Rudolf Carnap's *The Logical Structure of the World*

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Philosophy is facing a serious crisis, but no one cares. When German Idealism, Existentialism, and Marxism allied with Sociology, Psychoanalysis, Cultural History, and Literature Studies in the early 20th century, all attempts at conducting philosophy in a style similar to that of the scientists got expelled from the High Church of Philosophy. The creation of the Wykeham Professorship in Hermeneutics (formerly: Logic) at Oxford and the Stanford Chair of Textual Non-Presence (formerly: Methodology of Science) are well-known indicators of these, by now, historical developments. The best philosophical work since then is to be found in the history of philosophy—if one is lucky. One cannot help but wondering what turn philosophy would have taken if someone had picked up the revolutionary developments in logic and mathematics in the 1920s and directed them towards philosophy. Maybe there would still be logic courses in philosophy departments? Who knows?

Recently a monograph has appeared which seems to ignore the respiratory epicycles of this modern philosophical slumber completely (and rightly so). Rudolf Carnap, a young German philosopher who is working at the University of Vienna, has the chutzpah to conceive a *logischer Aufbau der Welt*—a logical structure of the world—as if nothing had happened in philosophy in the last 80 years or so. Well, not much has happened indeed. If only a book like that had been published back then!

Carnap's main aim is to argue for the following thesis: give him any meaningful sentence from natural language or science; then this sentence can be reformulated in a precisely delineated conceptual framework of primitive expressions, exact definitions, and logical and mathematical rules. In fact, there are several possible choices for such frameworks, each one serving a different purpose, but what all of them have in common is that the hidden logical structure of the original sentence will become completely transparent through reformulation. That the target sentence is required to be nothing than a much more precise restatement of the original sentence means that both sentences ought to have the same truth conditions, by the laws of nature and by linguistic convention. Accordingly, each concept from natural language or science will have to be reconstructed in terms of a formally purified concept that has necessarily the same extension as its informal counterpart. This type of translation is possible, or so the thesis says, but it needs the application of logical and mathematical methods as the ones developed by Frege and Russell a long time ago. Of course, these authors have been forgotten by philosophers long since, but in light of Carnap's book I urge people to reconsider their work: it is worth the effort, even though it means doing the unthinkable, that is, to learn some mathematics before one can philosophize.

How does Carnap argue for his revolutionary claim? By concrete example. He erects a particular conceptual system and sketches how both common sense statements and scientific hypotheses may be reformulated within it. The conceptual system he chooses for the sake of demonstration is one that takes elementary first-person descriptions of immediate sense experience as its starting point: merely on the basis of logical concepts, mathematical concepts, and a binary concept of recollected resemblance between total experiences at a time, Carnap wants to express statements about sensory qualities, subjective temporal

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order, space-time locations, material bodies, electrons, the mental life of other people, social groups, and cultural values. *Hang on a second* I hear you say—*this just won't work*. Unfortunately, taken strictly, you are right: there are indeed a couple of glitches in Carnap's book. Though my guess is: nothing that cannot be repaired.

First of all, with a conceptual system at hands that only allows for reference to sense experience, the intended reconstruction cannot actually preserve truth values or extensions necessarily; not even the laws of nature or linguistic convention are able to tie the truth conditions of sentences about electrons to the truth conditions of sentences about colour spots in one's visual field as firmly as would be required to accomplish Carnap's objective. However, something close by might still work: maybe it is possible to apply Carnap's translation manual while preserving all the *experienceable differences* that the truth of a sentence about electrons would make and that are noticeable as such by a subject. If so, this would be very close to saying that the meaning of the original sentence and the meaning of Carnap's reformulation of it would be indistinguishable with respect to everything that is epistemically accessible to the experiencing subject (neglecting emotions, aesthetic evaluations, and the like). And maybe whatever gets lost over and above *that* should not count as significant loss anyway: has not Kant taught us that nothing good ever comes from trying to transcend one's own epistemic boundaries? By the way: Carnap's reason for exemplifying his thesis by means of such a conceptual system is not because he thinks that a subject's descriptions of its own experience are *certain*: the actual reason is that, at the end of the day, conscious experience is *all the subject has*; every justification of an *a posteriori* claim must pass through it. Nor is it necessary to assume that the subject's experience is "raw", that is, unaffected by reason; it is simply whatever the subject is aware of going on in its mind. That is why it is an interesting example to consider. (For other purposes, a conceptual system with intersubjectively accessible concepts and individuals would be more appropriate, as Carnap notes.)

Anyway. Say, Carnap's demands on his reformulation procedure are adjusted as explained. Then still some other corrections are due. For example: When he constructs the initial stages of his reformulation scheme, Carnap takes up Frege's and Russell's method of abstracting equivalence classes from equivalence relations and generalizes it ingeniously to the empirically more plausible case of abstractions from mere similarity relations, that is, reflexive and symmetric relations. (Look up these notions in your university's mathematics library; obviously, you will not find them in philosophy books these days.) However, as one can show, already in certain simple cases Carnap's method of abstraction does not yield the intended results,

and indeed Carnap is aware of this. It would be a cheap move to criticize Carnap's project just in the face of a couple of overly simplified counterexamples which have nothing to do whatsoever with Carnap's intended application of the method to a realistic similarity relation on real experiences; no serious philosopher would dare to formulate this as an argument against it. (If philosophers still dealt with such topics, I mean.) But unfortunately one can prove by mathematical means that Carnap's method does not even work if the subject in question has sense experiences as rich and varied as anyone else's. Still no reason for losing heart: It was brave of Carnap to opt for a conceptual basis as meagre and economical as one consisting solely of *recollected resemblance*, yet there is no actual need for doing so; choose a more expressive repertoire of concepts relating not just to Carnap's overall experiences at a time but also to parts and aspects thereof, and it may well become possible to describe the structure of one's inner qualitative world in every formal detail, as is necessary for Carnap's project. (Another problem concerning Carnap's definition of dimension for subjective quality spaces can be solved in a similar manner.)

So assume these minor difficulties have been sorted out. Next one would have to rectify Carnap's suggestion of how to take the first conceptual step into the physical world. His thought is this: we know already how to reformulate statements such as 'There is a red spot in the left part of my visual field'. But ultimately we also want to reconstruct sentences such as 'There is something red to my left' as referring to a position in *spacetime*. As a first approximation, the constraint that this latter sentence imposes on my sense experience is something like: I have taken some location in spacetime; I have distributed my subjective colour spots over positions in the mathematical structure of spacetime in such a way that from my point of view I should experience (according to simple laws of geometric optics) precisely what I do experience; my hypothetical location and my assignment of colour spots are not overly bizarre and complicated; according to this location of mine and this colour assignment, *there is a red colour spot to the left*. This means Carnap actually formulates a little theory for the assignment of subjective colour experiences to points of spacetime and uses the concept of colour assignment (and that of "my location") to which this theory applies in order to reconstruct statements about colours in the physical world. That is a great idea. The only crux is: it seems for this reconstruction he needs the new concepts of location and colour assignment which have not been part of the original conceptual system and which might go beyond concepts that apply to immediate experience. That is: he does not have a method by which he could eliminate terms such as 'my location' or 'colour assignment' in favour of the given primitive terms, and a clever guy such

as Carnap should have noticed that. But again he is lucky: a long time ago, another completely forgotten philosopher named Ramsey proposed to simply quantify away such theoretical terms existentially (in fact, Carnap uses a method like that himself in his Sect. 155, but for the wrong purposes). Hence the reconstruction becomes: *there is something* (a location of mine and a colour assignment), such that…holds of it (including some laws from optics) and according to it *there is a red colour spot to the left*. Now logical concepts, mathematical concepts, and concepts for immediate experience are left, and still—as one can prove—the truth of this sentence makes the same difference to the subject's sense experience as Carnap's original less-than-perfect reconstruction. One might complain that such reformulations would thus need to incorporate chunks of scientific theory, even though these chunks would become existentially generalized; but why should this be a problem? Is not it plausible to assume that the more complex a statement is, the more complex (and "holistic") the constraint will be that it imposes on what we experience? And should it worry us that if a subject had understood colour assignments to be given by a different theory—some alternative optics, say—then the reformulation rules would have been different ones, too? Not at all. Different theory, different concept, different reformulation, that is it. This also applies if, let us suppose, it turns out that there are different concepts of colour assignment of different complexity in natural language and science: colour assignment based on one's own colour experience (as above), colour assignment based on one's own *and on other persons' experience reports*, colour assignment based on one's own experience and on other persons' experience reports *as well as on Newton's Optics*, and so forth. Reconstruct them one after the other, presumably, by using the reconstructions of concepts with lesser complexity as a means of reformulating the concepts with the next higher complexity.

This is still not quite the end of the story. If we helped Carnap to get that far, he should be able to demonstrate the truth of his thesis—within the boundaries of the conceptual system that he has chosen—for a large fragment of sentences and concepts, from much of everyday language to the language of Newtonian physics. But inevitably there will come a point when one wants to state reformulations of sentences that go beyond even these limits, such as 'This object is magnetic' or 'The chance for this atom to decay within the hour is so and so'. What is special about these sentences is that they express objective possibilities even when these possibilities never get actualized: the possibility of a computer losing data if moved close to the magnetic object, the possibility of an atom decaying within the hour, and so on. How could we reformulate such statements as statements about actual sense experience if maybe no computer ever gets close enough to the magnet and if the atom in fact does not decay within the hour? One option would be to allow the primitive concepts in our conceptual systems to apply to *possible* sense experience; experience a subject might have but maybe has not. Or one finds ways of taking 'magnetic' and 'chance' to be given to a subject by just more theory and one applies methods similar to the ones above. Or both. In any case, I have informed the author about these concerns, and he has promised me to work on them. (He said he had some vague ideas on what he calls the reduction of disposition terms, modal semantics, and inductive logic; but we will see.)

In any case, it is highly laudable that the precision and clarity with which this monograph is written makes it so easy to detect its flaws; and there is no reason to believe that after the necessary corrections the project could not be carried out successfully. But even if it failed, the method on which it is based is still groundbreaking and forward-looking.

Much more ought to be discussed in this review, especially the manner in which Carnap seems to divide questions into those that can be formulated within a conceptual system, those that are about a conceptual system, and the pseudo-questions which are neither. However, for the time being, let it suffice to say that Rudolf Carnap's *Der logische Aufbau der Welt* is like a breath of fresh air and that it is a paradigm case example of what philosophy should be like in the future. Indeed, this is my prediction: 80 years from now no philosopher will get away with doing philosophy without logical and mathematical means; it would be like doing modern theoretical physics without mathematics. There will be no trivial arguments, no hidden assumptions, no talking at cross purposes. Philosophy will be done in the way in which this young German does it, for it is the only way in which philosophy will make progress.

I hear you say *But there is no progress in philosophy*—if only Carnap's book had come out 80 years earlier…