are being made at this time in the Birmingham district. These puzzolan products utilize not only the water-granulated slag of the blast-furnace but hydrated lime from the lime industry of the South.

Slag from the blast-furnaces is cooled in huge graded pits, mined, crushed and graded for use as aggregates. Five hundred miles of Southern roadways are made of Alabama slag and Portland cement. Forty-five hundred miles of Southern roadways are constructed of Alabama slag and bituminous binders. Numerous buildings are made of slag concrete. Practical and scientific research both in the South and North have converted this once undesirable material from a waste to a useful raw material.

These are but a few of the prominent instances where scientific research has aided in the industrial development of the South. To these may have been added mention of many interesting discoveries in the fields of cotton textiles, cotton dyeing, tobaccos, cultivation and preservation of fruits, ceramics, soils, insecticides, petroleum refining, the production of diphenyl, production of helium, the manufacture of aluminium oxide, the production of celotex, the recovery of xylose and many other investigations pertinent to the industrial field.

For the most part these advancements have been largely responsible for industrial chemical research. In the solution of these problems industrial chemistry has been prominently aided and encouraged by geological researches and developments in chemical, electrical and mechanical engineering, so that the sum total accomplishments have not in many cases been attributable solely to the application of any one of the sciences.

To speak of accomplishments of research in the field of industrial development without enumerating some of the important scientific findings contributed from sources usually recognized as being independent of industrial activity would be to neglect paying tribute to many fine attainments.

We were permitted the pleasure one year ago of listening to an accurate account of the South's contribution to the sciences of botany, zoology, medicine, anatomy, surgery, pharmacology, pathology and several other of the sciences. In each of these fields distinct offerings have been made by Southerners. Investigations on the mechanism of heredity, on twins and twinning, oyster culture and mussels, coral formations, absorption spectra of solutions, viscosities of solvents, muscular discoveries, nervous system investigations, the transmission and control of yellow fever, surgical anesthesia, physiological behavior of poisonous alkaloids, ptomaines and cellular toxins and certain researches in connection with epilepsy and its relation to pellagra—these and many other important investigations have been contributed by Southern workers.

In the field of physical research we have to acclaim the attainment in connection with the recent discovery of two of the hitherto undetected members of the much discussed chemical family elements. Through the development of a magneto-optic method of chemical analysis exceptionally fine traces of elements have been made possible of identification and measurement, in concentration even as small as one part in 10^{11}. While academic interest in this accomplishment has centered considerably upon the discovery of the elements "Alabamium" and "Virginium" much promise is to be attached to this magneto-optic method of analysis as an effective tool of quantitative estimation.

To mention, however briefly, the many problems, industrial and academic, which are undergoing scientific investigation in the South at the present time, would be impossible. Likewise to set out the various influences which have stimulated the wide application of technical research in its various forms would be considerably complicated. Suffice it to state that the agricultural and industrial South has not only profited greatly by the relatively small number of contributions it has made to scientific discovery, but it stands to reap much greater benefits from its research conquests of the future. May the splendid accomplishments of the last fifty years serve as an ever accelerating stimulus to finer academic and industrial attainments to the end that in all the fields of science she may currently come to contribute her proportionate share of fruits of scientific research.

THE EARLY DAYS OF THE AMERICAN PHYSIOLOGICAL SOCIETY[1]

By Dr. HENRY H. DONALDSON

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As a survivor of the prehistoric period of physiology in the United States, I am asked to speak on the early days of the Physiological Society. Like all such survivors, I find myself in the position of the lady who, after the surgeons had finished with her, reported that she had only lungs and reminiscences

[1] Address at the dinner of the Federation of Societies for Experimental Biology, Philadelphia, April 29, 1932.

left. But in my own case even the reminiscences are fragmentary. Our chairman should have given me notice of this event some 45 years ago, so that I might have been better prepared. Let me sketch the background.

In the eighties the teaching of medicine, with which physiology was mainly associated, was poorly developed. I entered the College of Physicians and Surgeons in New York in 1880. It was then a proprietary school. You paid your fee and were enrolled. You could get your degree in two years by attending endless lectures and taking quizzes with a preceptor. There was a dissecting room—but no laboratories. Dalton held the chair of physiology. He was lucid in his presentation, largely based on French work—for he had been trained in Paris. An exposed heart is the only demonstration I recall.

But something unusual did happen that year. Prudden, who had been abroad with Welch, returned and offered a course in histology. It was given in a deserted ice-cream saloon, during the lunch hour, and with microscopes—mostly French models—which Prudden had borrowed from his friends. There half a dozen of us had a most inspiring introduction to histology. It was the one bright spot in the year.

In 1881 I went to Baltimore to be with Martin, the young professor of biology at the Johns Hopkins University. At that time there were no special societies dealing with biology in any of its aspects—but in 1884 Sam Clarke, then at Williams—and who had been with Brooks in Baltimore—decided that he must have some means for contact with his colleagues. So at his instigation the American Society of Naturalists was formed. In a measure this was a protest against conditions existing in the natural history section of the American Association for the Advancement of Science. This section was over-diluted with non-scientific members and, further, it met in midsummer. The Naturalists met at Christmas time.

At first all the natural sciences were represented in the Naturalists. Soon fission began. The Geologists withdrew—next the Physiologists—then other groups, and so the parent society of Naturalists kept on budding until it was reduced to something like a nucleus without cytoplasm.

Our interest lies in the event which gave rise to the Physiologists in 1887. At that time the better textbooks of physiology were that of Dalton—widely used, a pirated edition of Foster at 95 cents—and Hermann's Handbook, of which there was, I think, only one copy in the country. But physiology was in the act of declaring its independence, and the names of its representatives that occur to me are Bowditch in Boston; Chittenden in New Haven; Dalton and Curtiss in New York; Weir Mitchell, Chapman, Brubacker and Reichert in Philadelphia; and Martin, Sewall and Howell in Baltimore.

It was, I believe, at the suggestion of Weir Mitchell that a Physiological Society was formed, and the organization meeting was in 1887. During the first ten years Weir Mitchell, Bowditch and Chittenden were the presidents. There were some 15 to 20 of us, and the sessions were short.

The isolation of the mammalian heart, which is credited to Martin, served as the starting point for a number of investigations from Baltimore. There were studies in the early phases of biological chemistry by Chittenden, and Bowditch was working with the plethysmograph. At one of the early meetings we were gathered in Bowditch's new laboratory—a great room two stories high. Half way up the walls a balcony ran all around, and from this innumerable wires were strung across. Physiology was mainly in the mechanical phase of its development. Bowditch, who was a clever mechanician, had, as demonstration, a cat with plethysmographs on each of its four legs. Each of these was so arranged as to give typed records of the changes in each limb, with a corresponding graph.

It was a remarkable set-up, and the graphs were strikingly smooth—yet now and then a disturbing deviation appeared. Some one said to Bowditch, "What do the irregularities mean?" To which Bowditch replied, 'Oh, that's due to the animal"—adding with a twinkle, "But we are trying to arrange it so as to dispense with the cat."

Such were the activities of the Physiologists in the middle eighties. They looked forward to the future with both hope and confidence—but to the men of that time a meeting like this present one would be, and is, astounding.

Specialization after specialization has followed with the years—but our views concerning such have improved. I recall that a delinquent member of the Physiologists met a couple of us on the train as we were returning from a meeting, and remarked, "I've been up in Cambridge talking with some literary chaps, but I suppose that wouldn't have any interest for you fellows." Thank heaven, that attitude of the specialist is fast disappearing, and being replaced by the better notion that a specialty is merely one point on which all worth-while knowledge can be focused.

By reason of this subdivision of interest, we are ever threatened by that tidal wave of literature that sweeps down on us from year to year—but the present efforts to synthesize our knowledge, if vigorously pushed, may furnish a protection, and save us from the predicament of one of Wellington's staff. This

officer had held forth in great detail. "Sir," said the Iron Duke, "your information is too great for your understanding"—a cogent comment.

One word in closing: Martin brought to us the concept of biology, and the idea of special laboratories for physiology. The event has had far-reaching effects. It led to the founding of the Physiological Society and is the reason why, to-day, we are a Federation of Societies for Experimental Biology—ever expanding.

SCIENTIFIC EVENTS

THE SEVENTY-FIFTH ANNIVERSARY OF THE OLD SOUTH KENSINGTON MUSEUM

THIS year is the seventy-fifth anniversary of the opening of the old South Kensington Museum, and arrangements are being made, according to the London *Times*, in the Science Museum, which contains many of the original objects assembled in 1857, for a comparative exhibition illustrating the development which has since taken place in inventions. The original South Kensington Museum (in which the nucleus of the present Victoria and Albert Museum was also included) was founded as a result of the second report of the Royal Commissioners of the Exhibition of 1851.

The entrance hall of the present Science Museum and Gallery I, which adjoins it, were being cleared during the week-end in preparation for the anniversary exhibition, which will be open to the public on July 2. The exhibition will select the terminal points in a few branches of science which were at a primitive stage during the fifties and sixties. A model of an omnibus of the 1850's and locomotive models of the next decade will be placed beside models of a modern London omnibus and of one of the latest L. M. S. locomotives.

In many of the galleries upstairs parts of the permanent exhibition will be rearranged and relabeled for the anniversary, and a space has already been cleared in the Chemistry Gallery for illustrating the range of colors and fabrics now available to the artificial dye industry. Some of the largest British firms of chemists and textile manufacturers are lending exhibits for this portion of the exhibition. It is also intended to illustrate the part taken by the 1851 commissioners in founding the museum and fostering it since that time. The Great Exhibition in Hyde Park, and the development of the site south of the Park into the Museum and College area of South Kensington will be seen in a series of water-colors and plans.

The experimental apparatus used at University College, Gower-street, by the late Sir William Ramsay, has been transferred on indefinite loan from the college to the Science Museum, where it is now partly arranged for view. The exhibits now to be seen include the blow-pipe with which Ramsay himself made most of the apparatus connected with his discoveries of rare gases.

Some new additions have also been made to the ship-model collection in the museum. A model of a Handley Page "Hannibal" type air liner has been presented by Imperial Airways, while the Sudan Government have given a primitive smith's forge of the type used at the present time by the natives of the Jur tribe, and used with some variations in Ancient Egypt some 35 centuries ago.

The museum workshops have reconstructed a Roman pertica, or 10 ft. measuring rod. A series of the metal caps and ends of such surveyors' rods were discovered at Pompeii in 1912 by Cav. M. Della Corte, and replicas of these have been used in the museum.

SMITHSONIAN EXPEDITIONS

TWENTY-FIVE scientific expeditions were sent out by the Smithsonian Institution during the past year. They are described in detail in the annual Smithsonian exploration reports recently issued for distribution.

A. F. Moore, of the staff of the Smithsonian Astrophysical Observatory, spent months on barren peaks of African mountains in futile search for a satisfactory Old World site for a solar radiation station. He sought a high desert altitude with, so far as possible, a cloudless, dustless atmosphere. For more than a month he made daily observations on a high peak on Fogo Island in the Cape Verde group. Although generally cloudless, this mountain proved to be surmounted nearly all the time by a high, thick blanket of haze which seems to rise from the Sahara desert.

Disappointed here, Mr. Moore went on to Southwest Africa where, sometimes for weeks at a time, he conducted observations on four mountain peaks and made an unsuccessful effort to scale a fifth. None proved entirely satisfactory.

More than 600 specimens of fossil animals, mostly fragmentary, were collected under the direction of Dr. Charles W. Gilmore in Montana and Wyoming. It is anticipated that many new forms of animal life will be revealed when a systematic study is made. Material of interest included a partial skeleton of a large, flesh-eating mammal, the pachyaena; three partial skeletons of the coryphodon, a rhinoceros-like animal, and six more or less complete skulls of ancient crocodiles. More than 2,500 fossil specimens were se-