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The most simple picture one can form about the creation of an empirical science is along the lines of an inductive method. Individual facts are selected and grouped together such that their lawful connection becomes clearly apparent. By grouping these laws together, one can achieve other more general laws until a more or less uniform system for the available individual facts has been established—such however, that the intellect, looking backwards, could arrive at the individual facts reversely in a merely mental way.

Einstein diminishes the importance of an inductive method.

However, a merely casual look at factual development already teaches us that big advances in scientific knowledge originated this way only to a small degree. For if a researcher would approach things without a preconceived opinion, how would he be able to pick the facts from the tremendous richness of the most complicated experiences that are simple enough to reveal their connections through laws? Galileo would never have found the law of free-fall without the preconceived opinion that the situations as we find them are complicated by the effects of air resistance, and therefore, that one has to focus on cases where this effect has only negligible influence.

Hypothetico-deductive method described.

The truly great advances in our understanding of nature originated in a manner almost diametrically opposed to induction. The intuitive grasp of the essentials or a large complex of facts leads the scientist to the postulation of a hypothetical basic law, or several such basic laws. From the basic law (system of axioms) he derives his conclusion as completely as possible in a purely logically deductive manner. These conclusions, derived from the basic law (and often only after time-consuming developments and calculations), can then be compared to experience, and in this manner provide criteria for the justification of the assumed basic law. Basic law (axioms) and conclusions together form what is called a "theory." Every expert knows that the greatest advances in natural science, e.g., Newton's theory of gravitation, thermodynamics, the kinetic theory of gases, modern electrodynamics, etc. all originated in this manner, and that their basis has this, in principal, hypothetical character. So, while the researcher always starts out from facts, [4] whose mutual connections are his aim, he does not find his system of ideas in a methodical, inductive way; rather, he adapts to the facts by intuitive selection among the conceivable theories that are based upon axioms.

Thus, a theory can very well be found to be incorrect if there is a logical error in its deduction, or found to be off the mark if a fact is not in consonance with one of its conclusions. But *the truth* of a theory can never be proven. For one never [5] knows if future experience will contradict its conclusion; and furthermore there are always other conceptual systems imaginable which might coordinate the very same facts. When two theories are available and both are compatible with the [6] given arsenal of facts, then there are no other criteria to prefer one over the other besides the intuitive eye of the researcher. In this manner one can understand why [7] sagacious scientists, cognizant of both—theories and facts—can still be passionate adherents of opposing theories. [8]

I offer the reader in these hectic times a small, objective, passionless reflection because I believe that quiet devotion to the eternal goals that are shared by all civilized men can today serve political reconvalescence better than political meditations and credos. [9]

[5] This statement resembles Karl Popper's justification of his criterion of falsifiability. While Popper (1902–1994) quotes *Einstein 1918j* (Doc. 7) in *Popper 1935*, p. 7, he later claimed that he was unaware of the present document (Karl Popper to John Stachel, 15 March 1984, John Stachel, Boston).