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In the last thirty years, a school of philosophy has grown up which takes the narrow view, that to be true means to be verifiable in fact. It goes further and holds that no statement is meaningful if it cannot be put to the test of factual truth, at least in theory.

This test would limit our serious conversation to what the man in the street calls scientific matters, which can be defined and verified exactly. It rejects altogether such topics as value, ethics, and sentiments, claiming that discussion of them may be comforting and even entertaining, but is strictly without meaning. "Virtue is its own reward" is in this philosophy a piece of meaningless good cheer; sensible philosophers only discuss such statements as "Water is made up of hydrogen and oxygen". Here we have a philosophy in which science seems to have gone over to the counter attack, by replying to the charge that it contains no values with the curt remark that values are a lot of nonsense anyway.

But as so often happens when philosophers take up arms for science, the science that is being defended is long

out of date. The ideal of the meaningful and the true which this positivist philosophy sets up is indeed the nineteenth century conception of science. These are the notions of meaning and of truth which Joule had in mind a hundred years ago when he showed that heat is precisely a form of mechanical energy, or later Hertz when he found the radio waves whose existence had been implied by Clerk Maxwell's equations of the electromagnetic field. But such notions of truth have already turned out to be insufficient for science itself, in the modern sense. So that it is certainly an odd service to sweep value and ethics out of the door with this broom, which at once also gets rid of science and of human knowledge.

There are a number of grounds why logical positivism will not do; and they have this in common, that is is a piecemeal philosophy. It models itself on the heroic attempt by Russell and Whitehead to derive all mathematics, including such difficult ideas as the continuous and the infinite, from a finite number of axioms. Mathematics was to be built up step by step from a set of particulate or atomic propositions. This was a great and an important work in logic. It did not wholly succeed, even in its own field. But it remains a monument there to the two masters who created it.

The positivist philosophers have taken this attempt for their model, in picturing knowledge in the same way as built up from pieces of particulate fact. But if mathematics has difficulty in fitting this structure, it is plain that empirical knowledge does not begin to fit it. Obviously we do not get our knowledge in this way, from particulate pieces of information like "this is red". The mind does not begin from such sense experiences, but always from integrated bundles of them, that is from things. How else do I recognise what I

am now looking at as a book, and identify it as the same book I was looking at before I turned the page? We do not make up our knowledge like a meccano set piecemeal from minute nuts and bolts of experience.

This in itself so far is only an issue of psychology. But there is a deeper issue, which is this, that neither can we break our experience down into these nuts and bolts. Not even as a hypothesis will it do to think of knowledge as reducible to atomic propositions.

I have already spoken of the logical reasons why this cannot be so. If it were, there would remain, in this atomic world of knowledge, statements which would be neither true nor false. So the logical positivist, having been at pains to call everything not in his meccano world nonsense, would discover that even this world is still chock-full of nonsense. But I do not want to stop at this logical failing, as if we were scoring debating points. What is the deeper reason why the atomic construction of knowledge fails? Why ought we to have foreseen that it must break down in contradiction?

The answer is that this atomic construction supposes, like the atomic science of the last century, that there lies below our experience a set of facts which are more exact than experience; which are indeed exact. "This is red," we are told, and it is assumed that we have now dug down to a base of knowledge where there is no more room for disagreement: either this is red, or it is not red. But what is "this" that we are both supposed, the speaker and I, to see as the same spot? And what is the red about which as sensible beings we cannot differ? Red light has a wave length of about one three-hundred-thousandth of an inch: to what order of accuracy are we to read it in order to agree on our atomic proposition?

In the world of science, neither "this" nor "red"

are entities which can be defined with complete precision. "This" will always escape in the Brownian to-and-fro of atoms, and "red" must be embedded in a range of uncertainty of a few wave lengths. The world cannot be described, as positivists have explicitly supposed, by giving exact physical co-ordinates to every point in a statement, and then verifying whether or not the statement is true. Every co-ordinate reference must carry with it an area of uncertainty. And this implies that the verification is itself uncertain, and must be allowed a margin of error. To think otherwise is to wish oneself back to the atomic paradise of a hundred and fifty years ago, and to the blissful simplicity of which Blake said with imaginative contempt that it hoped "to build a universe out of farthing balls".

It is indeed clear that there is an essential fault within the basic conception of the positivist, that we can judge truth by a simple act of verification. What are we to verify? An atomic proposition, that is a statement in the simplest form about the simplest kind of fact. But the facts do not keep still for us, either in space or in time. I cannot verify now a statement about a fact which has already passed. I must make my statement about a future fact, and this means that I must turn it into a prediction. Indeed, the idea of verification must imply prediction, and prediction as we have seen cannot be separated from its own area of uncertainty.