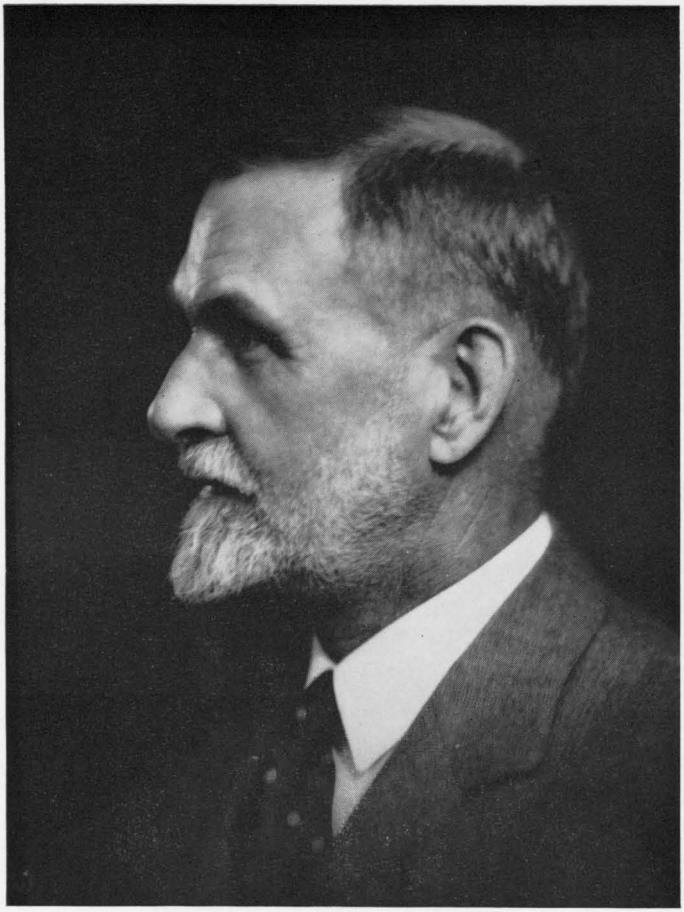
NATIONAL ACADEMY OF SCIENCES

GEORGE HOWARD PARKER

1864—1955

A Biographical Memoir by
ALFRED SHERWOOD ROMER

Biographical Memoir



G. H. Parker

GEORGE HOWARD PARKER

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BY ALFRED SHERWOOD ROMER

GEORGE HOWARD PARKER'S parents were moderately prosperous Philadelphians, and for his first dozen years his life was a happy one. In the panic of 1877, however, his father was reduced to poverty, his schooling ended, and he was forced to make his own way in the world. Family finances came into the hands of a grandfather who had Quaker principles of thrift, but appears to have lacked the more admirable qualities of members of that sect. Grandfather disapproved of higher education, and attempted to have Parker apprenticed to a local grocer. The youngster resisted, but was forced to eke out a poor living as a house-to-house book canvasser,

The situation was saved through Parker's interest in natural history. Like many another future biologist, he had become interested in animals as a small boy, and had been a frequent visitor at the Philadelphia natural history museum, the Academy of Natural Sciences. There have been preserved three much-worn small books—H. S. Conant's *The Butterfly Hunters,* J. G. Wood's *Common Objects of the Microscope,* and S. Tenny's *A Manual of Zoology*—with a note by Parker: "These were the books that first influenced me in the study of natural history." At the age of sixteen he obtained a fellowship at the Academy, under which, for a modest stipend, he spent half his time in work on the institution's butterfly collection, the other half on studies of his own choosing. At the Academy he was

associated with a stimulating group of zoologists and geologists, most notably Dr. Joseph Leidy, the distinguished anatomist and paleontologist. The fellowship was for a two-year term; a third year was spent in similar fashion—he had part-time work assisting with a manual of conchology and spent the remainder of his time in further study.

Parker had become increasingly interested in higher education. In 1883, at the age of nineteen, he passed entrance examinations for Harvard College, despite his inadequate formal preparation. He arrived at Cambridge that fall with no resources beyond $200 borrowed from a family friend, but his ability was soon recognized: he presently obtained a scholarship and, later, an assistantship in zoology. His main income, however, was gained from tutoring, and he fared well financially in cramming his more prosperous but indolent fellow students for examinations. Of these he was most impressed by the late William Randolph Hearst, who Parker always said had (when he cared to use it) a very quick and clear mind and a very retentive memory.

Graduating with a B.S. degree in 1887, Parker worked as a graduate student at Harvard for the next four years. Part of his time was occupied by instruction; in his senior year and that following he was an assistant in zoology, and for the next three, instructor. His senior—and only—colleague was Professor E. L. Mark (who had been called to Harvard to take over work in zoology soon after the death of Louis Agassiz). During this period President Eliot is said to have remarked that at Harvard "zoology was carried on by a man and a boy." In addition, Parker worked on water pollution problems for the state board of health. All available time, however, was spent on work for his Ph.D. thesis.

On completion of his doctorate in 1891 he received a traveling fellowship from Harvard, resigned his teaching post, and,

like so many Americans of that period, sought the scientific laboratories of Germany. A half year each was spent at Leipzig, in Leuckhart's laboratory; in Berlin, with Schulze; and in Freiburg, where Wiedersheim was in charge. A further half year was spent at the Naples Laboratory, then at the height of its activity.

After two years in Europe he returned to America. He had been reappointed at Harvard; more important at the moment were personal affairs. At the Harvard Commencement of 1888 he had met the cousin of a fellow student, Miss Louise Merritt Stabler, of Brooklyn. Their acquaintance grew during the three years that followed, and they met again for a Rhine trip during a visit to Europe with relatives made by Miss Stabler in the summer of 1892. On his return the following spring their engagement was announced; Miss Stabler had meantime graduated, with high honors, from Barnard College—a member of the first class to graduate from that institution. They were married in 1894, to enjoy six decades of very happy married life. Louise Parker was an ardent worker for women's rights, and after the granting of the vote to women became an active worker in the League of Women Voters and prominent in Cambridge civic affairs.

Parker resumed his instructorship at Harvard in 1893, and remained at that university the rest of his life, despite a number of attractive offers elsewhere. He was, however, far from sedentary. His summers were customarily spent at seashore laboratories, particularly at Woods Hole, where he early spent several seasons with the U.S. Bureau of Fisheries. Following the establishment of the Marine Biological Laboratory he became an almost annual worker there, and was a member of the group of distinguished Woods Hole biologists, including such other men as F. R. Lillie, E. G. Conklin, and E. B. Wilson, which dominated American zoology for half a century.

Parker was elected to membership in the National Academy of Sciences in 1913. In 1914 he was one of a committee of three appointed by Congress to investigate and report on the fur seal colony of the Pribilof Islands. In 1921 he was an exchange professor from Harvard lecturing at Grinnell, Colorado, and Pomona colleges. In 1926 he was appointed a Harvard representative to the Third Pacific Science Congress and traveled widely in Japan and China.

In accordance with President Eliot's policies, Parker's academic advancement at Harvard was slow; he was not appointed an assistant professor until 1899, after nine years as an instructor. In 1906 he was promoted to a full professorship and in 1921, on the retirement of Professor Mark, became Director of the Zoological Laboratories.

As a major figure in the biological group in Cambridge, Parker played a prominent role in the development of the new biological laboratories at Harvard. Zoology and botany teaching departments, as well as a department of general physiology developed through his encouragement, had long been cooped up in cramped quarters in the zoological and botanical museums, much to the discomfort of both teaching and museum staffs. Parker was one of a group who appealed successfully to the International Education Board for building funds; Harvard added an endowment fund from the Wyeth bequest; and the new laboratories were opened in 1931. With the propinquity of the three groups in the new laboratories adding to their many common interests, the departments were soon federated into a Division of Biological Sciences. By the time of Parker's retirement they had been fused into a single Department of Biology in which most of the irritations and conflicts often arising between separate university botanical and zoological departments happily disappeared.

At the time of Parker's student days a major interest of zoo-

logical workers, both in America and in Europe, was invertebrate morphology. His early efforts were in this field, notably in studies of the arthropod eye. As an undergraduate he produced a publishable work on the eye of scorpions, and the results of his graduate studies appeared in two major works on the histology and embryology of the lobster eye (1890) and, of broader scope, a general consideration of the compound eyes of Crustacea (1891). Following his return from Europe there appeared, in 1895, a detailed study of the retina and optic ganglia in decapod Crustacea.

Out of these early studies on sense organs there developed a broader plan of work which was to remain the main research field of his entire career. From the days of his youthful interest in natural history, the activities of animals and their responses to the situations in which they found themselves had fascinated him. In higher animals, with intricate nervous systems and complex sense organs, the study of such phenomena is one which, even today, baffles in most regards workers in psychiatry, psychology, and neurology. Perhaps, he thought, some basic understanding of these problems could be gained by a study of the simpler mechanisms present in lower animal forms—a study of their receptors, consisting at the most of primitive sensory organs, and of the modes of transmittal to the muscular or glandular effectors, through the primitive nervous system. Parker discussed his plans with the psychologist and philosopher William James, who warmly encouraged him.

For the next quarter century his work ranged widely over the animal kingdom in studies of reactions to sensory stimuli. The fascinating general problem of ciliary action long interested him, but much of his attention was devoted to the activities of primitive metazoans, notably the coelenterates and sponges. In the jellyfishes there is present a simplified scheme of the system found in more advanced animals, since there are

sensory organs in addition to a diffused nerve net for transmission of impulses and muscle cells as effectors. A stage below this is present in the polyps, of which the sea anemone *Metridium* was a form to which Parker devoted special attention. Here we find a nerve net and muscular effectors, but no developed sensory organs. Still lower down in the evolutionary series (even if a side branch) are the sponges, amongst which he paid particular attention to *Stylonella,* where muscular contraction is present but there is no development of sensory structures or of any sort of transmitting system. From these studies Parker logically concluded that the effector elements, the muscular tissues, arose first, and that the evolution of nervous elements for transmission and of special sensory structures for reception were later developments. Much of his work in this field was summarized in *The Elementary Nervous System* (1919).

But in addition to his studies of these lowly forms, Parker presently interested himself in the sensory organs of the lower vertebrates. To some degree he studied reactions to light and sound in fishes and amphibians, and the nature of the fish lateral line organs. But it was more especially the organs of chemical sense—simple in structure but tantalizingly difficult as to physiological interpretation—to which he devoted main attention. His work on these structures was reviewed in his book of 1922, *Smell, Taste, and Allied Senses in the Vertebrates.*

During the 1920s Parker interested himself to some extent in the physiology of nerve fibers, particularly in relation to carbon dioxide production during activity, but presently he concentrated on the topic which was to be his main occupation for the remainder of his scientific career—the chromatophores of the skin in lower vertebrate groups and the means by which their activities in color change are controlled.

When Parker began his scientific career the nervous system was thought to be the sole—or almost sole—intermediary be-

tween receptor and effector organs. As time and work progressed, knowledge of chemical stimuli by hormones produced by endocrine organs developed. It was long assumed that nervous and hormone systems were parallel and essentially independent systems of conduction. Parker's work on chromatophores did much to modify this point of view. The color changes seen in many animals, including the fishes, on which his attention was concentrated, may be brought about by direct action of nerve fibers on the chromatophores. But in addition they may be effected by minute amounts of chemical materials, such as adrenalin or acetylcholine, secreted at the tips of the nerve fibers themselves or by specialized nerve cells of glandular nature. For such substances Parker coined the useful term "neurohumors." A summary of his work and conclusions in this field is given in his *Humoral Agents in Nervous Activity,* published in 1932, and in his last major contribution, *Animal Colour Changes,* published in 1948.

Parker's experiments were clearly conceived and were executed with straightforward simplicity. He was not one to hide his experimental animal in a maze of apparatus. In an early essay on experimentalism in zoology, he said, "To Loeb the problem of the universe is soluble in a finger bowl; to Morgan in a milk-jar; and we must never forget that the importance of a result is often inversely proportional to the complication of the apparatus by which it was obtained." Just as he avoided unnecessary complications in carrying out experiments, so did he avoid the complex phrase in reporting his results. Among his nearly 300 titles are numerous examples of fine scientific prose.

Parker was a distinguished member of the Harvard University community. Tall, erect, with well-trimmed beard, he was a commanding figure. At times he appeared stern and severe. There is some of this in the Hopkinson portrait of him that

hangs in the Harvard Biological Laboratories. Close study of this potrait, however, reveals a half-hidden twinkle in the eyes. This was never very deeply hidden, and those who knew him well will not forget his wit, his humor, and (although not extended to all) his great affection.

He had been reared in the most rigorous of moral strait jackets, and in reaction he tended, in his later years, to sow tardy wild oats of a modest sort, principally in lunching or dining in Boston's more exotic restaurants—Syrian, Armenian, German, and (especially) Italian. His grandfather, for whom his feelings were not of the warmest, had died intestate, and a modest sum had come to Parker, who kept it in a special account, to be spent only on affairs of which this virtuous and frugal man would not have approved—an extra glass of liqueur after lunch, for example, or return to Cambridge by taxi rather than inexpensive streetcar. In his later years there met on Friday noons the "Sunday School." It was so called because Parker and William Morton Wheeler, the entomologist, who were originally the only two members of this exclusive gathering, spent a number of sessions reading and discussing the Book of Job. Later, two younger zoologists were added to the roster. The topics of conversation ceased to reach their original high level, but the name persisted.

Parker's deep interest in animals and his careful observation of their ways provided him with an endless number of suitable problems for graduate students. At his weekly conferences with students he rarely told them what to do. Instead, an obvious interest in a real accomplishment, along with a few well-directed questions about future work, provided a subtle guiding hand that kept one from going too far astray. The students of his students are legion, and a considerable fraction of this country's biologists today are, in a sense, his descendants.

Unlike many research workers, who consider elementary teaching as beneath their dignity, Parker considered under-

graduate teaching a matter of basic importance, and taught large elementary courses to the end of his professorial career. He was a forceful and inspiring lecturer. His effect on the students was heightened by their knowledge that here was a research worker who knew firsthand the things he taught, in contrast to the type of pedagogue who may lecture glibly but whose knowledge does not extend far beyond the text assigned. His friends relate that in his later years it was not uncommon to have an apparent stranger come up to him on the street in Boston or Cambridge and, shaking him warmly by the hand, say that while Parker would not remember him, he had taken Parker's elementary course many years before and never forgotten the experience. Many of his undergraduate students were "premedics" who later practiced in the Boston region. A number of years after his retirement he was injured in an automobile accident. Mrs. Parker, visiting him in the hospital the next day, was astonished to find in the corridor outside his room a number of prominent Boston physicians. "Why are you here?" she asked. Their spokesman answered simply: "He taught us."

Parker became Professor Emeritus in 1935, but his scientific career was far from finished, and his research activity continued. On a certain day a dozen years after his retirement, for example, he had completed and sent to the publisher the manuscript of a book on color change. One would have expected that for an octogenarian such an event would have called for at least a temporary cessation of work. Not at all. Next morning a friend, passing his laboratory, found him irritably pacing the room, disgruntled because of the failure of the express company to deliver a crate of fish, ordered from Woods Hole, on which he wished to do experimental work. It was not until a few years before his death at the age of ninety that the combination of a major operation, a skull fracture caused by an automobile accident, and gradually failing health brought to a close an active research career that had spanned two-thirds of a century.

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KEY TO ABBREVIATIONS

Am. J. Physiol. = American Journal of Physiology
Am. Naturalist = American Naturalist
Anat. Anz. = Anatomischer Anzeiger
Anat. Record = Anatomical Record
Biol. Bull. = Biological Bulletin. Marine Biological Laboratory, Woods Hole, Massachusetts
Bull. Bur. Fish. = Bulletin of the Bureau of Fisheries
Bull. Museum Comp. Zool. = Bulletin of the Museum of Comparative Zoology at Harvard College
Bull. U.S. Fish Comm. = Bulletin of the United States Fish Commission
J. Acad. Natural Sci. Phila. = Journal of the Academy of Natural Sciences of Philadelphia
J. Cellular Comp. Physiol. = Journal of Cellular and Comparative Physiology
J. Exp. Biol. = Journal of Experimental Biology
J. Exp. Zool. = Journal of Experimental Zoology
J. Gen. Physiol. = Journal of General Physiology
Pop. Sci. Monthly = Popular Science Monthly
Proc. Acad. Natural Sci. Phila. = Proceedings of the Academy of Natural Sciences of Philadelphia
Proc. Am. Acad. Arts Sci. = Proceedings of the American Academy of Arts and Sciences
Proc. Am. Phil. Soc. = Proceedings of the American Philosophical Society
Proc. Nat. Acad. Sci. = Proceedings of the National Academy of Sciences
Proc. Soc. Exp. Biol. Med. = Proceedings of the Society for Experimental Biology and Medicine
Sci. Monthly = Scientific Monthly

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