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The University of London Observatory.

THE new University Observatory at Mill Hill Park, N.W., was formally opened by Sir Frank Dyson, K.B.E., F.R.S., Astronomer Royal, on 1929 October 8. The principal instrument in the observatory is the Wilson Telescope originally constructed for Mr. W. E. Wilson and presented to the University by his son, Mr. J. G. Wilson. This instrument is a 24-inch reflector, which may be used in either the Newtonian or Cassegrain form for both visual and photographic observation, and is provided with a guiding telescope of 6 inches aperture. The equatorial mounting is of standard astrographic pattern and has a dual electric clock-control. The telescope is housed in an 18-foot dome constructed by Messrs. Cooke, Troughton and Simms.

The subsoil of the site is London clay, and considerable research was undertaken in order to eliminate vibrations arising from traffic. It was found that there were considerable horizontal vibrations at the surface of the ground which decreased in amplitude very rapidly with depth, becoming insensible at 8 feet below ground level. The traffic tremors were removed by excavating the soil around the pier and filling in with coke breeze to a depth of 4 feet, this latter precaution being necessary in order to prevent vibrations arising from varying wind pressure.

The observatory is also provided with a spectrographic laboratory, the principal instruments being a 10-foot Rowland grating spectrograph and a spring driven cœlostat by Cooke. The latter is mounted on the roof immediately over the laboratory. An arrangement, designed by Mr. Gregory and Prof. Filon, has been provided whereby the cœlostat can be moved into its required position for any star by means of a single setting on a divided circle.

The Director of the new observatory is Professor L. N. G. Filon, and Mr. C. C. L. Gregory has been appointed Wilson Observer.

The following is a report of Sir Frank Dyson's address on the occasion of the opening ceremony :—

Mr. Vice-Chancellor,

You have kindly assigned to me the pleasant and honourable task of opening the new Observatory of the University of London. I am certain that I am expressing the sentiments of astronomers in wishing the observatory a successful future and in anticipating much valuable work. They appreciate and are grateful for the generosity of Mr. Wilson and the public spirit of the University, of University College and other components of the University, and of the Hendon Council.

In the Middle Ages, the Monastic Schools which were, I suppose, the forerunners of the Universities included astronomy in their curriculum. Their students were familiarised with the daily and annual movements of the stars and with the more complicated movements of Sun, Moon and Planets. Observatories were not necessary, as instruments were not generally used, or at any rate only small and simple ones. When the revival of learning came, astronomy was taught in the Universities, and the controversy over the Copernican system made it of the highest interest. It was seen that extensive and accurate observations were required to improve planetary tables. The Universities did not set up observatories but left the task to the enthusiasm of private astronomers and of wealthy and enlightened patrons. In our own time we have seen very similar action in the United States of America.

The first observatory erected in Europe was at Nuremberg in 1476 by a wealthy citizen, Walther, who secured the cooperation of the astronomer, Regio-Montanus. A century later Tycho Brahe, who had studied astronomy at the Universities of Copenhagen and Leipzig and gave lectures on astronomy at Copenhagen, set up a great observatory in the island of Hven, under the patronage and at the expense of the King of Denmark. The excellence of the instruments, both in design and execution, the careful plan and the long continuous series of observations, made this observatory a model for future astronomers.

Leiden in 1632 was the first university to establish an observatory, but the instruments were very small and useful only for teaching purposes. The national observatories of Paris and Greenwich were founded in 1667 and 1675 respectively. Greenwich was established for the practical end—the assistance

which astronomy could give to navigation. This was the beginning of observations on the movements on the face of the sky of Sun, Moon, planets and stars which have been continued for 250 years.

In 1775 another public observatory was established under the Radcliffe Trust at Oxford, and in 1820 the observatory at Cambridge was founded with the Professor of Astronomy as Director.

The last quarter of the 18th century saw the discoveries of Herschel made at the observatory at Slough with his great mirrors. During the 19th century many private astronomers had their own observatories. The names of Lord Rosse, Dawes, Carrington, Groombridge, Lord Crawford, Lassell, readily come to mind, and later Huggins, Common, McClean, Maw, Roberts, Wilson. The variety and importance of the contributions to observational astronomy by these men needs no emphasis. All their observatories have disappeared. We have a large number of amateur observers in England doing excellent work, but they are confined to the use of comparatively small instruments. For large telescopes and permanent observatories attachment of some kind to universities is generally necessary. We have them at Oxford and Cambridge, and in London at South Kensington was the Solar Physics Observatory, under Lockyer's direction in close touch with the University of London. The possession of an observatory by a university insures greater permanence of any research which may be carried out. Again it provides an opportunity of giving to the students some interest in astronomy. The number who study astronomy intensively are naturally very few compared with those who take physics and chemistry, which are preliminary to the great professions of Medicine and Engineering and are of value in many branches of industry. But for cultural value no science exceeds astronomy Its long history and growth with mathematics ; its contribution to the foundations of dynamics ; the revolution it has made in men's conception of the world ; its contribution to the freedom of thought give it a unique place in the sciences.

In my opinion all university students, and particularly those who will be engaged in teaching, should know something of the history of astronomy and of those phenomena from which the change in our view of the Universe has been secured. This is perhaps an unrealizable ideal. But there will be a number who will appreciate, from a view of the phases of Venus or of the Satellites of Jupiter, how a revolution in thought came with Galileo's telescope. I am very glad to see that arrangements are being made for the public to be admitted at certain times and under certain conditions to the Observatory. The University is in this way taking a wide view of its duties. At the same time I hope and expect that a band of enthusiastic amateur astronomers will come to be associated with the Observatory and assist the observer in charge. For his duties with our climate are not light ones. Fine evenings cannot well be spared, and it is much more than one man can do to be always on the spot.

May I say a word about Mr. W. E. Wilson's work. It was my good fortune to meet him several times in London, though I never saw his observatory at Daramona. His interest in astronomy was stimulated by participation in the Eclipse Expedition of 1870. He decided to set up an observatory, and

began with a 12-inch reflector. Ten years later, he obtained the large reflector which has now been presented by his son to the University of London. He obtained beautiful photographs of nebulæ in the early nineties. He also made a determination of the effective temperature of the Sun and obtained the value of 6590°. He made parallel researches in the physical laboratory attached to the observatory on the temperature of the carbon arc. He also worked at the temperature of sun-spots, and at his observatory, so long ago as 1895, Mr. Minchin used photo-electric cells for the measurement of star-light.

It would have been a great pity if this beautiful telescope had fallen into disuse. Fortunately Mr. J. G. Wilson was good enough to present it to the Senate of the University of London, and the Senate had the enterprise to accept this gift and arrange for its maintenance. The Director, Prof. Filon, happily considered astronomy to be in the orbit of a Professor of Mathematics, and Mr. Gregory by his enthusiasm and experience is cut out for an excellent observer. This magnificent telescope well housed in an excellent site should prove a real addition to English observational astronomy, and has, I am sure, the good wishes of all astronomers. I have great pleasure in formally declaring the Observatory to be open.

Errata in the Napier Tercentenary Memorial Handbook and in the Encyclopædia Britannica.

In the *Napier Tercentenary Memorial Handbook* on pages 47–60 there is an excellent article "A Working List of Mathematical Tables," by Herbert Bell and J. R. Milne, which has been a source of inspiration to many computers. But several errors in it have caused a great deal of trouble, so it seems worth while to place the facts on record.

On page 48 is mentioned a table of *Square and Cube Roots up to 25,500, below 1010 to 14 decimals, above to 5*, by G. E. Gélin (Huy, 1894). This table could not be traced in any library in Great Britain, and eventually, acting on a hint from Prof. R. A. Sampson that the list had been compiled largely from Glaisher's article "Tables" in the 11th edition of the *Encyclopædia Britannica*, the mystery was solved. Glaisher describes Jahn's *Tafel der Quadrat- und Kubikwürzeln* (Leipzig, 1839) and this description is followed immediately by that of Gélin's *Recueil de Tables Numeriques* (Huy, 1894). The *Handbook* authors have combined the description of Jahn's tables with the authorship of Gélin!

But on turning to Jahn in the expectation of finding square roots