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INTRODUCTORY NOTE.

THE various causes which have so long delayed the publication of the present translation of the *Problems of Science*, may prove to be rather aids than hindrances to the just appreciation of this very remarkable synthetic view of scientific methodology. For, as a result of these accidents, the book of Professor Enriques is offered to American readers at a time when we are better fitted than we have been during the last few years to appreciate the significance of the author's large, clear, and calm view of a wide range of perplexing modern problems.

The first edition of the Italian text of the *Problemi della Scienza* of Professor Enriques appeared in 1906, and had already become known to a wide circle of European students, belonging to various nationalities, at the time of the International Congress of Philosophy at Heidelberg, in the late summer of 1908. At this congress I myself met the author, and undertook to do what I could towards finding an American publisher for a translation of this book. Not long after the congress, Dr. Carus, on behalf of the Open Court Publishing Company, agreed to undertake the publication of the translation. The translator completed the first draft of the manuscript by June 1909. A certain amount of revision of some of the more technical portions of the translated text remained as that part of the work which I had myself, from the outset, agreed to undertake. Moderate in quantity as this task of revision has indeed proved, it came into conflict with a great number of academic and personal duties of my own,—duties which resulted from my previous engagements, and which could not at once be laid aside for the purpose of finishing my own little part of the task. Various new hindrances later intervened. In consequence of my own delay, the revised manuscript of this translation was first put in the publishers' charge as late as June 1912; and this American edition of the work of Enriques has since been in press. The delay has given oppor-

tunity to use the second Italian edition of the *Problemi* for the purpose of the revision of some passages of the translation.

Since the Heidelberg Congress of Philosophy in 1908, pragmatism, which, as many readers of current discussion will remember, formed the principal topic of the lively discussions of that session, has passed through its days of joyously youthful success; and is now no longer a novelty. Meanwhile, the new star of Bergson has glowed with increasing brilliancy from year to year. "Anti-intellectualism" has become, for the time, the prevailing mood in the more popular expositions of philosophy. Mobile minds,—minds characterized by what James called a "dramatic" temper,—have taken a leading part in controversy. Books such as the present one may seem for the moment, to such minds, out of place.

Yet precisely such moods as have been so widely represented in the general literature of popular philosophy since 1908, call for their own correction, or at all events for their own complement and supplement. What is most to be feared, at a time when discussion is so lively and when "anti-intellectualism" has gained such large and eager audiences, is not any definitive triumph of the "anti-intellectual" enthusiasms, but rather some too swift and "dramatic" reaction in the world of the ruling philosophical interests, some drastic return from the revolutionary temper of the thought of the moment to the older types of scientific orthodoxy, some renewal of the "dogmatic slumber" from which James, the Pragmatists, and Bergson, have awakened many plastic, quick-witted, but not always naturally judicial minds.

At just such a moment, a book like the present work may therefore be especially useful to thoughtful students, who love patience and clear ideas quite as much as they are fond of intuitions, of brilliancy, and of "vital impetus." The work of Professor Enriques stands somewhat above and apart from those philosophical controversies which the anti-intellectual movement has inspired; for this book was prepared and published in the original Italian before those controversies assumed their latest phase. Yet the author, already prominent in the discussions of the Heidelberg Congress of 1908, has since been President of the Philosophical Congress at Bologna in 1911. Translations of his *Problemi della Scienza* into French and German have widely extended his influence. His book is by far the most thorough and synthetic treatment of the problems of scientific methodology which belongs to recent years,—with the sole exception of the treatment which forms part of the first two

volumes of Merz's *History of Thought in the Nineteenth Century*. Meanwhile, owing to their widely contrasting ranges and modes of discussion, Merz's book, (which is primarily a history of science, with a treatment of methodology *obligato*), and the book of Enriques, (which is explicitly a scientific methodology, with numerous references to contemporary interests and controversies):—these two books, I say, come into no sort of rivalry with each other, but supplement each other in a way which is all the more important because neither author can have known, I think, about the other's work until his own was substantially complete.

As for the relations of the book of Enriques to the recent controversies to which I have just referred, the work on the *Problems of Science* is thoroughly "intellectual" in its tone and temper, without being open to any of the usual objections to "intellectualism" which are now most popular among philosophical readers. The author (himself Professor of Projective and Descriptive Geometry in the University of Bologna), approaches his "Problems" with the training of the mathematician and the logician, and with the reputation which his treatise on "Projective Geometry," and his published essays on the "Foundations of Geometry" have long since won for him. Yet this book shows no tendency to magnify overmuch the office of the geometer, or the authority of the logician, or the powers of the human reason, in the interpretation of phenomena. Pragmatists will find Enriques emphasizing some of their own theses regarding what is now called the "instrumental" or the "functional" significance of thought, and of the whole scientific process. And this emphasis, as it appears in some of the most important general discussions (notably in the latter half of the chapter on Logic), is all the more interesting because (as we have just seen) this book,—especially in its earlier chapters,—antedates the most recent developments of pragmatism. Yet this relatively pragmatistic element of the book of Enriques appears in a form which is both largely original, and extremely many-sided and judicial. Enriques views the thinking-process as indeed an "adjustment" to "situations." But he lays great stress upon the tendency of science to seek unity, upon the synthetic aspect of scientific theory, upon what he calls the "association" of concepts and of scientific "representations." And this stress upon synthesis, this sense for wholeness and for unity, gives his treatment both of the values and of the limits of scientific hypotheses and theories, an original and a very notable character. In his view of the work and of the

uses of natural science, Enriques stands in strong contrast to the original or Comtean type of "Positivism"; for he greatly emphasizes both the "objective aspect" and the significance of constructive scientific theories. As a methodologist, Enriques also finds a positive value in many "hypotheses" of such a type that Ostwald's well-known maxims of scientific method would condemn them in advance. Nor does Enriques agree with Mach's or with Pearson's limitation of the business of science to the simple "description" of physical phenomena.

Yet, despite this fondness and this respect for synthesis and for the "association" of various scientific concepts and "modes of representation," Enriques has as sincere an aversion to what he takes to be genuinely "metaphysical" constructions as has any positivist; as vigorous a hostility to the "transcendental" and to the "absolute" as is cultivated by any philosopher of our "Chicago School"; and as clear, if not as vehement, a respect for the relation between thought and will as is expressed by any Pragmatist.

What sets Enriques most apart from most of the thinkers,—pragmatists, positivists, relativists,—with whom one would be most likely to associate him,—or on occasion to confound him,—is a certain judicial temper, a breadth of view, a fondness for synthesis, an exactness of intellectual training, a love of the comparative study of his topic,—in brief a spirit which is as rare as it is requisite in a man who is to prove a thoroughly good methodologist. Enriques certainly does not, as a philosopher, blindly overrate the work or the powers of the intellect. On the contrary, he emphasizes the imperfection, the relativity, the tentative and inadequate character of all scientific and theoretical construction. Yet he is neither sceptic, nor anti-intellectualist. He does justice to the "instrumental" function of thought. But he is certainly no mere "instrumentalist." For the stress which he lays upon the "objective aspect" of even the most highly theoretical portions of scientific theory; and his insistence upon the tendency of science towards a genuine and irrevocable progress, not merely in its mutable and transient control of special experiences, but in its total view of nature,—these tendencies in Enriques seem to exclude any interpretation of his philosophy of science as a mere "instrumentalism." For Enriques, the "absolute" is no object for science. But what is won, in a scientific way, is won, and the whole tendency of the scientific attainment of truth is to be *not* a dealing with what is merely mutable, but an irreversible progress towards a survey of the unity of the real,—

a grasping of real "invariants," and of wholes. These are theses that have a prominent place in the extremely careful, far-seeing, critical, and constructive methodology which constitutes this wealthy and well-wrought book.

Where so much is offered, it is hard to select what the reader should most consider. Personally I have taken very special interest in the treatment which Professor Enriques gives to the Principles of Geometry,—a topic which he has made especially his own, and which (as here discussed) will appeal not only to students of the logic of mathematics, but to psychologists interested in those aspects of the problem of space which especially concern their own work. The concluding chapter, dealing as it does with a wide range of highly technical physical problems and theories, is at once the most difficult (both for the translator and for the reader) and the most characteristic of the book. Here the synthetic tendencies of our author,—his wide outlook, his fairness of judgment, his careful comparisons, his bringing together of matters which are, for most readers, hopelessly far apart,—all tend to show what this book is,—a treatise on methodology such as we have long needed, and have here at length before us in English. May the work of the President of the last Congress of Philosophy serve to quicken as well as to nourish interest both in science and in methodology. May it aid us in treating more judiciously, more broadly, and more exactly, the current controversies concerning the office and the scope of the human intellect. And above all may it foster that spirit of unity in thoughtful research which its author has so well illustrated,—that spirit namely which tends to unite the work, not only of various sciences, but of various nations.

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JOSIAH ROYCE.