receive a bequest estimated at from one to two million dollars.

Fire which resulted in damage to equipment of approximately $20,000 and to the building of about $28,000 was discovered in the attic of the Richardson Chemistry Building, Tulane University, New Orleans, on the morning of July 6.

Dr. J. M. Bell succeeds Dr. F. P. Venable as head of the department of chemistry at the University of North Carolina. Dr. Venable, who was formerly president of the university, has resigned as head of the chemistry department, but retains his professorship.

Dr. Eugene P. Deatrick has resigned as instructor of soil technology, College of Agriculture, Ithaca, N. Y., to become associate professor of soils, and head of department, West Virginia University, Morgantown, W. Va.

Dr. Reuben S. Tour has been appointed professor of chemical engineering at the University of Cincinnati. Dr. Tour, who succeeds Dr. O. R. Sweeney, who resigned because of ill health, has served for several years as an expert for the government on nitrate and other chemicals, and will continue to act as consulting expert for the government.

Dr. Chas. C. Macklin has resigned his position as associate professor of anatomy in Johns Hopkins University to accept the professorship of histology and embryology in Western University, London, Canada.

Professor H. Lebesque, of the faculty of sciences, University of Paris, has been elected professor of mathematics at the Collège de France.

DISCUSSION AND CORRESPONDENCE

SECULAR PERTURBATIONS OF THE INNER PLANETS

To the Editor of Science: It is true, as Professor Poor states (Science, Vol. 54, pp. 30–34, 1921), that if we are at liberty to assume any distribution of density we like around the sun it is not difficult to account for all the secular perturbations of the four inner planets within their mean square errors, by means of the Newtonian law of gravitation. Professor Poor, however, does not appear to have read much of the paper of mine to which he refers,[1] or he would have noticed that the density we are at liberty to assume is subject to very severe limitations. It is possible to estimate the density of the matter at any distance from the sun directly; for the amount of light it scatters is known from observations of the zodiacal light and the corona, and by considering different possible constituents, whose scattering powers for given masses are known, we can determine limits to the density. Seeliger and de Sitter succeeded in explaining the residual secular perturbations of the four inner planets by means of two ellipsoids of matter, one close to the sun, and the other extending to the orbit of the earth. I showed, however, in the paper referred to, that the density of the matter between the orbits of Mercury and Mars can not exceed $\frac{1}{600}$ of that required by these writers, and in a later paper[2] I showed that the disturbing effect of the matter near the sun can not exceed 10^{-9} of that supposed to be produced by their inner ellipsoid. Accordingly, none of the secular perturbations of the inner planets can be explained by means of the Newtonian law of gravitation. The fact that the excess motion of the perihelion of Mercury is accounted for by Einstein's law therefore decides definitely in favor of the latter. Further, Einstein's law is the simplest that can account for it. None of the other nine residuals exceeds 3 times the corresponding mean error, and only three of them the mean error itself, and there is therefore no reason to regard them as anything but accidental errors.

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1 "The Secular Accelerations of the Four Inner Planets," *Monthly Notices*, R. A. S., Vol. 77, pp. 112–118, 1917.

2 "On the Crucial Tests of Einstein's Theory of Gravitation," *loc. cit.*, Vol. 80, pp. 138–154, 1919.