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NORTHERN BRANCH

The first Annual General Meeting of the Northern Branch of the Philosophy of Science Group was held at the University of Sheffield on the 14 October 1954, under the chairmanship of Professor D. M. Emmet. There were about twenty members of the Branch present. The officers elected for the session 1954-55 were: Chairman, Professor M. Polanyi; Hon. Secretary, Dr. W. Mays; Hon. Assistant Secretary, Dr. Mary Hesse; and it was agreed that each University group should elect two representatives to serve on the Committee. There was a general discussion of the future activities of the Branch. The meeting was followed by dinner in the Staff House.

Members then joined a large audience for a meeting organized by the Northern Branch in conjunction with the Extra-Mural Department, at which the Vice-Chancellor of the University of Sheffield took the Chair.

The meeting was addressed by Mr. L. L. Whyte, Chairman of the Philosophy of Science Group, who spoke on "The Growth and Implications of Modern Physics: a Philosophical View". The address was followed by questions and discussion.

ABSTRACT of Mr. L. L. WHYTE'S Address.

The development of fundamental physical ideas since 1600 can conveniently be considered from four points of view: (1) The scale-free or similarity properties which were dominant until 1900, followed by the scale-fixed phenomena of quantum physics. (2) The discovery of a series of universal dimensional constants, and the increasing attention which has been paid to their dimensionless pure number ratios since 1909. (3) The number of degrees of freedom, and simplicity or complexity, of the systems being studied, from Newton to the contemporary theories of protein structure and thermodynamics. (4) The emphasis on basic reversible processes, accompanied by increasing attention to irreversible phenomena. An analysis along these lines suggests that the great transformation of classical scale-free reversible physics, which began around 1900, is not yet complete. Quantum mechanics is the latest, but certainly not the last word in fundamental theory.

The key problem in current discussions is the nature of the fundamental particles, but it may be better to shift the emphasis, to stop speaking of single particles, and to concentrate on the characteristics of changing arrangements of several, or many, particles. Single particles may not "possess physical properties", all observable phenomena may be associated with transformations of systems of particles, and if we must think of "properties" it may be only

systems of particles which possess them. Moreover transient or unstable particles do not provide a satisfactory basis for theory; they may have to be re-interpreted as 'states' or 'components' of systems composed of reasonably permanent particles. These latter might be nucleons, appearing in different situations as 'neutrons' and as 'protons'.

Interest in physics may be heightened by watching what is going on in the firing line of the main advance. For example, concepts now under fire include 'random', 'order', and 'disorder'. These are tricky conceptions because they have many distinguishable meanings. But even more important may be the increased attention now being paid to time relations, and to the precise meanings of such terms as: reversible, irreversible, cyclic, stationary, steady, stable, static, permanent, transient, and so on.

Physics is now coming to grips with the properties of complex systems. So it is not surprising that the ideal of simplicity is sometimes forgotten and that it has been suggested that the *only* aim of physical theory is to predict measurements. This is a mistaken view and its general acceptance would ultimately destroy exact science. The valid aim, which should never be forgotten, particularly when struggling with complicated problems, is an elegant theory which not only covers the phenomena but brings understanding. But at the moment no elegant and comprehensive theory is in sight. Physical nature, in certain realms, for example at low temperatures and high energies, behaves very strangely. At least it seems so to minds trained in the theories of the past.

