Geographers know that to-day there are no more continents and seas to be discovered. They, however, have no doubt that in their science fundamental problems are unsolved as yet and still may occupy scholars through centuries. The state of physics, the world-picture and evolution of which I have tried to sketch, may perhaps be similar.

ARTHUR HAAS

VIENNA

LOUIS AGASSIZ FUERTES

As already noted in SCIENCE, Louis Agassiz Fuertes was suddenly killed at Unadilla, New York, August 22, when the automobile he was driving was struck by a moving train. In the many printed notices which appeared immediately after his passing, superlatives have been used freely and justifiably. "Foremost American painter of birds," says one; "Cornell's best beloved alumnus," says another; and all testify to the extraordinary personal popularity which he enjoyed.

He was indeed a unique character, the like of which is scarcely produced except in America. He was born at Ithaca on February 7, 1874. His father, Estevan Antonio Fuertes, one time dean of civil engineering at Cornell, was a man of outstanding character and ability. This father, whom Cornell students used to call "The Mogue," was of Spanish lineage, born in Porto Rico, but completing his education in New York. The mother, Mary Stone Perry Fuertes, now surviving at an advanced age, is a fine American type of English, Dutch and Huguenot ancestry. The remarkable combination of qualities developed by Louis Fuertes doubtless owed much to this parentage.

His especial professional godfathers were Abbott Thayer and Elliott Coues with whom he had close association for which he never ceased to make loyal acknowledgment. As a boy, his passion for the beautiful in nature had fairly free rein and his early drawings of birds were made practically without suggestion or guidance from others. However, neither he nor his parents thought seriously of ornithology or painting in any practical way, and his father expected him to enter the engineering or architectural profession. This idea was overcome to some extent through the influence of Liberty H. Bailey, and shortly before Louis graduated from Cornell in 1897 a fortunate coincidence led him to send a few samples of his bird paintings to Elliott Coues for criticism. The enthusiastic reply received from the great ornithologist was fulsome beyond his hopes. He was electrified with joy, and from that moment was never in doubt as to his purpose in life. Coues literally took him under his wing, hailed him as a new and better Audubon, and introduced him to the ornithological world in such a way that contracts to illustrate several books were soon in his hands.

He began at once to portray bird life in a way that appealed alike to the artist and to the ornithologist. At this time the long era of woodcuts and expensive lithographs was just passing. General interest in outdoor life and especially in birds in this country was awakening and the demand for good books of nature was growing. To say that Fuertes arrived opportunely to take advantage of the period does him injustice, for his influence was very powerful in stimulating and supporting the movement and but for him it would have been delayed or curtailed. Other artists and good ones came into the field, but it was Fuertes who set the standard, who inspired the ideal of all, and by abundant production spread broadcast the charm and beauty of birds, not merely in accuracy of line and color, but in the expression of subtle intangible qualities approaching spirituality. In effect the word went about that birds had souls and that Fuertes could see and transcribe them.

For thirty years his activity and industry were phenomenal. He illustrated book after book, sometimes with only a frontispiece or a few plates, but usually with a whole series covering all the species known from a wide area. A large percentage of the more important bird books published in America during this period contain pictures by Fuertes. One of the most important was the series of large plates in full color for Eaton's "Birds of New York" (1910), covering practically every species of eastern North America. At the time of his death he was under contract with the State of Massachusetts for a similar and even better set of plates, one volume of which had been finished and issued. He also furnished plates for various ornithological journals, for museum publications, for the National Geographic and other magazines, and for the widely distributed pamphlets and reports of the federal government. In all this, he was often under pressure, but his standard was high and the average quality of his production was never far from it. The demand for mere illustrations, however, prevented him from giving his talent the widest range. Had he lived, it was his well-determined intention to finish his contracts, to take no more which savored in the least of pot boiling, and to devote an entire year to untrammeled self-expression or, in his own words, "to paint whatever I want to paint, whether I can sell it or not"—not merely birds, but pictures, pictures with birds in them.

He had, in fact, painted such pictures before, but

his opportunities in this direction had been all too limited. A commission which he thoroughly enjoyed and in which he was signally successful was that of painting a series of twenty-five decorative panels in the private house of Mr. F. F. Brewster, New Haven, Connecticut. He also did some murals in the Flamingo Hotel, of Miami, Florida, and several large paintings for the collection in the Administration Building of the New York Zoological Society. His contributions to the backgrounds of the habitat groups of birds in the American Museum of Natural History were notable. In addition, he painted a certain number of mammals and domestic animals and, while some of these which he did not know in life were lacking in sympathy and below the standard of his pictures of wild birds, there were many of high quality, indicating that he might also have succeeded in this field.

In 1904, he was married to Margaret E. Sumner, of Ithaca, and their home was made "above Cayuga's waters" at the edge of the Cornell campus. There are two children, Sumner and Mary, to whom he was a most devoted father. His studio, which was detached but adjacent to his house in Ithaca, was a Mecca for prominent ornithologists from all parts of the country and a house of wonders to students of Cornell and other young people of the community. In it he kept not only his studies and sketches but an interesting assortment of curios and souvenirs picked up on his travels to various parts of the world. There was also his very choice collection of bird skins which, although it did not exceed 4,000 specimens in number, was especially selected and rounded out to meet the exacting needs of his work. This collection was largely the result of his own field work, birds that fell to his own gun, and were preserved by his own hand.

In his earlier years, Fuertes sometimes said half jestingly that he was an ornithologist first and a painter afterward. His genius as a painter will never be denied, but it is plain that his supremacy in his field was gained by many qualities besides mere skill as a draughtsman and colorist. His knowledge of birds was exceedingly extensive and, in some respects, almost profound. It was obtained mainly through direct contact with the subject. Probably it is not too much to say that Fuertes had a wider acquaintance with living birds in the field than any painter that ever lived. This was because he sought them out, not primarily to paint them but to know them and to enjoy them, often at the sacrifice of time and money. It was characteristic of him to do field work under various auspices. A general favorite himself, he played no favorites and was *persona grata* in all quarters. His first long trip was with the Harriman-Alaska Expedition; later he joined a party from the U. S. Biological Survey for work in Texas and New Mexico; and for several seasons he was associated with his friend, Dr. Frank M. Chapman, in expeditions for the American Museum of Natural History to Canada, Mexico and South America. He also visited California, Florida and the West Indies. His last and longest journey was as ornithologist and artist of Field Museum's recent expedition to Abyssinia, where he personally collected and prepared no less than one thousand birds and made about one hundred paintings and sketches.

The affiliations which he made with different institutions were mutually advantageous and usually so arranged that he retained originals of sketches and paintings for himself while specimens collected were shared, but so conscientious was he that what some might have considered his own interest was often neglected. He was a good shot, an ardent collector, and had such an inexpressible joy in the living bird and its surroundings that he would forget everything else including his painting. His day in the field was so occupied with hunting, observing and preparing specimens that he rarely had time for painting, even though he worked far into the night. Somehow, at odd moments, he made field sketches which in the aggregate were very many, but they were largely for recording the fugitive colors of soft and unfeathered parts which are altered in the preserved specimen. For the rest, he depended upon the genius of his uncanny faculty for retaining vividly impressions of those intimate "spiritual" qualities which gave each bird he painted its own distinctive "personal" character.

In the field, as elsewhere, Fuertes showed an extraordinary combination of qualities, at times almost paradoxical. Always as eager as a child, he was often as sentimental as a debutante and as sympathetic as a mother; yet he was full of a stern virility which continually manifested itself in ways that left no doubt he was a man's man. With gun in hand he was a hunter and collector, having no qualms at the shedding of blood, but with a freshly killed bird before him he would sometimes sit stroking its feathers in a detached ecstasy, purring and crooning over it in a manner that in another might have seemed ridiculous. On the trail, the sight of a new bird might cause him to abandon in a flash all practical considerations, his own safety or comfort, plans for the day, and hopes for the morrow. Yet that night in camp, it would be Fuertes who spent an hour of his precious time repairing ingeniously and most practically for someone else broken saddle gear, guns, typewriters or cameras. Pure beauty in all things fascinated him, and the exquisite combinations of

color and texture exhibited by many small birds were his constant joy, but it is significant that his favorites among all birds were the falcons, the swiftest, boldest, most dashing and, withal, the most rapacious and inexorably bloodthirsty of their kind.

In Abyssinia, Fuertes found himself in a veritable terra incognita, an ornithological world which was all new to him, and he plunged into it with an exuberance of joy. Every bird was an adventure and every moment an opportunity. Patience he had at the skinning table and the drawing board, but at other times it was not always evident and in his impetuosity he was occasionally near to disaster. His first day in Africa was in Djibouti on the coast of the Red Sea and, while others made necessary arrangements for progress inland or sipped cool drinks on the hotel veranda, he slipped out of the settlement, dodging local gendarmes, and in the sweltering heat collected seventeen birds which were skinned with penknives that night in the hotel. The next day on the train, after it had crossed the Abyssinian border but before customs regulations had been complied with, he was tantalized by unknown birds seen at a distance. Finally, at a small station, over the heads of a gaping and jabbering crowd of Abyssinians, a beautiful blue roller alighted on the telephone wire and Fuertes could stand it no longer, but dove into his luggage for a small shot pistol and started out of the standing train intent on having the bird in his hands, come what might. It required the combined efforts of the four other members of the party with argument and at least with threatened force to convince him that the bird was not worth the almost inevitable altercation with bystanders which would follow. Arrived in the capitol at Addis Ababa, Fuertes was subjected to a staggering blow. While all other equipment shipped by freight had arrived safely, his own personal outfit had suffered the mischance of being lost in transit without hope of recovery for three months. It contained his shotgun, his clothing and personal effects and, most important of all, his materials for painting and sketching. His disappointment was too keen to be wholly concealed, but when he was finally told the worst, he said at once, "Well, it simply means I'll have more time to collect birds for the Museum." His other expressed regret was that certain little knicknacks and home-made conveniences for camp life, which he had packed in sets, could not be shared with others of the party as he had intended. Nothing could be more characteristic of him than thus to see his own misfortune in the light of its relations to others.

His unselfishness in all human contacts was marked and perhaps it was but a slightly different form of this that made him so unsparing of himself in his work. He did not often look for the easiest way and would tear through brush and thickets, plunge into morasses, and fearlessly descend steep cliffs to attain his object. In the first few days in Abyssinia, an impetuous sally left him with a large thorn deeply imbedded and broken off in his leg. It could not be removed without a deep incision, so it was thought best to leave it alone. The next day the wound was inflamed and sore, but he would not listen to postponing the march. He was lifted into the saddle and remained there doggedly suffering during what proved to be for everybody the longest and most gruelling day of the whole trip. Thereafter, for nearly two weeks, he mounted and dismounted in agony, but this did not prevent him from doing it many times a day in order to collect birds along the trail which might not be obtained later. Probably no picture in the many of a very eventful trip will remain longer with the others of the party than that of Fuertes laboriously easing himself from his mount to the ground and painfully hobbling away with cocked gun, alert and determined that no needed bird should escape because of any leniency to himself.

His fondness for children, so well known at home, and his tender, almost feminine sympathy for the ailing and unfortunate, were much in evidence in Africa. Beggars and cripples were a great trial to him and it was exceedingly difficult for him to pass one by. He gave to many and almost immediately would apologize to his companions, saying "I know I shouldn't do it, but I just can't help it." If he found one imposing upon him, however, his pity turned to wrath instantly. One of the caravan men, a "nigger" if one wished, developed a loathsome abscess in the groin, and Fuertes carefully washed, poulticed, and bandaged it day after day until it was completely healed. Then the man, who was a worthless wretch, flagrantly betrayed his trust as guardian of the camp, was summarily discharged, and no one was louder in approval of the action than Fuertes. His sense of justice was marked and he was outspoken in his condemnation of sham and insincerity. This extended into the field of art and science and his great personal popularity was not unbroken by a few enemies who well deserved his forthright denunciation. He had no quarter for self-seeking pseudo-naturalists and no sympathy with certain schools of new art which arrogate to themselves an insight transcending that of other mortals. There was nothing mawkish about him.

Fuertes was actively interested in a variety of subjects other than ornithology and painting. These included music, architecture, primitive art, conservation, and all movements concerned with young people. Although his conversation usually sparkled with origi-

nality and his correspondence gave much evidence of literary power, he wrote very little for publication. His most important written work appeared first in *Bird Lore* and, later, in pamphlet form under the title "Impressions of Tropical Bird Voices." It was a charming and valuable contribution to a little known subject. He was much interested in bird songs but had no fanciful ideas about them and especially condemned attempts to relate them with human music except by mere notation. His powers of mimicry were most unusual and he was greatly in demand at gatherings of all kinds, not only for his imitations of birds and other animals, but for various "stunts" for which his sense of humor and his natural histrionic talent qualified him to a remarkable degree. These things contributed to his popularity and when combined with the pure gold of his character and the achievements of his profession served to mark him as a very outstanding man.

In 1925, he was made a lecturer in ornithology at Cornell and, although he took this responsibility seriously, it has been said that he accomplished more by example than by precept. His influence was felt among the citizenry of Ithaca in many other ways, as a Rotarian, as a master of Boy Scouts, as a friend and guide for all young people, with the result that he is mourned not only by the university but by the entire community.

During the few weeks since his death, there have been those who have not hesitated to pronounce him the greatest painter of birds that ever lived. There is much to justify such a large place for him, and time is not likely to modify it greatly. Certain it is that he marks an era for American ornithologists and that in him skill with the palette and pencil was combined with qualities of mind and character to produce a very rare result.

WILFRED H. OSGOOD
FIELD MUSEUM OF NATURAL HISTORY,
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SCIENTIFIC EVENTS

GIFTS TO COLUMBIA UNIVERSITY

AT the October meeting of the board of trustees of Columbia University gifts were announced totaling $210,000, including the following:

Mrs. Walter B. James, $25,000 to be added to the Walter Belknap James research fellowship fund established by bequest from Dr. James. Laura Spelman Rockefeller Memorial, $20,000 for research in education. Borden Co., $18,000 to establish the Borden research fund in food chemistry. Mrs. Lucius Wilmerding, $14,429.93 to be added to the special tuberculosis fund in the Medical School. J. William Clark, $10,000 for the School of Dental and Oral Surgery building fund; Walker Gordon Laboratories Co., $5,000 for research in food chemistry and nutrition; National Lead Co., Eagle Picher Lead Co., St. Joseph Lead Co., United Metals Selling Co., American Smelting and Refining Co., and U. S. Smelting and Refining Co., $4,842.75 for research work in the department of physiology; Motion Picture Producers and Distributors of America, $4,500 for research in applied psychology; William J. Gies fellowship fund committee, $3,518 to be added to the fellowship fund; Fritzsche Brothers, $3,000 to provide the stipend for the Fritzsche fellowship in the department of chemistry; Hartley Corporation, $2,600 for the Marcellus Hartley laboratory; Copper and Brass Research Association, $2,500 for research in the department of physiology; William Fellowes Morgan, '80, '84S, $2,500 for the Medical School; Mines '17, $2,500 for an Engineering School student loan fund; P & S, '12, $2,472.77 for the benefit of the Medical School; Robert H. Montgomery, S. W. Adler, $1,500 for purposes to be specified by the dean of the Medical School; anonymous, $1,500 for work in public health; E. I. du Pont de Nemours & Co., $750 for a fellowship in industrial chemistry; J. Russell Smith, $500 for a special fund for economic geology; Lehn & Fink, $400 for a research fellowship in organic chemistry; Miss Mary Wheelwright, $350 for research in anthropology; Mrs. Elsie Clews Parsons, $350 for research in anthropology; Gano Dunn, '91 Mines, $350 for the Gano Dunn scholarship in applied science; $300 for research in the field of Indian music; Harvard University, $250 to be added to the William J. Gies Fellowship Fund; Bunker Hill and Sullivan Milling and Concentrating Company, $157.25 for research in the department of physiology; D. H. Burrell & Co., $100 for research in the department of anthropology.

RESEARCH IN MINING AND METALLURGY AT THE CARNEGIE INSTITUTE OF TECHNOLOGY

FIFTEEN different research studies in mining and metallurgy are being carried on this year at the Carnegie Institute of Technology in cooperation with the United States Bureau of Mines and two advisory boards of mining engineers, metallurgists, steel operators and chemists. Thirteen of the problems are being investigated by college graduates appointed as research fellows, one by a research engineer, and another by an analyst.

This year's work, it is announced, is a continuation of the program that has been in effect for several years. Each research fellow is making his studies under the direction of a "senior investigator" representing the Bureau of Mines and a member of the faculty of the Carnegie Institute of Technology. Four of the fellowships are financed this year by the institute. Other organizations contributing to the expenses and the fellowship funds are the American