Ontic Generation: Getting Everything from the Basics
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1 Naturalism what

Properly executed, metaphysics consists in part of painstaking ontological detail and in part of grand systematic speculation. The distinction between these two aspects is not new: it is inspired by Wolff's distinction between *metaphysica generalis sive ontologia* and *metaphysica specialis*, Husserl's distinction between formal and regional ontology, and finally D. C. Williams's distinction between analytic ontology and speculative cosmology.[1] The detail concerns the basic kinds of entity and the ways in which they are discerned, analysed, fitted together and wielded in explanation. In this, analytic philosophy excels, but it cannot take place in a speculative vacuum. The speculation concerns hypotheses for which evidence is partial and inadequate to ground them without demur or risk. The classic metaphysical positions of Platonism, Aristotelianism, Cartesian dualism, Leibnizian monism, and Hegelian idealism all unabashedly adopt such metaphysical speculations. Analytic philosophers have tried generally to steer away from grand speculation because it got a bad name with Hegel and because it tends to undermine their self-sought credentials as "scientific". The upshot has been that their cosmological positions have been largely tacit or shamefaced: commonsense ordinary-language Moorean realism, Carnapian disavowal, Wittgensteinian quietism. But several significant twentieth century philosophers have been unafraid to speculate: Alexander, Whitehead, Quine and Lewis being examples. In my view it is part of a metaphysician's—nay any philosopher's—responsibility, to articulate the speculative hypothetical framework with which his or her detailed work takes its place.[2]

I do not shrink from this responsibility, I welcome it. So here is my first grand speculative hypothesis: for better or worse, I call it *naturalism*. It consists in the view that nothing, no thing, that exists, is outwith the single spatio-temporal-causal framework within which we have our place and with which we uphold our everyday commerce. This separates

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1. This second terminological distinction comes from Williams 1953, 3. It is no accident that Williams studied and was influenced by Husserl.
2. When philosophers shrink from this responsibility, the vacuum is willingly filled by others.

into two partial hypotheses. *Energism* holds that everything is capable of playing a role in causation. *Localism* holds that all is spatiotemporal. The two go together if it is assumed, as I think is correct, that causation and spacetime are intrinsically interwoven. This being a framework hypothesis, I neither seek nor attempt here to defend it in detail. I think it can be defended, but that is a matter for elsewhere. Of course naturalism is neither new nor original, nor untested: presaged by Greeks including Epicurus, its arch-defender was Hume. Its many prominent modern adherents include Armstrong, Bunge, Dawkins, and Dennett.

The primary evidence for naturalism comes from the ongoing success of the natural sciences. More and more phenomena prove themselves amenable to explanation through the natural sciences, from physics to geology to evolution to genetics to neuroscience. I regard this inductive and progressing success as a bald and uncontestable historical fact. Nevertheless I distinguish naturalism, as an ontological hypothesis about what there is, from physicalism, as a methodological or linguistic hypothesis about what kind of language is suitable to articulate our knowledge. Physicalism, as I understand it here, is the view that the apt vocabulary for adequately describing the world may be drawn exclusively from physics: if not today's physics, then a better or perhaps a completed physics. I regard physicalism in this sense as a cosmologically incompletable and hopeless position. Firstly, the vocabulary of physics is by design partial, intended to serve solely the science of physics, with its focus on basic forces and forms of energetic interaction, and not the manifold other disciplines of natural, biological, social, cultural and mathematical science, nor the myriad items and concerns of everyday life, from the price of bread or lack of confidence in the stock-market to trends in the performance of Baroque music. Secondly, although according to my version of naturalism everything is touched positively by the vocabulary and theory of physics, that does not mean everything true can be stated in terms of that vocabulary. This entails me taking a particular position with regard to physicalist reductionism, of which more below.

The consequences of adopting naturalism as a framework hypothesis are not anodyne: they are radical and far-reaching. If naturalism is correct, then a host of variously popular metaphysical positions are ruled out: these include Platonism, the view that there are abstract or ideal entities which are acausal and alocal; psychophysical dualism, according to which there are souls or states of consciousness which are not also inherently physical and spatial; and theism, according to which there is an eternal deity outside space and time but nevertheless affecting it. Briefly and provocatively, naturalism enjoins a "no magic" position,

according to which there are no spooky entities having spooky relationships to ordinary real entities. Having thus alienated the sympathies of a good proportion of my readership, I press on undaunted.

2 Ontic grounding

The second speculative hypothesis concerns what I call ontic grounding. It consist in the belief that there are entities which are ontically basic, and that everything else that exists is ultimately a combination of ontically basic entities, according to basic modes of combination (which are therefore themselves also basic). This rules out an infinite descending sequence of ever more basic entities. As with naturalism, this hypothesis goes well beyond the evidence, and is upheld according to the principle of inference to the best explanation. Massive inductive evidence for it is supplied by the continuing success of the sciences in accounting for the behaviour of many things, from quarks to organisms to stars. Ontic grounding would be wrong if the world consisted of at least some things which consisted of different types of things which consisted of different types of things and so on ad infinitum down. So it's a speculative hypothesis but not unreasonable.

Between them, naturalism and ontic grounding provide reasons to be a certain kind of reductionist, but what kind of reductionism they support is something that will take me a little while to explain. In a sense what I am trying to do is to outline a general ontological framework within which everyday scientific reduction can be at home.

The two principal rivals to or enemies of monistic naturalism are various dualisms or other pluralisms on the one hand, and emergence on the other. But only certain kinds of emergence. I do not rule out explanatory, *epistemic* emergence. On the contrary, it is to be expected. Explanations at different levels of scale and granularity, for example neurophysiological and evolutionary-behavioural explanations of animal behaviour, will be different in kind, so we should not expect meso- and macroscopic phenomena to be described or explained solely in terms of the language describing their contitutive parts and their characteristic operations. The kind of emergence that naturalism cannot accept is *ontic* emergence, the appearance of radically new types of entity. Ontic emergence is its own kind of magic, dosed magic with preconditions, perhaps requiring supervenience, perhaps not, but magic nonetheless. Even so prominent and indeed notorious an emergentist as Samuel

Alexander appears at one point to reject ontic emergence. Here is what Alexander says in a sub-section of *Space, Time and Deity* entitled "Identity of Mental with its Neural Process":

> Correlation is . . . an inadequate and misleading word to describe the relation of the mental to the corresponding neural process […] In truth, according to our conception, they are not two but one.[3]

This is in truth the very first Australian identity theory, though of course by the time he wrote *STD* Alexander had been in England for many years.

All the money in the rejection of ontic emergence is on what it means to be radically new, and that is where the notion of ontic generation comes in. So let's put a bit more detail into the various ideas of emergence.

3 Emergence, varieties of[4]

An emergent entity E is one which is in some way "new" or "surprising" with respect to a (comprehensive)[5] basis of other entities B. Now 'surprising' is an epistemic category, so one way of thinking of emergence is with respect to our knowledge. An entity E is *epistemically* emergent with respect to a basis B if no knowledge of B and their principles of combination and operation is sufficient to explain or predict E. This can be further refined. If the knowledge with respect to which E is surprising is the knowledge we *actually* have, then this is *weak* epistemic emergence. It may turn simply on contingent or factical gaps in our knowledge. This is not a particularly theoretically interesting concept because our ignorance may turn on contingent matters unconnected with the nature of the entity E, for example lack of funding for research. If E is still inexplicable or unpredictable with regard to knowledge we *could* have in respect of B, then we have *strong* epistemic emergence. Strong epistemic

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3.   Alexander 1920, p. 5. Alexander is a slippery customer however: there are other passsages where he does appear to accept metaphysically novel emergent properties. Small wonder that his stance on emergence remains controversial.

4.   Emergence is a vague and equivocal notion: it has many variants, a complex history, and has proven difficult to formulate clearly. On the history and variations, see O'Connor and Wong 2009. For my own attempt to get a foothold in this slippery terrain see Simons 2008.

5.   On why the basis needs to be comprehensive, see the following section.

emergence is a much more theoretically interesting condition than weak, because it does not turn on what knowledge we as a matter of fact have but on what knowledge we could have of a given domain, whether we have it or not.

The alternative description of an emergent entity as "new" hints at another way of defining emergence. We say an entity E is *ontically* emergent with respect to entities B if E does not naturally arise out of the entities B themselves. By this we mean that whatever operations and forms of combination entities B sustain are themselves fail to give rise to E. Again we can distinguish a weak, factical concept, according to which E as matter of fact fails to arise out of B, and a strong concept according to which E not only does not but *cannot* arise from B. Again, clearly only the modally strengthened concept is of central theoretical interest. So from now on when we speak of epistemic or ontic emergence we shall mean in each case the strong concept only. It is important that the idea of ontic emergence is in no way tied to matters of knowledge: it has to do with how the entities themselves comport and consort. This is important because ontic emergence and (strong) epistemic emergence are frequently run together. Whether the concepts turn out to be coextensional or not, which is another matter, they are not cointensional. The assumption that ontic and epistemic emergence (or their opposites, reducibility) coincide is based on an assumption which I question and indeed believe is wrong, namely the assumption of a thoroughgoing harmony between the way our knowledge works and the way the world works. If we think for a moment that the world's ways might be in some respect inherently inscrutable to us, then we have slipped a blade between ontic and epistemic emergence, because entities might for all we do or could know be emergent, but as a matter of fact arise naturally from their base in ways we cannot fathom or track.

4 Generation

Our characterization of "arising naturally" is imprecise and needs more work. Pushing the difficulties back but only one step, I say that an entity arises naturally from others if it is generated (constituted) from entities from B via combinations and operations characteristic of B, where by 'combinations' I mean the relations that naturally obtain among B, that belong naturally to the ontological repertoire of B; and by 'operations' I mean the characteristic modes of (inter)acting that occur naturally among entities B. In short I will say that an entitiy

E so constituted is (naturally) *generated* from or out of B. I am very conscious that this alleviates the terminological and conceptual fog only a little, though I find the switch from negative talk of irreducibility to positive talk of generation useful, and the articulation of generation into relational and operational components also worth making. Nevertheless it may be that generation is something that cannot be fully explained or defined by anything more simple: we run that risk.

A brief word is in order on the qualification 'naturally' above. It is again probably a slippery concept, but here is the idea. If we consider William Paley's famous thought-experiment of a watch found on a beach, most people would accept the idea that a watch is simply not the sort of thing that could have arisen naturally among the minerals of an inorganic planet acting among themselves according to natural processes. Pebbles, rivers, mountains, lakes, are so conceivable, but not a pocket-watch. That indeed is part of the point of Paley's example. It takes an extrinsic agency, that of human designers and craftspeople, to produce the watch. The watch is not a natural but an artificial, i.e. intentionally designed and made, object. However, there is another, post-Darwinian sense, in which the watch indeed is natural. Though still designed and made by human agency, on a naturalistic interpretation of the origins and characteristics of humankind, such abilities have arisen naturally, spontaneously, yet over a long time and with extreme complexity, through the process of evolution by natural selection. The natural processes by which the watch arose involve a massive detour away from metallic and silicate minerals through animal consciousness and the rise of technology. It is the length and complexity of that detour which lends credence to the reasonable but not unbreachable distinction between natural objects and artificial ones. A theist who considered human consciousness and the ability to make artifacts like the watch a divine gift rather than something which could have arisen spontaneously in mere matter goes a crucial step further in denying naturalness to the watch than our Darwinian.

Returning summarily to the idea of ontic emergence: an entity E is ontically emergent with respect to a basis B if it could not be or have been generated from B. On the basis of our definition, there will be cases of emergence that arise trivially or as side-effects of an inappropriate or merely idiosyncratically chosen basis B. Life is emergent with respect to non-metals, because life-chemistry requires some metallic elements, but no one would say this is an important form of emergence, interesting though it is that organisms are mainly non-metallic in composition, since metals and non-metals jointly go to make up the inorganic

basis of life. When considering emergence we will and should always consider the most comprehensive basis, and that is the point of the qualification at the beginning of the previous section.

5 Mereology: an impoverished basis

One of the most common statements made about emergence and reduction is that an entity E is reducible to entities B if it is composed solely of entities from B. The idea is that if an entity E with parts from B is "more than the sum of its parts" then it must be emergent with respect to B. The near-ubiquity of such mereological interpretations of emergence may best be explained by recalling how successful micro-reductive explanations have been in the last centuries. So many explanations of the observable features of macroscopic things, like the way ice floats on water or the way rain and sun produce rainbows, turn on accounts of the behaviour of the small parts of material things, that it is natural to think that where such an explanation is not forthcoming, we are confronting an emergent phenomenon. Indeed the idea of something's being other than the sum of its parts has sometimes been taken to *define* the concept of emergence. This leads to some strange consequences however, and makes the concept of emergence too wide in certain cases. For example, a travelling water wave is a macroscopic phenomenon constituted by the many concerted small circular motions of successions of ensembles of water molecules. It has features which the molecules and their motions do not have: an amplitude, a wavelength, endurance through time, a propagational velocity, the ability to travel long distances. But a wave is clearly generated by the motions of the water molecules. The weight of a complex body is readily construed as the sum of the weights of its (mereologically disjoint) small parts, whereas the body's shape arises from the distribution of these parts, which is not a sum in any straightforward sense, yet is clearly a property explicable in terms of the properties of and relations (in this case spatial) among the small parts.

More often the idea has been fleshed out to say that an entity E made of parts B is emergent if some features or behaviour of the whole E are untraceable to, unpredictable, or *inexplicable* in terms solely of the relationships among and behaviour of the parts B. In this regard, while a wave has novel characteristics by comparison with the water molecules whose motion constitute it, the water, its parts and their motions clearly do suffice to explain

the wave's features, this novelty notwithstanding. However the notions of predictability and explicability are clearly epistemic ones: how things in themselves are, which would be evident to a divine observer, may not be accessible via prediction or explanation even in principle to a finitely endowed observer. If some features of composite individuals or systems are too complicatedly dependent on the behaviour of their parts to be predictable or explicable, that does not mean they cannot arise naturally.

From an ontological point of view, a solely mereological approach to emergence and reduction is simply too narrow: it lets far too much count as emergent. If an emergent complex whole is one which is not merely the sum of its parts, then understanding the term 'sum' in its purely mereological sense means that arguably very few natural wholes are sums in this sense, which would mean that nearly all wholes are emergent.[6] The need for a less restricted notion of a generated or reducible hole is recognized in the move from merely novel features of wholes to inexplicable novel features. This epistemic addition broadens the effect of a basis, but not with ontic means alone. For a sensible ontic characterization of emergence, we need additional help from elsewhere.

6 What more is available

The example of the shape of a macroscopic body used earlier indicates one area in which we need more ontological resources: we need to invoke the conceptual scheme of location, in space, time, spacetime, or indeed more generally at a "place" in a structure (for example at a certain position in a crystal or in a DNA molecule). The notion of being located at, and its terms, occupant and locus, are a very general, indeed in my view a *formal* ontological notion, on a par with part/whole, applicable *partout* in a domain-neutral way.[7] The extended family of concepts associated with location, including the broadly geometric notions of relative location and relations among locations, add to the ontological resources we need in any case to use in talking about objects and their features and relationships, so let us add them to the repertoire of descriptors for objects alongside mereological concepts.

Taking the cue from the two previous examples, when we find a family of interrelated

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6.   Cf. Simons 2006.
7.   Simons 2004.

ontological concepts which we either know or surmise to be domain-neutral and further consider indispensable to ontology at large, then we should add them to our basis forthwith. Another obvious example concerns the plurality and numbers of items. Systems consist not of one but of several or many objects, consorting together. We can and must use the idea of a natural plurality or collection of things in addition to that of a single individual. This is not a controversial addition, since number is often taken as a logical concept and so already part of the logical background which we can always bring to bear on our ontological descriptions. Whether difference, identity, plurality, collection, number, sevenness, infinite, and many other cognate concepts are ultimately logical or ontological or indeed both is perhaps not as easy to decide as might at first appear, but it matters little if we assume we can have them in our descriptive repertoire.

Another family of concepts which are more unambiguously ontological this time are those concerning the notions of ontological dependence and independence. This family has been recognised and exploited in ontology since its inception: we find them in Aristotle, the Scholastics, Descartes, Leibniz, Husserl, Ingarden and others. At one time it seemed to me that dependence of various kinds could be defined in modal terms, but it now seems that Fine, Lowe and Correia are correct in taking dependence and cognates to be a family not definable in terms of other formal concepts.[8] Whether that it right or not is again not so important as the decision to add them to our basis.

Many of the data that scientists use to explain natural phenomena are quantitative in form: they concern such things as mass, electromagnetic charge, velocity, distance, angle, luminosity, temperature, energy, density, and the like. These many kinds of physical quantity are discovered empirically and their comparisons and measurement are part of the job of empirical science, but again behind them are a family of formal structures, which render the various such quantities apt for representation through mathematical number systems. These structures vary in detail from case to case, but they have a common formal core which makes them all quantities. The family of concepts going to describe quantiy in general is arguably not reducible to anything else we have considered, so for ontological completeness we should add them to the basis.

We have left out so far the concept or conceptual family most frequently invoked in

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8.   Fine 1995, Lowe 2005, Correia 2005.

connection with arguments pro and contra reduction in many a given sphere, and that is causality. Sometimes indeed emergence is characterized simply in terms of what is called downwards causation. An entity is emergent if it *qua* whole can cause changes in its parts, that are not changes caused by other parts. This assumes that we can talk about different levels of entity, and that higher-level entities which in their own right (not via their parts) influence lower-level entities do so via downwards causation as distinct from lateral causation. I must confess I have persistently been unable to make clear sense of this notion of downwards causation, so I shall not make it part of my definition of emergence. Be that as it may, causation is certainly in view in most cases when the talk is of explanation for the behaviour of objects and systems in respect to the behaviour of their parts. So without causation in our ontological repertoire, we shall definitely be working with too impoverished a basis in which to assess questions of what generates what. The energy transmitted by a water wave, for example, is explained in terms of the kinetic energy of many water molecules moving in concerted ways being transmitted in the direction of wave propagation, as molecule tugs and pushes at molecule.

I am here assuming that causation is something that applies to the real world, and not a conceptual convenience or merely methodological principle. That is of course not a neutral position, but there is no space to argue for it here. At its most blunt and basic, causation is about some things' happening making other things to happen. This much is mere common sense, though there is subtlety to the notion of "making", exposed by Hume, which I acknowledge only to duck. It is a more delicate question as to whether causation is part of formal or material ontology. I happen to think it is formal, and is actually slightly more general as such than the simple billiard-ball event-causation idea just alluded to. The more general notion, of which causing is a prime but not the only instance, is that of determining: one thing's being like this determining or ensuring that another thing is like that. There might pehaps be determination which is not causal, for example a spontaneous (uncaused) event of nuclear fission determines the extinction of a material possibility of the nucleus continuing to exist. Determining is what gives time its asymmetry: the present at any location is the boundary or limit of indetermination. So with determination (causation) and location we generate the distinction between local past and local present, though what material principles govern this is not a matter for ontology but for empirical investigation. The ontologist should not overstep her remit. Another putative case of determination which fails to fit the event-

causation model is the way in which a planet orbits the sun, because the continuous change of direction and the continuous change of line of application of gravitational attraction go together. Russell pointed this out long ago, and notoriously concluded that the notion of causation was as outmoded as the monarchy, and should be replaced by that of functional correlation.[9] But the less sceptical and I believe correct conclusion is that this is a case of continuous determination.

7 A more adequate basis

Let us review the formal ontological concept-families that we have introduced into the basis for description of entities. We have for a start the part/whole family, as studied in mereology. In addition there are the concepts associated with number and its cognates, location and its cognates, quantity and its cognates, dependence and its cognates, and determination and its cognates. These various families are investigable separately but in any actual instance they apply together, since formal ontological concepts are domain-neutral, go-anywhere concepts. Perhaps there are other families, perhaps not. It would be good to have a definitive list but for the pruposes of making my point it is not necessary. The first point to make is that when mereology is enriched by all these other families, the formal mechanisms for describing combinations and operations are multiplied manyfold, which has the effect that ontic generation appears capable of generating a much wider range of entities from a given basis. Ontic emergence becomes as it were more expensive, and also more dramatic. The second point is that these formal families provide only the formal ontological framework for reductionistic or generational accounts of complex phenomena. Any actual object or phenomenon to be examined falls not only under formal but also under material or substantive concepts: it has to do with real taxa of things such as electrons, water, planets, nuclear fusion, pyroclastic flow, osmosis, cell membranes, meiosis, demographics, wars, or whatever. Without an adequate supply of material taxa, the provision of which is no part of the ontologist's job, description and therefore explanation of real phenomena cannot get started. This may seem obvious but it is important not to lose sight of it in the drive to give a formal accountof what is involved in emergence or generation.

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9. Russell 1913.

Finally, ontological concepts and material taxa are not enough for our descriptive and scientific needs. We need a range of logical, mathematical and perhaps other concepts to enable us to carry through our scientific tasks, from negation, quantification and modalization in logic through differentiation and integration in mathematics to probabilistic and statistical concepts in applications. In describing matters of experience, society and culture we are perhaps forced to rely on phenomenological, folk-psychological and semantical concepts. We typically rely throughout science on abstractions, idealizations and simplifying models. Yet although these concepts are humanly necessary for us to pursue our cognitive and scientific goals, it does not follow that they enrich the ontological basis, nor that they point to irreducible phenomena or realms of entities outside the naturalistic domain. Mathematics, modality, mind, and morality have often been considered to provide the hardest tests for naturalism. That naturalism should be able to withstand these tests is part of our initial metaphysical speculation.

8 Subsidiary speculation

On the basis of a widened repertoire of formal ontological tools with which to categorize and describe the relationships among entities, the naturalistic speculative claim is that there are material taxa of entities which are securely naturalistic, the combinations and operations of which generate all we experience, including life, mind and culture, including the phenomenal as well as the physical. There is no ontological magic, whether it be the global magic of a pluralism of realms, at least one of which is not naturalistic, nor the local magic of carefully prepared emergence of new naturalistically ingenerable, irreducible kinds of entity. This lack of ontic emergence from natural kinds is perfectly compatible with and indeed tends to call for a richly epistemic emergence of inexplicably and unpredictably novel entities. Ontic generation may be graspable in its simplest forms, but it is almost certainly humanly inscrutable in all its gory detail.

9 Two kinds of categories

I accept with Kant that for knowledge to be humanly possible we must deploy a range of basic concepts that we cannot do without. Unlike Kant but like Aristotle, I consider that some

of these concepts are classificatory of reality as it is in itself, they "cut nature at the joints". Call such basic concepts *ontic categories.* They include the formal concepts of part, number, location, determination etc. mentioned above. That a certain aggregate of matter that we call the earth's crust is part of the earth is a fact expressed using the formal concept of part, but its truth depends on there being an objective material difference between the crust and other parts which enables us to differentiate it from cases of arbitrary or gerrymandered "parts" such as Switzerland. The ontic categories—whichever ones they are—make up the ontologist's basic tools for analysing or assaying putatively emergent entities. If an entity E cannot be plausibly taken to be generated from some basic entities B by their characteristic modes of combination and operation, analysed employing B and the ontic categories, then we have two choices: deny that E exists, or accept that it exists but is irreducible to B, whether it is emergent with respect to B or primitive.

Among his categories Kant reckoned not just ontic concepts like substance or causation but also such logical constants as negation, universality, implication and necessity. We would be cognitively deeply impaired without the ability to deploy these. But that does not mean there are negative, universal, conditional or modal facts in addition to simple or atomic facts. Wittgenstein was right: the logical constants do not represent anything. Their use however significantly *assists* us in our cognitive endeavours. For that reason I call such concepts *auxiliary* categories. In addition to employing logical auxiliaries, our minds busily fabricate cognitive tokens which do not stand for objects, but which we manipulate as if they do. We could call them cognitive fictions. Some such fictions are generated by recurrent and seemingly natural types of cognitive operation. For example, as Locke pointed out, all humans naturally abstract. They do so under salient equivalence relations, some so self-evident we don't even notice them, for example we abstract out under manifold changes and unperceived ongoing constitutive processes the invariant continuants which we call physical bodies. In treating the cognitive tokens (terms and concepts) thereby deployed as standing for their own entities humans *hypostatize.* Hypostatization may well be a human cognitive invariant. One familiar and exchaustively investigated form of abstraction is that of cardinal number: under the equivalence relation of equinumerosity we abstract out the cardinals. But weights, heights, lengths, angles, masses, incomes, are all abstracta with a more or less obvious base of concreta and a simple equivalence relation. More complex cases may be found in geometry, where we abstract over four-, six- and eight-place relations having

analogous logical properties to two-place equivalence relations. Some hypostatizations are either so outrageous or so obviously deliberate that they generate controversy from the moment they are publicised: Meinong's nonexistent objects and Lewis's possible worlds both arouse widespread disbelief. Other cognitive operations are so familiar they pass notice: predication and judgement for example. Yet the assumption that they somehow correspond to items in the world—attributes (properties and relations), and propositions respectively—is one which is not and can not be unquestioned. Deciding which cognitive operations correspond to entities and which do not is obviously a significant part of the metaphysical enterprise.

The utility of auxiliary categories is undeniable, but they do not contribute to the world's store of entities. It is ontic categories alone that structure ontology and provide the framework for the systematic variety of things. Only they can figure in the argument whether or not an entity E is generated by entities B.

10 Remarks on metaphysical method

Metaphysical hypotheses are, I claim, not irrefutable stances. They are no more immune from refutation by counterexample than normal scientific hypotheses. A counterexample to our naturalistic reductionism is perfectly imaginable, indeed for all I know is sitting out there and recognized by those less wedded to naturalism than I am. It is common to cite mind and consciousness as the most likey recalcitrant phenomena troubling a naturalistic standpoint. Aside from the fact that we are probably decades if not centuries away from gaining enough knowledge to hazard a good guess as to whether this is true, my own view is that mind and consciousness will probably tumble to naturalistic reduction, provided we or our successors live long enough. A more worrying potential counterexample I think comes from mathematics, which may (epistemically may) turn out to be seriously irreducible by any plausible account, so that one would have to live with a form of platonism. That I think is less worrying than psychophysical dualism. The steps to a naturalistic account of mind are well under way; a deflationary account of the apparent indendence of abstract mathematica stands on much shakier ground. It would be deeply disturbing to the thrust of the centuries of progress in natural science if dualism were correct, whereas platonism by its nature stands more aloof from the march of science. Either way, even the broadest and most reasonable-

seeming metaphysical speculations are prone to abandonment under the weight of evidence, and that goes for naturalism too. So when Franz Brentano proposed among his *Habilitation* theses that the true philosophic method is no different from that of natural science,[10] he was proposing a truth.

In the days when metaphysics was being rehabilitated after the passing of positivism, it was standard in analytical philosophy to pursue metaphysics and ontology by a logico-linguistic method, whether cleaving more closely to ordinary language or to the sanitized language of formalized science. The problem with this approach is that there is slack between linguistic and ontological facts which is taken up by semantics, and it turns out that semantics is pliable enough to bend with the varying ontologies pairable with a single syntax. Quantifying predicate variables only ontologically commits one to properties or sets if quantification is interpreted in a certain way, for example. Metaphysical facts cannot be dependent on such vagaries. A more autonomous, naturalistic approach characterizes later analytic metaphysics in for example Armstrong and Lewis, but has its genealogical antecedents in Anderson, Alexander and Whitehead. This of course has its risks: uncoupled from logico-linguistic constraints, metaphysics can and indeed recently often has become more fanciful and extreme, with such positions as genuine modal realism, presentism, subjective idealism, panpsychism and Parmenidean monism being reintroduced as respectable options. Finding the right balance between Moorean descriptive fidelity and plausible speculative boldness is not easy, but it has to be ventured.

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10.   Brentano's fourth habilitation thesis ran: "Vera philosophiae methodus nulla alia nisi scientiae naturalis est." Brentano 1929, 137.

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