

Faculty members and students can work as integral parts of the Survey's research programs whenever they are free of university commitments.

The diversity of the Geological Survey's original missions required the development of expertise in a wide range of subjects. The growth of the Survey took place in spurts as the Congress and the Administration chose to emphasize one program or another in answer to emerging problems in natural resources. Each spurt saw increases in manpower and funds, the development of a comprehensive program in the science and engineering related to some resource problem, and then steady continuation at a new program level. In a number of cases, the enlarged activity was separated from the Geological Survey (and, in some instances, combined with complementary elements of other bureaus) to form a wholly new Federal bureau. This happened enough times for the Geological Survey to be dubbed "the mother of bureaus." Three of the main transfers occurred as follows:

*Forests.* — According to Rabbitt and Rabbitt, 1954, "Up to 1891, the Survey had gathered, in connection with its regular geologic and topographic surveys, data related to forests. In 1891, the President was empowered by Congress to create forest reserves on the public lands, and the Geological Survey had aided in the determination of the boundaries of these reserves. However, there was little definite information on the resources of the lands included in the reserves, so Congress, in 1897, appropriated \$150,000 for a survey of the public lands that had been or would be made forest reserves by Executive action and placed this survey under the supervision of the director of the Geological Survey.

"The Geological Survey began a thorough study of the forest reserves. The work continued for the next 8 years and covered 75 million acres. Forty atlas sheets of land classification maps were one of the results of this study. The data collected furnished the basis for the regulations governing the reserves, with administration vested in 1904 in the General Land Office. The work was



Annabel R. Olson comparing landscape to aerial picture in Rock Creek Park.

transferred to a new bureau of Forestry in the Department of Agriculture in 1905. George Otis Smith<sup>1</sup> says (Am J. Sci, 14, 1 (1927)) that most of all this activity stemmed from <sup>2</sup>Walcott's interest in forestry, that he drafted the relevant legislation, and that

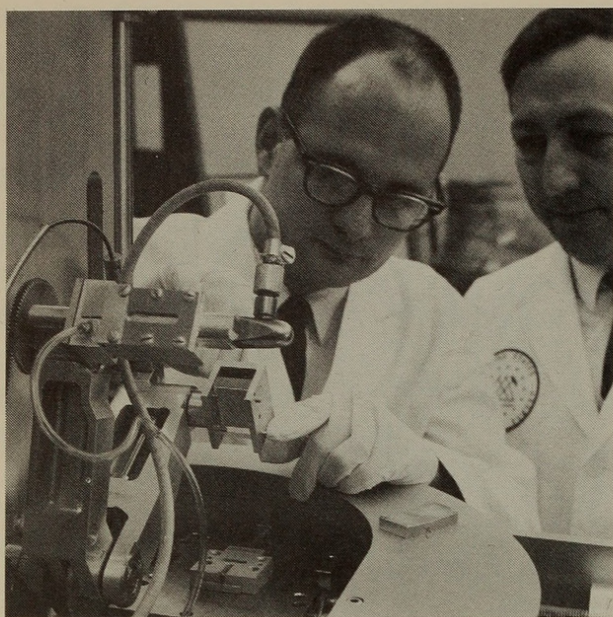
... it was only his influence with the leaders of Congress that made any stand successful against the anti-reverse agitation, so that the legislative beginning at a national forest policy may also be credited to him."

*Mines.* — The exploratory surveys and the Geological Survey made extensive studies of mines, mining operations, and mineral production. Between 1904 and 1908, monies were appropriated for the Survey to make technologic investigations of coals, lignites, and all fuel resources, for engineering studies of structural materials, and for the investigation of mine safety and the causes of explosions in mines. These activities led to the development of a large staff of mining

<sup>1</sup> Smith was the fourth Director of the Geological Survey, serving from 1907 to 1930.

<sup>2</sup> Charles Doolittle Walcott, third Director, USGS, (1894-1907)





U.S. Geological Survey scientists working at "super-soft" x-ray device used to analyze lunar samples.

technologists. In 1910, the Technologic Branch was split off to form the Bureau of Mines and the head of the Branch became its first Director.

*Irrigation and Reclamation.* — From the outset the Geological Survey studied and mapped drainage basins and river characteristics as had the exploratory surveys. "In October 1888, Congress authorized the Survey to undertake a study of the arid regions of the United States where irrigation was necessary to agriculture; to investigate the storage of water in dams, the capacity of streams, and the cost and construction of reservoirs; to designate all lands useful for sites for reservoirs, canals, or ditches for irrigation purposes and all the lands susceptible to such irrigation." (Quoted from Rabbitt and Rabbitt, 1954.) It was the start of water resources investigations of the modern type, and the beginning of reclamation work by the Federal Government.

In 1894, the Geological Survey received funds specifically for gaging streams and determining the water supply of the United States, including ground water and artesian wells in arid and semiarid regions. On passage of the Reclamation Act in 1902, the administration of the Act was placed in the Survey. The resulting Reclamation Service remained in the Survey throughout the

initial study and planning stages and during this period, a large engineering and technologic staff was developed. In 1907, when it reached the construction and management stages, it was made an independent Bureau of Reclamation and Newell, the Chief of the Service, continued as Director of the new bureau.

These and perhaps a dozen other transfers have served to focus the activities of the organization on those subjects which are obviously germane to its title of Geological Survey, the term "geology" being understood in its full sense of "science of the earth." The main divisions of the bureau now deal with:

**Topography** — mapping the configuration of the nation's surface and man's works on it.

**Geology, geochemistry and geophysics** — the composition and structure of the earth's outer parts, the processes which alter the earth, and the opportunities and hazards it presents for man's continued enjoyment of its resources and environment.

**Water resources** — the quality, quantity and distribution of water in nature and the processes that cause changes in its characteristics and occurrence (including man's intrusion in the hydrological cycle.)

**Conservation of mineral, fuel, and water resources of the public domain.**

It is probably the largest of the geological surveys of the free world; many other governments have separate agencies for water resources research and data collection, and for topographic mapping. The Geological Survey has about 8300 full-time employees and a total of about 9,500 including part-time and field personnel; its annual funding is now about \$168 million.

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# Frederick Charles Hottes, 1899-1970

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## ABSTRACT

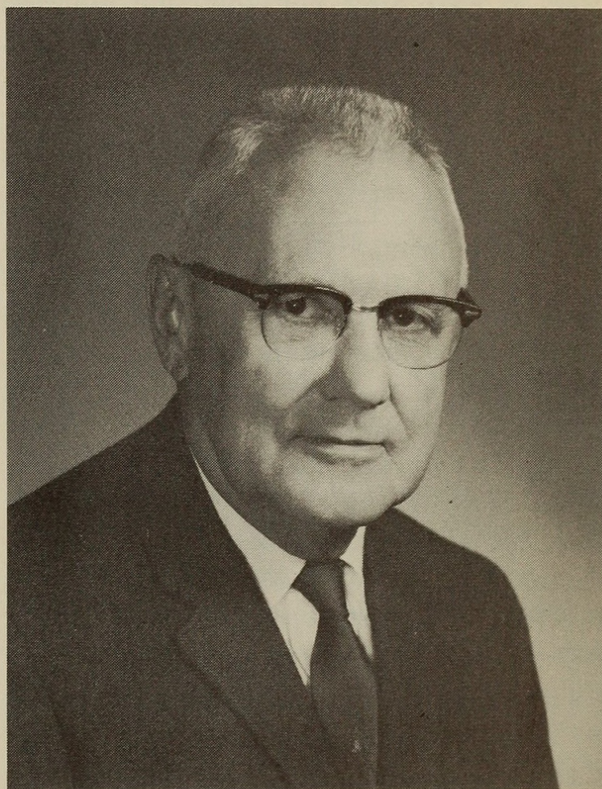
An account of the life of Frederick C. Hottes, including a bibliography of his 120 publications on the Aphididae and Heteroptera (Insecta).

Dr. Frederick C. Hottes, a well known authority on the taxonomy of aphids of North America, died in St. Mary's Hospital, Grand Junction, Colorado, on October 27, 1970. He experienced a serious illness in 1968 and never regained his former strength and stamina. His health deteriorated markedly in 1970; he entered the hospital in June and remained there most of the time until his death.

This account of his life and activities provides an appropriate vehicle for a list of his publications, which is presented as an aid to librarians, bibliographers, aphid and Heteroptera specialists. The bibliography contains 103 titles on the Aphididae and 17 on the Heteroptera.

Dr. Hottes was interested in the Aphididae for approximately 50 years and during that time acquired numerous aphid species and an extensive, valuable library. It was his earnest desire that the insects and literature be located where they would be of greatest helpfulness to aphid students. With characteristic generosity, he willed these articles to the Smithsonian Institution, Washington, D.C., and they are now in my custody. Dr. Hottes also worked to a limited extent in the Heteroptera, possessed examples of certain families of the group and had important literature concerning them. These insects and publications have been owned by John T. Polhemus, Englewood, Colorado, for several years.

Dr. Hottes was born October 20, 1899, the first child of Henry Gustav and Johanna



Frederick Charles Hottes

Kleine Hottes, in Mascoutah, Illinois. Fred was only five years old and his sister three when they were deprived of their mother's care and affection through her untimely death from tuberculosis of the bone. Subsequently, however, Henry Hottes married Amelia Krull, and this fine woman became the loving and beloved mother of Frederick Charles as well as the mother of his two brothers. Amelia and Frederick Hottes were devoted to each other as long as she lived.

Mascoutah was a small town populated with German immigrants and their descend-



ants who retained many Old World customs and spoke entirely in the German language. Here Fred was christened Friedrich Karl, which he later anglicized, and here he and his sister learned to speak only in German. Inability to converse in English was an inconvenience and embarrassment when the family moved to the wholly English speaking community of Palisade, Colorado, in late 1905, and after learning English, the children pretended they could not understand or speak German.

In 1908 the Henry Hottes family moved to Boise, Idaho, where the Hottes grandparents lived, but returned to Palisade in 1913 to look after the large land holdings belonging to Henry Hottes, his parents, and his five sisters. The Hottes family had developed extensive fruit orchards in the Palisade area, and eventually Henry Hottes became a fruit dealer as well as a grower.

During those early years Fred was a carefree, frontier boy who played with his sister, brothers and friends. His hobbies were painting china, decorating wood by burning, raising various kinds of poultry and riding horseback. He assisted his father in caring for pigs and horses, their only farm animals, and in deciding when fruit should be picked. Since the elder Hottes was color blind, he depended on his eldest son to tell him when apples, pears, peaches, plums and cherries were ripe.

Fred went to school in Palisade or nearby Mt. Lincoln, and though the family moved to Grand Junction in 1918, he continued his schooling at Palisade where he graduated from high school in 1919. That Fall he entered Colorado Agricultural College whence he received a B.S. degree in 1923. Graduate studies earned him an M.S. degree from Iowa State College in 1925, and a Ph. D. degree from the University of Minnesota in 1927. At Colorado Hottes was elected to membership in Alpha Gamma Rho, a social fraternity of students in Agriculture, and was initiated into Gamma Sigma Delta, an honorary agricultural fraternity, at Iowa State.

It is uncertain when Dr. Hottes first became interested in entomology, but his

intense interest in aphids developed while he was a student at Colorado. There, under the influence of the most active American aphidologists of that period, C.P. Gillette and Miriam A. Palmer, he entered upon the collection and study of aphids with an enthusiasm that persisted throughout his entire life.

At Iowa State College Hottes was persuaded by the eminent hemipterist, C.J. Drake, to undertake the study of certain Heteroptera. Although he worked on this group and co-authored papers with Dr. Drake, his engrossing interest remained with aphids. He obtained a teaching assistantship at the University of Minnesota where he studied with the noted aphidologist, O.W. Oestlund, with whom he published his first aphid paper.

Fresh from his graduate work with Dr. Oestlund, Dr. Hottes was given an opportunity to pursue aphid studies with the Illinois Natural History Survey at Urbana and was an employee of that organization during the summers of 1927, 1928, and 1929. T.H. Frison, Chief of the Survey Division, envisaged a report that would assist in the determination of mid-western aphids and enlisted Fred's aid. Although the Survey had almost no aphids except the Thomas Collection when the project was initiated, the entire work, including collecting, research, writing and publication, was completed in five years, an admirable accomplishment in that length of time. After 40 years, the resulting volume, *The Plant Lice, or Aphidae of Illinois*, remains a principal reference to North American aphids, and Hottes' share in it probably is his most useful contribution to the understanding of the Aphididae.

Dr. Hottes began his professorial career in the Biology Department of The James Millikin University, Decatur, Illinois in 1928, became head of the Department in 1929, and served in this capacity with distinction until his retirement in June 1947. At that time he returned to Grand Junction to care for his aged father.

Most Hottes' articles on aphids and heteropterans were descriptions of new



species or previously undescribed forms of older species, though a few dealt with morphology and nomenclature. He was a bibliophile and took great satisfaction in recovering old, forgotten names and articles. After retirement most of his publications treated aphids of conifers, with emphasis on *Cinara*, in which genus he described 74 species. Unfortunately many of his species were not illustrated and he seldom provided keys to assist in the identification of taxa.

Although Dr. Hottes was dedicated to entomology and to aphids in particular, he did not seek close association with other workers. He welcomed aphidologists and others to his home where his collection was stored, but did not return their visits even when urged to do so. He rarely attended meetings where entomologists assembled, and he was not a joiner of entomological societies. During his career he belonged to few scientific organizations, and at the time of his death was a member of only The Pacific Coast Entomological Society.

In Grand Junction Dr. Hottes participated actively in cultural, community and business affairs. He had a consuming interest in Chinese art and owned a notable collection of ivories, porcelains, and textiles. He supported the Grand Junction Library, serving as chairman of its Board from 1961 to 1967, and was instrumental in the establishment and maintenance of the Palisade Library. He also led in the formation of the Western Colorado Center for the Arts, served as chairman of its buildings and grounds committee, and was its president from 1964 to 1967. He was a benefactor of St. Mary's Hospital. A good botanist and an ardent gardener, his lovely grounds were visible testimony of his dedication to, and effectiveness in, beautification. Dr. Hottes was a member of the Lions Club, the Masons, Shriners and Scottish Rite, and was a director of the Mutual Savings and Loan Association of Grand Junction.

In spite of his many interests and accomplishments, appreciative colleagues, friends and financial security, in his later years at least Dr. Hottes was an unhappy man. Basically he was quiet and kindly, a friend

and helper to those in need, and for years he attempted to satisfy every wish of an aging, dictatorial, demanding parent. Although his lifetime performance in kind and perhaps even sacrificial acts might have provided deep satisfaction to a person of different temperament, Dr. Hottes did not seem to reap enjoyment from his execution of good deeds. Rather he appeared to be resentful of the burdens and vicissitudes that were, perhaps by his own decisions, a portion of his life. A bachelor, he lacked close companionship, and after his father's death, lived alone with various Boston terriers for pets. Although dissatisfied with many facets of life, Dr. Hottes thoroughly enjoyed his frequent drives through the scenic Colorado countryside to Grand Mesa, the largest plateau in America. Over the years the Mesa was his favorite collecting area, and there, in the grandeur of the mountain top, he experienced his most satisfying moments. The fact that he did not visit his beloved Mesa during 1970 is ample evidence of his serious illness during that period.

Dr. Hottes' body was cremated and his ashes interred in the family plot at Mascoutah, Illinois, in accordance with his wishes. He is survived by a brother, Howard H. Hottes of Grand Junction, Colorado, and by two nephews.

I am grateful to George F. Knowlton, Miriam A. Palmer and H.H. Ross for information on the life of F.C. Hottes, and I am deeply indebted to Howard H. Hottes for information on the early life of his brother.

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