The American Journal of Science, 1818-1948

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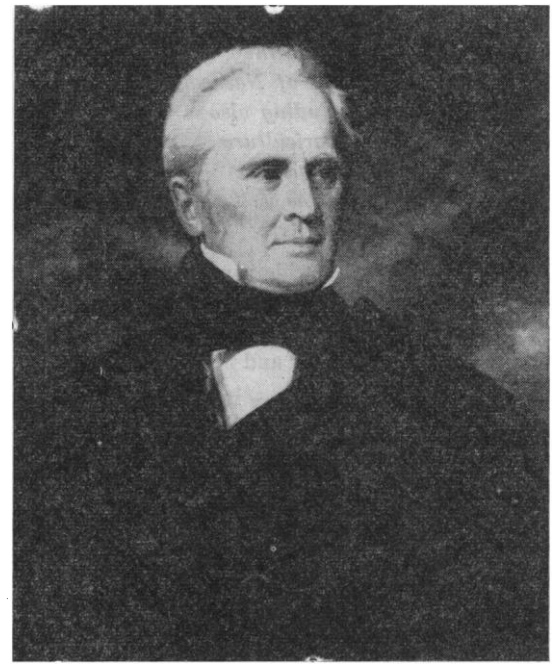
ONE OF THE CHIEF NECESSITIES for the advancement of science is that enough channels of publication be provided so that the results of research may readily become available to all investigators. In the early days most such channels were furnished by the publications of scientific academies and other societies, embodied in the volumes of their Transactions, Proceedings, and Memoirs and usually published rather irregularly. Such important early means for scientific publication were the *Transactions of the American Philosophical Society,* first published in Philadelphia in 1771; the *Memoirs of the American Academy of Arts and Sciences,* in Boston in 1785; the *Memoirs of the Connecticut Academy of Arts and Sciences,* in New Haven in 1810; the *Journal of the Philadelphia Academy of Science,* in 1817; and the *Annals of the New York Lyceum of Natural History* (later the New York Academy of Sciences), in 1823. Most papers in this country today, however, are published in scientific journals. These may be independent or may be related to some society, but they appear with regularity and are not merely reports of meetings. During the past century there has been a very great increase in the number of such journals and in the specialization of the fields covered by them.

When the American Association for the Advancement of Science was founded, publications of this sort were few. Now and then one was undertaken, but after a brief life, abandoned. One, however, *The American Journal of Science,* was apparently gifted with particular vitality, for, though it was born in 1818, 30 years before our Association, it has survived to our own day, thus maintaining an uninterrupted existence longer than that of any other scientific periodical in the country. Though today it is simply one in a long list of such publications, its influence on the development of American science in earlier days was so profound that it is well worthy of our attention in this Centennial year, when we are turning our eyes back to the history of science in the United States.

This distinguished journal owes its existence to one of the most notable figures in American scientific life, Benjamin Silliman, professor of chemistry, mineralogy, and geology in Yale College during the first half of the 19th Century. Timothy Dwight, far-sighted president of Yale at the century's turn, recognized the promise of young Silliman, then only 23 years old and trained as a lawyer, and chose him for this important new chair. Silliman, who at that time had little knowledge of the sciences, set about deliberately and methodically to remedy this defect. He studied intensively in New Haven and in Philadelphia and spent the year 1805 in travel and study in London, Edinburgh, and various centers of learning on the continent. In 1806 he began his active career at



Benjamin Silliman
(Courtesy of Yale University Art Gallery and News Bureau)

Yale. Silliman was a remarkable man, both personally and professionally, as his recent biography by Prof. Fulton well shows. He had a fine presence and was a notable teacher. As a public lecturer, in those days when the lyceum and the lecture platform were so important in American culture, he was remarkably successful in arousing public interest in, and enthusiasm for, the sciences.

Among his many friends was Col. George Gibbs, of Newport, Rhode Island, an amateur mineralogist and collector of some note, who first suggested to him, in 1817, the desirability of founding a scientific journal. Silliman discussed this proposal carefully with many persons and, though somewhat doubtful of its success, was impressed by the great promise of such an under-

taking. "No one," he wrote, "will doubt that a journal devoted to science, and embracing a sphere sufficiently extensive to allure to its support the principal scientific men of our country, is greatly needed; if cordially supported, it will be successful, and if successful, it will be a great public benefit."

Silliman issued "proposals" for such a journal in January 1818, and the first number appeared in July of that year. On the cover of this number is presented the following comprehensive title:

The
American
Journal of Science
More especially of
Mineralogy, Geology
and the
Other Branches of Natural History
including also
Agriculture
and the
Ornamental as well as Useful
Arts

This surely displayed a wide range of interests! The "Plan of the Work," written by the editor as a sort of prospectus for the new journal, emphasizes still more its catholic character and is worth quoting:

PLAN OF THE WORK

This Journal is intended to embrace the circle of THE PHYSICAL SCIENCES, with their application to THE ARTS, and to every useful purpose.

It is designed as a deposit for *original American communications;* but will contain also occasional selections from Foreign Journals, and notices of the progress of science in other countries. Within its plan are embraced:

NATURAL HISTORY, in its three great departments of MINERALOGY, BOTANY, and ZOOLOGY;

CHEMISTRY and NATURAL PHILOSOPHY, in their various branches: and MATHEMATICS, pure and mixed.

It will be a leading object to illustrate AMERICAN NATURAL HISTORY, and especially our MINERALOGY and GEOLOGY.

The APPLICATIONS of these sciences are obviously as numerous as *physical arts*, and *physical wants*; for no one of these arts or wants can be named which is not connected with them.

While SCIENCE will be cherished *for its own sake*, and with a due respect for its own *inherent* dignity; it will also be employed as the *handmaid to the Arts.* Its numerous applications to AGRICULTURE, the earliest and most important of them; to our MANUFACTURES, both mechanical and chemical; and to our DOMESTIC ECONOMY, will be carefully sought out, and faithfully made.

It is also within the design of this journal to receive communications on MUSIC, SCULPTURE, ENGRAVING, PAINTING, and generally on the fine and liberal, as well as useful arts;

On Military and Civil Engineering, and the art of Navigation;

Notices, Reviews, and Analyses of new scientific works, and of new Inventions, and Specifications of Patents;

Biographical and Obituary Notices of scientific men; essays on COMPARATIVE ANATOMY and PHYSIOLOGY, and generally on such other branches of medicine as depend on scientific principles;

Meteorological Registers, and Reports of Agricultural Experiments: and we would leave room also for interesting miscellaneous things, not perhaps exactly included under either of the above heads.

Communications are respectfully solicited from men of science, and *from men versed in the practical arts.*

Learned Societies are invited to make this Journal, occasionally, the vehicle of their communications to the Public.

The editor will not hold himself responsible for the sentiments and opinions advanced by his correspondents; but he will consider it as an allowed liberty to make slight *verbal alterations*, where errors may be presumed to have arisen from inadvertency.

This plan is surely magnificent in its ambition and shows the broad but modest point of view with which the editor approached his task. For many years the contents of the Journal lived up to this prospectus. An article on "Musical Temperament" appears in the first number. We find one on "Mystery" by Mark Hopkins, of Williams, and on "Gypsies" by Prof. Griscom. The Trumbull paintings are discussed, as is architecture in the United States. A paper on Arabic words in English and other linguistic contributions appear. From the beginning, however, the bulk of the papers have been strictly scientific, though it was not until 1880 that "the Arts" ceased to be a part of the title. All fields of science, both practical and applied, were covered. The cotton gin and the applications of the steam engine are discussed. An early form of explosive engine was described in 1826. Medicine was by no means neglected, and in this field the properties of chloroform as an anesthetic were described and the classic work of Dr. Beaumont on the character of the gastric juice presented. Almost from the beginning, probably because of the special interest in it of Silliman himself and the editors who succeeded him, geology and its related sciences have been particularly emphasized, and the editors have with one exception been members of the Yale Department of Geology. Prof. G. P. Merrill, in his history of American geology, calls the Journal "perhaps the most important geological periodical in America." Today it is concerned primarily with problems of geology in the broad sense, but there has never been any formal limitation of its field, and it is still open to contributions from any part of the great realm of science.

Silliman faced many of the same problems that confront modern editors. One of these was whether to make his journal a strictly technical one, thus limiting its support to men of science alone, who were very few in number, or to give it a broader appeal by publishing some material more popular in character. His course is well stated in his own words after 11 years of experience:

> The editor of this Journal, strongly inclined, both from opinion and habit, to gratify the cultivators of science, will still do everything in his power to promote its high interests, and as he hopes in a better manner than heretofore; but these respectable gentlemen will have the courtesy, to yield something to the reading literary, as well as scientific public, and will not, we trust, be disgusted, if now and then an *Oasis* relieves the eye, and a living stream refreshes the traveller.

Financial problems were also serious then, as now. Subscribers were not numerous, ranging from 600 to 1,000 in the early years, and many of them often failed to pay their bills! Costs for paper, printing, and engraving were considerable and often exceeded total income, leaving nothing for editorial compensation. Recurring deficits were met by Silliman himself and later by his family and their friends. The Connecticut Academy from the beginning helped in the way of contributions and at least on one occasion gave important financial aid. The Journal has never had a subsidy from any source. For well over a century it was a strictly proprietary one, the property and responsibility of its editors. In 1935 Yale University became its custodian.

Until that year *The American Journal of Science* was a family affair. Benjamin Silliman was its founder and sole editor for 20 years and was closely associated with it until his death. Indeed, the publication was long known popularly as "Silliman's Journal." His son, Benjamin, Jr., joined him as editor in 1838, and in 1846 James Dwight Dana, soon to become the most notable American mineralogist and already Silliman's son-in-law, became a member of the editorial group. The elder Silliman died in 1864, and in 1875 Edward Salisbury Dana, son of James D., was added to the staff. The younger Silliman retired in 1885 and the Danas, father and son, ran the Journal until the former's death in 1895. Edward S. Dana was sole editor until 1926. Thus, for over a century the Journal was in the sole hands of the Silliman and Dana families, whose members assumed not only its grave editorial responsibilities but its financial ones as well. It was well called the "Silliman-Dana family child." The four members of these families who were associated with the Journal were themselves notable investigators and prominent members of the Yale faculty, but their contribution to the scientific life of our country was greatly enhanced by their fatherly care of this ancient and influential publication. It should be remembered that they were also intimately concerned with the foundation and early growth of the Sheffield Scientific School, which has had such an important share in the development of science in the United States.

After Edward S. Dana's retirement, Prof. Alan Bateman and Dr. Ernest Howe were editors, successively, and from 1932 until the present time this responsibility has been in the able hands of Prof. Richard S. Lull.

Beginning in 1851 a group of associate editors was added to the staff. These colleagues, drawn from various fields of science, were available for advice in their specialties, wrote abstracts of important papers published elsewhere, reviewed scientific books, and were otherwise of service, as they still continue to be. Notable among the earlier associate editors were Wolcott Gibbs, Asa Gray, and Louis Agassiz of Harvard, in the fields of chemistry, botany, and zoology; and Brush, Johnson, Newton and Verrill of Yale, in mineralogy, agricultural chemistry, astronomy, and zoology. More recent associate editors have included some of the most distinguished of American scientists.

The volumes of the Journal mirror well the development of science in America. Every great new idea, every fresh field that is cultivated, is there presented. It is interesting, for example, to follow in its pages the progress here of the theory of organic evolution, from Asa Gray's first and rather cautious review of the *Origin of species* in 1860 through the many discussions of this revolutionary idea to the final acceptance of evolution as one of the keys to our understanding of the earth and its history.

During the life of the Journal the organization of science in America has progressed greatly, and scores of new societies and periodicals have been established. Silliman outlines some of the beginnings of this growth in his survey of science in 1847, in which he calls attention to the establishment, 7 years before, of the American Association of Geologists and Naturalists, "composed of individuals assembled from widely separate parts of the Union," and the great service it was rendering. This organization was in a sense the forerunner of the AAAS.

In this Centennial year we are looking backward with gratitude toward the humbler beginnings of the scientific life of America which now flourishes so vigorously and has become such an important part of the life of our Nation and the world. As we do so, we should not forget to pay tribute to the venerable Journal which Benjamin Silliman founded 130 years ago and which for so long has been a notable part of our scientific tradition.