George W. Beadle

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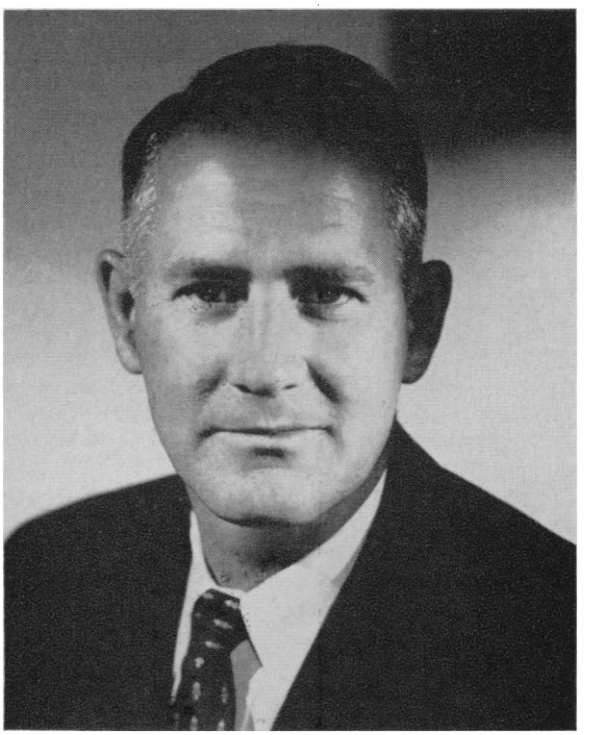
DURING the last 20 years the mean age of president-elect of the AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE has been 60.4 years. George W. Beadle, the president-elect for 1954, is ten years younger than the average, close to the left-hand end of the range. It is gratifying to all scientists to be represented by a leader who is still so near the young generation that they can admiringly claim him as one of their own.

George Beadle has attained his eminence with the help of an unusual flexibility of mind. Trained in the field of agronomy in the University of his native state, Nebraska, and obtaining there both the bachelor's and master's degrees, he continued his graduate education in the Department of Plant Breeding at Cornell University. Here Beadle joined the school of geneticists who, under the wise guidance of R. A. Emerson, were making *Zea mays,* the Indian corn, genetically the best known plant. At Cornell, in the Department of Botany, L. W. Sharp and L. F. Randolph provided instruction in the cytological approach to genetic problems, and Barbara McClintoek had just entered upon her career as the foremost cytogeneticist of our times. In this favorable scientific climate and within a few years, Beadle made fundamental contributions to the understanding of inherited sterility phenomena in plants. He recognized the varied chromosomal nature of different cases of sterility in corn. A series of papers on Mendelian asynapsis, on a gene for supernumerary cell divisions in cells normally destined to form pollen or ovules, on a gene for failure of cytokinesis during meiosis, and on a gene for sticky chromosomes are records of important discoveries in a strategic region, that of chromosome behavior, particularly in meiosis. Some of these studies were completed at Cornell University, which awarded Beadle his Ph.D. degree. Others he took with him, under a National Research Council Fellowship, to the Laboratories of the Biological Sciences, California Institute of Technology.

At Pasadena, Beadle soon turned his interest to an organism that had been developed into the most penetrating tool for the probing of chromosomal genetics, *Drosophila.* For three years intricate analyses were made of basic phenomena in the process of crossing-over, the exchange of sections between homologous chromosomes. This second period of research was terminated by a fundamental publication, jointly with A. H. Sturtevant, which contained a surprising solution of long extant problems of crossing-over in cells with inverted gene sequences in their chromosomes.

At this time Beadle left the classical field of chromosomal genetics to turn to developmental problems. During a stay in Paris together with B. Ephrussi he devised a method of transplantation of drosophila tissues from one larva to another that has become a much



used tool in physiologic genetic investigations. The problem to which Beadle applied his technic was that of the determination of eye color. Many genes were known whose action results in different pigmentation of the adult drosophila eye. What is the biochemical sequence of events which leads to the specific pigmentation, and where do given genes exert their influence on this sequence? The answer, obtained in collaboration with E. L. Tatum at Stanford University, where Beadle, after a year at Harvard, had become by now a staff member, consisted in the discovery of a number of successive steps in the biosynthesis of the eye pigments and in the basic concept that individual steps are controlled by individual genes.

The actual recognition of the different substances involved in this chain of reactions proved to be a very difficult undertaking. It was at this point in his career that Beadle with Tatum took the courageous step of calling a halt to their successful exploration of the genetic-biochemical determination of the eye colors of *Drosophila* and to begin work with a completely different kind of organism, the bread mould *Neurospora.* Drosophila genetics had supplied the genes but had failed to give easy access to the biochemical substances. The new project envisaged to begin with well-defined biochemical materials and to create the genes that would control their synthesis and transformation. In

1941 a short paper on "Genetic control of biochemical reactions in *Neurospora*" described the ingenious method designed to obtain biochemical mutants, and gave the first examples of such genes, in this case concerned with the synthesis of vitamin B_6 and other growth factors. The foundation had been laid for the many important discoveries of the neurospora group of biochemical geneticists.

George Beadle's accomplishments are his own yet they are shared with those of others. His wide knowledge is continually outgrown by his widening interests. To keep pace with them he has had to increase his knowledge still more, by learning and by association with experts in other fields. Everyone has been the gainer in these joint undertakings. Thus Beadle is a symbol not only of the outstanding discoverer but also of that type of modern scientist who succeeds in combining separate branches of knowledge in his own person and in the teamwork of a group of men from different disciplines. The temporary specializations of the sciences, so often decried by shortsighted critics, in the presence of men like Beadle lead to unification on a more comprehensive level.

Beadle has not shirked from presenting and interpreting the new aspects of genetics to wider audiences. His Sigma Xi National Lectureship and his addresses to many groups of chemists, at general symposia and diverse occasions, have brought to his listeners the pleasure of reliving the experiences of the researcher. As president of the AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, he will more prominently than ever continue to represent science to the American public.

Since 1946 Beadle has been chairman of the Division of Biology of the California Institute of Technology. His service in providing the best working opportunities for one of the largest and most original group of investigators bears witness to his unusual ability as an organizer. Many governmental agencies and other bodies also constantly make use of Beadle's skill in solving the problems of the organization of science and of research. With a clear head he sees the essentially simple facts even in a complex situation; and, seemingly without effort, order is created. The AAAS can be congratulated upon having secured for itself the many-sided gifts which George W. Beadle brings to his tasks.

Dael Wolfle

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PERHAPS because I am a psychologist and a member of the Board of Directors of the AAAS, I have been asked to introduce to the membership Dr. Dael Wolfle, the newly elected Administrative Secretary. Perhaps the real reason was that, over the past ten years, I have at times been closely associated with Wolfle in the administration of large research programs and in advisory capacities to governmental agencies where there has been an excellent opportunity to note the soundness and wisdom of his judgments as well as the calmness and good sense with which he met critical issues as they arose. The Association is indeed to be congratulated that the Administrative Office is to be under the leadership that he can provide.

Wolfle's father was brought to this country from Germany when still a baby, and he grew up in an isolated farming community with little English and little opportunity until a visiting teacher got him started toward a college education. The University of Washington granted him the bachelor's and master's degrees in physics and an instructorship, after which he turned to public school teaching. When he died in 1952 he had taught and administered in the public schools longer than anyone else in the State of Washington.

Initially Dael started in his father's footsteps, majoring in physics and mathematics and receiving his bachelor's and master's degrees from the University of Washington (1927 and 1928). An offer in psychology from Ohio State University led him to shift his interest to that field and he earned the doctor's degree at Ohio State in 1931. After one year as an instructor there, he was appointed professor of psychology at the University of Mississippi where, at the age of 26, he was by far the youngest professor on the campus. That he was successful is beyond doubt since he remained for four years, building up a fine small department. In 1936, he left Mississippi to become the Examiner in the Biological Sciences at the University of Chicago. This position not only developed his expertness in the field of tests and measurements; it brought him into contact with outstanding biologists and further developed his know-how in dealing with people. Three years of such an experience led to his appointment in the psychology department at Chicago.

And then came the War. For two years Wolfle was Civilian Administrator for the Signal Corps in the Ninth Corps area. Here he was concerned with curriculum development and the selection of students for the various schools in telephone, radio, and radar