rations. From the food intakes, which are not included in this note, one can calculate the milligrams of each amino acid which were consumed by the animals daily. This may prove to be a more accurate method of expressing the data. It should be emphasized that factors such as the proportion of fat and carbohydrate in the ration, and the age, weight and sex of the subjects may play important rôles in determining the minimum level of a given component. Furthermore, we have not yet investigated the possibility of inducing growth when the animals receive only ten amino acids *each at the minimum level.* If normal increases in weight occur on restricted diets of this nature, the amino acid mixture will prove to be the most efficient source of nitrogen ever devised for the purpose. On theoretical ground it appears more likely that growth will not occur. As indicated above, the values in Table 2 were obtained when liberal quantities of the non-essential amino acids were furnished. In the absence of the non-essential group, the nitrogen intake probably would be inadequate to meet the synthetic demands. In this event, a method will become available for the study of the origin of each dispensable amino acid and of the chemical transformations involved in its formation.

Finally, additional information has been obtained on the replacement of amino acids for growth purposes by the corresponding α-hydroxy and α-keto acids. The results of unpublished experiments demonstrate that phenylalanine, leucine and isoleucine can be replaced by both the hydroxy and keto compounds. Valine is replaceable by α-hydroxyisovaleric acid. Tests with the corresponding α-ketoisovaleric acid have not yet been completed.

OBITUARY

NATHANIEL LYON GARDNER

NATHANIEL LYON GARDNER was born in Keokuk, Iowa, on February 26, 1864. He passed away at his home in Berkeley on August 15, 1937. Graduating from the high school at Iowa Falls, he, after passing the necessary examinations, began teaching school in Iowa, but soon removed to Tacoma, Washington, to enter business with a relative. After the panic of 1893 he returned to teaching, having graduated from the normal school at Ellensburg, Washington. He received the degree of B.S. from the University of Washington in 1900, that of M.S. from the University of California in 1903 and that of Ph.D. in 1906.

As a teacher in the schools, he was soon called to Island County, in the State of Washington. Here he continued studies in natural history which had intrigued him even in his earlier years in Iowa, collecting specimens, of most excellent character, of various groups of plants and sending them to eminent authorities for determination and advice. In 1897, while teaching school at Coupeville, he addressed a letter to the writer at the University of California, asking for instruction in preparing, and assistance in determining, specimens of marine algae, of which he estimated there were about sixty-five species in his neighborhood. There began at that time a cooperation between Gardner and Setchell which increased in scope and lasted until the death of the former. Due to their combined efforts the knowledge of the marine algae of the Pacific coasts of North America was tremendously advanced.

Professor Gardner was an extraordinary collector, with keen insight, careful selection and skilful manipulation, so that his specimens and his knowledge increased side by side. When it came to publicaton, he was most meticulous. Some thirty or more papers were published under his name, while many more than that were published as joint papers with the writer.

He was an authority on blue-green algae of the world, as well as those of the Pacific coasts of North America. His knowledge of the green algae, while more limited to the marine species, was nevertheless extensive and he made very valuable contributions towards a better knowledge of the morphology and development of many species of this group. When it comes to the brown algae, his researches in various groups, from the minute forms to the more gigantic, were characterized not only by the distinguishing of many new species, but by substantial additions to our knowledge of their morphology and development. He was engaged particularly in the study of various polymorphous genera of the red algae of our Pacific coasts at the time of his death.

Professor Gardner, through his wonderful patience in collecting, culturing and studying his specimens, was rapidly bringing order out of the chaos of our knowledge as it previously existed. His work along these lines was cut short, much to the detriment of all those who are interested.

He served the University of California as assistant in botany from 1900 to 1906, as acting assistant professor of botany during the academic year 1909–1910, as assistant professor of botany from 1913 to 1923, as associate professor of botany from 1923 to 1934, and was retired in 1934 as associate professor of botany, emeritus. In 1920 he was also appointed curator of the herbarium of the University of California, which position he held until his retirement in 1934, when he was made curator, emeritus. He was head of the department of biology in the Los Angeles Poly-

technic High School from 1906 to 1909 and 1910 to 1913.

He married, in 1915, Edith Jordan (daughter of David Starr Jordan, then chancellor of Leland Stanford Junior University), who survives him. He was a member of both the scholastic honor societies, Phi Beta Kappa and Sigma Xi.

WILLIAM ALBERT SETCHELL

RECENT DEATHS AND MEMORIALS

DR. FRANK NELSON BLANCHARD, associate professor of zoology at the University of Michigan, died on September 21 at the age of forty-nine years.

DR. PAUL EMERSON, senior soil scientist of the Soil Conservation Service of the U. S. Department of Agriculture, previously associate professor of soils at the Iowa State College, died on September 20 in a canyon eight miles from Rapid City, South Dakota, while attempting to stem the poison of a rattlesnake bite. He was fifty years old.

DR. WILFRED N. STULL, vice-president of the Mallinckrodt Chemical Works in charge of operations and research, died on September 17 at the age of sixty years.

DR. CHARLES H. EHRENFELD died on September 25 at the age of seventy-three years. Dr. Ehrenfeld had been associated with the York Collegiate Institute, Pennsylvania, for forty-one years, having joined the faculty in 1887 as professor of chemistry and physics. He held the presidency from 1916 until 1928. From 1903 to 1916 he was chief chemist of the York Ice Machinery Corporation, makers of refrigeration machinery, later becoming a consulting chemist.

DR. JOHN WOODFORD FARLOW, librarian emeritus of the Boston Medical Library, formerly instructor in laryngology at the Harvard Medical School, died on September 23. He was eighty-four years old.

THE Division of Botany of the College of Agriculture of the University of California at Davis on September 15 held a special seminar commemorating the one hundredth anniversary of the discovery of the sieve tube by Theodor Hartig. Dr. Katherine Esau read a paper reviewing the development of present-day knowledge of sieve-tube structure and ontogeny. Dr. Alden S. Crafts discussed the part played by the sieve tube in translocation. A number of papers, including several of Hartig's reports, were on display. There was also a demonstration of microscopic slides illustrating sieve-tube anatomy and ontogeny.

SCIENTIFIC EVENTS

NATIONAL FOUNDATION FOR INFANTILE PARALYSIS

PRESIDENT ROOSEVELT has announced that he is forming a national foundation to unify the fight against infantile paralysis. It is planned to finance the new foundation through a nation-wide solicitation of private contributions. The goal will be from $7,000,000 to $10,000,000 in the next five years. Also to be used will be receipts from the President's birthday balls, held throughout the country. The Warm Springs Foundation's share of these receipts this year amounted to $340,000. In addition the balls raised about $660,000 for the work in the localities in which it was raised.

The text of President Roosevelt's statement is as follows:

I have been very much concerned over the epidemics of infantile paralysis which have been prevalent in many cities in different parts of the country. I have had reports from many areas in which this disease is again spreading its destruction.

And once again there is brought forcibly to my mind the constantly increasing accumulation of ruined lives—which must continue unless this disease can be brought under control and its after-effects properly treated.

My own personal experience in the work that we have been doing at the Georgia Warm Springs Foundation for over ten years leads me to the very definite conclusion that the best results in attempting to eradicate this disease can not be secured by approaching the problem through any single one of its aspects, whether that be preventive studies in the laboratory, emergency work during epidemics, or after-treatment.

For over ten years at the foundation at Warm Springs, Ga., we have devoted our effort almost entirely to the study of improved treatment of the after-effects of the illness. During these years other agencies, which we have from time to time assisted, have devoted their energies to other phases of the fight.

I firmly believe that the time has now arrived when the whole attack on this plague should be led and directed, though not controlled, by one national body. And it is for this purpose that a new national foundation for infantile paralysis is being created.

As I have said, the general purpose of the new foundation will be to lead, direct and unify the fight on every phase of this sickness. It will make every effort to insure that every responsible research agency in this country is adequately financed to carry on investigations into the cause of infantile paralysis and the methods by which it may be prevented.

It will endeavor to eliminate much of the needless after-effect of this disease—wreckage caused by the failure to make early and accurate diagnosis of its presence.

We all know that improper care during the acute stage of the disease, and the use of antiquated treatment, or