Science and Philosophy

IN a Friday evening discourse delivered at the Royal Institution on December 2, the Right Hon. Viscount Samuel discussed the importance of obtaining closer co-operation between science and philosophy than there has been in the past. The scientific worker, intent on special problems, has tended to ignore the need to examine the general principles on which his studies rest. Separation has come from the other side too. Nineteenth century philosophy of the idealist tradition went on its way regardless of science, with disastrous consequences. The question is not a purely academic one. At the present time, he said, "every land resounds with the tramp of armies, and the air throbs with the droning of their aircraft. Behind the armies are the dictators or the parliaments. Behind them are the political creeds—Communism, National-Socialism, Fascism, Democracy. And behind the creeds are the philosophers—Marx and Engels; Hegel, Nietzsche, Spengler, Sorel and Croce; Mill and the other protagonists of liberty. Some of the creeds, it is true, are anti-intellectual; but irrationalism also is a philosophy of a kind".

If philosophies of this kind are to be avoided, a reasonable basis must be found for ethics and religion in place of the confusion and uncertainty now prevailing. The first step in this direction is for the philosopher frankly to accept the main conclusions and point of view of science. In particular, he must admit that the universe exists independently of human thought. Men and their thoughts enjoy no special privilege except as parts and products of this universe. The realist tendencies that are noticeable in recent philosophy in Great Britain and in the United States are therefore to be welcomed. As a consequence of such a realist attitude some old metaphysical difficulties about space and time, and about substance and qualities, should disappear. Lastly, it is necessary to abandon the notion that what we call 'values'—truth, beauty and goodness—are ingredients of the world at large. As Alexander has said, "Values are human inventions". This means that, in the sphere of ethics, actions are to be judged by their consequences, not in terms of any supposed *a priori* moral principles.

These are examples where the philosopher should look to the man of science for guidance; but there are others where the philosopher should be able to help the man of science. For one thing, he can urge the need of caution in accepting the paradoxes that have been prominent in recent scientific thought. An example of this is the tendency to attribute physical properties to space. Strictly, space indicates only an interval between things or processes. If it is really empty, it cannot have physical properties. If any such properties have to be attributed, it should be openly acknowledged not to be empty, as was admitted by the old 'ether' hypothesis. Another example is the tendency to make Heisenberg's Uncertainty Principle an argument for abandoning the notion of causality, on which scientific procedure is based.

The philosopher may also be of use in directing attention to unfilled gaps in scientific theory. One of these is the absence of any explanation of gravitation. In spite of the Theory of Relativity, gravitation is still, as it was in Newton's day, a 'brute fact' unconnected with anything else known about matter. Conceivably the internal structure of the atom may provide the answer. Another, and perhaps a more scandalous, gap in theory is that the great problem of the relation of mind and body remains apparently untouched. Although science itself is a process of thought, science tells us nothing about the nature of thought. A serious mistake has perhaps been made in supposing that perception is necessarily confined to the known functions of the human sense organs. The solution of the problem may possibly come from the science of electro-physiology, which is still only in its infancy.

There are already encouraging signs, Lord Samuel concluded, that science and philosophy are coming closer together. If this union becomes complete, and if the long-standing isolation of religion can also be overcome, it may be possible at last for mankind to possess a unified and harmonious basis for thought and action.

The Expanding Universe

A DISCUSSION on the subject of the Expanding Universe was held on January 27 under the joint auspices of the Physical Society and the Royal Astronomical Society, the chair being taken by the Astronomer Royal. The discussion was opened by Prof. G. Temple and Dr. G. C. McVittie in two papers which gave general surveys of the theory of relativistic cosmology and of the information to be derived from astronomical observations.

The first of these papers dealt especially with the developments in relativistic theories of the large-scale structure of the universe since the publication of Robertson's report in 1933[1]. The more important of these developments are the investigations of Milne and his school into the possibility of solving the cosmological problem by the methods of the special theory of relativity, and the researches of Whittaker and his fellow-workers on the form taken by the astronomical distance functions in general relativity.

A cosmological theory which endeavours to explore world structure by means of terrestrial observations is necessarily speculative, and the relativistic theories rest upon two main hypotheses—the uniformity of space-time and the homogeneity of the nebular distribution. The first of these leads to either the special or the general theory of relativity, according as the uniformity is taken to be 'global' or 'local'. The second hypothesis, first formulated satisfactorily

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