

The Philosophy of Science, Today and Tomorrow

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After general remarks on the outlook for the Philosophy of Science the speaker posed the question: "Does the field of current scientific theory possess any intrinsic general connectedness which is of importance for the advance of science?" The sciences can be classified from many points of view; we are here concerned only with their relations from the point of view of concepts and principles.

The sciences of non-recurrent processes, treating the history of the universe, of life, and of man, which involve the epoch, are more speculative and may provisionally be neglected. This does not mean neglecting all irreversible or one-way processes, many of which continually recur.

The main question is applied to the three major branches of theory dealing with recurrent processes, for convenience called "physics", "biology", and "the science of man". It is suggested that *the theoretical relationships of the three non-historical branches of science are displayed by arranging them in a circle around which certain relations hold one-way* (physics \longrightarrow biology \longrightarrow science of man \longrightarrow physics). The general principles of one science, when applied to a special situation, yield the general principles of its successor round the circle. (This is not "deduction", as normally understood in logical theory).

This arrangement of the sciences is not arbitrary or trivial (*e.g.* it cannot be replaced either by spiral or by open branching systems of connections), for if the closed character of the system of the three sciences is neglected, some connection which is indispensable to scientific theory is absent.

The main task of theoretical enquiry during the second half of the century is to close the circle, by completing three tasks:

- (a) The representation of the structural transformations of functional protein in terms of physical principles. This implies a comprehensive structural theory of all organic properties, linking biology to physics.
- (b) The representation of the structural transformations of the human brain in terms of organic principles. This implies a comprehensive structural theory of all brain-mind processes (including symbol formation), linking the science of man to biology.
- (c) The representation of the "transformations of elementary particles" as a consequence of the manner in which observations and physical measurements of fundamental processes have been made by man. This implies a complete theory of perception, of physical measurement, and of fundamental physics, linking the latter to the branch of the science of man covering man's study of nature. Epistemology, in the widest sense, thus becomes a branch of exact science.

This vista implies that no one science has a unique status: all three cover the whole of knowledge, but starting from different points round the circle.

The formulation of the idea of the circle is an urgently needed heuristic instrument opening up new lines of approach to various difficult problems. For example, unresolved issues in the foundations of mathematics may only be capable of clarification as part of the science of man, which must account for the appearance in the human mind of the basic mathematical ideas. In fact, the foundation of any one science may be incapable of full clarification except as part of the circle.

Logic has not yet analysed the properties of a circular system of concepts and principles serving, not to obtain valid conclusions from prior premisses, but to provide a self-consistent representation of phenomena.