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SPENCER FULLERTON BAIRD—A PIONEER DISSEMINATOR OF SCIENCE NEWS

THE nineteenth century stands out prominently in the history of the world as the one in which the greatest development of science occurred. In the United States a series of great dominant figures has always conspicuously exerted a potent influence for the benefit of humanity on the progress of science.

Even when the century was at its very beginning the splendid figure of the many-sided Franklin was already almost at its zenith. He knew this and he knew that; he talked with this friend and discussed with that friend, and from the gathering of his friends grew the American Philosophical Society, and Philadelphia became the scientific center of the new world.

The scientific mantle of Franklin passed to Robert Hare, a man of wonderful attainments, conspicuously in chemistry, and to him came Benjamin Silliman, who, having absorbed all that he could acquire in Philadelphia, supplemented it with study abroad and then settled in New Haven as professor at Yale College.

Dana and Hubbard, his sons-in-law, Loomis, Olmsted, Shepard and others were his followers and the *American Journal of Science* came into existence as the great event in American science of the second epoch of the century.

Like a meteor in his brilliancy, Samuel Latham Mitchill flashed on the scene in New York, and for a time Columbia College with its splendid and distinguished teachers of science was foremost. Bruce, Hosack and Renwick are familiar names of that period.

When the century reached its high tide, Louis Agassiz with his wonderful personality settled in Cambridge, and Harvard became the Mecca to where, besides his own son Alexander, Hyatt, Lyman, Morse, Putnam, Scudder, Shaler and Verrill came and studied and then spread their knowledge abroad, illuminating wisdom with marvelous skill and adding much to what was known in natural history. The founding of the Museum of Comparative Zoology with its many fortunate students is a noteworthy event of this time.

Almost simultaneously with the progress made in natural science in Cambridge was that made in Washington under Baird, who, as assistant secretary of the Smithsonian Institution, was slowly developing the

National Museum, in which are deposited "all objects of natural history, plants and geological and mineralogical specimens belonging to the United States." Baird was quick to appreciate the wonderful opportunities that were his, for he had the foresightedness to realize that great agencies as those of the Geological Survey and the Bureaus devoted to American ethnology, entomology and fisheries were also great collecting agencies. From them would come the objects that he needed for the National Museum, and so much of his time was devoted to building up these many scientific offices of the government and in training men for their management.

Baird, like Franklin, was a many-sided man, and there have never been wanting those who would tell of the mighty things he did in developing American science; but my task is simply to describe him as the founder of our American News Science Service. "Baird," writes Billings, "for the most part taught only by the pen and by example." Newberry adds that he had correspondents everywhere who were working along his lines in the interest of science.

While others required rest from their arduous labors or sought recreation in amusements or society, Baird found it in intellectual pursuits. The enormous volume of publications that came to the Smithsonian Institution during his long connection with it passed under his inspection, and from this source he gleaned the scientific news of the world.

Miss Lucy Baird, in her charming "Notes" on her distinguished father's career, which are incorporated in William H. Dall's excellent biography of Spencer Fullerton Baird, tells of the origin of his work for periodicals, which is so interesting that I give it in full. She says:

> In 1869, being in the neighborhood of Philadelphia, he went down to Long Branch on a visit to his sisters, who had a cottage there. On the train he found Mr. George W. Childs, who was also on his way to Long Branch. After some little conversation, Mr. Childs asked him to contribute a scientific column, or, to speak more exactly, about half a column, each week to the Philadelphia *Ledger*, giving items of scientific interest. My father, who was modest as to his literary abilities, as in everything else, felt so sure of his inability to write popular paragraphs agreeably that he was inclined at first to decline this offer, although, to a man of limited means, the remuneration proposed by Mr. Childs was a temptation. Mr. Childs, however, begged him to consider the matter and those of his scientific friends, to whom he confided the matter, urged him so strongly that he decided to attempt it.

This seems to have been the beginning of his contributions to current publications, and it soon led to other similar work in which he was most successful.

I shall not attempt in this place to present any record of Baird's other literary productions or express my opinion in regard to his ability as a writer or as an editor. That part of the task has already been most admirably done by G. Brown Goode in Bulletin 20 of the United States National Museum, which forms one of the series of bibliographies of American naturalists and bears the specific title of "Published writings of Spencer Fullerton Baird, 1843–1882."

From that authoritative source, I find that as early as 1871 Baird began to contribute to *Harper's Weekly* and to *Harper's New Monthly Magazine* regularly items on science, concerning which Goode wrote:

> Many of these are original contributions to knowledge never elsewhere published. Others are critical reviews or notes upon the current literature of science. Others are abstracts of papers, with the addition of explanatory or illustrative remarks. Others still are abstracts of papers, for the most part in the words of the authors of the papers or of some other reviewer.

Miss Baird also writes in her "Notes":

> In addition to the work mentioned above (*i.e.*, in connection with publication of the Harpers) he finally entered into a similar arrangement with the New York *Tribune*, to which he furnished a scientific column.

These various abstracts were subsequently collected, more or less revised and then issued annually in book form as "An Annual Record of Science and Industry."[1]

The first of these was published in 1872 and bears on the title page the statement that it was prepared "with the assistance of eminent men of Science." In this volume are no less than 92 items for which Goode gives credit to Baird as being essentially from his pen.

For six years these volumes continued without change and as showing Baird's remarkable industry, when it is remembered that his duties elsewhere were also very arduous, attention is called to the fact that the volume for 1872, according to Goode, contained 193 items written by him, that for 1873, 187 items, that for 1874, 132 items, that for 1875, 106 items and that for 1876, 76 items.

The heavy demand on the time of Baird, due to the declining strength of Henry, followed by his death, and Baird's succession to the secretaryship of the Smithsonian made it more and more impossible to devote as much of his own time as formerly to the preparation of this press information. Accordingly,

[1] I am not unmindful of the fact that from 1849 to 1866 David A. Wells edited an "Annual of Scientific Discovery," but I have never understood that this was more than a year book, for which special articles were prepared at the end of each year summarizing the development of the topics treated during the given period.

there was a change in the methods used in the volumes of the "Record of Science and Industry" for the years 1877 and 1878, which in Baird's own words was as follows:

> A modification of the original plan of the "Annual Record" was commenced in the volume for 1877. Previous to that it consisted of two parts—first, a general summary of progress in the various branches of science; and, secondly, a series of abstracts of special papers, credited to the work in which they were published. These abstracts, although prepared by several specialists, were without indication of their authorship. The experience of several years showed that, in attempting to give abstracts of anything like the most important announcements of the year, more space was required than could be spared for the purpose; and it was therefore determined to enlarge the scope of the first division, and make it include a great amount of detail, each summary to be prepared by some eminent specialist, and to be headed by his name.

This plan was continued with the volume for 1878, the preface of which is dated March 1, 1879, but with this volume the series came to an end. These most admirable summaries were continued in the annual reports of the Smithsonian Institution and formed the most important feature of each of these valuable reports until the death of Baird.

Goode's work as a rule was superior and he seldom omitted an essential item in anything that he wrote, but I am sure that were he living, he would gladly permit me to add the word "editor" to the following description that he wrote of Baird:

> He was one of those rare men, perhaps more frequently met with in the new world than elsewhere, who give the impression of being able to succeed in whatever they undertake. Although he chose to be a naturalist, and of necessity became an administrator, no one who knew him could doubt that he would have been equally eminent as a lawyer, physician, mechanic, historian, business man, soldier or statesman [and editor].

When the publication of the "Annual Record of Science and Industry" ceased with the volume of 1878, it seemed as if the sun had set, but not altogether, for here and there were bright spots in the sky. The *Scientific American,* founded in 1849, was devoted to the exposition of popular science. In 1876 it added its *Supplement* to give to the world a record of the progress in applied knowledge as manifested by the Centennial Exhibition held in that year in Philadelphia. It still lives in a more dignified dress as a well-edited and useful monthly.

Just above the horizon was the *Popular Science Monthly,* then edited by the gifted Edward L. Youmans and devoted to a higher grade of popular science than any of its predecessors. Later came SCIENCE, which has become probably the most important scientific journal ever published in the United States. All these have paved the way for a *Science News Service,* which, ably controlled by E. E. Slosson, again gives to the public statements of the progress and development of science that are as true, honest and reliable as those put forth by Spencer F. Baird.

MARCUS BENJAMIN

SOME PHYSICAL ASPECTS OF A RECENT ANALYSIS OF THE EARTH'S MAGNETIC FIELD[1]

THE difficulties to be met in the formation of any adequate theory of the origin of the earth's magnetism are in part mathematical, in part geometrical, because of the sphericity of the earth-magnet, but they arise chiefly from the physical conditions involved. No matter what theory is proposed somewhere a hypothesis must be introduced implying new properties of matter or physical conditions below and above the earth's surface, regarding which we have at present either no knowledge whatsoever or but the faintest glimpse. The same remarks apply to that other great problem of cosmical physics—the origin of the earth's electricity. It has accordingly been suggested that terrestrial magnetism and atmospheric electricity may reveal to us hitherto unknown properties of matter; for the properties which the rotating earth and the rotating sun may possess, because of their masses, sizes and angular velocities, may fail of detection with the experimental conditions possible in the laboratory.

The most complete and exhaustive analysis heretofore made of the earth's magnetic field, as based on the accumulated magnetic data of the Carnegie Institution of Washington and cooperating organizations, has just reached the preliminary stages of completion. We have now facts of sufficient reliability so that in a number of cases it is possible to say definitely that a theory advanced is not correct or at least not complete.

One of the definite disclosures of interest is that about 94 per cent. of the earth's magnetic field arises from systems of magnetic and electric forces inside the earth; about 3 per cent., except for possible relativity effects, is apparently to be referred to an electric system in our atmosphere, and the balance, about 3 per cent., to a system equivalent in its effects to electric currents passing perpendicularly through the earth's surface. Furthermore, we now know that the direction of the axis of the magnetic field of the earth, of the atmosphere and of the sun is related in the same way, for all three bodies, to the direction of

[1] Presented at the meeting of the American Philosophical Society, Philadelphia, April 21, 1923.