grazed area and further reduce the water available for the already reduced and cropped grasses and other forage plants. Sage-brush, rabbit-brush, prickly pear (Opuntia) and other cacti are important. Sage-brush is especially important in this respect in northern regions: overgrazing is responsible for much of the so-called sage-brush desert. In southern regions cacti such as staghorn opuntias and shrubs as Larrea, Franseria and various other coarse plants play an important role and favor the invasion of the larger rodents which intensify unpalatable plant invasion. Moderately grazed grasses are able, however, to steal the water from the invaders and kill them out again.

The increase in rodents which results from the destruction of their enemies hastens the depletion of grasses because some rodents use the grasses just as the cattle do. Some rodents are favored by overgrazing; grasshoppers are also favored and may take further toll from the depleted grasses.

In addition to invasions by coarse plants, small trees have behaved similarly and had similar effects. For example, the cattle business of the United States had its beginning in the gulf coast tallgrass prairie. This is an area almost universally mapped as mesquite —chaparral or savannah and regarded by many as having been that type before the white man came to the area. On the contrary, since cattle eat the mesquite beans and fail to digest them, they spread the seed widely and may be responsible for the entire savannah. It is well known that the mesquite has been spread from south central Texas into west central Oklahoma by this method. The effect of the mesquite trees ranges from a slight depreciation of the grazing value of an area, to almost complete elimination of the grasses.

(4) *The Development of Crop Farming.* Cattle ranching and farming within enclosures made possible by the invention of barbed wire replaced the cattle outfits. This step was aided by the introduction of the wind mill to pump stock water from wells.[7] The transition was nearly completed by 1895. In general, homesteaders contributed to the difficulties of the cattlemen. Covered wagons swarmed over the land, land prices rose, and the ranchman cut up another pasture which he turned over to the farmers, mostly on credit.

As homesteaders increased, the plow turned more and more land wrong side up each year. Sometimes crops were good, and sometimes poor or indifferent. Webb described their plight as follows:

> A few wet years, and the farmers all make bountiful crops of wheat, forage, and even of corn. They wrote "back East" to tell their brothers and sisters and friends about it. Finest land in the world! Plenty of rain; no "grubs" to dig out of the soil. Land to be had for one-fifth of what they ask for that worn-out land in the East. Good health, no chills, no fever, no doctor's bills. And, besides, the country is "getting more seasonable." Always that fiction, the expression of a vain hope, asserted itself in the fat years of the West. Then came the drought, and the covered wagons stole away, taking their occupants back East to the cotton patches and cornfields or shops of their former neighbors, there to become tenants or wage-earners, their spirits crushed, fortunes gone.

While on the plains, each of these settlers also plowed some land, killed some predator enemies of rodents and left the plains in a worse condition than when he arrived.

(To be concluded)

OBITUARY

IN MEMORY OF CHARLES E. SANBORN

IN the passing on July 5, 1944, of Charles Emerson Sanborn, formerly professor of entomology and head of the department of entomology, Oklahoma Agricultural and Mechanical College, the State of Oklahoma and the nation has lost a highly esteemed citizen and scientist.

Ten years of intimate personal association with Professor Sanborn on our anaplasmosis project was a rare privilege. The many field trips, laboratory contacts, conferences and experimental procedures brought to light the true character of the man. He was a loyal and true friend. His interests in human endeavor were legion. Many a young lad received a deeper individual insight into the realm of natural agencies through him, and he contributed much to the Boy Scouts along these lines.

Professor Sanborn was an untiring worker and a keen observer in the field of applied science. Well do I recall his observations on the mating instincts of the horse-fly (*Tabanus sulcifrons*) during the early hours one summer morning at Girard, Kansas. He was awakened just at the brink of dawn by an incessant buzzing sound, and my attention was called to the air being literally alive with huge swarms of these insects. Within a short period, when the sun began to shine, but few of the flies were to be seen.

On other occasions his keenness of observation were noted in calling my attention to swarms of flying ants on the distant horizon. Only a trained observer would discern such phenomena.

In our quest for the collection of ticks, many hours and nights were spent in looking for new species or particular kinds of ticks for experimental use in the

anaplasmosis project. One of the last cases I now recall was when the hounds treed a large coon about midnight in northeastern Oklahoma. Two balls of fire shone from the top of a great oak tree. A timely shot brought "Mr. Coon" to earth. From around its ears and head we recovered several specimens of much desired castor-bean ticks, *Ixodes scapularis*. During our period of field activity, 16 species of ticks were collected in Oklahoma. Some of these were unknown species for the state, *e.g., Ixodes Kingii* and *Ixodes Texanus*.

One result of the anaplasmosis project was the establishment of a splendid tick collection, perhaps the most extensive in the southwestern United States, now available at the Entomology Department of the A. and M. College, Stillwater, Oklahoma.

Largely through the efforts of Professor Sanborn, cooperating with Dr. E. E. Harnden, Dr. Harry W. Orr, Dr. Lewis H. Moe and myself, the transmission of anaplasmosis by horse-flies was established, since confirmed by other scientists. He was joint author of several published articles on the subject of this disease in cattle. I shall miss his kindly smile and native wit.

GEORGE W. STILES

DENVER, COLO.

WILLIAM HARMON NORTON
1856–1944

AMERICAN geologists join with widow and friends to mourn the passing of a great scientist, teacher, scholar and author, William Harmon Norton, who died at his Mount Vernon, Iowa, home on May 3, 1944.

Dr. Norton enjoyed a long and distinguished career which brought honor to him and the institution he served so faithfully for sixty-nine years. He was a tireless and meticulous worker, keenly interested in current events as well as his chosen field right up to the time of his death. To few men is given the keenness of mind that was his. As one biographer has stated, "He would have been great in any field."

Dr. Norton was graduated from Cornell College, Iowa, in 1875 and became tutor in Latin and Greek. Two years later, 1877, he became adjunct professor of Latin and Greek, a post he held until 1881. He received the Master of Arts degree in 1877. In the meantime he became interested in the science of geology and in characteristic thorough fashion probed its depths and later became one of the outstanding names in the science. In 1881 he became professor of Greek language and literature and geology and in 1890 abandoned the teaching of Greek and became professor of geology. The latter chair he filled until 1924, when he became professor emeritus. However, Norton continued to teach one class in evolution, a field which had challenged his mind, until 1942. Until his death Professor Norton continued to write in the field of evolution, publishing both in the United States and abroad.

In the course of his long career he received many honors. The State University of Iowa bestowed upon him the honorary degree of Doctor of Laws in 1911. He was a member of Sigma XI and Phi Beta Kappa, a fellow in the Geological Society of America, president of the Iowa Academy of Science in 1900. Dr. Norton was assistant on the U. S. Geological Survey from 1903 to 1913. His keen business judgment and other qualities caused him to be elected to the board of trustees of Cornell College in 1924, a post he held for twenty years, at which time he became an honorary member.

Dr. Norton attained world-wide recognition for his ground-water studies in Iowa; however, it was as a teacher that he liked best to be known. In this field he gained the love, respect and admiration of a host of students, many of them later to become famous in their own right. He was the author of "Elements of Geology," a text widely used in schools and colleges.

Dr. Norton's interests were many. He accumulated a vast library of fine music recordings and, as was his custom, delved deeply into music history. He often stated, "Jazz is an abomination to my ears." His tulip garden, embracing many hundreds of choice bulbs, many of them species developed by himself, was a show-place of eastern Iowa. It was here that he loved to visit with his friends and strangers who came to view their beauty.

Professor Norton is survived by his widow, Mary Burr Norton, for many years on the mathematics faculty of Cornell College.

The great scientist is gone, but the earth and its history is the richer for his having been here.

NEIL A. MINER

CORNELL COLLEGE

SCIENTIFIC EVENTS

SCIENTIFIC CONDITIONS IN CHINA

DR. WM. H. ADOLPH, acting professor of biochemistry and nutrition at Cornell University, who has been professor of biochemistry at Yenching University, Peiping, China, has received a letter from Dr. P. S. Tang, physiologist at Kunming, from which the following excerpts are given:

We have been cut off from the external world since 1941. No new journals or magazines have reached us since that time, except the excellent microfilms which the