QUOTATIONS

A GREAT ASTRONOMER

PROFESSOR TURNER, whose death at the age of sixty-nine is announced on another page, was not only a pioneer in astronomical research, but was also a singularly gifted expositor of the wonders of his science. In him *The Times* loses a valued contributor of long standing.

Herbert Hall Turner, the son of Mr. John Turner, was born at Leeds in 1861, and was educated at Leeds Modern School, Clifton College, and Trinity College, Cambridge. His career at Cambridge was brilliant; he graduated as second wrangler in 1882, and was second Smith's prizeman in the following year. He was elected a fellow of Trinity, but left Cambridge in 1884 to become chief assistant at the Royal Observatory, Greenwich, where he remained until 1893, when he was appointed to succeed Professor Pritchard as Savilian Professor of Astronomy and director of the University Observatory at Oxford.

Turner's contributions to astronomy were remarkable for their number and variety; he published over two hundred papers and essays on scientific subjects. He had a fertile and ingenious mind, and more than the usual amount of courage in putting forward ideas and speculations. Many of his ideas have not met with general acceptance, but this is a fate that must befall some part of the work of any one who has a claim to be called a pioneer. When he assumed the direction of the University Observatory at Oxford, he found it committed to taking a part in the international scheme of mapping the heavens, which had been decided upon at a conference in Paris in 1887, and he threw himself into the work with so much enthusiasm that the Oxford section was finished before that of any other observatory with the exception of Greenwich, the only other observatory in England which was allotted a part in the scheme. He then proceeded to help some of the other observatories which were finding the burden of the work too heavy for them, and when the International Astronomical Union was formed after the war, he was elected president of the committee delegated to deal with the scheme.

Much of the technique of the methods now universally employed for deriving the positions of stars from photographs is due to him, and this is perhaps his greatest contribution to astronomy. He also did a large amount of useful work on the classification of variable stars, and put forward a theory to explain stationary meteor radiants, but his explanation of sunspots as being due to a swarm of meteors formed by collision between the Leonids and the rings of Saturn has not been generally accepted, and the same must be said of his attempt to account for the two star streams in terms of gravitation.

When Professor Milne, the seismologist, died in 1913, Professor Turner took over the control of his seismological bureau at Shide, and on the return a few years later of Mrs. Milne to Japan the bureau was moved to Oxford, where it remained under the direction of Professor Turner as president of the seismological committee of the British Association. He was also president of the seismological section of the International Geophysical Union, and himself did a large amount of work on the analysis of earthquake records, with a view to detecting periodicities in them. His frequent communications to *The Times* on earthquakes he had detected in remote parts of the world will be well remembered, as also his letters and articles on eclipses and other astronomical subjects.

He spared no effort to promote international cooperation in astronomy, and was a well known and popular figure at international conferences, of which he attended a large number. He also went on several eclipse expeditions, including those to Japan in 1896 and to Egypt in 1905, and when the office of foreign secretary of the Royal Astronomical Society fell vacant in 1919, he was clearly marked out for it.

Turner had a great gift for presenting the complicated facts of modern astronomy in a way easily understood by the lay mind, and was an excellent lecturer. He wrote four very readable popular books on astronomy, "Modern Astronomy," "Astronomical Discovery," "The Great Star Map" and "A Voyage in Space," the last being the outcome of a series of children's lectures at the Royal Institution in 1913. For more than thirty years he contributed each month to the periodical, the *Observatory,* a series of notes, light in vein, under the heading "From an Oxford Note Book," which formed a feature of the magazine that has been greatly appreciated by astronomers all over the world. He was for many years secretary, and then president, of the Royal Astronomical Society Club, where he could always be counted upon for an apt after-dinner speech, and, on occasions of any importance, for a song. He had the all too rare gift of being able to enter into other people's difficulties, and there must be many amateur astronomers, in addition to some of the younger professional astronomers, who will always gratefully remember help and advice given both frequently and ungrudgingly.

As Savilian Professor at Oxford, Turner became a fellow of New College. Coming to the university, he

threw himself wholeheartedly into the intimate life of the college, entering with zest into its activities, educational, scientific and social, and contributing a valuable element to its discussions by his independent, yet sympathetic, point of view and a breezy disregard of conventions which now and again shocked more conservative minds.

It was unfortunate that the refusal of the university to provide an official house in the Parks for the Professor of Astronomy made his relations with the university less cordial. This and the remoteness of astronomical studies from the ordinary curriculum rendered his influence in Oxford less than it ought to have been. But those who knew him well were aware of the keen interest which he took in its studies and general welfare, and also in the lives of his friends and colleagues. No one was more ready to give active help to his friends in any time of trouble. It was characteristic of his generous temper and his sympathy with struggling causes that from the first he gave his vigorous support to the Workers' Educational Association and the organization of tutorial classes. In this work his optimism and persistence were invaluable.

Here, as in everything else he took up, his help was direct and personal. He had the courage and strong will of a true Yorkshireman, and he also shared the North Country love of music; he was an assiduous member of the Oxford Bach Choir, and an active supporter of musical enterprises. A lover of the open air, he had a close acquaintance, by bicycling, boating and walking, with the beautiful country near Oxford, and in other parts of England, and his scientific expeditions gave him a wide acquaintance with the oversea dominions and with foreign countries. In these activities he was fortunate in having a wife who shared in his tastes and in much of his travel. The astronomical world is weaker by his death, and he has certainly left in his college and among his friends in the university a place which can not be filled.

Professor Turner was elected a fellow of the Royal Society in 1896, and was president of the Royal Astronomical Society in 1903 and 1904. From 1913 to 1922 he was one of the general secretaries of the British Association. He was given the honorary degree of D.Sc. by the Universities of Leeds, Sydney, Wales and Strasbourg, that of D.C.L. by Durham, and that of LL.D. by California. He was also a corresponding member of the French Institute, and he received the Bruce gold medal of the Astronomical Society of the Pacific in 1927.—*The London Times.*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN IMPROVED METHOD FOR THE STUDY OF NUTRITIONAL ANEMIA IN THE WHITE RAT

RAPID progress in solving the mysteries surrounding the underlying causes of pernicious anemia has been made within the past four years.[1] One of the phases of this problem which has attracted the attention of many investigators is the study of nutritional anemia in the white rat.

Young rats at the weaning age become anemic when fed 4 to 6 weeks on whole milk only, for at this stage the store of iron in the body is at a low ebb. It has been noted in some instances, however, that anemia did not appear unless milk was fed over a prolonged period or even to the second generation.[2] The authors were surprised to find that under the conditions in their laboratory a number of rats fed whole milk only or whole milk plus cod-liver oil grew well and for the most part were about normal in hemoglobin content (Fig. 1). Studies were therefore conducted to learn why the conditions under which these animals were kept were not conducive to anemia.

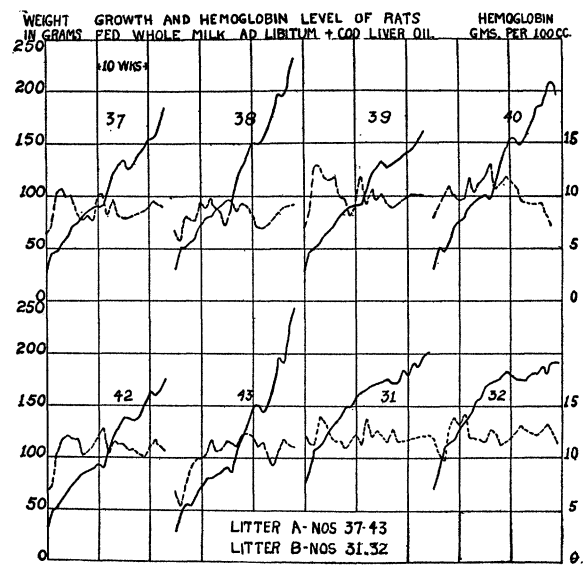

FIG. 1. Contrary to expectations, young rats fed whole milk and cod-liver oil made good growth and in most cases were normal in hemoglobin content. The solid curves show live weight and the broken lines the amounts of hemoglobin in the blood.

The cages employed in the early work were constructed of galvanized iron wire, having a mesh small

[1] SCIENCE, 71, (No. 1850): x, June 13, 1930.
[2] W. M. Happ, *Bul. Johns Hopkins Hosp.*, 33: 163, 1922.