GOODE AS A NATURALIST.*

THE designation 'naturalist' was one which Goode richly earned and which he held most dear, and our deep sorrow is that his activity as a naturalist extended over only a quarter of a century. It is pleasant to reflect that he was a man of whom no adverse word can ever be spoken either in science or in character. We think of both at this time because in him the man and the profession were inseparable and constantly interacting. His scientific virtues were of an order rare as the Christian virtues, and we cannot thoroughly understand his scientific career unless we understand him as a man. Errors of judgment, misleading tenets and adherence to false hypotheses among some of the most gifted of our professional ancestors have arisen as often from defect of principle and from personal prejudices as from defect of knowledge. We see in our friend, on the other hand, that the high standard of scientific achievement was constantly parallel with, and very largely the outgrowth of, a high standard of personal character and motive.

In brief the work of the true naturalist is ever lighted by the four lamps of love, of truth, of breadth and of appreciation, and all of these shone brightly upon the path of Goode. His love of nature was inborn, predetermining his career, and so far surpassing his self-interest we fear it is only too true that he sacrificed his life for the diffusion of natural truth. So far as I know, he never entered a scientific controversy, and was never under temptation to warp or deflect facts to support an hypothesis, yet he was incapable of tampering with truth under any circumstances which might have arisen. His Presidential Address of 1887 before the Biological Society showed him as scrupulous not to overestimate as he was eager not to underestimate the existing status of American science. While largely cultivated by wide experience in contact with nature and men, his breadth of view was certainly innate. If Goode had a fault it was that his interests were too numerous and his sympathies too broad. He displayed not only a warm appreciation of those around him and an enthusiasm for contemporary research, but an exceptional sense of the close bonds between the present and the past, as seen in his admiration for the pioneers of American science, and his repeated vindication of their services. This passion for history led to an important phase of his literary work. His fine addresses, 'The Beginnings of Natural History in America' (1886), The Beginnings of American Science' (1888), 'The Literary Labors of Benjamin Franklin' (1890), and 'The Origin of the National Scientific and Educational Institutions of the United States' (1890). 'An Account of the Smithsonian Institution' (1895), sprang from the same instinct which prompted him to compile the valuable bibliographies of Baird, of Girard, of Lea and of Sclater, and to undertake the remarkable genealogy of his own family entitled 'Virginia Cousins.' The time, between 1887 and 1895, which he devoted to these subjects caused some of his fellow naturalists anxiety, yet I fancy this work was largely sought by him for diversion and rest, just as Michael Foster tells us that philosophy and controversy served as recreation to Huxley, at a time when overwork had given him a passing distaste for morphology.

His trend of life, guided by these four beacon lights, was swayed by two countercurrents—first, his strong impulses as an original investigator, and second, his convictions as to the duty of spreading the knowledge of nature. These currents moved him alternately. The most superficial view

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of his career shows that his whole environment fostered his public spirit and made difficult, and at times impossible, the retirement so essential to the studies of nature.

Goode's practical and public achievements for natural history, therefore, do him even more honor than his writings, because from June, 1870, when he graduated from Wesleyan University, to September, 1896, administrative service became paramount, and he was free to devote only the odd intervals of his time to research. Our great gain in the national institutions he has advanced is our corresponding loss in icthyology and the kindred branches of zoology.

Goode's successful work in the natural history courses at Wesleyan led at graduation to a position in the College Museum, where in 1870 he at once showed his great talent for systematic arrangement. In further preparation for zoology he went to Harvard and for a few months came under the genial influence of Louis Agassiz. But the turning point in his life came in 1872, when, working as a volunteer upon the United States Fish Commission at Eastport, he met Spencer F. Baird. The kind of simple but irresistible force which Abraham Lincoln exerted among statesmen, Baird seems to have exerted among naturalists. He at once noted young Goode's fine qualities, adopted him and rapidly came to be the master spirit in his scientific life. Goode delighted to work with a man so full of all that constitutes true greatness. He frequently spoke of Baird as his master, and intimate friends say that he never showed quite the same buoyant spirit after Baird's death—he felt the loss so keenly. Baird took Goode to Washington in the winter of 1872, and practically determined his career, for he promoted him rapidly through every grade of the Fish Commission and Museum service. It is hard to realize now the intensely rapid and eager development of our national scientific institutions in those years.

No doubt Baird's mantle fell fittingly upon Goode's shoulders, and he had all but the magnificent physique of his master to qualify him for this heavy burden. His talents and methods were of a different order. Both men enjoyed universal admiration, respect and even love, but Baird drove men before him with quiet force, while Goode drew men after him. Lacking the self-confidence of Baird, Goode was rather persuasive than insistent. His success of administration also came partly from an instinctive knowledge of human nature and his large faculty of putting himself in other men's shoes. He sought out the often-latent best qualities of the men around him and developed them. When things were out of joint and did not move his way he waited with infinite patience for the slow operation of time and common sense to set them right. He was singularly considerate of opinion. Not "I think," but "Don't you think?" was his way of entering a discussion. I am reminded of the gentleness of my teacher, Francis Balfour, when one of his students carelessly destroyed a rare and valuable preparation, as I learn from one of Goode's associates that, under similar provocation, without a word of reproof, he stooped over to repair the damage himself. He was fertile of original ideas and suggestions, full of invention and of new expedients, studying the best models at home and abroad, but never bound by any traditions of system or of classification. He showed these qualities in a marked degree in the remarkable Fisheries Exhibit which he conceived and executed for Berlin in 1879, and continued to show them in his rapid development of the scope as well as the detail of a great museum. To all his work also he brought a refined artistic taste, shown in his methods of printing and labeling, as well as in his encouragement of the

artistic, and therefore the truthful and realistic, development of taxidermy in the arrangement of natural groups of animals. To crown all, like Baird, he entered into the largest conception of the wide-reaching responsibilities of his position under the government, fully realizing that he was not at the head of a university or of a metropolitan museum, but of the museum of a great nation. Every reasonable request from another institution met a prompt response. I well recall Goode's last visit to the American Museum, the hearty approval of the work there, and especially his words: "I am glad to see these things being done so well in this country." Not the advancement of Washington science, but of American science, was his dominating idea.

In fact, every act and every word of Goode's breathed the scientific creed which he published in 1888:

"The greatest danger to science is, perhaps, the fact that all who have studied at all within the last quarter of a century have studied its rudiments and feel competent to employ its methods and its language, and to form judgments on the merits of current work. In the meantime the professional men of science, the scholars, and the investigators seem to me to be strangely indifferent to the question as to how the public at large is to be made familiar with the results of their labors. It may be that the use of the word naturalist is to become an anachronism, and that we are all destined to become, generically biologists, and specifically, morphologists, histologists, embryologists and physiologists.

"I can but believe, however, that it is the duty of every scientific scholar, however minute his specialty, to resist in himself, and in the professional circles which surround him, the tendency toward narrowing technicality in thought and sympathy, and above all in the education of non-professional students.

"I cannot resist the feeling that American men of science are, in a large degree, responsible if their fellow-citizens are not fully awake to the claims of scientific endeavor in their midst.

"I am not in sympathy with those who feel that their dignity is lowered when their investigations lead toward improvement in the physical condition of mankind, but I feel that the highest function of science is to minister to their mental and moral welfare. Here in the United States, more than in any other country, it is necessary that sound, accurate knowledge and a scientific manner of thought should exist among the people, and the man of science is becoming, more than ever, the natural custodian of the treasured knowledge of the world. To him, above all others, falls the duty of organizing and maintaining the institutions for the diffusion of knowledge, many of which have been spoken of in these addresses—the schools, the museums, the expositions, the societies, the periodicals. To him, more than to any other American, should be made familiar the words of President Washington in his farewell address to the American people:

"Promote, then, as an object of primary importance, institutions for the general diffusion of knowledge. In proportion as the structure of a government gives force to public opinions, it should be enlightened."

As a naturalist Goode did not close any of the windows opening out into nature. His breadth of spirit in public affairs displayed itself equally in his methods of field and sea work and in the variety of his observations and writings. While fishes became his chief interest, he knew all the Eastern species of birds after identifying and arranging the collection in his College Museum. He loved plants, and in the latter years of his life took great pleasure in the culture of the old-fashioned garden plants around his house. He was not wedded to his desk, to dry bones nor to alcoholic jars. His sea studies and travels ranged, as early as 1872, from the Bermudas to Eastport, on the Bay of Fundy; to Casco Bay in 1873; to Noank, on Long Island Sound, in 1874. Here he conceived his great '*Index Bibliography of American Ichthyology*,' and here he met his future colleague, Bean, who describes him as 'a young man with plump cheeks and a small mustache.' During the following two years his Assistant Curatorship at the National Museum confined him, but in 1877 he was studying the fisheries off Halifax, and in 1879 off Provincetown. The work of the fishery census was starting up in earnest, and Goode was busy planning and getting together his men. Special agents were sent out to every part

of the coast and to the great lakes to gather information. Goode worked at it himself on Cape Cod, and manifested the same enthusiasm as in every other piece of work he took up. He interested himself in getting together a collection representing the methods of the fisheries and the habits of the fishermen. Neglecting neither the most trivial nor important objects, branching out into every collateral matter, he showed his grasp both of principles and of details.

His literary bent and facility of written expression showed itself before his graduation at Wesleyan in the *College Argus*, which contains seven brief papers, including his first scientific article, prophetically entitled 'Our Museum.' He contributed to the *American Naturalist* in 1871 a note upon 'The Bill-fish in Fresh Water,' and in 1872 'A Sea Bird Inland.' He published and presented before the American Association in 1873 his first paper of importance, entitled 'Do Snakes Swallow Their Young?' These studies of real merit foreshadow two marked features of his later work: First, his recognition of the importance of distribution, which culminated in the preparation of his unfinished memoir upon the '*Geographical Distribution of Deep-Sea Fishes*;' second, his close observation of the habits of animals, which was of marked usefulness in his subsequent Fish Commission service and treatises upon fish culture. His '*Catalogue of the Fishes of the Bermudas*,' from his 1872 visit, indicate how early in life he had thought out a thoroughly philosophical method of studying a local fauna. "In working up my notes," he says, "I have endeavored to supplement previous descriptions by (1) descriptions of the colors of the fishes *while living*, (2) notes on size and proportions, (3) observations on habits, (4) hints in reference to the origin and meaning of their popular names, (5) notes upon modes of capture and economic value. He increased the number of recorded species from 7 to 75 and gave a careful analysis of their probable geographical derivation.

Many of his briefer papers deal directly with the biological problems which attracted his interest, especially among reptiles and fishes, touching such questions as migration, coloring, albinism, mimicry, parasitism, feeding and breeding habits, the relation of forest protection to the protection of fishes.

It is difficult to classify the papers long and short which we find rapidly succeeding each other in the valuable bibliography prepared by Dr. Adler and Mr. Geare. Of his 193 independent papers, 21 are biological, 9 treat of reptiles and amphibians, 38 are devoted to the structure, life habits and distribution of the fishes, in addition to 15 purely systematic contributions upon the fishes. Among the former are his large Memiors upon the 'Menhaden,' his shorter treatises upon the Trunk Fishes, the Carangidæ, the Sword Fishes and the eel. The work of the Fish Commission is described and published at home and abroad in 30 reports and popular papers. The special branch of 'Fisheries Exhibits' is treated in 8 papers, and of fish culture in 12 papers. Besides his 14 reports as Director of the National Museum, he published, between 1881 and 1896, 13 papers developing the theory and practice of museum administration, leading up to his very notable articles, 'Museums of the Future,' 'Museum History and Museums of History' in 1889, and his invaluable memoir upon '*Museum Administration*' in 1895. His labors and writings placed him in the lead of museum experts in this country and upon the level of the distinguished leader of museum development in England, Sir William Flower. The closing sentence of his address before the English Museums Association must be quoted:

"The degree of civilization to which any nation, city or province has attained is best shown by the

character of its public museums and the liberality with which they are maintained."

His popular works include the 'Game Fishes in the United States,' published in 1879, a book written in charming literary style, besides innumerable short articles in the *Chautauquan*, *Forest and Stream* and SCIENCE. In 1888 appeared his 'American Fishes: a popular treatise upon the Game and Food Fishes of North America with special reference to habits and methods of capture.' These writings give us a further insight not only into the two sides of Goode's scientific nature, the theoretical and practical, but into his artistic and poetical sentiment and into the wide extent of his reading. Besides the long list enumerated above, he published 51 joint ichthyological papers with G. Brown, W. O. Atwater, R. E. Earll, A. Howard Clark, Joseph W. Collins, Newton P. Scudder, but his chief collaborateur was Tarleton H. Bean. Under their names appear 35 papers, but chief of all the 'Oceanic Ichthyology, a Treatise on the Deep-Sea and Pelagic Fishes of the World, based chiefly upon the collections made by the Steamers Blake, Albatross and Fish Hawk in the Northwestern Atlantic.'

In 1877 Goode saw his first deep-sea fish drawn fresh from the bottom and experienced a sensation which he thus describes in the preface of his monograph:

"The studies which have led to the writing of this book were begun in the summer of 1877, when the first deep-sea fishes were caught by American nets on the coast of North America. This took place in the Gulf of Maine, 44 miles east of Cape Ann, on the 19th of August, when from the side of the U. S. Fish Commission steamer 'Speedwell' the trawl net was cast into 160 fathoms of water. The writers were both standing by the mouth of the net when, as the seamen lifted the end of the bag, two strange forms fell out on the deck. A single glance was enough to tell us that they were new to our fauna, and probably unknown to science. They seemed like visitors from another world, and none of the strange forms which have since passed through our laboratory have brought half as much interest and enthusiasm. *Macrurus Bairdii* and *Lycodes Verrillii* are simply new species of well-known deep-dwelling genera, and have since been found to be very abundant on the continental slope, but they were among the first fruits of that great harvest in the field of oceanic ichthyology which we have had the pleasure to garner in the fifteen years which have passed since that happy and eventful morning. It seems incredible that American naturalists should not then have known that a few miles away there was a fauna as unlike that of our coast as could be found in the Indian Ocean or the seas of China."

In one of the latest of his 45 contributions to the Bulletin of the United States National Museum is the description of the discovery of the new deep-sea Chimæroid, for which, true to his appreciation of the past, he proposed the name *Harriotta* in memory of Thomas Harriott, the earliest English naturalist in America.

The quaint, old-fashioned style of some of Goode's essays again gives us an insight into his historic sense and his reversion to the ideas and principles of his Virginia ancestors. Seldom have we known the loyal, conservative spirit, of reverence for old institutions, fealty to independence of societies, combined with such a grandly progressive spirit in the cooperation of the government with the state, and of one country with an other, in the promotion of science.

Again, what impresses us most is Goode as the apostle of scientific knowledge, the conviction of his mission in life breathing through his earliest papers in the *College Argus* to his final appeal in SCIENCE for the 'Admission of American students to the French Universities.'

One of his intimate friends writes: "Sometimes we talked of more far-reaching matters and in such discussions I often took a position I had no faith in, hoping to draw him out. I remember once we fell to talking of the province of science, and for the sake of argument I took the position that most scientific work was merely a form of intellectual amusement and benefited no one. He became quite

earnest in his protest against that view and asserted his belief that the majority of scientific men were working toward the improvement of things and that it was the destiny of science to be the salvation of the world. At another time he unfolded the idea that man through science was approaching step by step nearer the Infinite Ruler of the Universe, and that it was only through these activities that he could hope to reach his proper destiny; that every amelioration in life, every improvement in manners, every change in theological tenets, was a token of man's unfolding through the working of intellectual forces.

Our lasting regret must be that Goode's life terminated just as he had richly earned the right to retire from the scientific service of his country, from your service and mine, my friends, to devote himself more exclusively to his own researches.

As early as 1880, during the herculean task of entering the New National Museum, Goode remarked to one of his friends: "We have had pretty hard scrambling; I think we will take a rest presently." But alas, the rest days never came. One duty after another fell heavily upon his too willing shoulders. All must have observed in later years a certain quiet melancholy which marked his overwork and conscious inability to cope with all that his ambitious and resourceful spirit prompted. None the less he showed a continuous and rapid intellectual development during the last ten years of his life, and it was evident that his powers were constantly expanding and that his brightest and most productive days were to come in his projected independent and joint researches. As before noted, his 'Geographical Distribution of Deep-Sea Fishes' was nearly completed, the charts having been exhibited before the Biological Society, and a mass of voluminous notes and valuable observations are ready to show that the distribution of deep-sea fishes is far from being general, as has been supposed, and that there are certain well defined thalassic faunal regions. Another projected work for which extensive materials were collected was upon the 'Fishes of America,' in which Dr. Theodore Gill was to have cooperated.

He was always encouraged by his supreme faith in the reward of honest intellectual labor, and it is pleasant to recall now that he took the keenest satisfaction in the completion and publication of the 'Oceanic Ichthyology,' which revived in him all his old natural history spirit. He regarded it as his chief life work, and once observed to his fellow-writer, Tarleton Bean, "it will be our monument," little foreseeing that in a fortnight he would be gone and that his friends and admirers all over the world would share this very thought in receiving the fine monograph a few weeks after his sudden and unexpected death.

Our friend has gone to his fathers. As a public spirited naturalist he leaves us the tender memory and the noble example which helps us and will help many coming men into the higher conception of duty in the service and promotion of the truth. We cannot forget his smile nor his arm passing through the arm of his friend. Thinking little of himself and highly of others, faithful to his duties and loyal to his friends, full of good cheer and helpfulness, it is hard for us to close up the ranks and march on without him.

Henry Fairfield Osborn.

THE NATIONAL UNIVERSITY.

A GROWTH, NOT A CREATION.

We Americans do not, as a rule, believe in 'the day of small things.' Whatever we do we like to do on a great scale and with a great rush and a great noise. Sometimes we are unwilling to do anything at all until we can do something very grand. Unquestionably, it is wise not