tumor, which was then observed through the transparent cornea with the microscope. It was thus learned that this cancer always develops according to a definite structural pattern, namely, in the form of undifferentiated membranes which gradually thicken and become more compact. In this manner growth continues until the tumor fills the cornea.

Cyclic changes in the mammary gland of the monkey: CARL G. HARTMAN and HAROLD SPEERT. A large and controversial literature has arisen concerning changes in the human breast in relation to the menstrual cycle. Since the phenomena accompanying the cycle in man and monkey parallel each other in so many respects; and since the monkey breast is so well adapted for study and is readily obtainable the matter was investigated in a series of nine regularly menstruating monkeys. It was found that there is a definite cycle when ovulation has occurred, none in the absence of ovulation. The chief changes consist of enlargement of the lobules and dilatation of the ducts. These changes begin to be manifest several days after ovulation and occur in accelerated tempo until they reach their maximum in the late premenstruum. The relation of these findings to the physiological action of estrogens and progesterone will be discussed.

The piezo-electricity of beta-quartz: A. W. LAWSON (introduced by D. W. Bronk). In distinction to the generally accepted belief that beta-quartz is not piezo-electric, the existence of piezo-electricity in quartz above 575° C., originally observed by Osterberg and Cookson, has been confirmed. Piezo-electricity was observed in small crystalline fragments of quartz up to about 800° C. by the "click" method. A suitably cut quartz bar was excited to longitudinal vibration which could be detected by both the click method and measurement of the impedance of the quartz with a peak voltmeter up to about 650° C. The observations suggest that the disappearance of piezo-electricity in beta-quartz at higher temperatures attributed by Osterberg and Cookson to the appearance of a new phase is due to the rapidly increasing electrical conductivity of the quartz.

Relative acid strengths in various solvents: MARTIN KILPATRICK (introduced by A. N. Richards). It has been shown experimentally that the ratio of the dissociation constants of the substituted benzoic acids to that of benzoic acid yields a sequence of relative acid strengths which differs from solvent to solvent. In general the meta and para substituted acids become relatively stronger in solvents of low dielectric constant while the reverse is true for ortho substituted acids. The effect of the meta and para substituents can be interpreted in terms of electrostatic effects, but the observed effect with decreasing dielectric constant is greater than the theoretical.

(*To be continued*)

OBITUARY

HENRY McELDERRY KNOWER

HENRY MCELDERRY KNOWER, son of Captain Edward C. Knower, U. S. A., and Mary D. (McElderry) Knower, was born in Baltimore, Maryland, on August 5, 1868. His death, at the age of 71, occurred in his native city on January 10, 1940. He was educated at schools in Baltimore and at the Johns Hopkins University, where he received the A.B. degree in 1890. Continuing there as a graduate student under the late Professor William K. Brooks, he was awarded the doctorate of philosophy in 1896. During this period he served as assistant for two years and the last year he held the Adam T. Bruce fellowship.

After obtaining his Ph.D. degree Knower was appointed to an instructorship in biology at Williams College but returned to Baltimore the following year and in 1899 became instructor in anatomy in the Johns Hopkins Medical School, where he remained ten years, the last year as associate. From Baltimore he was called in 1909 to the University of Toronto as lecturer in anatomy, and in 1910 he became professor and head of the department of anatomy at the University of Cincinnati. After his resignation from this post in 1924 he served as visiting professor at the University of Georgia (1925–27) and then as professor of anatomy at the University of Alabama until 1929. From 1930 to 1932 he was associate professor of anatomy in the Albany Medical College of Union University. His last appointment was that of research associate in biology at Yale University (1933–37).

In the late nineties Knower attended a number of sessions at the Marine Biological Laboratory, Woods Hole, and in 1908 became a regular summer resident. He served there as librarian from 1909 till 1919, during which period the library grew rapidly and was well arranged and catalogued.

In 1897 he married Miss Virginia Du Barry, who survives him. They had two children, Henry Du Barry, whose death late in 1939 was a severe blow to his father at a time when he himself was critically ill, and Virginia (Mrs. William A. Moore, of Bronxville, N. Y.). There are five grandchildren.

Knower's first research work dealt with the embryology of termites, in which he became interested on an expedition to Jamaica in 1891. This was the subject of his doctoral dissertation, which was published in Volume 16 of the *Journal of Morphology*. After his appointment in anatomy his interests naturally shifted to problems more closely related to that field. He became absorbed in the study of the development of the vascular system, first through the demonstration of the lymph hearts and vessels in embryos from which the systemic heart rudiment had been removed. In Dr. Mall's department during this period there was

much interest in the vascular system. Knower made essential improvements in the technique of micro-injection by blowing a bulb at the end of the capillary injector and using gentle heat, applied to the bulb, to propel the injection fluid. Through the years which followed he made extensive studies of the development of the vascular system, both blood vessels and lymphatics, and accumulated a vast collection of injected material, including embryos of various species of urodele and anuran amphibians and of fishes. Brief reports on this work were made from time to time at the meetings of the American Association of Anatomists, where his specimens were demonstrated, but it is only upon the anuran material that a full report was published, as one of the *American Anatomical Memoirs*. This was finished and put through press less than a year before his death, at a time when his physical condition was such that it seemed scarcely possible for him to work at all.

These investigations led to the conclusion that the lymphatics spread first from a center connected with the anterior lymph hearts, which pump the lymph into a tributary of the pronephric sinus. The process of growth is by budding, and in this Knower agrees with Hoyer, Sabin and Clark and is opposed to the lacunar theory. He did not reach this conclusion without careful consideration of the evidence, and, indeed, open-mindedness and critical judgment characterized all his work.

Knower will, perhaps, be remembered as much for his services in the establishment of the *American Journal of Anatomy* and the *Anatomical Record* as for his special investigations. At the close of the last century journals for the publication of anatomical and zoological research were altogether inadequate; in fact, aside from certain institutional publications, they were almost non-existent. On account of financial difficulties the *Journal of Morphology* had just been discontinued (fortunately only temporarily) and there was nothing to take its place. This was about the time when the Association of Anatomists was undergoing reorganization at the hands of a younger group of men who were active in anatomical research as understood in continental Europe. The need of a new journal was generally felt, but there was hesitancy about setting up any more institutional publications. Cooperative action was needed. Knower often discussed this situation with Mall, and late in 1900 determined to go ahead with the organization of the *Journal of Anatomy*. He visited various laboratories, secured pledges of financial support, and won the cooperation of the distinguished group of men that afterward formed the editorial board of the journal, which was nearly identical with the group that had been active in the reorganization of the association. When the editorial board was founded, Knower became its secretary, virtually managing editor, which position he held until 1921, when the ownership of the journal was transferred to the Wistar Institute. In those days the managing editor of a scientific journal was a combination of editor, business manager and office boy, and a lot of hard work was required to make the enterprise successful. Knower served with great devotion and tact, and this, together with the unselfish cooperation of the board, insured the success of the journal from the start. It is odd that he was never given the title of managing editor. Whatever may have been the reason, it was not lack of appreciation of his services. There are in his files many letters from members of the editorial board and from those who contributed funds for the journal, including President Daniel C. Gilman, that are most complimentary and appreciative. One of these, the last one written him by Dr. Charles Sedgwick Minot and dated June 26, 1914, announcing a grant from the Elizabeth Thompson Fund for Knower's research, may be quoted:

> We have from experience learned to look upon grants for illustrations as rarely desirable. In your case I explained to the Board that your University was probably not able to assist you much in that way but the deciding consideration was that you had done a great deal of devoted work for the Journal of Anatomy of the sort that necessarily receives little attention and excites none too much gratitude. The Board hopes that you will consider the grant partly as an expression of appreciation of your very real service in promoting the cause of Anatomy in America. It is a personal pleasure to me to write this to you.

The *Journal of Anatomy* naturally became the official organ of the Association of Anatomists, and some years later the need was felt for another type of publication that would bring out shorter articles, book reviews and news items of interest to anatomists, including the proceedings of the association. Thus was established in 1906, at Knower's initiation, the *Anatomical Record,* which was printed for the first two years as a supplement to the journal. During this period Knower, as editor, contributed frequently to its pages, but by 1908 it had made such a place for itself that it was established as an independent journal with its own editorial board.

As teacher and director of an anatomical institute Knower's main sphere of activity was at the University of Cincinnati. When he was called there in 1910, only a year after the publication of Flexner's report on medical education in the United States, two of the proprietary medical schools in Cincinnati had been united and had become affiliated with the university. The history of both schools went back many years to the days of Daniel Drake, and the rivalry between the two faculty groups continued after the merger.

The introduction of new ideas, especially in preclinical teaching and research, was needed, and Knower was one of a group of four men brought in from without to accomplish this purpose. The plans called for the construction of a complete new plant, both hospital and laboratories, which was carried through under the general leadership of the late Dr. Christian Holmes. Knower's part was to plan and equip the new anatomical laboratory, and this he did with vision and skill. He had brought with him from Baltimore the spirit of Mall's laboratory at Johns Hopkins, and this was reflected in the organization and atmosphere of the department. Such fundamental changes could not be carried through undisputed. Controversies that would not abate arose over methods of teaching, the value of research, and standards for students. Knower, always persistent and uncompromising in matters of principle, would not yield, and the friction that developed led in the end to his resignation, an occurrence which could and should have been avoided. Nevertheless, this transitional period was a constructive one, and in spite of the difficulties and the unfortunate ending it was a very happy one in his life.

Knower was one of those teachers who treated his students as individuals and not simply as members of a class. He was not a facile lecturer and the inspiration that he gave them was not through this medium. It was rather by close personal contact in the laboratory and by his sympathetic understanding of their problems that he won their warm regard and affection.

To his friends and associates he was loyal and true, companionable and sympathetic, with a sense of responsibility in all his relations. His humor, cheerfulness and good nature gained him many friends, especially among the younger generation. In his years of declining health, which were long and distressing, these qualities never failed him. His courage and determination in completing a substantial part of his life work during this period of adversity will remain as an example to all who knew him.

ROSS G. HARRISON

NATIONAL RESEARCH COUNCIL,
WASHINGTON, D. C.

RECENT DEATHS AND MEMORIALS

DR. CARL L. ALSBERG, director of the Food Research Institute and of the Giannini Foundation of Agricultural Economics at Stanford University, died on November 1 at the age of sixty-three years.

DR. JOHN RENSHAW CARSON, research mathematician at the Bell Telephone Laboratories, New York, died on October 31. He was fifty-four years old.

DR. ORMOND R. BUTLER, since 1912 professor of botany and botanist in the Agricultural Experiment Station of the University of New Hampshire, died on October 24 at the age of sixty-three years.

DR. WILLIAM GOGGIN CROCKETT, professor of pharmacy at the Medical College of Virginia, died on October 29 at the age of fifty-two years.

DR. GUSTAVUS AUGUST EISEN, from 1893 to 1900 curator of the California Academy of Sciences, known for his work in biology and archeology, died on October 29 at the age of ninety-three years.

THE REV. DR. JOSEPH J. WILLIAMS, professor of cultural anthropology at Boston College, died on October 28 at the age of sixty-four years.

DR. ROBERT BOWIE OWENS, electrical engineer, secretary of the Franklin Institute from 1910 to 1924 with the exception of the war years, died on November 2 at the age of seventy years. He was formerly director of the Bartol Research Foundation.

M. EDOUARD CLAPARÈDE, professor of psychology at the University of Geneva and permanent secretary of the International Congress of Psychology, died on September 2. During recent years he had specialized in child psychology and had established the J. J. Rousseau Corresponding Institute of France. He was an honorary member of the British Psychological Society.

DR. ADOLPHO LUTZ, of the Oswaldo Cruz Institute of Rio de Janeiro, author of medical, zoological and entomological works, died on October 6 at the age of eighty-four years.

THE W. S. Blatchley Club, formerly the Hamilton County Nature Study Club, held a memorial meeting on October 11 for the late Dr. Blatchley, formerly State Geologist of Indiana, for whom the club was named. The meeting was held at Noblesville and the memorial tribute was given by Dr. J. J. Davis, of Purdue University.

THE *Journal* of the American Medical Association states that friends of the late Dr. Lawrason Brown, for many years head of the Trudeau Sanatorium, Saranac Lake, N. Y., have established the Lawrason Brown Memorial Fund to finance one or more fellowships for research in diseases of the chest. The fund will be managed by the Saranac Lake Society for the Control of Tuberculosis, and if at any time that organization should cease to exist the management of the fund will be offered first to the Johns Hopkins University. The present committee is composed of Drs. Leroy U. Gardner and James Woods Price, Saranac Lake; Louis Hamman, Baltimore; Esmond R. Long, Philadelphia; David R. Lyman, Wallingford, Conn., and William P. Thompson, New York.