
Science Without Experience

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SCIENCE WITHOUT EXPERIENCE

ONE of the most important properties of modern science, at least according to some of its admirers, is its *universality*: any question can be attacked in a scientific way, leading either to an unambiguous answer or else to an explanation of why an answer cannot be had. In the present note I shall ask whether the *empirical hypothesis* is correct, i.e., whether experience can be regarded as a true source and foundation (testing ground) of knowledge.

Asking this question and expecting a scientific answer assumes that a science *without* experience is a *possibility*; that is, it assumes that the idea is neither absurd nor self-contradictory. It must be possible to imagine a natural science without sensory elements, and it should perhaps also be possible to indicate how such a science is going to work.

Now experience is said to enter science at three points: testing; assimilation of the results of test; understanding of theories.

A test may involve complex machinery and highly abstract auxiliary assumptions. But its final outcome has to be recognized by a human observer who *looks* at some piece of apparatus and *notices* some observable change. Communicating the results of a test also involves the senses: we *hear* what somebody says to us; we *read* what somebody has written down. Finally, the abstract principles of a theory are just strings of signs, without relation to the external world, unless we know how to connect them with experiment, and that means, according to the first item on the list, with experience, involving simple and readily identifiable sensations.

It is easily seen that experience is needed at none of the three points just mentioned.

To start with, it does not need to enter the process of *test*: we can put a theory into a computer, provide the computer with suitable instruments directed by him (her, it) so that relevant measurements are made which return to the computer, leading there to an evaluation of the theory. The computer can give a simple yes-no response from which a scientist may *learn* whether or not a theory has been confirmed without having in any way *participated* in the test (i.e., without having been subjected to some relevant *experience*).

Learning what a computer says means being informed about some simple occurrence in the macroscopic world. *Usually* such information travels via the senses, giving rise to distinct sensations. But this is not always the case. Subliminal perception leads to reactions directly, and without sensory data. Latent learning leads to memory traces directly, and without sensory data. Posthypnotic suggestion leads to (belated) reactions directly, and without sensory data. In addition there is the whole unexplored field of telepathic phenomena. I am not asserting that the natural sciences as we know them today could be built on these phenomena alone and could be freed from sensations entirely. Considering the peripheral nature of the phenomena and considering also how little attention is given to them in our education (we are not trained to use effectively our ability for latent learning) this would be both unwise and impractical. But the point is made that sensations are not *necessary* for the business of science and that they occur for practical reasons only.

Considering now the objection that we *understand* our theories, that we can *apply* them, only because we have been told how they are connected with experience, one must point out that experience arises *together with* theoretical assumptions, *not* before them, and that an experience without theories is just as uncomprehended as is (allegedly) a theory without experience: eliminate part of the theoretical knowledge of a sensing subject and you have a person who is completely disoriented, incapable of carrying out the simplest action. Eliminate further knowledge and his sensory world (his "observation language") will start disintegrating; even colors and other simple sensations will disappear until he is in a stage even more primitive than a small child. A small child, on the other hand, does not possess a stable perceptual world which he uses for making sense of the theories put before him. Quite the contrary. He passes through various perceptual stages which are only loosely connected with each other (earlier stages *disappear* when new stages takes over) and which embody all the theoretical knowledge achieved at the time. Moreover, the whole process (including the very complex

process of learning up to three or four languages) gets started only because the child reacts correctly toward signals, *interprets them correctly*, because he possesses means of interpretation even before he has experienced his first clear sensation. Again we can imagine that this interpretative apparatus acts without being accompanied by sensations (as do all reflexes and all well-learned movements such as typing). The theoretical knowledge it contains certainly can be *applied* correctly, though it is perhaps not *understood*. But what do sensations contribute to our understanding? Taken by themselves, i.e., taken as they would appear to a completely disoriented person, they are of no use, either for understanding, or for action. Nor is it sufficient to just *link them* to the existing theories. This would mean extending the theories by further elements so that we obtain longer expressions, not the understanding of the shorter expressions that we wanted. No—the sensations must be incorporated into our behavior in a manner that allows us to pass smoothly from them into action. But this returns us to the earlier situation where the theory was applied, but allegedly not yet understood. Understanding in the sense demanded here thus turns out to be ineffective and superfluous. Result: sensations can be eliminated from the process of understanding also (though they may of course continue to *accompany* it, just as a headache accompanies deep thought).

I conclude with a few remarks on the observational-theoretical dichotomy.

Most of the time the debates about this dichotomy concentrate on the question of its existence, *not* on the question of its purpose. We may readily admit the existence of statements that are examined by looking and of other statements that are examined with the help of complicated calculations, involving highly abstract theoretical assumptions. There are observational statements and theoretical statements in that sense. But there are also statements expressed by long sentences and statements expressed by short sentences, intuitively plausible statements and statements that either sound absurd or leave our intuitions unmoved, and so on and so forth. Why is it preferable to interpret theories on the basis of an *observation* language rather than on the basis of a language of intuitively evident statements (as was done only a few centuries ago and as must be done anyway, for observation does not help a disoriented person), or on the basis of a language containing short sentences (as is done in every elementary physics course)? Because observation is supposed to be a source (a testing ground) of knowledge. Is this supposition correct? And does it justify the use of observational languages for the explanation of theories?

It justifies such use only if observation can be shown to be the *only* or the only *trustworthy* source of knowledge. On pages 791/793 above we have seen that the first part is far from true. Knowledge can *enter* our brain without touching our senses. And some knowledge *resides* in the individual brain without ever having entered it. Nor is observational knowledge the most reliable knowledge we possess. Science took a big step forward when the Aristotelian idea of the reliability of our everyday experience was given up and was replaced by an empiricism of a more subtle kind. Later on progress was often made by following theory, not observation, and by rearranging our observational world in conformance with theoretical assumptions. In the struggle for better knowledge theory and observation enter on an equal footing, just as do intuitive plausibility and intuitive absurdity: the absurd theory may win the day and the plausible theory may have to be given up just as the refuted theory may win the day, pushing aside, and making irrelevant, the refuting observations (this is what happened, for example, at the time of Galileo). Empiricism, insofar as it goes beyond the invitation not to forget considering observations, is therefore an unreasonable doctrine, not in agreement with scientific practice.

To sum up: a natural science without experience is *conceivable*. Conceiving a science without experience is an effective way of examining the empirical hypothesis that underlies much of science and is the *conditio sine qua non* of empiricism. Proceeding in this way, we may find methods that are more effective than plain and simple observation (just as Galileo found certain illusory phenomena to be more effective sources of astronomical knowledge than plain, direct, undiluted observation). Proceeding in this way of course means leaving the confines of empiricism and moving on to a more comprehensive and more satisfactory kind of philosophy.

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COMMENTS AND CRITICISM

IN DEFENSE OF JUSTIFIED TRUE BELIEF

OBVIOUSLY there are differences between knowing and believing, but there must be connections as well. Consider one typical case: hailstones are falling outside your window, and you think, but do not yet know, that there is a storm. What else would you need for knowledge in this type of situation?