

REVIEW

Max Jammer, *Concepts of Mass in Classical and Modern Physics*. Harvard University Press, Cambridge, Mass., 1961, 230 pp., \$ 6.00.

A historical and critical study on the concept of mass. After a more or less isolated chapter on the etymology of the word "mass", the author deals respectively with the concepts of mass in ancient thought, in Neoplatonic-Judeo-Christian philosophy and in the Middle Ages (the concept of *quantitas materiae*). Two chapters follow on the "conceptualization" of inertial mass (Galilei, but principally Kepler) and the "systematization" of mass (principally Newton). With regard to every process of concept formation, the author distinguishes three stages: conceptualization, systematization (incorporation in the syntax of the scientific system) and formalization (formal definition within the texture of a deductive system). After a discussion of some philosophical modifications of the Newtonian concept (Leibniz, Kant), the author comes to the modern concept of mass (i.a. Mach) and its axiomatization. The subsequent chapters discuss the gravitational concept of mass (active gravitational mass), the electromagnetic concept, the relativistic concept (the special theory of relativity; here the author distinguishes three stages: the work of Einstein, of Lewis and Tolman, and of Minkowski) and mass and energy. The last chapter deals with the concept of mass in quantum mechanics and field theory. Unitarian and mass-unitary theories are discussed and also the concept of mass according to general relativity.

A very fine study on this difficult subject. In the historical parts, the author shows an enormous knowledge of the literature on the topic. It might have been a help to readers less familiar with history, if the time could have been mentioned in which the philosophers and scientists lived, whose ideas are discussed. In most cases, the author gives only the year of the edition or translation from which his quotation is taken.

The analyses of more modern theories are very profound. So the author gives in a few pages a deep-going analysis of Mach's introduction of the concept of inertial mass and of the dependence of mass on velocity according to the special theory of relativity. The last chapter, on field theories, is too technical and too concise to be of any use to a reader not thoroughly acquainted with this subject.

The book is very well presented.

Amsterdam

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