The Background of the Smithsonian's Museum of Engineering and Industries

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THE DEPARTMENT OF ENGINEERING AND INDUSTRIES of the National Museum has its roots in such old and diverse activities as the U. S. Exploring Expeditions of 1838–42 and the accumulation of experimental physical apparatus left by Smithsonian researchers. Its future is directed toward a full-scale development into a National Museum of Engineering and Industry within the Smithsonian family.

Though the Department's collections include some of the earliest accessions of the Institution, its history begins about 1880. G. Brown Goode, in charge of the National Museum, was convinced then that the great industrial expositions had proved the value of exhibition as a means of public instruction. He felt that if so much could be learned from exhibits that were unorganized and largely unexplained, a well-planned display of industrial and scientific material would be a contribution to education.

At the same time the old Armory Building and several sheds were bulging with collections acquired from exhibitors at the Centennial, and the first National Museum Building was nearing completion.

Dr. Goode drew up a provisional plan for the organization of the Museum, which he saw as a museum of anthropology in the most comprehensive meaning of the word. The Museum would exhibit all phases of human culture and industry. He suggested that exhibits be grouped to show the development of ideas and processes rather than according to geographical, racial, or tribal origins. He saw the most primitive tools and wares as the beginnings of series tracing their development to complicated modern machines or structures. Of 64 primary classifications tabulated in his plan, 49 related to Arts and Industries.

When the time came to move into the new building, it proved woefully inadequate to house the collections then on hand. The fine plan had little chance. A few exhibits, originated by Museum people or Smithsonian associates for the expositions and preserved intact, got off to a good start. The Section of Fisheries, for example, was launched with evening openings of its display, "illuminated with the latest equipment of the Brush-Swan Electric Light Company." Other exhibits in this group included Materia Medica, Naval Architecture, Food, Textiles, History, and Ceramics. Forestry, Graphic Arts, and Steam Transportation were soon added in an attempt to carry out the plan.

But the pressure for space to house laboratories, scientific workshops, and the growing collections in natural history not only hampered expansion but actually crowded out exhibits. So little remained at Dr. Goode's death that the Department was abolished, and the remaining sections were placed in other departments. The surviving sections were Medicine, Graphic Arts, including Photography, and Technology, which was a catchall for all others of the original activities. The orphaned and poverty-stricken nature of the work is indicated by the fact that a naval officer was assigned to the work headed Medicine, the Museum photographer made the Section of Photography his avocation, and the curator of Technology was the superintendent of buildings. These men, who held on in spite of obvious difficulties, were the real fathers of the present Department.

J. Elfreth Watkins was one of these. He came to the Museum from a successful railroad career, to be the unpaid curator of Steam Transportation. He visited museums and inspected transportation systems abroad at his own expense. His work was so favorably recognized that, without his knowledge, a memorial was presented to Congress over the signatures of practically every railroad official of the country, urging the expansion of the transportation collections according to Watkins' plan. The tiny space then available to him made the appeal somewhat pathetic. Watkins left the Museum in 1892 to plan and direct the outstanding exhibit of the Pennsylvania Railroad at the Columbian Exposition and then spent a year as the head of the Department of Industrial Arts at the Field Columbian Museum. When he returned to the National Museum, everything that was left of Arts and Industries except Graphic Arts and Medicine was grouped under his care; and, as mentioned above, he was the superintendent of buildings.

During his tenure he made many original studies in the field of engineering and railroad history, and reference is still made to his papers. Many of the rare old volumes relating to these subjects now in the Museum library were secured for his private library, while such items as the old locomotives "John Bull" and the "Stourbridge Lion" and the cylinder of the first steam engine in America represent the quality of the collecting done by him.

Among his more fortunate later undertakings was the creation of a Section of Electricity, with George C. Maynard in charge. Maynard was an electrician, which at the time meant that he was a physicist, elec-

trical engineer, and communications expert. He was an associate of Gardner Greene Hubbard and Alexander Graham Bell in the promotion of the telephone and manager of the Bell Telephone System of the District of Columbia. Because of Bell's work in aviation, Maynard was also interested in that field and, being of a family of firearms inventors, his collecting interests and qualifications were broad. Relics of the aviation pioneers, the earliest telegraphers, the telephone, and the beginnings of electromotive equipment were secured by him and are among the most valuable archives of these industries today. It is also most fortunate that he and Watkins were able to select the original models of basic American inventions from the Patent Office collection when that collection was at its best.

As the photographer of the Institution, T. W. Smillie collected for the Section of Photography so quietly that his amazing collection was well formed before the Museum people generally realized it existed. Smillie, a leading photographer of his time, worked out methods of photographing fish that proved invaluable in the Fish Commission's work of propagation; he was in charge of the photographic work for the Smithsonian at the solar eclipse at Wadesboro, North Carolina, in 1900; and he assisted Dr. Langley in photographic recording of the infrared spectrum and later with his records of birds in flight. He wrote on color photography and other advanced photographic processes. But his collecting will be his increasingly valuable monument.

The work of these men carried over into the revival of the Department beginning in the years 1910 to 1914, when the occupation of the new Museum Building released space in the old. This was a fresh opportunity. Richard Rathbun, then in charge of the Museum, reactivated and revived old sections, added new curators, and encouraged them in their work. Frederick L. Lewton, in Textiles, and Chester Gilbert, in Mineral Technology, sought the cooperation of industry, and many fine exhibits of current information in these fields resulted. World War I interrupted the work at its start, but the momentum carried it through, and after the war the Department assumed form and direction. Excellent collections and exhibits were developed in Wood Technology, Organic Chemistry, and Medicine, all within the Division of Textiles. The present head curator took over the Section of Technology left by Maynard. The organization was good, and enthusiasm was high, but it ran head on into a block—a Federal economy program. Some of the staff left, discouraged, and the old procedure of doubling up the work and combining sections was repeated. The effort and knowledge of the men who were left were again spread thinly over impossibly wide subjects. They did their best to keep up with developments in vastly expanding fields, making selective collections as opportunity afforded. At the same time they were pressing for recognition of the work which would raise it to the level of the other departments of the Museum and assure it of some continuity of effort.

A step forward appeared to have been made in 1932, when the Department was reorganized. For the first time it was headed by a head curator, Carl W. Mitman, who could visualize the work and future of the Department as a whole. Since 1920 Mitman had urged the development of the Department into a position comparable with national museums of science and industry elsewhere. His work in developing the plan for the new Museum of the Peaceful Arts in New York (1927) and firsthand inspection of the leading museums abroad had been encouraged and recognized by the Institution. In fact, his organizing abilities were so well recognized that he was assigned to head a succession of Institution-wide activities from 1932 to the present—to the substantial exclusion of departmental work. The Department still did not have the effective organization of the older units of the Museum, and its history up to World War II followed the earlier pattern.

The men fortunate enough to be able to devote their time to single activities accomplished much. Charles Whitebread kept the Division of Medicine abreast of modern developments in that field while collecting much of consultative value from the past. William N. Watkins built the collection of woods to rank with the one or two leading collections of the world while establishing his own scientific leadership in the taxonomy of woods. The fine national aircraft collection owes its present stature almost entirely to the work of Paul E. Garber.

One who worked successfully against the handicap of a fantastically broad field is Dr. Lewton, recently retired curator of Textiles. Dr. Lewton was called to the Museum in 1912 by Dr. Rathbun to head the revived Division of Textiles. He had had eight years with the Commercial Museum of Philadelphia as curator of economic botany, followed by distinguished service with the U. S. Department of Agriculture as a specialist in the breeding and acclimatization of tropical plants, particularly cotton. Most valuable to the Museum were his friendships with the manufacturers he had previously contacted to determine the qualities of raw cotton most desired by them for his guidance in the breeding work. At the Museum he dug into and salvaged what was recoverable of the old collections of foods and textiles, fought the dispersal of the Division of Medicine, and undertook to act as its head until a curator could be found. He was handed almost immediately the whole field of animal and vegetable products, together with forestry, and

in addition was required to perform the rough groundwork of reviving the Division of Mineral Technology. Without guidance, he set up a plan of organization for the development of these varied collections, but the implied necessity of implementing the organization with additional staff brought it an unenthusiastic reception. The plan recognized the threefold substance of the work: the custodial, or preservation of government-owned relics as required by law; the exhibition for public education and information (as well as for Institutional advertisement and public relations); and, in his mind most important, the development of record study collections of authenticated specimens of all of the industrial raw materials and foods. He included in the last the study collections of models and machines representing important inventions. Applied to his very broad field, the plan imposed a large task on him. With several sections of it in able hands, still too much was left for one man. That he did so well with all of it is a tribute to his skill and industry.

World War II shifted the emphasis from the development of the collections to the immediate and effective use of the collections and the expert skills of the staff. The Department performed creditable service in an almost incredible variety of ways. Practically every collection was consulted for solutions of problems and ideas on materials and processes to wage the war effectively. Wasteful reinvention of older ideas was frequently made unnecessary by the existence of an example of the old item, or the time for development was shortened if an old idea was found to be a solution.

Since the cessation of hostilities the Department's work is returning to normal. Collections have been returned from protective storage, and staff members are returning from service. The objective for the future is a department of national significance, with staff and sections adequate to the purpose of establishing the National Museum of Engineering and Industry.

A Century of Progress in Smithsonian Biology

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THE SMITHSONIAN INSTITUTION from the very first was specifically charged with the responsibility for maintaining a museum. In December 1850 Assistant Secretary Baird submitted to Secretary Henry a detailed program of museum activities, which included provisions for the stimulation of scientific research and for scientific and educational publications. As specified in the original endowment, the Institution was founded "for the increase and diffusion of knowledge among men." Since the financing of "explorations in descriptive natural history" was the sole biological objective listed by Secretary Henry in the fall of 1847, when he presented the plan for the organization of the Institution under the terms of the Smithson bequest, the sponsored research was naturally in accord with this directive. To increase the existing knowledge of animal and plant life, various steps were taken to stimulate the collection of such materials and to encourage original investigations by competent workers. To diffuse the knowledge that resulted from studies on these collections, the Institution made provision for assistance in the preparation of illustrations and for the publication of monographs, revisions, and preliminary papers.

The descriptive zoologist or botanist is concerned primarily with establishing the diagnostic characters that differentiate living forms. By assembling for minute comparative study large series of specimens, all uniformly prepared or preserved, from all possible localities, taxonomists have been enabled constantly to advance human knowledge. Consequently, the descriptive phase of natural history is by no means static, since the relative importance of characters selected as having diagnostic significance is continually being scrutinized.

The accumulated studies on the collections thus provide a means of measuring the progress made in this branch of biology during the past 100 years under the sponsorship of the Smithsonian Institution. The natural-history collections assembled under the auspices of the Smithsonian were originally largely North American, but in the course of time expeditions were sent to all parts of the world. Study of these materials, as here described, has helped to elucidate the floras and faunas of these regions. Since these contributions to natural history have resulted from investigations made by staff members, collaborators, and others aided by the Institution, it will be convenient to review the progress in the 10 divisions whose curators have had the responsibility for the improvement and care of the collections.

Mammals

Shortly after entering on his duties as assistant secretary in 1850, Spencer F. Baird brought his private collection to Washington, from Carlisle, Pennsylvania, and about the same time the Smithsonian Institution appro-