All too often in the past settlement schemes have been undertaken and ended in disaster in areas unhealthy to man, beast or crops, when, if the scientist had first been called in, precautions might have been taken which would have averted the calamity.

Finally, science must harness the great resources of Africa. And here there are suggested to us all the varied contributions which the engineer can make in the work of development. Has not the Institution of Civil Engineers defined the ideal underlying all engineering activity as "the art of directing the great sources of power in nature for the use and convenience of man"? Africa offers abundance of opportunities for the realization of that ideal. It is not by working in isolation that the engineer will realize it, but rather by cooperation with his colleagues in other branches of science, and by the correlation and coordination of the essential data which they must do so much to provide. First in the order of engineering development come the civil and mining engineers. Their tasks are the provision of facilities for communication, for health, for the conservation of agricultural assets, for the production of raw material and for the development of mineral resources. In their train there follow, with the advent of industrial activity, the mechanical and electrical engineers. Their tasks are to make the fullest use of the revolution in ideas of transport, including transport by air, which have resulted from the perfecting of the internal combustion engine, and to secure the maximum advantage possible from cheap production and efficient distribution of electrical power. The day must come, to give a concrete instance, when the Victoria Falls, with their immense water resources, will mean much more for Africa than Niagara to-day means for America. Later still there will be called in the services of the chemical engineer, ever engaged in problems of research to ascertain the most advantageous processes of converting raw materials into manufactured articles. In all these tasks it is the South African engineer who has, under the conditions of an undeveloped land, built up a technique and practice suitable to African requirements and showing promise of wider applicability, that we may well expect to assume a position of leadership and of inspiration. These are some of the ways in which science can respond to the challenge of Africa.

The picture which I set out to portray I have now completed. I have tried to suggest something of the magnitude of the rewards which Africa has in store for the scientist who has the enterprise to adventure and the vision to see. I have sought also to be the medium of the challenge presented to science by Africa's opportunities and needs. It is a vast canvas on which I have had to work. On it I have drawn but a few sketchy outlines. Yet I hope that the vision stands out clear. I hope that I have said enough to convey the power of its inspiration. Not least do I hope that you, our visitors, will play a great part, in the time that you will spend with us, in filling in some of the details of the picture, and in quickening and vitalizing its message for the scientists of South Africa. It is to them chiefly that it makes its appeal. The development of science in Africa, of Africa by science, that is the promised land that beckons them. I believe that they will not be disobedient to the vision.

OBITUARY

JOHN MERLE COULTER[1]

DR. JOHN MERLE COULTER was born at Ningpo, China, November 20, 1851. His parents were missionaries sent by the Presbyterian church to work in China, the family being left fatherless through death in 1853. John M. Coulter and his brother, Stanley, in the care of their mother, returned to southern Indiana, where their boyhood days were spent. His college education was secured at Hanover College, from which he was graduated with the A.B. degree in 1870 and from which he received his master's degree in 1873. The degree of doctor of philosophy was conferred on Dr. Coulter by the University of Indiana in 1882, and the degree of doctor of laws was conferred by the same institution in 1920.

After a period of secondary-school teaching at Logansport, Indiana, Dr. Coulter became professor of natural sciences at Hanover College, where he taught from 1874 to 1879. He then went to Wabash College, where he was professor of biology from 1879 to 1891. Then he continued his particular interest in botany as professor of botany in the University of Indiana, where he was also president from 1891 to 1893. He was president of Lake Forest University from 1893 to 1896. With the establishment of the department of botany of the University of Chicago, Dr. Coulter became a part-time teacher in that department and he soon resigned the presidency of Lake Forest University, becoming head of the department of botany of the University of Chicago, where he remained from 1896 to 1925. When William Boyce Thompson became interested in establishing an institution for plant research he consulted Dr. Coulter, amongst others, and finally asked him to become adviser in the organization of the Boyce

[1] At the fifth New York meeting of the American Association for the Advancement of Science the council named a special committee to prepare a statement for the association in memory of the late Professor John M. Coulter. The committee's statement is presented herewith.

Thompson Institute for Plant Research. Dr. Coulter responded favorably and he continued in that capacity until his death in Yonkers, New York, on December 23, 1928.

Probably the most important single stimulus to Dr. Coulter's earlier botanical work came as the result of his membership in the Hayden Survey of the Western Territories in 1872. He was made a member of that survey as assistant geologist, but it soon became evident that his interest in plant life was of even greater importance than his interest in geology. Soon after the beginning of the work he was appointed official botanist in the Hayden Survey Expedition. In a talk to graduate students Dr. Coulter once explained how he came to be appointed as botanist. He said that after most of the day's work was done and while some of the other members of the party were sitting around the camp engaged in activities which did not particularly interest him, he went "plant scouting and collecting" and soon had acquired a large collection of plants which were then new to botanical records. During the preparation of his report of the Hayden Expedition, he consulted Professor Asa Gray, with whom he later continued his botanical studies. During his life he often referred to the very great influence Asa Gray had on his work, and undoubtedly that relationship was an important factor in the systematic work to which Dr. Coulter's earlier efforts were directed.

While teaching at Hanover College in 1875, Dr. Coulter started the publication of a small pamphlet which was the beginning of the *Botanical Gazette*. There was not a large demand for this publication at that time but the publication itself helped to create the demand which made possible the present magazine, which is known wherever students are interested in botanical science. The earlier years of the magazine, like Dr. Coulter's own interests, were primarily taxonomic. Then, toward the close of the nineteenth century, when morphology began to be more fundamentally organized, the *Gazette* changed accordingly and helped to develop the change in attitude. In a similar way physiology and ecology, as emphasis has changed, have found their place in the changing attitude of the magazine. The progressive spirit of Dr. Coulter and the other editors with whom he associated himself is well illustrated in the comprehensive and inclusive representation of botanical science in its own changing periods. The publication of the *Gazette* was always at great sacrifice of time and effort on the part of Dr. Coulter and in its early years it often included financial sacrifice as well.

Some of Dr. Coulter's most important publications are mentioned below:

1885	"Manual of the Botany of the Rocky Mountain Region."
1893	"Manual of Texan Botany."
1894–1896	"Preliminary Revision of North American Species of Echinocactus, Cereus and Opuntia."
1900	"Monograph of North American Umbelliferae."
1901	"Plant Relations," an elementary text-book.
1903	"Morphology of Angiosperms."
1904	"Plant Structures," an elementary text-book.
1904	"Plant Studies," an elementary text-book.
1906	"A Text-book of Botany," an elementary text-book.
1909	"New Manual of Botany of the Central Rocky Mountains."
1910	"Morphology of Gymnosperms," in collaboration with others.
1910	"Text-book of Botany," a general college text-book, in collaboration with others.
1914	"Fundamentals of Plant Breeding," in collaboration with others.
1914	"The Evolution of Sex in Plants," in collaboration with others.
1916	"Evolution, Heredity and Eugenics," in collaboration with others.
1918	"Plant Genetics," in collaboration with others.

Dr. Coulter became a member of the American Association for the Advancement of Science in 1883 and was elected a fellow in 1884. He served as general secretary of the association for the annual meeting held in Denver, in August, 1901, in place of Dr. William Hallock, who had been elected general secretary but was not able to be present. Dr. Coulter was elected president of the American Association in 1918 and presided at the third Baltimore meeting, in December of that year. He gave his retiring presidential address, on "The Evolution of Botanical Research," at the third St. Louis meeting in December, 1919. He served on many important special committees of the association during his long and useful period of membership. His membership and guiding influence have also been appreciated in many other organizations of national scope, notably the Botanical Society of America, the American Association of University Professors, the National Academy of Science, and religious organizations such as the Presbyterian church, in which he was an active member throughout his life.

Notwithstanding the scientific achievements and guiding judgment in national affairs which were so conspicuous in Dr. Coulter's life, it is probable that his greatest influence was through his teaching of general students and in his guidance of his special research students in botany. His lecture room was

always an engaging place for the listener. Many students enrolled for whatever course Dr. Coulter presented and did so in many cases more because Dr. Coulter gave the course than because of the subject. His readiness in use of his extensive and accurate vocabulary and fine phrases enabled him to make difficult matters clear even to those who did not have adequate personal experience on which to base interpretations. To him it was a matter of the greatest importance that speech should be appropriately organized to convey ideas. Vague and "wobbly" statements were not common with him, but clean-cut and picturesque elucidation appeared whenever he spoke. This characteristic gave him one of his most important powers to assist the many graduate students who worked in the department of which he was the guiding spirit. Many articles published by his students are far better than they could have been without his help, and many are in print which could scarcely have appeared without his criticism.

At a testimonial of appreciation a volume was presented to Dr. Coulter on the occasion of his seventieth birthday by those who had received their doctor's degrees under his supervision. The volume consisted of the bibliographies of publications by these students.

More than two hundred of Dr. Coulter's students have contributed to the endowment of the John M. Coulter research fellowship which was established before Dr. Coulter's death and is administered by the department of botany of the University of Chicago. In addition to this testimonial and through the efforts of a committee organized by admiring friends who were not Dr. Coulter's students, testimonials of appreciation had been provided and were to have been presented to Dr. Coulter at the last New York meeting of the American Association. Though he had been advised of this forthcoming additional expression of admiration and affection from his colleagues, his death, on December 23, 1928, made it necessary for the testimonials to be presented to other members of his family.

Statements regarding the life and work of Dr. John M. Coulter appear in SCIENCE for February 15, 1929, in the *Botanical Gazette* for March, 1929, and in the *University of Chicago Magazine* for March, 1929.

OTIS W. CALDWELL
HENRY C. COWLES
WILLIAM CROCKER
L. R. JONES
R. A. HARPER

RECENT DEATHS

DR. CHARLES WILLIAMSON RICHARDSON, professor emeritus of laryngology and otology of George Washington University, and a member of the board of trustees of the American Medical Association, died on August 25 at the age of sixty-eight years.

PROFESSOR W. H. PERKIN, research chemist, Waynflete professor of chemistry at the University of Oxford since 1912, and fellow of Magdalen College, died on September 17 at the age of fifty-nine years. Before going to Oxford Professor Perkin had been for twenty years professor of chemistry at Victoria University, Manchester.

THE death is announced of Dr. Wilhelm Brandt, professor of botany and pharmacognosy at the University of Frankfort.

SCIENTIFIC EVENTS

RECENT ADDITIONS TO THE SOUTH KENSINGTON MUSEUM

ACCORDING to the London *Times* a large number of important objects have been added, during the past six months, to the collections of the Science Museum, South Kensington. In the entrance hall there was until recently a copy of the locomotive Rocket of 1829, constructed for Mr. Henry Ford by Messrs. R. Stephenson and Co., for his museum at Detroit. This has now been withdrawn for shipment to America. At the foot of the main staircase the rotation of the earth will shortly be demonstrated by a pendulum, suspended from the roof of the museum, as in Foucault's experiment. In the collection illustrating radio-telegraphy accurate copies of the original apparatus used by Hertz, including the oscillators, resonators, prisms and reflectors with which he demonstrated the essential optical properties of electromagnetic waves, are now exhibited. Together with the original apparatus of Sir Oliver Lodge, Signor Marconi and Sir Ambrose Fleming, these copies of Hertz's apparatus form a part of a collection designed to illustrate the growth of radio communication from its earliest beginnings up to the present day.

On the first floor in the collection of early sailing ships a model of an Elizabethan galleon is on exhibition. This has been constructed in the museum from data which were collected by Samuel Pepys and which are now preserved in the Pepysian Library at Magdalene College, Cambridge. The mast and rigging will be added in the autumn. On this floor in the old buildings glass technology is now much more adequately represented; models of glass furnaces of the twelfth and sixteenth centuries, specimens showing stages in manufacture of optical glass, and many other products of the industry are represented. Ad-