atmospheres. The brightness depends on the above-mentioned n, the wave-length, the initial temperature, the distance from the center and the angle of sight. Our interest was chiefly confined to showing whether or not the theoretically predicted eclipses will have a dependence on the wave-length in the same sense as observed. The application was made to thirty-six cases, depending on difference in brightness and size of the components, n and on wave-length. It may be mentioned before publication that the theoretical results seem to be in full agreement with the observations. The photographic minimum is narrower than the visual. Of course, in a strict sense, both eclipses begin at the same time, but the distribution of the brightness over the disc in the photographic light is so different that the eclipse apparently begins much later. It would follow from this that the usual law of darkening towards the limb is only a limited case of this general distribution of the brightness over the disc with the thick atmosphere.

It is evident that the real observational results are more complicated than we can now theoretically handle. There is a serious question about the effect of ellipticity, and if we remember that the thick atmospheres of the two components may fill the whole space between the components, so that a great distortion in the isophotes and in velocities of atoms can be expected, the problem is indeed complicated. Then there is the inherent difference between the two components in some systems. It seems, however, that there is no doubt that the first application of the theory to the observed difference in the light curves has met with some success.

(5) *Conclusions.* The theory of thick atmosphere of Kosirev and Chandrasekhar, the spectroscopic observations of Struve and our photometric results seem to indicate that elusiveness of the radius is a more general phenomenon than has previously been thought.

The application of such an idea may have a wide scope and it may be that some observations on peculiar stars with envelopes, on large eclipsing variables like VV Cephei, ζ Aurigae and others or even on new stars (as with the duplicity of Nova Herculis) may receive a new explanation. Some other branches of astronomical research may also be influenced.

Since this effect has been found from the comparison of the visual with the photographic light curve, the visual observer of eclipsing variables will probably find a new stimulus. In the last decade many visual observations were considered unnecessary because of the ease and richness of the photographic work. Now the visual observations should probably not be confined to fixing an epoch of minimum, but will have another and more physical meaning. It is worth while to mention that the comparison in two wave-lengths does not need the basic photometry of the zero point, only of scale. It would seem that some revision of the sizes of large stars will be in order. Some peculiarities in their characteristics may be explained through the recognition of this edgeless effect.

It may also be that the internal constitution may receive a modified approach, for of the three fundamental parameters, two are becoming less definite, or have to be more precisely defined. If the effect is general, a great deal of work will probably be done in the future to determine the degree of thickness (the number n) in order to approach our established methods in computations of eclipsing variables with the inclusion of this effect.

In a recent communication Sir Arthur Eddington remarks with his usual simplicity and profundity that in our problem the conception of "occultation" radius and "bright" radius of a star should be kept apart, and though the problem is probably complicated this difference in the conceptions may contain a valuable element of bridging the new elusiveness of the radius with the old hard and fast conception of it.

OBITUARY

JAMES ALEXANDER SHOHAT

JAMES ALEXANDER SHOHAT, professor of mathematics at the University of Pennsylvania, died in the University Hospital on October 8, 1944, after an illness of three months. The cause of his death was bacterial endocarditis.

Professor Shohat was born in Brest-Litovsk, Russia, on November 18, 1886. He graduated from the University of Petrograd in 1910. He continued graduate studies there and in 1922 was awarded the degree of master of pure mathematics.

In 1922 he married Nadiaschda W. Galli, a physicist who later taught in the Physics Department of the University of Michigan, Mount Holyoke College, Rockford College and Bryn Mawr College. He and Mrs. Shohat came to the United States in 1923. He became a United States citizen in 1929.

From 1913 to 1917 he was an instructor in mathematics at the Polytechnic Institute, Petrograd. From 1917 to 1921 he was professor at the University of Ekatherineburg and from 1921 to 1923 at the Pedagogical Institute of Petrograd.

When he first came to the United States, he was an assistant in mathematics at the University of Chicago.

From 1924 to 1929 he was assistant professor of mathematics at the University of Michigan. He spent the year 1929–1930 doing research at the Institut Henri Poincaré, Paris. In 1930 he became an assistant professor at the University of Pennsylvania. He was promoted to an associate professorship in 1936 and to a full professorship in 1942.

He was a member of the American Mathematical Society, the Mathematical Association of America, the Institute of Mathematical Statistics and a fellow of the American Association for the Advancement of Science. For the past four years he was associate editor of the *Bulletin of the American Mathematical Society*.

The main field of his research was that of orthogonal polynomials, on which he had written numerous papers while still in Russia. He continued very active in this work after coming to America. His many publications in American and foreign mathematical journals form an important contribution to classical analysis. He was an inspiring lecturer and interested many graduate students in research problems under his direction. The following took doctorates at the University of Pennsylvania under his guidance: R. P. Bailey, W. Lawton, C. J. Rees, H. M. Schwartz, J. Sherman, Vivian Spencer, M. S. Webster and C. Winston. He was deeply devoted to his doctors; he was never satisfied with their mere satisfaction of the research requirements for the doctorate but followed their further careers with many suggestions as to problems and with advice leading to their solution.

He was chairman of a committee of the National Research Council on Bibliography of Orthogonal Polynomials. The other members of the committee were Einar Hille, of Yale University, and J. L. Walsh, of Harvard University. The work of this committee resulted in the publication in book form in 1940 of an excellent bibliography which is an invaluable aid to research workers in orthogonal polynomials.

In 1931 he published a monograph "Théorie Générale des Polynomes Orthogonaux de Tchebichef" in the series, Mémorial des Sciences Mathématiques. He planned a sequel to the above monograph, and a portion of the material for the same is found among his unpublished papers. In 1943 he and J. D. Tamarkin, of Brown University, published "The Problem of Moments," the first volume of the new series of monographs, Mathematical Surveys, published by the American Mathematical Society.

Dr. Shohat was interested in applied mathematics, and his course on higher mathematics for the solution of engineering problems attracted numerous engineers and physicists connected with a large number of industrial organizations in the Philadelphia area. In this manner he became interested in Van der Pol's Equation, which was the subject of his last two published papers. Just before his last illness he finished the translation from the Russian of Kryloff's "Differential Equations for Mathematical Physics and their Application to Engineering." This translation will be published posthumously.

He had an intense patriotism for his adopted country and was vitally interested in doing everything possible to aid in the successful prosecution of the war. During the last year of his life, in addition to his own numerous research activities related to pure mathematics, he acted as a consultant for the Navy Department in connection with the work of the David Taylor Model Basin.

A burning enthusiasm for mathematical research, a deep interest in the work of his students, both graduate and undergraduate, an earnest desire for the improvement of all opportunities for graduate study made Professor Shohat a forceful figure in the scientific work at the University of Pennsylvania. He was a true friend and a loyal colleague.

J. R. KLINE

RECENT DEATHS

DR. MAURICE COLE TANQUARY, since 1928 professor of apiculture at the University of Minnesota, died on October 25. He was sixty-two years old.

DR. EVANDER FRANCIS KELLY, of the University of Maryland, since 1926 secretary of the American Pharmaceutical Association, died on October 27 at the age of sixty-five years.

DR. MARTHA BUNTING died on October 13 in her eighty-third year. She had taught biology at Goucher College and in high schools in Philadelphia and New York. Subsequently, at the University of Pennsylvania she served as research assistant in the Medical School for six or seven years, and later was a research fellow for a number of years in the department of zoology.

DR. RICHARD B. HENDERSON, of the National Institute of Health at Washington, D. C., died on October 20 at the age of thirty-two years. He was engaged at the request of military authorities in perfecting a vaccine to combat "scrub typhus." During the course of this work he contracted the disease.

HOWARD PALMER, known for his explorations of the Canadian Rockies, died on October 24 in his sixty-first year.

DR. CHARLES G. BARKLA, professor of natural philosophy at the University of Edinburgh, died on October 23 at the age of seventy-three years.