extensive or less complicated patterns or functioned more economically than the earlier ones. The tension patterns would shift but would never disappear. There is evidence for such shifts of pattern in the experiments of Freeman[26] and of Jacobson.[27] And the data of Jacobson give some support for the view that a tension pattern is always present during mental activity, since such activity is reduced to a minimum during a state of muscular relaxation.

Our possible explanations of the economy of adjustment are still not exhausted. Let me merely suggest a third, namely, the *law of least action* as propounded by Wheeler.[28] Any situation which presents an obstacle creates a condition of strain or tension. And any effort to overcome strain is an activity directed in a line of least action. Wherever there are two or more potentials belonging to a particular energy system motion takes place from the higher to the lower stress until an equilibrium is established. An illustration employed by him is particularly pertinent at this point. I quote freely: A lecturer and an indifferent audience.

> Why was the audience indifferent? But, first, what is indifference? It is a strain. The audience was bored; the seats were hard; the air was stuffy. The people preferred other activities than listening to an uninteresting speech. Accordingly, movements and attitudes on the part of the audience were not only symptoms of this strain, but they were also efforts to compensate for it. Had it not been inhibited by fear of breaking a long established custom and thus subjecting itself to criticism, the audience would have walked out to relieve itself of this strain, but courtesy to the lecturer prompted it to remain in the hall and to make the best of it.

They obeyed Wheeler's law of least action!

I hope that the several tentative explanations that have just been proposed have not served merely to belittle the remarkable fact that the human organism can adjust itself to changing conditions with an economy that man-made mechanical devices can not imitate; or to give the lie to the title of this paper which says that these problems are still unsolved. They are unsolved but not insoluble. The unknowns are gradually being whittled away. In the meantime, let us remind ourselves that organismic homeostasis is not inactivity, that complacency is not laziness, that the law of least action does not imply a saving of one's energy, and finally that having aspirations and striving to attain them are normal human organismic reactions deeply rooted in mechanisms as fundamental as the reflex.

OBITUARY

JOHN KUNKEL SMALL

DR. JOHN KUNKEL SMALL, chief research associate of the New York Botanical Garden, died at his home in Bronx Borough, New York City, on January 20, 1938, in his sixty-ninth year. He was of German descent, and was born in Harrisburg, Pennsylvania, on January 31, 1869. At 19 he entered Franklin and Marshall College at Lancaster, Pennsylvania. His first botanical paper was published during his sophomore year, and six more followed before his graduation in 1892. Of these early contributions to botanical science, two were concerned with mosses, and two were prepared in collaboration with his classmate, A. A. Heller, well known for his later work in the botanical field.

A few months after his graduation from Franklin and Marshall, he entered Columbia College, now Columbia University, with a fellowship in botany, and there he remained for six years, studying and serving as curator of the herbarium. His attention then, and throughout the years that followed, was concentrated upon the taxonomy of flowering plants and the flora of the southern United States.

Upon his arrival in New York he commenced work at once upon the genus Polygonum, and published five preliminary papers upon this subject. When he received his degree as a doctor of philosophy in 1895, his volume, "A monograph of the North American species of the genus Polygonum," was the most sumptuous American botanical thesis ever published. Meanwhile he had studied various other plants in his customary critical way, and had begun work on the Oxalidaceae, with which his name has since been closely associated.

His interest in the southern flora began at least as early as the summer of 1891, when in company with Heller he made a trip to western North Carolina, and continued unabated throughout his life. During his six years at Columbia he prepared a series of fourteen "Studies in the botany of the southeastern United States"; these comprised more than a hundred pages, and were published, as were most of his botanical writings of this period, in the *Bulletin* of the Torrey Botanical Club.

He had joined the Torrey Club in January, 1890, two and a half years before he made his home in New York, and always identified himself with this, the oldest American botanical society; he was elected an honorary life member in 1934. He became a member

[26] *Op. cit.*
[27] *Op. cit.*
[28] R. H. Wheeler, "The Science of Psychology," Chap. 3, 1929.

of the American Association for the Advancement of Science in 1895, and a fellow in 1902. But he persistently held aloof from entanglements with other scientific societies.

When the staff of the New York Botanical Garden was organized, in 1898, he was one of its original members, with the title, curator of the museums. In 1906 this was changed to head curator of the museums, and so continued until the end of 1932; he was then relieved of his administrative duties, in order that he might devote his time more completely to the research upon which he had been engaged so assiduously throughout his career.

His transfer from Columbia to the garden was not marked by any important change in his activities. He had been in charge of the Columbia herbarium, and he continued in charge of the herbarium of the garden with which that of Columbia was combined a few years later. He had been devoting as much time as he could to study of the southern flora, and this he worked upon with unabated enthusiasm. In 1903 was published his monumental work, the "Flora of the Southeastern United States," a bulky volume of nearly fourteen hundred pages; a new edition of this flora appeared in 1913; and his work in this field culminated in 1933 with the appearance of his "Manual of the Southeastern Flora," with figures illustrating every genus.

In the course of his earlier studies on the flora of the southern United States he became more and more impressed with the importance of Florida in the general scheme. The flora of Florida was varied by the southern extension of northern forms and the northern extension of tropical ones; no systematic botanical exploration of the state as a whole had ever been attempted, and it was apparent that here was the most promising field for such exploration in the entire country. He first visited Florida in 1901, and during the succeeding thirty-five years he returned more than thirty-five times, throwing himself into the work of exploration with unquenchable zeal. When circumstances finally put an end to his trips, he possessed unparalleled first-hand knowledge of the flora of all parts of the state. In the course of these trips he formed many friendships with kindred spirits, and such friends will join his closer associates in mourning his loss. Some of his later southern trips extended westward along the Gulf coast as far as Texas.

In most of his books he discussed flowering plants only. This was because he felt that the word "flora" belonged specifically to "flowers" and was inappropriate in the case of ferns, which are included in most so-called "floras." It was because of this view that he planned certain smaller works devoted exclusively to ferns and fern-allies. His first fern paper was published as early as 1890, and was followed by others at rather infrequent intervals. In 1918 he issued two small books on the ferns of southern Florida; in 1932 a larger one entitled "Ferns of Florida"; and in 1935 a still larger work, "Ferns of the Vicinity of New York." He became increasingly interested in this group of plants, and spent much of the time during the past year revising the proofs of his "Ferns of the Southeastern States," a book of 500 pages, with a full-page illustration of each species, which will make its appearance in the near future.

When the late Thomas A. Edison, realizing that war might at any time deprive this country of its sources of supply of rubber, began his series of experiments with native plants and such as could be grown on a commercial scale within our limits, as a possible source of this product, it was to Small that he turned for advice on the botanical aspects of his study.

In his later years he was saddened by the changes wrought in his beloved Florida by the advances of so-called "civilization." One after another he saw the most interesting plant communities and the most beautiful scenery in the state perish by the hand of man, until it was sometimes difficult to determine exactly where they had been. Then it was that he wielded his pen with telling effect in defense of Florida's remaining wonderlands.

In 1912, when his alma mater, Franklin and Marshall College, celebrated the 125th anniversary of her establishment, she conferred upon him the honorary degree of doctor of science. In 1936 he received the award of an honorary scroll from the Alumni Association of the Graduate Schools of Columbia University for his contributions to science as botanist, explorer and author.

Little remains to be said of his life work. He devoted himself to the advancement of botanical science with unflagging energy. Blessed with a rugged constitution, he never spared himself in his work, whether wading all day in southern swamps or writing in his study long after midnight. Perhaps he shortened his days by his overexertion; but, at all events, his was a full life—full of enjoyment, full of accomplishment. His life was concentrated in his work. His only recreation was furnished by his lifelong interest in music, which he transmitted to his children, but this aspect of his career needs only passing mention here.

His scientific writings were characterized by originality, honesty and fearlessness. His view-point was always that of a progressive, and was not always appreciated by his fellow-workers. But the writer of these words, who was his friend for forty-four years,

believes that when the conservatism that is still rampant has broken down, the name of John K. Small will be ever more highly revered.

J. H. BARNHART

LEO D. WHITNEY

FOLLOWING an illness of but a few days, Leo D. Whitney, assistant agronomist of the University of Hawaii, died on November 7, 1937. Born in Willits, California, on May 11, 1908, he secured his early education in the schools of Santa Rosa, and received his B.S. degree from the University of California in 1933, having majored in agronomy. The next two years were devoted mainly to graduate study in botany. Before completing his work for the Ph.D., however, he was called to the University of Hawaii to undertake special studies on grasses and on taro. He made very valuable contributions to the taxonomy of Hawaiian grasses, listing a number of new species, not before described, from Hawaii. His work dealt especially with economic pasture grasses. He had, at the time of his death, prepared for publication a list of 150 grasses, established on Hawaiian ranges. One of his principal tasks at the University of Hawaii was to attempt to work out a key for the classification of Hawaiian taro varieties. Out of more than 200 so-called varieties, he was able to describe 85 distinct horticultural varieties and to develop a satisfactory key for their identification. He also made a very distinct contribution to the knowledge of Aroids in general through his work on the seeding and mutations of taro. He was a member of the American Association for the Advancement of Science, Botanical Society of America, Hawaiian Botanical Society and a number of other botanical and taxonomic societies.

Mr. Whitney was a conscientious worker, thorough student and sincere friend. His untimely death came as a severe shock to his many friends and associates, and removed prematurely one of the most promising young agronomists of the present generation.

B. A. MADSON

RECENT DEATHS

DR. HARRY W. TYLER, professor emeritus of mathematics of the Massachusetts Institute of Technology, secretary of the American Association of University Professors from 1916 to 1933, died on February 2 in his seventy-fourth year.

DR. HOWARD E. SIMPSON, head of the department of geology of the University of North Dakota and state geologist, died on January 31. He was sixty-three years old.

SIR JAMES CRICHTON-BROWNE, London, specialist in mental and nervous disorders, died on January 31 at the age of ninety-seven years.

SIR AMBROSE THOMAS STANTON, chief medical adviser to the British Secretary of State for the Colonies, adviser to the government on tropical diseases, died on January 25 at the age of sixty-two years. Sir Thomas had been bacteriologist at the Institute of Medical Research, Kuala Lumpur, Federated Malay States, becoming director of the institute in 1920.

WILFRED HENRY PARKER, for eighteen years director of the British National Institute of Agricultural Botany, died on January 11 at the age of forty-nine years.

THE death is announced of Dr. A. B. Martynov on January 29. Dr. Martynov was an entomologist, known for his investigations on insect paleontology and evolution. He has been stationed during the last year or so at the Institute of Paleozoology at the Academy of Sciences in Moscow.

SCIENTIFIC EVENTS

RESEARCH ON CHRONIC DISEASES AT WELFARE ISLAND

DR. S. S. GOLDWATER, commissioner of the Department of Hospitals of New York City, has announced the receipt of an appropriation of $66,000 from the Rockefeller Foundation for the support of research on chronic diseases to be conducted on Welfare Island. This work was inaugurated two years ago and is conducted by a research staff appointed by the Department of Hospitals and supported in part by the City of New York. Supplementary funds required for the conduct of intensive research work have heretofore been obtained from various sources by the Research Council of the Department of Hospitals, to which the Rockefeller grant of $66,000 has been intrusted for expenditure over a three-year period.

The officers of the Research Council of the Department of Hospitals are: Marshall Field, *president;* Dr. John A. Hartwell, *vice-president;* Dr. Bernard Sachs, *treasurer,* and Dr. S. S. Goldwater, *secretary.* The Research Council acts on the advice of a scientific advisory group, under the chairmanship of Dr. Alfred E. Cohn, of the Rockefeller Institute.

On the completion of the Welfare Hospital for Chronic Diseases the work of the research division, which is now being carried on in temporary quarters at Metropolitan Hospital, will be transferred to the new 1,600-bed Welfare Hospital, now rapidly approaching completion.

The following is a résumé of the scientific work now in progress: