

## Philosophical Implications of Physics . . . by Professor W. J. Archibald

The task of the Philosopher is to describe the nature of Reality—a most ambitious undertaking. He takes the data which experience brings to him and examines it as objectively as is possible in the hope of discerning principles and laws of wide validity. The question he most frequently asks begins with the words "What is the ultimate nature of—" and may end with many different words of which some are the following: space, time, matter, substance, causality, mind, spirit, virtue, beauty, morality, etc. During the past fifty years the physical sciences have presented philosophy with much new data, and these recent discoveries have led to a re-examination of the first five problems mentioned above.

Forty or fifty years ago a famous experiment was performed by two physicists named Michelson and Morley which definitely established the fact that the measured velocity of light is independent of that state of motion of the person who measures it. The implication of this experiment are extremely impressive. They were worked out by Einstein whose predictions have stood the test of experiment. The relevance of his work to philosophical thinking cannot be over emphasized for he has introduced wholly new conceptions of the nature of space and time. Common sense, three dimensional, Euclidian space proves to be inadequate to describe the observed properties of the universe on a cosmic scale and the alternatives proposed

by the theory of Relativity are undoubtedly more satisfactory. And what exciting alternatives! Time had a beginning, and space is finite but unbounded. It is easy seeking to test these predictions and the relevance of their to appreciate the enthusiasm with which astronomers are findings to philosophical speculation.

Another fruitful current of thought was started by Planck, enriched by Einstein and Bohr, and brought to a state of completion by Schrodinger, Heisenberg and Dirac. In its completed form it is called Quantum Mechanics and it had to be invented because of the inability of Newtonian mechanics to give answers in accord with experiment when dealing with radiation and the behaviour of atoms. The important implication of Quantum Mechanics for philosophy may be stated as follows: Complete knowledge of the behaviour of any physical system (even a simple one) is unattainable, and this vagueness is not an accident of the theory but is an inherent property of reality. From now on we must be satisfied with probabilities and get used to the idea that the mind never can "know all". This aspect of the theory raises the question of the meaning of causality—an important problem of philosophy. The Quantum Theory, with its well established uncertainty principle, seems to have put the materialistic theorists on the defensive. Even if the law of causality has to be abandoned it is interesting to note that the Physicist will

not bemoan its loss since the Quantum Mechanics enables him to predict everything his instruments can measure.

The newer mechanics has an importance in still another connection. It enables the physicist to describe the atom and its behaviour, but the description is wholly mathematical. The mathematical interpretation is straightforward and unambiguous but of such a nature that it is next to impossible to form a mental picture of that matter on a fine scale is like. Space is for the most part empty and the entities the scientist has to deal with are fields of force and probability amplitudes. Even mass is only one aspect of a more fundamental reality which has other aspects even more impressive—e.g. the atomic bomb. This picture is still unfolding but already profound changes have taken place in the philosopher's conception of matter or substance.

The three areas briefly outlined above are perhaps the most important ones in which the physical sciences have influenced philosophy. It is doubtful if philosophers will ever get much help from the natural sciences in their investigations of the ultimate nature of mind, spirit, virtue, beauty or morality except perhaps indirectly by emulating the method employed for discovering truth. The successes of the method of science in ferreting out nature's secrets have been so spectacular that no serious investigator of any problem can neglect to employ the method.

## The Laymen and the Scientist . . . by Professor F. R. Hayes

The title was provided by the Editors. I have never personally used the contemptuous term "layman", or its smug opposite, "scientist". The greatly increased use of these words during the half-century, however, furnishes a clue to changing attitudes. So great is the lustre of the word "science", that it can create whole branches of learning such as library science, domestic science, etc. Natural science has become the religion of materialism with its priests (or scientists) and worshippers (or laymen). The official priestly activity is known as research, which, whatever its nature and by whomever it may be practised, is always to be considered by the layman as virtuous.

Research has two main aims, of equal social value. Biologists are expected by laymen to seek means to extend the span of human life, and their highest accolade is to be credited in the Reader's Digest with the discovery of a "wonder drug." The duty of physicists is to develop improved methods to shorten human life, and for them the pinnacle of eminence comes with arrest as a Russian spy. All research is expected to be practical, and public support is not in general granted to projects which are more than

one step away from a practical result. When attempt to solve practical problems fail, the product is known as pure science. A properly instructed layman believes, that by alchemy not vouchsafed to him, a sufficiently large mass of pure science changes spontaneously into a noble nugget of applied science. For this reason, no direct action is taken by society to prohibit the practice of pure science which, like scholarship, is regarded as an old-fashioned but harmless pursuit, doubtless of use in the past, but supplanted in these modern times by specialized institutes and teams of technicians.

The layman believes in the production of special kinds of scientific practitioners, analogous to doctors and dentists. The half-century has seen engineering become well established, although its graduates do not yet enjoy the same immunity from competition as their medical brethren. Agriculture is superficially flourishing, but suffers from the failure of its good graduates to return to the farm, perhaps because they have no legal protection at all from untrained competitors. Border line experiments in fisheries, food technology and so forth, are

going on all the time. There is some difficulty in matching the title of a new course with an integrated body of knowledge, while the proposed courses make a horizontal cut across several of them. The layman believes that it is better for a student to leave college with several stumps of knowledge than with one long branch.

What of the next half-century? We may hope that science will cease to be a vocational cult and become, as it was in the days of Bacon and Goethe, a fit subject for contemplation by any thoughtful man. We may hope that, as scholars in the past were provided through hard training in classics with the key to the world's literature, they may be provided in the future, through hard training in observation and measurement, with the key to all science. We may hope for some abatement of the pressure on universities to increase vocational training. Finally we may hope for a clearer realization that research is the same thing as scholarship, and that bad or trivial research is as easy to recognize as bad scholarship, and smells no sweeter.

## The Philosopher and the Scientist . . . by Professor J. A. Doull

I am asked to describe how far differently science is now regarded by philosophy than at the beginning of the century.

It was characteristic of the philosophy of the 19th century to reason as follows. (1) Science gives us a true picture of the world. (2) Science has with great success assumed the world to be composed of material particles whose motions are mechanically determined. Therefore philosophy must look on the world similarly. Nor can philosophy add to the picture any knowledge it has of its own; for it has agreed to allow the title of knowledge to nothing but what is yielded by the methods of science. Philosophy may certainly regard the world of science as appearance only, but it can offer no knowledge of another world it may find reason to assume; it is limited to shewing how that appearance is imposed on us by the structure of human reason. Or it may be content with a smaller task: it may merely undertake to systematize the conclusions of the several sciences. The former Idealists, the others Positivists. Either way, the great problems of the earlier philosophy (Hellenic and Medieval)—God and human personality—were seen to exceed our knowledge. Either one does not speak of these things, or what one says rests not on knowledge but some 'feeling' or 'intuition'.

During this century science has itself very greatly changed. Some principal assumptions of the old science—matter, mechanism, determinism—themselves became problems. Thus the particular form of science which the philosophy of the 19th century assumed became superseded. But its other assumption, that science gives a true picture of the world, was also exploded. The new theories

did not pretend to do that. They were allowed to be not the only possible theories, but the most convenient: the best adapted to our powers of knowledge and the most effective in guiding to the experimental solution of difficulties.

The philosophic systems which had grown up with the old science decayed, in part because of the scientific developments just described, but also from internal difficulties. But to understand some chief tendencies in contemporary philosophy one must have in mind a more general change. The characteristic illusion of modern culture—the belief in progress through science and technique—largely lost its power in much of Western Europe. In proportion as this belief decayed attention returned to the great questions which in older times had a place in philosophy. Certainly a revived interest could not supply knowledge where none was to be had. But with the decline of the recent systems, the reasons for which they had departed from Platonism and Aristotelianism no longer appeared satisfactory to everyone.

One may say very roughly that contemporary philosophy has followed three courses. (1) It has held to the assumption that there is no knowledge but scientific, and directed its efforts to shewing that all statements save scientific propositions and the rules for combining them are meaningless. Science is a very insufficient guide, but the only guide we have. This is Logical Positivism. (2) There is no knowledge, in the ordinary use of the word, but scientific. But we have an acquaintance with the structure of individual human existence. To this we cannot give expression in the concepts of traditional philoso-

phy. Philosophy has been astray from its proper course since the time of Plato, in that it sought for the real in the universal, not in the individual existent. By such philosophy (Existentialism) scientific knowledge is not very favourably regarded. It is useful but superficial, and forever being misapplied by superficial minds to fundamental questions. Existentialism still leans very much on the 19th century assumption that metaphysical knowledge is impossible. (3) It has returned to the ancient belief that a rational knowledge of God and man and of the due order of human life is in some measure possible. The most influential representatives of this tendency are the Thomists. From this standpoint philosophy does not depend on science for its principles or for its method. But it takes full account of scientific method and scientific conclusions, where these are relevant. It values science, but deprecates the philosophic misuse of it (scientism).

It should be observed that either the last mentioned direction is substantially correct or the civilization we prate about so much was founded on erroneous assumptions, which are at last being fully exposed. The modern world which believes, or believed, in science, education, and democracy has been completely discredited—so far as it pretends to be sufficient, and independent of its Christian and Hellenic origins. In many countries its assumptions still dominate popular thought, but only in backward countries like Canada and Russia does it continue to possess the universities and educated opinion. The only question that still requires serious debate is whether Christianity and Hellenism are to be thought no less unreasonable.

A young man's wisest investment,  
one which gives protection at the  
same time — a participating policy  
with...

THE  
**MUTUAL LIFE**  
LIFE INSURANCE AT LOW NET COST  
of CANADA  
HEAD OFFICE: WATERLOO, ONT. C-65

YOU'LL FIND YOUR LOCAL  
REPRESENTATIVE  
here

G. W. HIGGINS, Branch Manager  
Bank of Nova Scotia Bldg.

The NOVA SCOTIAN

"DANCING  
SATURDAY  
NIGHT"



HALIFAX

REID SWEET  
PHOTO SUPPLIES

COMPLETE LINES  
of all  
Photographic Supplies  
and Equipment

24 Hour Developing and  
Printing Service

9½ Prince St. - Dial 3-8539

ASK FOR THEM  
BY NAME



Lady Anne  
SWEATERS & SPORTSWEAR

Crimp set NYLON cardigan and short sleeve pullover