ity. This explanation has been proposed by Benedict,[14] though direct attempts to verify it have not been successful.[15] It is conceivable, however, that acid stimulation may be an important factor with ruminants, in which large amounts of organic acids resulting from extensive bacterial fermentations are absorbed from the intestinal tract. But obviously this theory also can not be construed to favor the view that a definite net energy value for a food is characteristic of each animal function, or that the percentages of utilization of metabolizable energy for different functions bear a constant relation to one another.

Finally, in ruminants at least, the chemical, bacterial, glandular and muscular events occurring in the alimentary canal, or in its accessory organs, during digestion are known to result in a definite and considerable increase in heat production, an increase that may account for a large percentage of the total heat increment following the ingestion of food. But it appears that these events, and the accompanying heat losses, would bear no relation to the events subsequently or simultaneously occurring on the other side of the gastro-intestinal mucosa. They would presumably be related, more or less constantly, to the amount of food consumed, and its physical and chemical make-up, particularly as this bears upon the extent and rapidity of its digestion, but would be quite unrelated to the manner in which the food is utilized after absorption.

It appears, therefore, that the determination of the relative net energy values of feeds for animals in different functional conditions is being approached on the basis of assumptions, not only without experimental justification, but even in contradiction to established experimental findings. The results obtained, in consequence, are being given a significance that they do not seem to possess, in all probability. Hence, a different working hypothesis should be adopted. Since Lusk's experimental work and the theories that he has deduced from it appear to offer the most plausible explanation of the specific dynamic action of food—the only calorigenic effect of food that would conceivably be related to its disposal in metabolism—a working hypothesis based upon these theories would seem to be the safest guide in future investigations of the net energy values of food for farm animals.[16] In a broad way, these theories differentiate three general lines of investigation, involving studies of (1) the heating effect of different amounts of food in animals in the same functional condition, (2) the heating effect of the same amount of food in animals in different functional conditions, and (3) the influence of internal factors, such as heredity and endocrine activity, upon the specific dynamic effect of food. The first study is concerned with the rate of establishment of the metabolism of plethora, the second with the rate of its depression due to withdrawal of food by the tissues and the third with the response of the tissues to a given plethora stimulus; in other words, with the irritability of the tissues.

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[14] Benedict, F. G., Trans. 15th Intern. Congress Hyg. and Demography, Washington, D. C., 1912.

[15] Lusk, G., *J. Biol. Chem.*, 1921, xlix, 453; Taistra, S. A., *ibid.*, 479; Chanutin, A., *ibid.*, 485.

[16] It may, of course, be objected that Lusk's work was done with carnivora and that the conclusions from it can not be assumed to apply to herbivora. However, there is little reason for believing that the energy metabolism of the two types of animals is fundamentally different. In any case, the theories of Rubner as well as those of Lusk were based upon experimental work with carnivora. Until there is definite reason for doubting the applicability of experimental data so obtained to farm animals, they may be considered a safe guide upon which to base working hypotheses.

RALPH GORDON LUSK

DR. RALPH GORDON LUSK, instructor in geology at Harvard University, died suddenly with heart failure in New York City on July 27, at the age of thirty-one years, just as he was entering upon his career as a geologist. He was born July 14, 1896, at Manchester, Iowa, where his father, the Reverend C. F. Lusk, was at that time pastor of the First Baptist Church. His mother's maiden name was Grace A. Hilbrant. Ralph Lusk was educated in the public schools of Iowa, and in March, 1918, he enlisted in the U. S. Navy and was sent to the Great Lakes Naval Training Station. On April 1 of the same year he was married to Neva Belle Frederick at Lake City, Iowa. At Great Lakes, the heart ailment which finally caused his death was first developed and by September he was discharged for vocational rehabilitation. He entered Denison University that fall and graduated with the class of 1922, after making geology his major subject. The next year was spent as a graduate student at the University of Chicago. At Denison he was elected to membership in Phi Beta Kappa and at Chicago to Sigma Xi. In 1923–24 he was instructor in geology at Denison and in 1924 he entered Harvard University as an Austin Teaching Fellow in Geology. He was appointed instructor in geology in 1926 and in June, 1927, he was awarded the degree of doctor of philosophy at Harvard, having previously received the degree of master of science from Chicago.

During the summer of 1922, Ralph Lusk had served as field assistant to Kirtley F. Mather, of the U. S. Geological Survey, in Colorado and New Mexico. Shortly thereafter he was appointed assistant geologist on the survey and spent the summer of 1923 in Montana as assistant to A. J. Collier. Similarly during the field season of 1924 he was engaged in geological mapping in northeast Colorado for the United States Geological Survey, and during the field season of 1925 and 1926 he was in eastern Tennessee as geologist of the State Survey. This field work supplied the basis for his doctor's thesis as well as shorter technical articles. He was also one of the joint authors of a government bulletin, now in press, descriptive of the oil and gas resources of northeast Colorado.

Dr. Lusk was a member of Beta Theta Pi and a Mason. He is survived by his widow and four children: twin daughters, aged eight; a son, Ralph Gordon Lusk, Jr., aged four, and a baby daughter, nine months old.

KIRTLEY F. MATHER

HARVARD UNIVERSITY

PROFESSOR ALBRECHT KOSSEL

GEHEIMRATH PROFESSOR ALBRECHT KOSSEL, until recently professor of physiology in Heidelberg University, director of the Heidelberg Institute for the Study of Proteins, Nobel prize winner, known for his elucidation of the chemistry of the proteins and of nuclear chromatin matter, died unexpectedly, after a very short illness, in Heidelberg on July 5.

Professor Kossel in a very real sense was the founder of modern biochemistry. It was his conception of the structure of the proteins, following upon his study of the simplest of these substances, the protamines, a conception which was confirmed and established by synthesis of artificial or synthetic proteins by Emil Fischer, work undertaken at Professor Kossel's suggestion and request, which gave to biochemistry its great impetus in the last years of the nineteenth century and led to the wonderful outburst of activity in this field.

Professor Kossel was a fine-looking man of medium height, of a simple, friendly, affectionate and generous nature. He had nothing of the insolence, conceit and arrogance so often associated with the Prussian, but he was a real scientific man, modest, kindly, simple, sincere, with a brilliant imagination and indefatigably at work in the laboratory even up to the time of his death. He retained his youthfulness of appearance, of mind and outlook and all of his faculties to the very end of his life. To his great honor it may be recalled that he did not sign the ridiculous pronunciamento of the German professors at the start of the great war. He did not sympathize with those who brought on the war, although after his country was engaged he gave it loyal support.

Ever since the death of Hoppe-Seyler he had been editor of the *Zeitschrift für Physiologische Chemie*, being associated for a year or two and until the death of the latter with Professor Baumann, but being thereafter sole managing editor. This journal, established by Hoppe-Seyler about 1879, was for many years the only journal in the world devoted exclusively to biochemistry and it is one of the finest journals of science of the present day, its papers being almost without exception valuable contributions to the subject and several of them being classics in their fields.

Mrs. Kossel, whom many American students and friends will remember with great affection for her kindness, sincerity and intelligence, and who was related to some of our most distinguished scientific men, died in 1912. Two children survive them; a son, the distinguished physicist of Kiel, Professor Walther Kossel, and a daughter, Gertrud Kossel; and three grandchildren, Albrecht, Dierick and Irene Kossel. Professor Kossel was a brother of the bacteriologist, Professor H. Kossel, who died about two years ago.

Professor Kossel had many pupils, his laboratory in Heidelberg being filled before the war with students from all lands. His death is felt by them all as a great personal loss. It removes another of the great men of science of Germany, the greatest glory of that country in the years just preceding the war. As one after another of these great men pass away it is as if one light after another were being extinguished and Germany entering again into the twilight of learning.

ALBERT P. MATHEWS

SCIENTIFIC EVENTS

THE IMPERIAL AGRICULTURAL RESEARCH CONFERENCE

THE Imperial Agricultural Research Conference which opens in London on October 4 has, according to a report in the London *Times*, as its main objects the establishment of closer cooperation in agricultural research work throughout the empire, the setting up of additional research stations in tropical and subtropical countries, the creation of greater imperial bureaus, and the recruitment, training and interchange of research workers. It will be attended by seventy-five delegates of high administrative and scientific standing from the oversea parts of the empire and by many representatives from Great Britain and