NATIONAL ACADEMY OF SCIENCES

CHARLES PALACHE

1869—1954

A Biographical Memoir by

REGINALD A. DALY

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WITH EXPERT HELP Charles Palache traced his family tree back to the sixteenth century; none of its members seem to have had any leaning toward science. One family of these ancestors belonged to the group of the persecuted Sephardim Jews of Portugal who were exiled to Holland. Some of their descendants won distinction as ambassadors to Algiers. Much later, for some unknown reason, one family migrated to Jamaica where Charles Palache's grandfather, John Palache, headed a plantation. For political reasons he abandoned that home in 1834, and put his wife and three daughters on a ship sailing for New York, but he died before he could follow them on the next boat. Three months later Charles Palache's father, James, was born in New York City. At the age of fifteen, James acted as cabin boy on a schooner rounding Cape Horn and in 1849 landed in San Francisco, his home henceforth. There he married Helen M. Whitney, who had traveled from her home in Green Bay, Wisconsin, to California in a caravan of seven covered wagons. Their son Charles was born in San Francisco on July 18, 1869.

During his childhood the family moved across the bay to Berkeley, where Charles' education began in private and public schools. In 1887 he entered Berkeley College, of the University of California. There he found his "only compelling interest" in natural science and he chose mining geology as the only course even approximating to what he wanted, though during a visit to the "Mother

Lode" he was repelled by the prospect of a life in mining.

In 1891 Palache won his bachelor's degree, after absorbing the lectures of the genial Professor J. Leconte, about to retire, who gave his classes no inkling of the value of field work in the great outdoors. The same year Andrew C. Lawson, already famous for his epoch-making work on the geology of the Archean terrane of Canada, was appointed Leconte's successor as head of the Geological Department in the University. His arrival was an eye-opening experience for Palache, F. L. Ransome, G. D. Louderback, and other students of geology and mineralogy. These were assembled on the top floor of "South Hall." Looking out of the eastern window up to the Berkeley Hills, Lawson said in effect, "Well, that looks fine for geology; what's up there?" The students confessed complete ignorance, since "no one had even suggested our going up there and seeing the rocks." Lawson then asked: "Have you any maps?" The answer was again, "No." And the comeback was, "We'll have to go and see and have some maps made." That winter a corps of topographers from the United States Geological Survey mapped the Berkeley Hills and the San Francisco peninsula. With these maps the enthusiastic students, always under Lawson's direction, soon learned the technique of systematic field work. One published result was the "Geology of the Berkeley Hills" by Ransome and Palache. Palache later wrote that Lawson's coming to Berkeley gave him a "new prospect in life"; it "directed my whole life." Lawson sized him up and soon had Palache appointed Teaching Fellow in Mineralogy, and assigned to the geological mapping of the San Francisco peninsula.

While there at work, south of Colma, he "found some little ponds high up on the slope and in places that seemed most unlikely for ponds to exist. They were long and narrow and had neither outlets nor streams feeding them." Greatly puzzled, he asked Lawson to look at the string of ponds. Lawson showed him where some of the ponds marked breaks in the rocks, indicating recent movement of some sort—namely, faulting on a major scale. Here was

the first evidence for a zone of slicing of the state of California along the now celebrated "Rift," where sudden displacement caused the powerful earthquake of 1906 and the destruction of so much of San Francisco. Thus Palache and Lawson became pioneers in a principal field study in a new science, seismology, as illustrated in western Cordillera.

During 1892 and 1893 Palache elaborated the geology of the Grizzly Peaks and offered the result as a candidate for the degree of Doctor of Philosophy, which was granted him the following year; he was the first to win that degree in his University department.

In April, 1893, family troubles took him to Europe, where he had the opportunity of studying with Zirkel and Credner, after which he took a trip over the Alps, largely on foot. He attended an International Congress at Zurich, where the leader was the famous A. Heim; then studied crystallography with Paul Groth at the University of Munich. Palache then went to Heidelberg University, where he developed a close friendship with Victor Goldschmidt, that prince of crystallographers. Late in life Palache wrote: "I found in Goldschmidt's work my real goal which I have followed ever since." After attending the International Geological Congress in London, he returned to California.

In December of 1895 he accepted Harvard's offer of an assistantship in mineralogy. In 1897 he made further studies with Goldschmidt in Heidelberg before going to the International Geological Congress in Russia, with an excursion to the Ural Mountains. In 1898 he left Cambridge to join the Harriman Alaska Expedition; on his return he married Helen Markham. All of their children, Mrs. Jeanette Barker, Mrs. Mary Gregory, and Miss Alice Palache, still living, inherit the deep loyalty to truth so characteristic of their father.

In 1901, with Professor T. A. Jaggar, he mapped geologically the Bradshaw Mountains of Arizona.

The following year Harvard named him Assistant Professor of

Mineralogy. In 1910 he was appointed full Professor of Mineralogy, a position which he held to the time of his retirement thirty years later. Early in this tenure he made contact with Guerdon Holden, who accompanied him to several mineral localities with the purpose of increasing Harvard's already considerable collections. In 1922 Guerdon Holden made a handsome additional endowment for both museum and personnel in mineralogy, and A. F. Holden gave a priceless collection of mineral's to Palache's museum.

In 1919 Palache in Cambridge helped to organize the Mineralogical Society of America. He became its President two years later and received its Roebling Medal in 1936, when he was elected to the presidency of the Geological Society of America, an honor befitting a man who during the preceding 45 years had kept an active dynamic interest in the sister science while conducting his favorite researches in mineralogy. For Palache was no narrow specialist. He showed his geological skill, for example, during nearly six months in 1922, when he joined the Shaler Memorial Expedition to that wonderland of geological marvels, South Africa. Incidentally, it was during a collecting trip in southwest Africa that he came close to losing his life from an attack of enteric fever, but was saved by a German physician and nurse. His recovery was so rapid and full that he was able to rejoin the main Shaler Memorial party in a prolonged attack on the constitution of the peerless Bushveld Complex of the Transvaal.

Palache was a Corresponding Member of the Geologiska Föreningen of Stockholm and of the American Museum of Natural History; an Honorary Member of the Boston Mineral Club, of the Mineralogical Society of Great Britain, of the New York Academy of Science, of the Royal Geological Society of Cornwall, of the Sierra Club, and of the Société Géologique de Belgique. He was elected to the National Academy of Sciences in 1934.

Throughout his half-century of work the authorities of the University of California had watched the achievements of their distinguished graduate and summoned Palache in 1941 after his

retirement from active teaching at Harvard, to receive the honorary degree of LL.D.

But, many and varied as were Palache's published contributions to mineralogy, the story of his greatest work has still to be told. With the receipt of the Holden endowment money and the Holden gift to the century-old Harvard collection of minerals, Palache felt a growing responsibility for their use on an appropriate scale and conceived the project of revising the Dana *System of Mineralogy,* which had throughout its six editions been the vade mecum of American students but still remained incomplete. Before undertaking the immensely detailed job Palache spent much time on enlarging laboratory space and equipment in the Harvard Museum and adding still more to the collections of specimens under his care. To supply this last need he made many visits to American localities, went to Europe for further additions, and purchased a valuable part of the big Karabachek Collection in Vienna.

To bring Dana's *System* up to date, Palache well knew that he had to have expert help. His first success with the personnel problem was in discovering Harry Berman, who came to Harvard from the staff of the National Museum at Washington, and for twenty years was Palache's close friend and adviser in technical matters. It was Berman who in 1933 installed the first X-ray apparatus in the laboratory and therewith prepared the Harvard group to institute a revolutionary program leading to the publication of a new bible for mineralogy of world scope.

During forty years of research in crystallography Palache had been concerned with the morphology and other external features of crystals. The comparatively early European explorations of the interior make-up of crystals by the use of X-rays soon convinced him that this new tool had to be used in mineralogy. However, he felt himself to be too old to master this new kind of investigation. This desideratum, however, furnished by Berman (who died in 1944 while on a wartime mission to Great Britain), and by Clifford Frondel, called from the Massachusetts Institute of Tech-

nology in 1938, who still continues the Dana work at the Department of Mineralogy at Harvard. Volume I of the new (7th) revision was published in 1944, Volume II in 1951. The third and final volume is in preparation for the press. Until his death Palache was especially active in supplying crystallographic data. Judging from the first two volumes, it seems certain that this new world handbook of mineralogy will long be without a rival anywhere.

The strikingly modest but efficient Charles Palache died suddenly on December 5, 1954, at his home near Charlottesville, Virginia, to which he had moved from Cambridge a few years before.

KEY TO ABBREVIATIONS

Amer. Acad. Arts Sci. Proc. = American Academy of Arts and Sciences Proceedings
Amer. Geol. = American Geologist
Amer. Jour. Sci. = American Journal of Science
Amer. Min. = American Mineralogist
Amer. Nat. = American Naturalist
Econ. Geol. = Economic Geology
Geol. Soc. Amer. Bull. = Geological Society of America Bulletin
Geol. Soc. Amer. Proc. = Geological Society of America Proceedings
Geol. Surv. Mich. = Geological Survey of Michigan
Jour. Wash. Acad. Sci. = Journal of the Washington Academy of Sciences
Kungl. Sv. Vet. Akad. Hand. = Kungliga Svenska Vetenskapsakademien Handlingar
Min. Mag. = Mineral Magazine and Journal of the Mineralogical Society
N. Jahrb. Min. = Neues jahrbach für mineralogie, geologie und palaeontologie
U. S. Geol. Surv. Geol. Atlas = United States Geological Survey Geological Atlas
U. S. Geol. Surv. Prof. Papers = United States Geological Survey Professional Papers
Univ. Calif. Dept. Geol. Bull. = University of California, Department of Geology, Bulletin
Univ. Calif. Mag. = University of California Magazine
Zeits. Krist. = Zeitschrift fur kristallographie und mineralogie und petrographie

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