

knowledge which penetrates the quiddities of sensible things, as found in the philosophy of nature, and, on the other hand, his opponents' solidly established position that these two knowledges cannot be explained as specifically different levels within the first order of abstraction, can be reconciled only by the admission of two generically different levels of abstraction, a physical and what might be called a prophysical abstraction.

Prophysical abstraction, the perinoetical knowledge of sensible nature, and the empirio-schematic sciences seem to fall within the scope of an internal sense, most probably of the imagination, as perfected by its conjunction with reason in man. Then the question will arise: do modern investigations into the adaptive behavior of animals call for the admission of a collative imagination? And at once the principle upon which the whole Thomistic doctrine of sensitive knowledge has been erected will be under fire, the principle that the senses only know individual sensible things, whereas the intellect knows specific natures (the universal). For this principle presupposes that there is no term of knowledge intermediate between the image and the concept whereas the perinoetical knowledge of sensible things according to aggregates of sensible phenomena common to many individuals presupposes such an intermediate.

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***The Philosophy of Science. An Introduction.* By Stephen A. Toulmin. New York: Longmans, Green, 1953. Pp. viii + 172, with index. \$2.40.**

The author of this book is Lecturer in the philosophy of science at Oxford. It is, in his words, "designed to meet the needs of University students in philosophy, and assumes no special knowledge either of mathematics or natural science." More particularly it appears to be intended to open the eyes of such students to the fact that the logic of the physical sciences and the certitude, if any, to which they lay claim, is not quite what their logic books may lead them to believe. The whole book might be considered as an exposition to contemporary philosophy students of the logic—both formal and material—of the physical sciences, using such phenomena as light rays and gravitation as models.

It begins quite charmingly with the analogy of bed-time stories: "When we tell children stories at bed-time, we talk to them about all kinds of people . . . logically different kinds of people. Some nights we tell them stories from history, other nights ancient myths; sometimes legends, sometimes fables. . . . So in bed-time stories, Julius Caesar, Hercules, Achilles, the Boy who cried 'Wolf!', Uncle George and Winnie-the-Pooh all appear, at first sight, on the same footing. . . . Unless the child is told (what the logical status of each character and story is—'No, there aren't really any talking bears'), he may not know how to take them; and thus he may get quite false ideas about the world into which he has been born, about its history, its inhabitants, and the kinds of thing he might encounter one day as he turned the corner of the street." In a word, in order to understand what science is trying to do and trying to say, one must understand the logical status of its personages—its laws, its formulae, its entities. From here on in, although the author appears quite capable of sustaining the initial tone, the matter seems to become needlessly drawn out and tedious. From a scholastic point of view, it is a little as though someone were patiently trying to explain that silk purses cannot be made out of sows' ears to someone who never thought of trying it anyway.

However, this is undoubtedly not the attitude of the author. One senses that his is rather the attitude of science which having supplanted philosophy sees something of a menace in contemporary logic blithely explaining such things as the "scientific method." To halt this encroachment, science sets out to show to the rash logician that science has a logic of its own which the contemporary logician-philosopher should not presume to be a part of his domain. The author sets out to show that logic from examples, and quotes Einstein as saying: "If you want to find out anything from the theoretical physicists about the methods they use, I advise you to stick closely to one principle: don't listen to their words, fix your attention on their deeds."

Assuming the attitude of Einstein, the scholastic philosopher, trained in the outlook of Aristotle and St. Thomas Aquinas, will come to the conclusion that the purpose of this book might have been satisfied far more briefly and simply. Why the length? Like the author, one might resort to an analogy: If at one time men were looking for the Promised Land, convinced it lay somewhere and could be found, and a Prophet were to appear who said that they had been looking in the wrong direction and he had the true direction, substantiating his claim by certain tangible results as the journey began, he would undoubtedly attract

a confident following. Then, supposing the Prophet's certain directions proved to be something less than certain. Then the Prophet might turn around and say, forgetting those who had not chosen to follow, not, "I have been mistaken," but "We have been mistaken, and you will notice that I am the first one to have detected it." Thus what might have appeared to have been a mistake is transformed into further testimony to the clairvoyance of the Prophet. A further step in the same direction would be for the Prophet to announce that actually we are not sure that there is any Promised Land at all, but we'll keep looking for it, always ready to change course at a moment's notice. For those who have been dutifully following the Prophet, his great merit now consists, not in his being able to lead anyone to the Promised Land, but in having been the first one to have discovered that perhaps there is no Promised Land at all. In such a world, the Prophet's resolute diffidence represents the greatest wisdom, and the attitude of those forgotten searchers, who have gone right on thinking there is a Promised Land and have gone right on looking for it without ultimate success, but neither with disillusionment, is written off, thanks to the Prophet's experience, as incurably naive.

For a scholastic, it is no great discovery to find that physical laws do not apply with mathematical exactitude, because he never thought so in the first place. He does not consider inductive (called "deductive" in the text—as in Sherlock Holmes) inferences to be a simple accumulation of experiences, because he never accepted Bacon's (impossible) method. He simply observes sufficient singulars, as the author likewise prescribes, in order to be able to elaborate an adequate explanatory principle. He knows, without needing chapters to be told, the difference in predicting singular events between necessity of consequence and necessity of consequent. And since he has not enthusiastically erected new principles, such as the Law of the Conservation of Energy, into immutable laws of the universe, only to see them shattered by other laws, he has not felt the need to limit all necessity to that of consequence. And when the scientist theoretically restricts even the Uniformity of Nature to such a cautious necessity, he looks at the physicist's deeds rather than his words. In conclusion, accordingly as one believes the world to have begun before or after 1500, what may appear, in this book, as enlightenment to some, to others will appear simply as a belated—and unduly involved—recognition of reality.

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