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AN INSTITUTE FOR THE HISTORY OF SCIENCE AND CIVILIZATION

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TO THE EDITOR OF SCIENCE: The appeal concerning "an Institute for the history of science and civilization" published in SCIENCE, March 23—ill-timed as it was—has met with the most encouraging response. Two communications relating to it have been published in SCIENCE, June 22 and July 6,[1] and a great many more have been privately addressed to me. Most of them, however, lay so much stress on some special feature of our plan that I feel it necessary to state again, briefly, the fundamental idea that underlies it, lest the real purpose of the institute be lost sight of.

But let me say first of all that there is at least one point upon which an unanimous agreement seems to have been reached. The whole budget of letters which I have received from all over the country, points to the conclusion that there is already a wide-spread, though scattered interest in the history of science, and that it is high time to organize it and to devote to these studies at least as much attention as is given to the history of other aspects of human life. The wretchedness of present conditions will be best depicted by remarking that, whereas there are hundreds of scholars who earn a living by teaching general history, or the history of art, of literature, of religion, there is not yet in America a single chair exclusively devoted to the history of science! From my very extensive corre-

[1] *Cf.* also F. S. Marvin in the *Positivist Review*, London, June, 1917.

spondence on this subject, I gather, however, that before long an irresistible pressure will fortunately put an end to this paradoxical situation.

The purpose of the institute can only be accomplished if its activities be constantly inspired by a close coordination of the three following points of view.

There is first *the point of view of the historian*: The progress of mankind is a function of the development of science. Indeed science is the only process which is really cumulative; it is also the most international. Hence to give a true picture of the development of civilization, it must be focused on the evolution of scientific thought and practice.

Secondly, *the point of view of the scientist:* The evolution of science must be studied to better understand the interrelations of all its branches, and the principles and real signification of each of them. The elaboration of science into an organic whole implies such historical research. A continuous criticism of the foundations of science is equally necessary, lest it degenerate into empiricism or into a system of prejudices. This critical work is essentially of an historical nature. The point of view involved is splendidly illustrated in the works of Pierre Duhem and Ernst Mach.

Thirdly, *the point of view of the philosopher,* which could also be called *the encyclopædic point of view,* the philosopher whom I have in mind being of course a man highly trained in scientific thought and research, but whose interest is mainly a coordinating, a synthetic one. It is clear that the more science is specialized, the more it becomes complex and extensive—the more also do some kind of synthetic studies become necessary to preserve its organic unity and indeed its very existence. A work of this kind has been more or less successfully accomplished at different periods by such men as Aristotle, Thomas Aquinas, Kant,

Comte, Cournot, Spencer. It needs must be undertaken over and over again, but it becomes increasingly difficult and is now perhaps beyond the grasp of any single man. It is not simply a matter of genius—such synthesis does not require more genius now than it did in the fourth century B.C.—but the initial stock of knowledge to be mastered is so much greater that the process of classification and assimilation previous to any new synthesis must be partly effected on a cooperative basis.[2]

I beg to repeat that the fundamental idea of the institute is to coordinate these three converging points of view; that is, to organize —for the first time—a systematic collaboration between scientist, historian and philosopher, and so to make the accomplishment of their highest task possible, despite the increasing wealth and intricacy of specialized knowledge. These points of view complete and balance each other. He who separates them simply proves that he has failed to understand the purpose that we try to accomplish.

One may object that the cooperative work which we are advocating is already possible now—without a new institute—and that our universities already bring together some of the men whose collaboration is needed. The objection, however, is not valid, because, even if the right men happen to belong to the same university, economic conditions will generally prevent them from devoting themselves entirely to an activity of great amplitude and duration which does not pay. Besides, we can not depend on such chance combinations: this synthetic work must be carried through in a systematic way, with sufficient completeness and thoroughness, extreme accuracy and reasonable speed.

[2] This is especially true for all the historical material. The encyclopædist must take the whole past into account; yet, he has no time to pursue historical investigations.

Hence, I believe that the creation of such an institute—either as a department of an existing university or other institution, or independently—is the only practical way to make possible this intimate collaboration of historian, scientist and philosopher which is becoming more and more necessary. Moreover, the institute would also provide one of the most effective ways of preparing a much needed reorganization of our educational system, the internal vice of which is clearly proved by the ever recurring controversy "science versus the humanities." It is obvious that the importance of science in education can but increase, but this can not be safely done without introducing a little of the humanistic spirit—*i. e.*, essentially a historical and disinterested point of view—in our scientific and technical studies. There should not be any rivalry between scientific and humanistic studies, but only cooperation to a common end; more knowledge, beauty, justice. Now, the proposed Institute would become the natural center of this *New Humanism* for which I am pleading; it would train men imbued by this new ideal —not one easily made up of vague generalities, but an idealism constantly rejuvenated and checked by intimate contact with the best available knowledge and the most exacting scholarship. Its humanizing influence would soon be felt all over the country.

I think that I can say, without any impertinence, that one of the shortcomings of this country—one that may imperil the accomplishment of her higher destiny—is the relative scarcity of broad and accurate scholarship. This is partly caused by economic conditions discouraging disinterested studies, but it also is due to the absence of a congenial tradition. The institute would establish such a tradition.

The reader who is in sympathy with the purpose of the institute will find no difficulty in appreciating the interesting suggestions

published in these columns by Mr. Bert Russell and Mr. Aksel G. S. Josephson.

Mr. Russell suggests (June 22) that to the activities of the institute be added the following: "the facilitation of prompt and reliable judgments upon all questions of novelty arising in connection with the administration of the patent laws, thereby aiding in the placing of the administration of such laws upon a secure scientific foundation."

There should be indeed as close and friendly a collaboration as possible between the institute and the Patent Office. But we must not forget that the collections of the Patent Office refer almost exclusively to the technical end of science—taking all in all, not the highest one (a scientist does not generally patent the original combination of instruments that have led him to a discovery). Besides they refer only to the most recent times.

It is noteworthy in this connection, that I have also received two other interesting communications insisting on the importance of the study of primitive science and suggesting therefore a closer collaboration with ethnographic museums. As a matter of fact, the institute should try to consider not simply the beginnings or the latest developments of science and technology, but the entire development. After all, in the whole evolution, it is impossible to point out one step forward which is more important than the others; each is indispensable and there is no common measure between them.

If the institute is to be associated with another institution, the most useful association would perhaps be one with a great museum, such as the U. S. National Museum, the American Museum of Natural History or the Harvard Museums. The objects of a museum can not be easily moved or duplicated, whereas it is not difficult to move or photograph books or manuscripts. Moreover, the eventual crea-

tion of a museum of science such as the *Conservatoire des Arts et Métiers* or the *Deutsches Museum,* would be easier and less expensive if the institute were already connected with another museum.

Mr. Aksel G. S. Josephson lays special stress (July 6) on the bibliographical activity of the institute. The historians of science should be grateful to him for the valuable bibliographical work which he has undertaken in their behalf, and I, for my part, am much in sympathy with most of what Mr. Josephson says.

Still, we must not forget that bibliography is not an end, but simply a means, a method. I am, of course, chiefly concerned, not with external bibliography such as is needed in libraries, but with internal, critical bibliography. From this point of view, it is quite clear that the matter of essential importance is not the mere bibliographical technique—however important it may be—but a deep knowledge of the subject matter to be criticized.

I am quite agreed with Mr. Josephson, that many scientists show a deplorable lack of bibliographical method. Yet, I do not think it possible, as a rule, to train bibliographers for very special critical work. Anyhow it should be easier to teach bibliographical consistency to the scientists, than to make the bibliographers omniscient.

I hope that Mr. Josephson will be pleased with the following conclusion. There should be on the staff of the Institute at least one highly trained bibliographer, whose duty it would be to distribute the books and articles among expert critics and to see to it that their work, as far as external bibliography is concerned, be as accurate and uniform as possible. His functions would chiefly be those of a bibliographical editor.

At the present time, excellent critical bibliographies are periodically published for almost all the branches of science, but there is none really satisfactory for their history, philosophy or for the organization of the whole. I had tried to organize such a bibliographical service in *Isis*, but unfortunately this publication was stopped by the war, just when I was beginning to see my way to do it well. The publication of such a bibliography would naturally be incumbent on the institute; considerable pains should be taken to make it as perfect as possible—but it would only be a means to a higher end.

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