

cance and coherence of geometry. Thus a real mutation of the elementary takes place; but it is not owing to mere chance. The method which has presided over that transformation, the historical changes and stages of which are described, is clearly shown, and it is made evident that it also determines the new forms of physics, the theoretical constitution of which does not differ essentially

from geometry considered as the rational science of space. That method is the statute of an open science. So Mr. Bouligand's account is fully justified. By elucidating each other, both books open new horizons to the teaching—even elementary—of geometry. The philosophical significance of those books is of no less importance than the pedagogical one.

From The British Journal for the Philosophy of Science

Volume VIII, No. 30—August 1957

“Problem Solving,” MICHAEL POLYANI. Problem solving as taught to students of mathematics presents the main features of heuristics. It is defined as the crossing of a logical gap and the width of this gap is a measure of the ingenuity displayed in crossing it. Such a process is essentially informal, irreversible and self accrediting. Thus it appears rooted in the purposive tension of animals and their alertness which keeps their environment under mental control. On the other hand, a tacit component of this kind enters into all formal operations of the human mind and remains the ultimate arbiter of their rightness.

“Historical Explanation in the Social Sciences,” J. W. N. WATKINS. “Methodological individualism” is advocated as an essential principle for social science. Secondly, to this principle there are no “holistic” sociological laws that are irreducible to laws about the situations, dispositions, aims etc., of individual persons. It is claimed that the principle can account for organic-like social behaviour. The ways in which explanation of social regularities and of unique historical events should be framed in accordance with the principle are described.

“What Makes a Subject Scientific?” W. B. GALLIE. There is no single criterion of scientific achievement; different criteria being used in different fields. Nor is any single criterion applicable to natural or formal—or to pure or to applied—

science: different criteria of scientific achievement cut across these familiar distinctions. Further, no known criterion is sufficient, and at most two are necessary, to establish scientific achievement in any field. Conflicting criteria of ‘the scientific’ function like persuasive definitions; they direct attention to the importance of novel or neglected features of scientific work. To understand such criteria is to appreciate how they have helped to diversify and articulate the scientific tradition.

“Diathesis, the Self-winding Watch and Photosynthesis,” H. A. C. DOBBS. This article supports the resolute extension of mechanistic thinking in the “sciences of life”. The argument is in two parts. (1) Refutation of vitalistic thinking as exemplified in Professor Kapp's theory of Diathesis. The operations of a self-winding watch are shown to be instances of processes in an inorganic mechanism in which forces of random origin, acting in accordance with the laws of physics, can be caused to produce specific events at specified moments of time. Thus an inorganic mechanism is shown to exhibit a characteristic which vitalistic theory holds to be distinctive of ‘living’ entities: the capacity to produce selective controlled output in response to random input. (2) Demonstration of the close analogy between the mechanical operations of a self-winding watch and certain biochemical processes which occur naturally during the process of photosynthesis in living plant leaves.

From The British Journal for the Philosophy of Science

Volume VIII, No. 31—November 1957

“A Logical Analysis of ‘Psychological Isomorphism,’” EDWARD H. MADDEN. The concept of isomorphism plays a prominent role in psychology, where, however, it has received neither an adequate historical nor logical analysis. Historically, analysis is confined to one type of isomorphism or is interwoven with other material so it does not

form a unit. Logically, analysis usually is preoccupied with doubtful *a priori* judgments, pro and con, about the usefulness of different isomorphism hypotheses.

After making preliminary statements about mathematical isomorphism, for the sake of subsequent comparison and contrast, I provide what I

take to be the elements of a historical and logical analysis of the concept of psychological isomorphism. The Gestalt variety of isomorphism figures prominently in this analysis.

"The Place of Historical Statements in Biology," R. P. GOULD. The characteristics of statements, and particularly explanatory statements, found in science and history are analysed and compared. The two different kinds of historical explanations found in various examples taken from Morphology, Palaeontology, Physiology and Evolutionary studies are examined and commented on with respect to their usefulness in advancing the science of biology.

"Societal Laws," M. MANDELBAUM. "Methodological individualism" has attacked the view that there are irreducible laws concerning society; it has assumed that any such laws necessarily presuppose or imply "organicism" and "historicism". This view is challenged. Societal laws may be of any of four main types, not all of which involve either historicism or social holism. The contrast

between "methodological individualism" and "methodological holism" is therefore shown to be oversimplified and misleading. It is also suggested that this fourfold classification of societal laws may usefully be applied in the analysis of social theories and in the philosophy of history.

"How Economic Theory May Mislead," ANNE MARTIN. The economist cannot be satisfied with the state of his subject while his achievements in the prediction and control of economic events are so slender. Economists have tended to fall into characteristic confusions, which have prevented their theories from having explanatory use. They have been unclear as to whether their basic propositions are empirical or "a priori", have confused the idea of rational economic behaviour with that of efficient economic achievement, and have so misused the "ceteris paribus" clause as to make many propositions untestable. Some have also treated the simplifying assumptions of economic theory as if they were imperatives for economic behaviour.

From the British Journal for the Philosophy of Science

Volume VIII, No. 32—February 1958

"Occam's Razor and the Unification of Physical Science," R. O. KAPP. In physics unification means the replacement of many specific laws by a smaller number of general ones in which the specific laws are implicit. Complete unification would therefore leave only tautologies and one single basic principle in which all specific laws were implicit. It is suggested and supported by examples that such a single basic principle could be worded as follows:—"In physics a generalisation that is logically possible is also physically possible. It can therefore be represented by an actual example and is so represented with a frequency that is determined by statistical considerations only". This is called the Principle of Minimum Hypothesis. If valid, it provides a means of testing all explanatory hypotheses in physics. The claim is made that this basic principle has great explanatory and pre-

dictive power and that every valid generalisation in physics that is not a tautology is implicit in it.

"On Prediction and Explanation," NICHOLAS RESCHER. Analyses in the philosophy of science frequently contend that explanation and prediction are identical as regards their logical structure, the sole point of difference between them being that one concerns a "known" past, the other an "unknown" future. It is shown that this thesis is untenable, and that the justification of predictions can be a mode of argument far weaker in logical strength than is tolerable in explanations. This accords with the fact that the state of our scientific knowledge of the present day is such that ability to explain the past enjoys a substantial superiority over our capacity to predict the future.