

The Washington Historical Quarterly

HISTORY AND SCIENCE

What is science? What is art? Is history one, the other, or neither?

In facing those questions, it is not the present purpose to join the many who have attempted abstract definitions. It is rather the purpose of launching a plan to gather the concrete facts of the progress the sciences have made within the State of Washington, that students and writers may realize how history has been enriched by science in at least one of the commonwealths of the nation.

Readers may be interested in some thoughts encountered during the evolution of this plan. Horace Greely Byers, Professor of Chemistry at Cooper Union, New York, in one of his pugnacious intervals about twenty years ago, while a member of the University of Washington faculty, blurted out: "You historians neglect science. You all deal in politics, in economic and social development, but none of you pay any attention to the influence of science on civilization." In April, 1927, there was published the first two volumes of Professor Vernon L. Parrington's work on *Main Currents in American Thought*. They were abundantly praised by reviewers throughout the country. One adverse note was sounded. Professor Charles A. Beard reviewed the work very favorably in *The Nation* for May 18, 1927, but added these two sentences: "To the present reviewer Mr. Parrington's chief sin of omission is his neglect of natural science and its influence on theology, politics, and letters. Surely, Silliman's pamphlet on the effect of the new geology upon Miltonic cosmogony, published in the romantic age of Emerson, deserves as much space as the lucubrations of Cotton Mather."

That criticism of the work of a colleague revived in memory the former outburst by Professor Byers. Professor Parrington was asked about the criticism of his work and he replied: "Yes, I know about that. I intend to treat of the influence of science in my third volume. I feel that science had but little ef-

fect on American thought prior to 1860." Professor Beard and his wife, Mary R. Beard, in their *The Rise of American Civilization* devote the last chapter to "The Machine Age."

Obviously, the historians are awakening to the influence of science. Yet it ought to be conceded also that for many years American history text books have noted the influence of such inventions as the cotton-gin, the railroad, the steamboat and the plow. The newer attitude is simply an expansion of that recognition through efforts toward a clearer comprehension of the complexities of modern life. Moreover, this is quite in harmony with the present concept of the sphere of history. Few now accept Freeman's brief definition that "history is past politics." Facts must now be selected from all activities which promote or retard civilization. Such efforts may prove to be endless and perfection may be hopeless. Poincare has pointed out that the universe is spawning milliards of facts every second. The writing of true history never has been an easy task nor has finality ever been achieved in that field. Nearly every generation has insisted on re-writing history for itself.

In one of his last historical addresses Henry Cabot Lodge declared that man has never equalled the three primitive inventions—use of fire, the hollow boat and the round wheel. Like other interesting generalizations this one is open to sharp debate by the chemist and the physicist and how promptly would an electrical engineer declare that Faraday's discovery, in 1831, of electro-magnetic induction certainly equalled those primitive discoveries by beginning the electric age, in which we live. It is not expected that the pages of history shall be changed into catalogues of scientific discoveries and inventions but, rather, that those pages shall record the facts when life and civilization have been affected by such discoveries and inventions. It is not expected that history shall be transformed into a science but, rather, that the historian shall seek to harmonize his work with that of the scientist.

James Truslow Adams has recently discussed the question "Is History Science?" in *The Saturday Review of Literature* for January 7, 1928. His argument is well expressed in his concluding paragraph as follows: "I do not see why we need label history as either a science or an art, except that everything has to have a tag, but, on the whole, if one insists on a designation, I believe it safer to consider it an art, and leave it to the gentlemen who write it to tell the truth like gentlemen as they find

it, for in this age it is not only scientists who try to think clearly, report honestly, and use every possible source and resource to see how things really were and how they have come to be as they are. I can see no way in which history can approximate science more nearly than that. If that be science, make the most of it." In arriving at that conclusion, he had called attention to a half-century of rather bitter debate in Germany and elsewhere, adding: "The discussion simply goes on and on on the same lines. In the main it rages around two general topics,—what should form the subject matter of history, and whether history is a science or an art."

Any historian who seeks from recognized scientists a definition of science is sure to receive as reply: "Science is organized knowledge." If the historian should convince himself that his collected and selected materials are positive knowledge and if he proceeds to organize those materials in chronological and consequential order, what is to hinder him from counting his work a science and himself a scientist? Of course there are many other definitions of science involving laws of occurrence and recurrence. Thereupon hinges the debate as to whether history is or is not a science.

Scientists are much less concerned over the content of histories than are the historians over their own credit for using the scientific method. Forty years ago, during a flurry of opposition to science, David Starr Jordan declared: "Science is truth and truth is the most patient thing in this world." Historians as well as scientists can derive consolation from such a dictum. John Eglinton (William McGee) in his essay on "Sincerity," published in 1917, says that Scio has ascended the throne of Credo, "who sits as a kind of dowager-empress, wearing the insignia of former greatness, and even insisting on precedence, yet yielding all her real authority to her successor." Science is certainly on the throne of the intellectual world and those at work in the recognized fields of science may exult over the present clamor by historians and others to attain the dignity of inclusion within the realm. That clamor is producing results. Science is expanding by the admission of such fields as archaeology, sociology, political science and economics.

The scientific method is relatively quite as recent in origin as are the classifications of some of the newer sciences. By many the origin of the scientific method is definitely fixed at 1838 when Professor Justus Liebig established the laboratory of

chemistry in the University of Giessen. That laboratory and its followers certainly wrought a revolution in the methods of study, of teaching, and, ultimately, of writing. Hopeful historians call the library a laboratory.

One reason why scientists have little concern over histories or historians is that the nature of their work compels concentration on expanding the frontiers of knowledge. Occasionally historians have come to their rescue by preparing histories of science. A new effort in this line is now in process. The Carnegie Institution of Washington has just published Volume I of *Introduction to the History of Science* by George Sarton. Reviewing this work in *The American Historical Review* for January, 1928, Professor Lynn Thorndike, of Columbia University, says: "It represents a tremendous amount of work and a high order of erudition, but will save others many times the labor expended on it and tend to raise subsequent work in the field to its own level." The bulky volume of 839 pages carries as a subtitle "From Homer to Omar Khayyam." It deals with biographics of those who worked in science. It is interesting to note that for this first period covered historians are included among the scientists.

In stating the purpose of his work, Mr. Sarton, who is listed as Associate in the History of Science, Carnegie Institution of Washington, says: "The purpose of this work is to explain briefly, yet as completely as possible, the development of one essential phase of human civilization which has not yet received sufficient attention—the development of science, that is of *systematized positive knowledge*. I am not prepared to say that this development is more important than any other aspect of intellectual progress, for example, than the development of religion, of art, or of social justice. But it is equally important; and no history of civilization can be tolerably complete which does not give considerable space to the explanation of scientific progress. If we had any doubts about this, it would suffice to ask ourselves what constitutes the essential difference between our and earlier civilizations. Throughout the course of history, in every period, and in almost every country, we find a small number of saints, of great artists, of men of science. The saints of today are not necessarily more saintly than those of a thousand years ago; our artists are not necessarily greater than those of early Greece; they are more likely to be inferior; and of course, our men of science are not necessarily more intelligent than those

of old; yet one thing is certain, their knowledge is at once more extensive and more accurate. *The acquisition and systematization of positive knowledge is the only human activity which is truly cumulative and progressive.* Our civilization is essentially different from earlier ones, because our knowledge of the world and of ourselves is deeper, more precise and more certain, because we have gradually learned to disentangle the forces of nature, and because we have contrived, by strict obedience to their laws, to capture them and to divert them to the gratification of our own needs."

That the guild of historians is resolutely facing the issues between science and history is further evidenced by the proceedings at the forty-second annual meeting of the American Historical Association in Washington, D. C., on December 28-30, 1927. One general meeting, devoted to "History and Science," was presided over by John C. Merriam, President of the Carnegie Institution of Washington. The three papers were: "A Historical Sketch of the Relationship Between History and Science," by Professor Lynn Thorndike, of Columbia University; "The Responsibility of the Historian," by Professor Frederick J. Teggart, of the University of California; and "Historical Essentials in the Philosophical Study of Science," by Professor Frederick Barry, of Columbia University. Professor Teggart placed an enormous burden of responsibility upon his colleagues by showing that the historian only is in a position to create what is, in our day, the greatest of all desiderata, historical science. His conclusion was: "In this great undertaking which confronts the historical student, the materials which are available consist of 'histories,' that is, of the experiences which have befallen men in different parts of the world. Hitherto we have dealt with these histories in accordance with an established procedure which restricts our interest to one history at a time. The hope of eliciting knowledge, as distinct from factual information, from the study of human experience, turns upon our willingness to face the task of comparing histories—in all the continents, and throughout the entire extent of time for which evidence is available—for without comparison there can be no 'historical science'." Professor Barry was quite as emphatic in regard to the amount of work ahead. He urged more synthesis, more "suggestive generalization." He declared: "History is the parent and guardian of all science, and is itself rather than mathematics the basic science. Science is always in a state of flux, never complete, and the

essential need of the scientist is not logical premises, but the 'history of the case.'" Professor Thorndike swept over the whole field in brief, compact paragraphs. He showed that the relations between history and science "seem not to have been hitherto at all close." He noted how science has been greatly advanced by the invention of such mechanical aids as the mariner's compass, the barometer, the accurate time piece, the microscope, telescope and photography. If he had had time he might also have elaborated on the wonders wrought by the test-tube. His concluding sentence was: "Advocates of the New History believe that recent science and thought offer other instruments which may prove almost equally efficacious in extending, correcting, or substantiating our previous knowledge and evaluation of the human past."

A sheaf of extracts from recent educational discussion is found in the *Bulletin of the American Association of University Professors* for March, 1928. Three of these extracts may prove of value here. J. McKeen Cattell, writing in *Science*, discusses analytically the additions to the 1000 names in the biographical dictionary of *American Men of Science*, since its first publication in 1903. He says: "Westward does the course of science take its way but it is not gratifying if the eastern states do not equal the cultural nations of Europe before losing their leadership. This may indicate a waning of the world's great era in science." Karl T. Compton, Professor of Physics at Princeton University, writing in *Science*, calls for further support of research and points out the competition in this line of industrial organizations with universities, saying: "Where immediate financial returns are in sight, the keen search for profits which spurs our business life brings quick support and reward. Thus industrial research and development are coming more and more to be looked upon as shrewd business policy. Purely scientific research, which is absolutely prerequisite and basic to invention and development, is, on the other hand, generally carried on at a personal sacrifice and cramped for facilities." Nicholas Murray Butler, in his annual report as President of Columbia University, says: "The scientific method is everywhere extolled and within certain limits is rigorously applied. Yet the public mind, reinforced each year by a veritable army of youth which is marched through scientific laboratories and lecture rooms, museums, and observatories, is as untouched by scientific method as if no such thing existed."

Later he stresses his argument as follows: "The specialist gets from his study of science all that he needs for his speciality, but science meanwhile stands apart from the general stream of cultural influence and development. Faraday and Maxwell, Huxley and Tyndall, Berthelot and Pasteur, Helmholtz and Kelvin, as well as our own Pupin and Millikan are scientific teachers of a different type. They all have in high degree the power of so interpreting science that at their hands it becomes a genuine instrument for the improvement of popular thinking and public action and a vitally important element of broad and fine culture."

Many American historians will gather inspiration from these recent discussions and publications. Here in the State of Washington, in this present undertaking, we are not attempting to arrive at laws or theories for history or science. We are seeking a practical program that may later lead to more obtruse or erudite evaluations. Scientists recognized as successful exponents in their several fields have been invited to prepare articles showing the progress made in those fields within the State of Washington. It is hoped that the publication of these articles will produce at least two distinct and helpful results: First, enabling the scientists to visualize their own constructive contributions to the progress of the State; Second, aiding the historians to evaluate those scientific contributions and to that extent approximate the desired scientific method.

The first one in the proposed series of articles on the progress of science in the State of Washington is published in this issue—"Hydroelectric Power in Washington" by C. Edward Magnusson, Dean of the College of Engineering and Director of the Engineering Experiment Station in the University of Washington.

EDMOND S. MEANY.