AXIOM, (Greek αξιομα [axioma]—dignity, weight, value)— the presupposition or foundational proposition in a science, and especially in a deductive theory.

Over the centuries, the term “axiom” has not been used consistently in the same sense. Aristotle and the ancient mathematicians most commonly understood it as a general presupposition that was immediately evident, infallible, and common to many sciences. In the middle ages and at the beginning of modern times, the term generally retained its Aristotelian meaning. In the nineteenth century, and especially among contemporary logicians and mathematicians, an axiom was a proposition explicitly mentioned as a major premise and accepted in a deductive system without proof. It was not considered whether the proposition was evident or not.

The group of axioms for a theory sufficient to prove all its theses is called the system or axioms or the axiomatic. An infinite number of axioms may be written down as the scheme of axioms. A science that is constructed in such a way that each specific thesis is either an axiom or can be proven on the basis of the system of axioms creates an axiomatic system (or axiomatic theory). An attempt to comprehend a science in such a system is called axiomatization, and the method for constructing such systems is called the axiomatic method.

Two sets of problems are connected with the axiom: a methodological problematic and a gnoseological problematic. The methodological problematic concerns the role of the axiom in science, and the gnoseological problematic concerns the mode and value of our knowledge of axioms.

The question of how axioms function arose in the writings of Aristotle. Aristotle thought that in apodeictic knowledge we should distinguish between the presuppositions that are common to many sciences (axioms), and the presuppositions that are specific to particular disciplines. Those common to many sciences are the most general certainties about being. They had never been clearly formulated, but are in fact used and known well to anyone who knows anything at all. Examples are the principle of non-contradiction, the principle of the excluded middle, etc. The presuppositions specific to a particular science are the basic definitions of its object, and they are divided into definitions and major assertions. This was the case in Euclid, who mentions three kinds of presuppositions: definitions (explanations and descriptions of terms), postulates (evident presuppositions that are necessary for the construction of geometrical figures, and which correspond to the specific major assertions of Aristotle), and axioms (in the Aristotelian sense). There was a new conception of the role of axioms in a deductive system at the end of the nineteenth and beginning of the twentieth century. There were three stages of the *a priori* sciences: pre-axiomatic, axiomatic, and formulated. What is characteristic of the first form of definition is that within it, all general and evident theses are permitted, namely those that are considered to be certainties. The second level of deduction is the axiomatic system in which the basic premises are explicitly mentioned. The deductive system reaches the third stage by formalization. The presuppositions (or postulates) become not only the major premises, but also the axiomatic definitions (they constitute the meaning of terms specific to the formalized theory). The empirical meanings that terms may possess outside of the system are not considered. In order to avoid arbitrary usage, they must meet the following conditions: non-contradiction, categoricality, independence, completeness and resolvability. It turned out, however, that no richer formalized theory could meet the last two criteria.

If we understand the axiom as a presupposition of a deductive system, and that it meets only certain specific formal conditions, we do not need to be puzzled about how we know the axiom and the source of its truth. The problem is different if we consider axioms as the most general presuppositions of all deductive inferences, and the problem is different again if we consider axioms as specific presuppositions in the formal or real sciences. In general, we should distinguish two groups of positions in this matter: apriorism and empiricism. Apriorism holds that an axiom is completely independent of experience (the eternal truths of R. Descartes, the innate truths of G. W. Leibniz). More moderate forms of apriorism appear in I. Kant (an axiom in mathematics is a synthetic *a priori* proposition), and E. Husserl (an axiom is the result of a direct inspection of a thing's essence). The empiricists state that an axiom is an inductive generalization of particular propositions based on experience (F. Bacon, J. S. Mill). With reference to the *a priori* sciences, it is also stated that an axiom is the product of the sum of unconscious experiences and inferences (H. L. Helmholtz); it is the result, not of individual experience, but of the collective experience of the human race during its historical development (H. Spencer); it is an analytic proposition that merely explains the meaning of the terms used in it. Experience cannot refute or confirm this kind of proposition. In the real sciences, an axiom is a certain kind of hypothesis which is ultimately resolved by experience. Conventionalism is the final form of this position. Conventionalism adds that experience verifies or refutes an axiom by a prior conventional precise refinement of the meaning of the terms (H. Poincaré). Aristotle tried to justify the truth of the axiom by the dialectic method and in a special way by the inductive method. St. Thomas further developed the dialectical method. We know an axiom directly after we understand terms that genetically originate from experience. The intellect directly grasps certain necessary connections that occur between these terms.

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