SCIENCE.—SUPPLEMENT.

FRIDAY, JANUARY 13, 1888.

ADDRESS OF MAJOR POWELL IN MEMORY OF PROFESSOR BAIRD.[1]

BAIRD was one of the learned men of the world, and, to a degree perhaps unexampled in history, he was the discoverer of the knowledge he possessed. He knew the birds of the air, from the ptarmigan that lives among everlasting snows, to the hummingbird that revels among the orchids of the tropics; he knew the beasts of the forests and the prairies, and the reptiles that crawl through desert sands or slimy marshes; he knew the fishes that scale mountain-torrents, that bask in quiet lakes, or that journey from zone to zone through the deep waters of the sea. In all this realm of nature he had a minute and comprehensive knowledge that no other man has ever acquired. What others have recorded in this field of research he knew, and to their discoveries he made a contribution of his own so bounteous, so stupendous, that he is recognized as the master of systematic zoölogists.

All of Baird's scientific work is an illustration of modern inductive or scientific reasoning. The inductions or general principles of modern science are reached by the accumulation of vast stores of facts. He knew how to accumulate facts; how to reject the trivial and select the significant. Modern science is almost buried under the *débris* of observation, the record of facts without meaning, — the sands of fact that are ground from the rock of truth by the attrition of mind; but Baird could walk over the sands and see the diamonds. Then he knew how to marshal significant facts into systems, and to weld them into fundamental principles. In all his works there can be discovered no taint of *a priori* reasoning or syllogistic logic; for in his mind there was no room for controversy, and disputation fled before the light of his genius. Formal logic, a disease of modern thought, — the contagion of Aristotlina, — never ravaged his brain. With healthful directness, he sought the truth guided by wise inference, and told the truth in its simplicity.

Baird was an organizer of the agencies of research. When a bold explorer essayed to penetrate the seas of ice by the path of peril and in quest of fame, he would ever so manage that a corps of quiet scholars should be attached to the expedition to study the climate of the Arctic zone, the geology of the Arctic rocks, the flora of the Arctic lands, or the fauna of the Arctic fields; and the best knowledge we have of the igloo-dwellers, the Eskimo whose home is on the ice of the north, has been brought to us by the quiet students he succeeded in attaching to Arctic exploring expeditions; and so the love of glory was made to serve the cause of truth.

When, in the interests of international commerce, expeditions were sent to explore and survey routes of travel and transportation across Central America from sea to sea, he managed to send with them corps of scientific men whose function it was to bring from the tropics all forms of its abundant life, vegetal and animal, and the relics of the arts of the people of Central America as they are exhibited in stone and clay and gold; and the National Museum has been enriched by the results of this labor, and the boundaries of human knowledge extended thereby; and so the greed of gain was made to serve the love of truth.

When our army was distributed on the frontiers of the land, he everywhere enlisted our scholarly officers into the service of science, and he transformed the military post into a station of research, an Indian campaign into a scientific expedition. Scott, Marcy, McClellan, Thomas, and many other of the great generals of America, were in their younger days students of natural history, and collectors for Baird. When our navy cruised around our shores, its officers were inspired with that love of nature which made every voyage of military duty a voyage of discovery in the realms of natural science; when they journeyed among the islands of the sea, they brought back stores of scientific materials; and when they sailed through the littoral waters of other continents, they made voyages of scientific investigation. Many of these earlier naturalists of the navy in subsequent times became commodores and admirals.

But time would fail me to tell of the exploring expeditions and the railroad surveys throughout America, and the travels throughout the world, which he utilized in the interest of science, or of which he was the immediate projector. Of the abundant material thus gathered from all parts of the world, some has gone to enrich American institutions of learning, and some has been gathered into the National Museum, — the result of Baird's organizing genius and a splendid monument to his memory.

The hills of the land stretch not so far as the billows of the sea; the heights of the mountains are not so great as the depths of the ocean; and so the world was unknown until this greater region was explored. The treasures of the land did not satisfy the desires of Baird, he must also have the treasures of the sea; and so he organized a fish commission, with its great laboratories and vessels of research.

> "What hidst thou in thy treasure-caves and cells,
> Thou hollow-sounding and mysterious main?
> Pale, glistening pearls and rainbow-colored shells,
> Bright things which gleam unreck'd of, and in vain.
> Keep, keep thy riches, melancholy sea!
> We ask not such from thee."

What the scholar asked of the sea was all its forms of life, its organisms minute and lowly, its crawling articulates, its pearl-housed mollusks, its fishes that swim in armies, and its leviathans that prowl among the waves, — the life of the reedy shore, the life of the ocean-current, and the life of the deep sea. So, with many ingenious appliances, he and his lieutenants sailed away to explore the ocean's mystery. So the Fish Commission was an agency of research; but it was more: he made it an agency by which science is applied to the relief of the wants of mankind; by which a cheap, nutritious, healthful, and luxurious food is to be given to the millions of men. He affirmed that for the production of food an acre of water was more than equal to ten acres of land, thus giving to the gloomy doctrine of Malthus its ultimate refutation, and clearing away the veil of despair from the horizon of the poor; for, when the sea shall serve man with all the food that can be gathered from its broad expanse, the land will not contain the millions whom it is thus possible to supply.

In the research thus organized the materials for the work of other scientific men were gathered. When a great genius reads to the world a chapter from the book of nature, the story is so beautiful that many are stimulated to search in the same field for new chapters of the same story. Thus it was that the publication of Baird's great works on natural history developed in America a great corps of naturalists, many of whom have become illustrious; and the stimulus of his work was felt throughout Europe. In the research which he organized the materials were furnished for this corps of naturalists; but his agency in the development of this body of workers was even more direct. He incited the men personally to undertake and continuously prosecute their investigations. He enlisted the men himself, he trained them himself, he himself furnished them with the materials and instruments of research, and, best of all, was their guide and great exemplar. Thus it was that the three institutions over which he presided, the Smithsonian Institution, the National Museum, and the Fish Commission, were woven into one great organization, — a university of instruction in the methods of scientific research, including in its scope the entire field of biology and anthropology. Such is Baird the investigator, Baird the organizer, and Baird the instructor, in the length, breadth, and thickness of his genius, the solidarity of a great man.

All that I have said is a part of the public record; it is found in

[1] Delivered Jan. 11, before a joint meeting of the Philosophical, Biological, and Anthropological Societies of Washington.

the great libraries of the world. But, however exalted the feeling of admiration we may entertain for Baird as an eminent scientific man, it is to his attributes as a man as disclosed in his personal relations with friends, associates, and contemporary men of affairs, that we most fondly turn, since it is in these relations that he most clearly exhibited those kindly and modest traits of character which made him so universally beloved.

As a man of affairs, Professor Baird exhibited great sagacity. His plans for the organization of scientific work were of great magnitude; and had they been presented to the administrative officers of the government or to legislative bodies with exaggeration, or even had they been presented with the glow of an enthusiastic missionary of science, they might well have encountered opposition. But Baird had a wonderful faculty of presenting his plans with extreme modesty, and with a degree of under-statement but suggestive explanation of possibilities which speedily caused him to whom the appeal was made himself to become an advocate of the professor's measure. He had traits of character in this respect which are hard to explain, and which seem at first to be contradictory. In the advocacy of measures his modesty amounted almost to timidity, and he avoided alike argumentation and notoriety, and he presented his measures with the directness of a child.

Notwithstanding all this, there was such a poise of faculties, such dignity of mien, that he impressed those with whom he came in contact as a venerable and wise patriarch. He seemed devoid of personal interest or feeling, and solicitous only for the welfare of those to whom he was in fact appealing, and he conveyed the impression that he was giving benignant advice. Thus the shrinking, sensitive man, who could not even stand before a public body, such as a committee of Congress or a scientific society, and advocate a cause, could, from his seat by the fireside or at the desk, so illumine the subject with which he had to deal that men stood round him to gather his words, that nothing should be lost; for in the exposition of his subject he illumined ever thing with clear statement, arising from an exhaustive knowledge and full understanding of results.

As the director of the work of research in which other men were engaged, Professor Baird had marvellous insight and skill. The appliances of modern research, alike in the inorganic world and in biology, have come to be multifarious and diverse; and there is this peculiarity about their use: that once used, so that the secret of nature which they were planned to unlock has been revealed, they speedily become obsolete, and immediately new keys, new apparatus, new devices, are necessary. Thus to a very large extent skill in research is absorbed in the skill necessary for the development of the agencies of research. A continuous line of research, prosecuted by a corps of men so that the boundaries of knowledge are carried far forward, can result only from a continuous line of inventions in the apparatus of research; and it was here that Baird exhibited his skill. His own devices were many and constant, and even he was fertile in suggestions to his assistants. No wonder, then, that so many of the secrets of nature were unlocked through his agency. It was in the direction of this work of research that the man Baird stood forth as a giant; it was where his vast knowledge of details was most apparent; it was where his marvellous skill was most shown; it was where his insight into human character was most exhibited. With clearness he formulated his interrogatories; with aptness he selected his course of procedure; with judgment he sought the aid of others, and with suggestiveness directed their work. And, lo! his questions were speedily answered. It was in this manner that his own good hands were supplemented by the hands of many, that his own great mind was re-enforced by the best mental activity of many assistants; and thus the whole body of men under his control worked together as one organic integer for the increase and diffusion of knowledge among men.

In his work with his assistants he scrupulously provided that every one should receive the meed of honor due for successful research, and treated all with generosity. Many an investigation begun by himself was turned over to assistants when he found that valuable conclusions could be reached; and these assistants, who were his warm friends, his younger brothers, reaped the reward; and he had more joy over every young man's success than over the triumphs and honors heaped upon himself from every quarter of the globe. He was the sympathetic counsellor of many men; into his ears were poured the sorrows and joys of others, and he mourned with the mourning and rejoiced with the rejoicing. To those in need his hand was ready and his purse was open, and many and many were the poor who called him 'blessed.' Though a man of great force of character, a man of great learning, a man upon whom had been showered the honors of the scientific world, in character he was as simple as a child. He had a fund of 'folk-lore,' and loved the books and papers written for children. In his later years, weakened with disease and burdened with many labors, he still read *St. Nicholas* from month to month, and kept the run of every little story, and was glad to be 'a child again.' His life at home was pure and sweet, and full of joys, for he gave and received love and trust and tender care. But the history of his home life is sacred. Its words and acts abide in the hearts of the husband, the wife, and the daughter.

For many long months he contemplated the day of parting. Labor that knew no rest, responsibility that was never lifted from his shoulders, too soon brought his life to an end. In the summer of the past year he returned to his work by the seaside, that he might die in its midst. There at Wood's Holl he had created the greatest biologic laboratory of the world; and in that laboratory, with the best results of his life-work all about him, he calmly and philosophically waited for the time of times. Three days before he died he asked to be placed in a chair provided with wheels. On this he was moved around the pier, past the vessels which he had built for research, and through the laboratory, where many men were at work at their biologic investigations. For every one he had a word of good cheer, though he knew it was the last. At the same time, along the pier and through the laboratory, an invalid child was wheeled. "We are rivals," he said, "but I think that I am the biggest baby." Then he was carried to his chamber, where he soon became insensible, and remained so until he was no more.

"Blessed are the pure in heart, for they shall see God."