which would represent a reasonable initial distribution of subjective probability prior to all experience.[21] Then we may say that the condition is satisfied iff $Prob(X/S)$ and $Prob(X/Not\text{-}S)$ both exceed 50%. (This requires that $Prob(S)$ and $Prob(Not\text{-}S)$ are positive, else the conditional probabilities would be undefined.)

Here is an example of partial aboutness in the sense of (non-trivial) partial supervenience. Suppose we have an urn with 100 balls, some but not all of them green. The frequency of green balls in the urn is a subject matter. Suppose we sample randomly, with replacement, for very many draws. It is always possible to draw an unrepresentative sample, but with our very large sample it is very improbable. Let X contain all the worlds where the sample is representative: that is, where the sample frequency, rounded to the nearest percent, equals the urn frequency. Let X also contain all worlds contrary to our stipulation of the situation. Sample frequency does not supervene *simpliciter* on urn frequency—you can still get any sample from any urn—but it does supervene on urn frequency within X. So the truth value of a statement S which specifies the sample frequency (rounded to the nearest percent) likewise supervenes on urn frequency within X. Our condition of non-triviality is satisfied—very well satisfied, since the overwhelming majority of S-worlds, and also the overwhelming majority of (Not-S)-worlds satisfying our stipulation, all fall within X. So we may say that S is partly about the urn frequency, in the sense of partial supervenience. I do find it fairly natural to say this.

I think we could find it no less natural to say that a statement

is partly about observation if it is so in the sense of partial supervenience—at least, if the condition of non-triviality is more than barely satisfied. But that scarcely matters. What does matter is that we have here a third line of retreat from the idea that an empirical statement is entirely about observation, and one that can again be linked to Ayer's discussion. The link, however, is not via the criterion—as we shall see, both of the guiding principles we took from it are violated. Rather, the link is to Ayer's preliminary suggestion, before the criterion, that the test question for a putative statement of fact is: 'Would any observation be relevant to the determination of its truth or falsehood?'

Ayer found the notion of evidential relevance unclear; but for us, with a well-developed probabilistic model of confirmation, it is in good shape. We have assumed that we are given a certain reasonable initial probability distribution, Prob. Then we may say that E is evidentially relevant to S iff Prob(S/E) differs from Prob(S). Iff some statement entirely about a subject matter is evidentially relevant to S, we may say the same about the subject matter itself. Then observation is evidentially relevant to S iff, for some statement 0 entirely about observation, Prob(S/0) differs from Prob(S).

A statement S is partly about observation, in the sense of partial supervenience, iff observation is evidentially relevant to S. Or rather, this is so *modulo* two idealisations; I shall omit a precise statement of the result, and allow the idealisations to appear in the course of the proof.

Proof. Left to right. S supervenes on observation within a class X that satisfies our condition of non-triviality. We can assume without loss of generality that any S-world observationally equivalent to an X-world where S is true is itself in X, and any (Not-S)-world observationally equivalent to an X-world where S is false is itself in X. (For if it were not so originally, we could just add the missing worlds to X, and the new expanded X would satisfy non-triviality as well as the old X did.) Assume, by way of idealisation, that for any class of worlds, there is a statement true at exactly the worlds in that class. Let 0 be a statement true at any world observationally equivalent to an X-world

where S is true. Let P be true at any world observationally equivalent to an X-world where S is false. Let Q be true at any world that is not observationally equivalent to any X-world. These three statements are entirely about observation, and they are mutually exclusive and jointly exhaustive. Suppose for *reductio* that none of them is evidentially relevant to S: Prob(S/0), Prob(S/P), Prob(S/Q) are all equal. Then for X to satisfy our condition of non-triviality, Prob(0) and Prob(P) both must be greater than 50%; which is impossible.

Right to left. Consider the equivalence classes under the relation of observational equivalence. Divide them into 'upper' and 'lower' classes such that, first, the two classes differ as little as possible in total probability, and second, whenever A is in the upper class and B is in the lower, Prob(S/A) is greater than or equal to Prob(S/B). Then also, whenever A is in the upper class and B is in the lower, Prob(Not-S/A) is less than or equal to Prob(Not-S/B). Since observation is evidentially relevant to S, we will sometimes have inequality. Let U be the union of the upper class, and let L be the union of the lower class. Then Prob(S/U) exceeds Prob(S/L), and Prob(Not-S/L) exceeds Prob(Not-S/U). We made Prob(U) and Prob(L) approximately equal; if the approximation is good enough—now we assume, by way of idealisation, that it can be made good enough—it follows that Prob(U/S) and Prob(L/Not-S) both exceed 50%. Let class X contain the worlds in U where S is true together with the worlds in L where S is false. Then S supervenes on observation within X, and X satisfies our condition of non-triviality. *QED*

Given that partial aboutness in the present sense amounts to evidential relevance, it is easy to see how it violates both the Entailment Principle and the Compositional Principle. In fact, it can violate both at once. It can happen that observation is relevant to P, and also to Q, but not to their conjunction 'P & Q'. (And further, that 'P & Q' is not analytic.) Then the Entailment Principle is violated because 'P & Q' entails P, and the Compositional Principle is violated because 'P & Q' is a truth-functional compound of P and Q.

Miniature example. We have just four worlds, all equally probable. We have two observational alternatives: L and D (light and dark; left and right column). P-worlds are drawn as noughts, Q-worlds as crosses, (P & Q)-worlds therefore as noughts superimposed on crosses.

L: ⊕   +   D: O   ⊕
Prob(P/L) = 50%   Prob(P/D) = 100%
Prob(Q/L) = 100%   Prob(Q/D) = 50%
Prob(PQ/L) = 50%   Prob(PQ/D) = 50%

Observation is relevant to P and to Q, but not to 'P & Q'.

Partial aboutness in the sense of partial supervenience—that is, evidential relevance—does obey the Equivalence Principle. The present conception, like the previous ones, has no resources to distinguish between equivalent statements. If two statements are equivalent, they supervene on exactly the same subject matters, within any class; and their evidential relations are the same.

As a delineation of the empirical, being partly about observation in the sense of partial supervenience—that is, evidential relevance of observation—again seems acceptable, though again it is only one candidate among others.[22] But again it is hopeless as a standard of meaningfulness, because it is absurd that we should be able to make a meaningless statement just by conjoining two meaningful ones.

XI

Fourth, we have the *part-of-statement* conception: a statement is partly about a subject matter iff some part of that statement is entirely about that subject matter. This presupposes that statements have other statements as parts. Do they? No, if we conceive of statements as propositions, and propositions just as sets of possible worlds. Yes, if we conceive of statements as 'structured meanings', abstracted from sentences far enough to leave behind such superficial details as the spelling and pronunciation and order of words, but not far enough to leave behind the syntactic structure which divides a sentence into constituent clauses.[23] I believe that these conceptions (and

others) are entirely legitimate. There is no saying which one better deserves the name 'statement', and no saying which one better fits what Ayer had in mind.

Consider these three sentences, equivalent but different with respect to their subsentences.

    (a)   The Absolute is crafty.

    (b)   Either the Absolute is crafty and it's dark, or else the Absolute is crafty and it isn't dark.

    (c)   The Absolute is crafty, and either it's dark or it isn't dark.

We can perfectly well say that we have the same statement, expressed three different ways. Or we can just as well say that we have three different, but equivalent, statements. In the second case, we will say that just as the sentences (a)-(c) have different sentences as parts, so likewise the corresponding statements (a)-(c) have different statements as parts. That gives us what we need to make sense of the part-of-statement conception of partial aboutness.

Our previous conceptions of entire and partial aboutness were all *intensional*: if there ever were two nonidentical equivalent statements, they wouldn't differ in aboutness. So we never had to choose between conceptions of statements that do or don't allow nonidentical equivalence. The part-of-statement conception, on the other hand, is *hyperintensional*: it distinguishes between equivalent statements. The statements (b) and (c) are partly about observation, but the statement (a) is not. The reason is that (b) and (c), unlike (a), have as a part the statement 'It's dark', which is entirely about observation. Also, if we look at parts that are already compound, we find that (c), unlike (a) and (b), is partly about tax reform, or any subject matter whatever. The reason is that (c), unlike (a) and (b), has as a part the analytic statement 'Either it's dark or it isn't, and an analytic statement is entirely about anything.

The part-of-statements conception is *cumulative*. When we build up statements from their parts, we may gain new subject matters for the resulting statement to be partly about, but we

never lose old ones. Not so for our other conceptions, even
applied under the assumption that statements have other
statements as parts. On our other conceptions, (b) and (c)
would not be partly about observation, despite the presence
within them of a statement which is entirely about observation.

The part-of-statements conception deserves attention for
the sake of completeness, and because close relatives of it are
prominent in other discussions.[24] However, I see no way of
linking it with what Ayer said. Neither the evidential relations
of Ayer's preliminary suggestion nor the entailment relations
of the criterion itself are sensitive to hyperintensional
distinctions. And if we are seeking something that can pass for
a delineation of the empirical, we scarcely want something that
will admit (b) and (c) while excluding (a).

XII

When something goes bump in the night, it's none too
reassuring to be told there's nothing there. You'll sleep more
soundly when you know there is something there, but only
Magpie and Possum. When Ayer threatened us with the
criterion, the collapse tried to tell us there was nothing there.
Unconvinced, the patch-and-puncture industry struggles on.
Well, there was something there. Or rather, several
things—but no fear, nothing that could possibly carry us off to
old Vienna. Now perhaps we can rest.

NOTES

1. *Language, Truth and Logic* (London: Gollancz, 1936; second edition, 1946).
Citations are to the second edition.
2. However, he gives an incorrect proof of it, overlooking that a conditional may
imply its own consequent. See my 'Ayer's First Empiricist Criterion of Meaning: Why
Does it Fail?' *Analysis* 48 (1988) 1-3.
3. Alonzo Church, review of the second edition of *Language, Truth and Logic*,
Journal of Symbolic Logic 14 (1949) 52-53.
4. For a history of the ups and downs in this project, see Section VII of Crispin
Wright, 'Scientific Realism, Observation and the Verification Principle', in *Fact,
Science and Morality: Essays on A.J. Ayer's Language, Truth and Logic*, ed. by
Graham Macdonald and Crispin Wright (Oxford: Blackwell, 1986).
5. I construe Ayer's 'entails' and 'deducible' to cover not only narrowly logical
entailment, but also deduction with the aid of analytic auxiliary premises. Thus 0 is

deducible from $0_1, \ldots$ iff the conditional 'If 0_1 & $\ldots$, then 0' is analytic. If 'entails' were given a narrowly logical sense it could turn out—and independently of the main collapse—that the conditional counts as directly verifiable although it is analytic, and that would be contrary to Ayer's intention.

Against this construal, we note that when Ayer goes on to indirect verifiability, he takes the trouble to make explicit provision for analytic auxilliary premises. If entailment with the aid of such premises is already covered, why bother? However, I think a construal on which Ayer said something superfluous is more charitable than one on which he allowed analytic statements to count as verifiable.

6. Maybe the Equivalence Principle is already built into Ayer's notion of a statement. That depends on how broad a notion of translation he has in mind when he says that 'any two sentences which are mutually translatable will be said to express the same statement.' (p. 8) Is equivalence an adequate standard of translation, or does Ayer mean to require something stronger?

7. Is it bad to count contradictions as 'verifiable'? No: whatever the target distinction may be that we are trying to capture, we would not expect it to apply to them in any intuitive way. Let their status be settled by stipulation, guided by convenience. Our settlement is the same one that follows immediately from Ayer's formulation. And if you doubt that '0 & not-0' does entail 0, bear in mind that we are not using the maligned rule *ex falso quodlibet;* we just drop the second conjunct.

8. That is, under truth-functional composition such as to yield a statement that is not analytic. Let this qualification be understood without saying henceforth.

9. It may be, for all I know, that the 'observation-statements' already are closed under truth-functional composition. If they are, of course this step will add nothing new. That will be so, for instance, if the observation-statements are the same thing as the 'statements entirely about observation' to be discussed shortly; whereas it will not be so if they are the statements that can be tested fairly quickly and decisively by observation.

10. Observation-statements themselves need no separate mention: they entail themselves. Entailers of entailers of observation-statements, or entailers of entailers of entailers of observation-statements, or $\ldots$, need no separate mention: entailment is transitive.

11. Could we assume even less and still prove the collapse? No. The empty class is closed under converse entailment and under truth-functional composition; so without just assuming the contrary, we cannot rule out the hypothesis that no statements are verifiable. The class of contradictory statements also is closed under converse entailment and under truth-functional composition (since we exclude composition that yields analytic statements); so without just assuming the contrary, we cannot rule out the hypothesis that exactly the contradictions are verifiable.

12. An interesting new idea for patching Ayer's criterion to avert collapse has been advanced by Crispin Wright (*op. cit.,* pp. 267-268). It invokes what I shall call *idiosyncratic entailment.*

Think of Ayer's 'statements' as sentences, so that it makes sense to speak of their syntactic constituent structure. Call X a *constituent of* a (one-premise) entailment iff X is a non-logical expression that occurs at least once in the premise. Say that substitution of Y for X *preserves* the entailment iff the result of uniformly substituting Y for X in the premise still entails the conclusion. Say that the entailment is *idiosyncratic to* X iff some substitution for X fails to preserve the entailment—the entailment works in virtue of some idiosyncrasy of X, and accordingly fails when we find a substituent for X that lacks the idiosyncrasy. Say that the entailment is *idiosyncratic* iff it is idiosyncratic to each of its constituents. (It is the opposite of a narrowly logical entailment, which is idiosyncratic to none of its constituents.)

When we prove the collapse of Ayer's criterion, there is nothing idiosyncratic about

it: it makes no difference whether we are admitting 'The Absolute is cruel' or 'The nothing noths' or what have you. So maybe we could stop the collapse by limiting the Entailment Principle to apply only to idiosyncratic entailment. This would be far simpler than most of the proposals to patch Ayer's criterion. Further, it would make intuitive sense—though maybe it would rest more on an intuitive conception of what counts as logical jiggery-pokery than on an intuitive conception of what counts as empirical. Try this:

> The verifiable statements are the class we get if we start with the observation-statements and we close both under converse *idiosyncratic* entailment and under truth-functional composition.

The proposal avoids collapse, sure enough, in a sufficiently impoverished language. For instance, take a sentential language in which all the atomic sentences are independent: then there are no idiosyncratic entailments, so the verifiable statements are exactly the truth-functional compounds of observation-statements. But in a sufficiently rich language, the limitation to idiosyncratic entailment accomplishes nothing. Take a language in which, for any P and Q, we have an atomic sentence S that does not occur in P or Q, and that is equivalent to 'P & Q'. Whatever language we start with, it has a definitional extension that provides such an S for every P-Q pair. (Not to worry that it takes infinitely many definitions—we could specify them all by a single schema.) Then if P entails Q, whether idiosyncratically or not, it follows that P idiosyncratically entails S and S idiosyncratically entails Q. (Idiosyncratic entailment is not transitive.) Closure under converse idiosyncratic entailment has the same effect as closure under converse entailment *simpliciter*, except that sometimes we need two steps instead of one. Collapse ensues. Even if 'The Absolute is cruel' is not admitted as verifiable in the langue we speak today, it will be admitted in the definitionally extended language we could, if we liked, speak tomorrow. Collapse brought on by definitional extension is no better than collapse straightway. The proposal fails.

(Might we say that the proposal applies only after we have replaced all defined terms by their *definientia* in primitive notation?—But a language does not come with its terms already labelled as 'primitive' or 'defined'. Then might we say that the proposal applies only after we have replaced all defin*able* terms by their *definientia*?—But if there are circles of interdefinability, that never can be accomplished.)

Wright's way of invoking idiosyncratic entailment is more complicated than the proposal just considered. But to the extent that the complications make a difference, their effect is to admit more, not less. They do nothing, therefore, to avert collapse brought on by definitional extension.

13. See my *On the Plurality of Worlds* (Oxford: Blackwell, 1986).

14. We get a circle here: two things are exact intrinsic duplicates iff they have exactly the same intrinsic properties; a property is intrinsic iff a statement that predicates that property of something (without introducing any extra descriptive content by its way of referring to that thing) is entirely about that thing. If you begin by accepting none of the notions on the circle, you should end still accepting none; the journey around the circle does not help you. But if you begin by accepting any, you should end by accepting all. And if you begin by half-accepting several, which I suppose to be the most likely case, then again I think you should end by accepting all. Here is one point among others where the present approach to delineating the empirical appeals to distinctions that an austere empiricist might well disdain.

I discuss the circle further in 'Extrinsic Properties,' *Philosophical Studies* 44 (1983) 197-200; and 'New Work for a Theory of Universals,' *Australasian Journal of Philosophy* 61 (1983) 343-377.

15. Suppose some unobvious, philosophically interesting supervenience thesis is true:

perhaps the thesis that the laws of nature supervene on the spatiotemporal arrangement of local qualities. It follows that any statement entirely about the laws of nature is also entirely about the arrangement of qualities. If someone who rejects the supervenience thesis thinks he is speaking entirely about the laws of nature, and not about the arrangement of qualities, he is mistaken. This will not appeal to those who want to distance supervenience from reductionism. For myself, I welcome it. (Here I am indebted to Peter Railton.)

16. This points up the artificiality of the identification. A relation is a set of pairs, a subset of a given set is part of that set; yet when M^+ is part of M in the sense of subset and set, we say that M is part of M^+ in the sense of less and more inclusive subject matter.

17. The theory in 'Events' in my *Philosophical Papers*, Volume II (Oxford: Oxford University Press, 1986) is one that does not.

18. At this point you would do best to forget any technical sense of the word 'situation'.

19. Here I am indebted to William Tolhurst and Terence Horgan.

20. A statement entirely about New Hampshire is entirely about New England and thereby, if New England is sufficiently close-knit and Maine is a large and important enough part of it, is partly about Maine. Nelson Goodman, in 'About', *Mind* 70 (1961) 1-24, raises this dilemma: 'Apparently we speak about Maine whenever we speak about anything contained in Maine, and whenever we speak about anything that contains Maine. But to accept this principle is to be saddled with the conclusion that anything is about Maine.' (p. 2) He concludes that our ordinary notions concerning aboutness 'are readily shown to be inconsistent.' (p. 1) I conclude that he should have distinguished entire from partial aboutness, and the present conception of the latter from others, and suitable from unsuitable subject matters.

21. If we imagine this distribution to be uniquely determined, we have made altogether too bold a conjecture. But let us suppose instead that we have a class of reasonable initial probability distributions, differing somewhat but not too much from one another; and that what follows is said relative to some arbitrary choice from that class. As usual, what is true on all ways of making the arbitrary choice is determinately true; what is false on all ways is determinately false; what is true on some and false on others is indeterminate.

22. See Brian Skyrms, *Pragmatics and Empiricism* (New Haven and London: Yale University Press, 1984) 14-19 and 111-119, for further discussion of evidential relevance to observation, understood in terms of probability, as a way of delineating the empirical.

23. See M.J. Cresswell, *Structured Meanings: The Semantics of Propositional Attitudes* (Cambridge, Massachusetts: M.I.T. Press, 1985); or the discussion of 'meanings' in my 'General Semantics', *Synthese* 22 (1970) 18-67.

24. Two treatments of hyperintensional and cumulative conceptions of aboutness, or 'relevance to a context', are Richard L. Epstein, 'Relatedness and Implication', *Philosophical Studies* 36 (1979) 137-173 (see especially 156-158); and B.J. Copeland, 'Horseshoe, Hook, and Relevance,' *Theoria* 50 (1984) 148-164. In both papers, however, the aboutness of atomic statements is left unanalysed.