old, have a duty to serve. This duty is the same as that of any man or woman who might be drafted. Scientists expressly do not wish to be thought of as an elite corps above the "common herd," but they believe that, because of the complexity and multiplicity of their skills, they present a special problem.

With these beliefs in common, it is the duty of the scientists themselves to contribute answers to that special problem. Scientists probably would go anywhere, provided they had confidence in the ability of those who give the orders to assess their worth to the country and to use it to the fullest extent. If, however, scientists subscribe to what amounts to a national service act for themselves, there would have to be answers to such problems as wages, hours, and working conditions, reemployment rights, benefits, methods of enforcement, and discipline. It might be argued that an individual research chemist best knows what he can do best for a war effort, and therefore should be allowed to volunteer to do that. This might work, but the rest of the nation, seeing their sons and brothers and husbands without the opportunity to choose between carrying a gun and working in a factory, would not permit that.

It would seem, then, that scientists, technicians, and professional people can only volunteer themselves in a body, and, once they do that, they can lay down certain conditions for their service—conditions designed not for the welfare of the scientists but for the welfare of the nation and of world civilization.

Charles Taylor Vorhies: 1879–1949

Allan R. Phillips
Museum of Northern Arizona, Flagstaff

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE lost a Fellow and a past president (1933) of its Southwest Division, in the sudden death at Washington, D. C., March 10, 1949, of Charles T. Vorhies, head of the Department of Entomology and Economic Zoology of the University of Arizona for many years. Dr. Vorhies had gone to Washington to attend the annual meeting of the National Wildlife Federation, of which he was vice president and chairman of the Committee on Conservation Education.

Born in Henry County, Iowa, September 7, 1879, Dr. Vorhies attended public schools and received the B.S. from Iowa Wesleyan College in 1902. At the University of Wisconsin in 1908, he was the first to receive the Ph.D. in zoology. He was professor of zoology and botany at the University of Utah and served also as acting dean of the Medical School from 1911 to 1913. In 1915 he moved to Tucson and the University of Arizona.

Dr. Vorhies worked steadily for the conservation of natural resources. He was a leader in the founding of the Arizona Game Protective Association, the Tucson Natural History Society, and the Arizona Wildlife Federation, which he served for many years as secretary-treasurer. His approach to conservation was never that of a blind sentimentalist; he put much stress on the importance of continued and unhampered research.

Dr. Vorhies was a man of extraordinary versatility. Originally an entomologist (his graduate studies were on Trichoptera), he later contributed importantly to other fields, especially vertebrate zoology. His leadership in the science of bioecology was recognized in his election as president of the Ecological Society of America in 1939.

The southern Arizona desert was Dr. Vorhies' laboratory, and he made good use of it, both in his research and in his teaching. His first trip to the then remote Santa Rita Mountains was in the summer of 1918; for years thereafter he followed the changing conditions of grass, shrubs, rodents, and rabbits on the Santa Rita Experimental Range. Thus he gradually developed the concept of "animal weeds," the abundance of which was the effect of an overgrazed range rather than its cause. In the earlier years of this research, the automobile was still rather new and the roads were poor. Dr. Vorhies became a skilled mechanic, an ability added to his knowledge of other such unrelated arts as cooking, fishing and other sports, music, and literature, as well as the sciences. He lived an exceptionally full life.

Dr. Vorhies was especially interested in the methods utilized by different animals to control water loss, and in their ability to live under arid conditions with little or no moisture. His most important paper was probably his "Water Requirements of Desert Animals in the Southwest" (*Univ. Ariz. Agric. Exp. Sta. Tech. Bull. 107*, 1945). His work at the Santa Rita Experimental Range produced three other outstanding bulletins, written in collaboration with Walter P. Taylor, on the relation of mammalian numbers and food habits to range forage plants. Their bulletin on *Kangaroo Rats*, published by the U. S. Department of Agriculture in 1922, was a pioneer accomplishment; it combined close observation of the animals' habits and life history with the effect of varying animal populations upon range production. Later bulletins on *Jack Rabbits* (1933) and *Wood Rats* (1940) were published by the University of Arizona's Agricultural Experiment Station.

Ever since the 1870s, the lush grasslands and abundant

game of eastern and northern Arizona had been subjected to heavy abuse by man and his livestock. Eventually it became clear that a given amount of land cannot support an unlimited number of cattle. A gently sloping area of former grassland below the Santa Rita Mountains, 30 miles south of Tucson, was set aside for experiments to determine better methods of range utilization. It was here that Dr. Vorhies found the answers to the questions of what part, if any, the native rodents and rabbits had played in the transformation of verdant pasturage into barren lands of thornbush, cactus, deep gullies, and poisonous weeds. After long study, he and Taylor concluded that "contrary to our original opinion, detailed studies indicate that it is not true that jack rabbits are most abundant where the grass is best." Instead, they found that rabbits preferred poorly grassed areas, and that "under conditions of overgrazing and of misapplied control of predators, there is almost sure to be a jack rabbit and rodent problem. . . . In small or moderate numbers the jack rabbit may be of neutral or even beneficial status on all but cultivated lands." The wood rat was found to be even less harmful; large-scale control was considered unnecessary and undesirable.

Of the greatest interest were Dr. Vorhies' discoveries on the microclimates of desert mammals. For example, the ground squirrel *Citellus tereticaudus* can always retire to a burrow whose mean maximum temperature never exceeds 85° F at a depth of 4 feet, even though the mean maximum soil surface temperature is over 150° F for months, with individual temperatures reaching almost 170° F! Nor do mammals avoid such areas of extreme temperatures. "A comparison of the climate of the mesquite forest with the adjacent desert mesa shows a less extreme climate in the forest, especially as to atmospheric humidity and soil-surface temperature. Nevertheless more mammals, both as to species and individuals, live in the desert environment."

With his students, Dr. Vorhies had great patience and understanding, but he saw to it that they learned to think for themselves. He did not try to cram impossible amounts of trivial details into their heads momentarily, but gradually, by readings, discussions, and field observations, the students came to see the complexity and interdependence of all nature, the need of thought before action, and the vast amount of research still to be done.

Coming on the eve of a retirement that would have freed him from many routine pressures, Dr. Vorhies' death was a loss to science and to the cause of intelligent land use. His name is perpetuated in a phytomonad protozoan, *Chlamydomonas vorhiesi* Jones; a tarantula, *Delopelma vorhiesi* Chamberlin and Ivie; and a little-known wren, *Troglodytes brunneicollis vorhiesi* Brandt. He is survived by his wife, Georgia Ann (Smith) Vorhies, and by a son, Charles Tuttle Vorhies.

Gregory B. Mathews, S.V.D.: 1903–1949

Harold W. Rigney

Office of the Rector, The Catholic University, Peking, China

Father Gregory B. Mathews, S.V.D., Ph.D., dean of the College of Agriculture, and professor of botany at the Catholic University (Fu Jen) Peking, China, died of a heart attack in his living quarters at the university on the morning of February 4, 1949. Father Mathews was born at Peterswalde, West Prussia, Germany, on October 14, 1903, and attended the Gymnasium of the Holy Cross College at Neisse in Upper Silesia. He pursued his philosophical studies at St. Anselm's in Rome and studied theology at the University of St. Gregory in the same city. He was ordained a priest in 1932. In 1934 he joined the staff of the Catholic University, Peking, lecturing on botany. Later he pursued graduate studies in botany at the University of Chicago, where he took his Ph.D. in 1939, specializing in paleobotany.

In 1946, the Department of Agriculture was established at the Catholic University, Peking and entrusted to his care. The department was later extended into a college.

Father Mathews was noted as a good teacher and a tireless worker. He published textbooks and syllabi, as well as many papers, most of them dealing with paleobotany. He had worked many years preparing a Bibliography of Paleozoic and Mesozoic Flora of China and Korea. The research work on this project was finished, and the manuscript almost ready for the press, at the time of his death. Mr. Cheng Pao Shan, who assisted him in this work, is putting the final touches to the manuscript.

The passing of Father Mathews is a great loss to the scientific circles and life of Peking.