

PHILOSOPHY OF SCIENCE GROUP

Supplement Number 2

to the Bulletin of the

BRITISH SOCIETY FOR THE HISTORY OF SCIENCE

Vol. 1.

APRIL, 1950.

No. 3.

Heuristics and the Inductive Method

BY PROFESSOR G. POLYA

Department of Mathematics, Stanford University, California

ABSTRACT of Paper read on 25th April, 1949.

The aim of this paper was to illustrate the following contention: "The most instructive examples of inductive method can be found in mathematical research". The term "induction" is taken here in the meaning as used in the natural sciences (non-mathematical, incomplete induction). Such induction, of course, can never yield more than a plausible heuristic ground. It was shown by examples with some historical background (Descartes, Fermat, Goldbach, Lord Rayleigh) that, nevertheless, such non-mathematical induction plays an important rôle in mathematical research and various analogies with the use of the inductive method in the natural sciences were pointed out. The general ideas about the nature of inductive inference, to which these examples lead, were not explicitly discussed. It was just observed that the mere existence of such mathematical examples shows that the assumption of any specific link between causality and induction is without foundation.

The Inference of the Gene

BY PROFESSOR K. MATHER

Department of Genetics, University of Birmingham

ABSTRACT of Paper read on 30th May, 1949

Many different units are recognised in genetics. The set of chromosomes is a unit in balanced action, the chromosome is a unit in movement, and the whole nucleus is a unit in the production of polyploids. The gene is the smallest, the ultimate, unit into which the genetic material can be divided: it is the unit further subdivision of which must lead to loss of the special properties which make us regard these materials as determinants of living processes.

Several criteria have been used in inferring and distinguishing genes. Mendel used the mechanical criterion of relation in hereditary transmissions. He recognised two relations between the determinants he was led to postulate: they could be strict alternatives in inheritance, allelomorphs of the same gene as we should now say; or they could be quite independent of one another in their transmission, *i.e.* distinct genes. With the discovery of linkage this latter relation was perforce extended to take in all cases other than allelomorphism. Determinants belonged to different genes if they could be recombined, however rarely, in inheritance.