

THE KIRKWOOD OBSERVATORY OF INDIANA UNIVERSITY.

JOHN A. MILLER.

At its November meeting of 1900 the Board of Trustees of Indiana University appropriated a sum of money for the purchase of a telescope and some accessories, and for the erection of an Observatory. The Observatory is built of Indiana limestone and was completed in January of 1901. It contains six rooms—a library and computing room; a lecture room, which may be darkened at any time, equipped with a Colt electric lantern, lantern slides and other illustrative apparatus, a convenient dark room; a transit room; the dome room and a room similar to it and immediately below it.

The skeleton of the dome, which is twenty-six feet in diameter, is of white pine and is built according to plans furnished by Messrs. Warner & Swasey, who also furnished the running mechanism. It is covered with tin. The performance of both dome and shutter is entirely satisfactory.

The design of the Board of Trustees, that the equipment is to be used in a large part for instruction and in part for purposes of research, determined largely the character of the instruments which we afterwards purchased. In the dome-room is mounted a twelve-inch refractor. The objective is by Brashear, and is of high optical excellence, giving star-images which are free from fringes or distortion and on a black field. The mounting is by Warner & Swasey. It is provided with coarse and fine circles in both declination and right ascension, the fine ones being provided with reading microscopes and electric illumination. A star dial-dial located on the north side of the pier and driven by the driving clock, from which the right ascensions can be read directly, is of almost indispensable convenience. The driving clock drives regularly and the entire mounting is of the highest mechanical excellence.

The telescope has as accessories a micrometer by Warner & Swasey, provided with electric illumination; a polarizing helioscope; a battery of positive and negative eyepieces by Brashear, and two positive eyepieces by Steinheil und Söhne of Munich. The transit room contains a small universal instrument by Bamberg, a chronograph by Fauth & Co., a Bond sidereal chronometer, and a sidereal clock. A Howard sidereal clock, with contact that breaks an electric current each second except the fifty-ninth, and the last ten seconds at the end of every five minutes, will be put in

place in a few weeks. Mr. O. L. Petitdidier, of Chicago, has kindly loaned the Observatory a parabolic mirror fifteen inches in diameter and with a focal length of 120 inches, which he constructed at his optical works. The mounting for this mirror has been designed by Mr. W. A. Cogshall and in large part constructed by him. The reflector will be in place by the first of March and will be used chiefly in photographing nebulae.

These instruments, together with a portrait lens of five inches aperture and a Browning equatorial of four inches aperture, which for many years have been the property of the University, constitute a nucleus around which the University authorities hope to collect a more complete equipment.

The Observatory is located on the University campus, about 300 feet from the nearest building. With practically an unbroken horizon within 75 degrees of the zenith—as low as one can usually observe, and in most instances the view is entirely unobstructed.

We have found the seeing at the Observatory fair. On an average clear night a power of 300 can be used effectually; on about half the working nights we use a power of 480, while a night when a power of more than 600 can be used is comparatively rare.

The Observatory is essentially a Students' Observatory. Those who take courses in general astronomy are permitted to use the telescope a limited number of hours each week, and though this work is optional, few fail to avail themselves of an opportunity to use the telescope an hour. No accurate measurements or really scientific work is attempted by these students.

In addition to the work in spherical and practical astronomy and work carried on by the teaching force certain students are encouraged to undertake work in the nature of research. This generally consists of drawing planetary details or in making micrometrical measures of double stars or of planetary disks. The observing lists are made out under the direction of the instructors and in general consist of stars that need measuring. We are engaged at present in measuring the double stars discovered in the process of making the catalogues of the *Astronomische Gesellschaft*. These as a rule are not difficult objects. Also search is being made for new pairs with a fair degree of success.

The Observatory bears the name of Dr. Daniel Kirkwood, the eminent astronomer, who, for nearly half a century, was a member of the faculty of Indiana University and who, by his manly qualities, won the

lasting esteem of his students and his colleagues, and by his devotion to his science a lasting name among his contemporaries.

The Observatory was formally dedicated May 15, 1901. The dedicatory address was given by Astronomer W. J. Hussey, astronomer in the Lick Observatory. He spoke of "Astronomy and Modern Life." President Swain spoke of "Personal Recollections of Dr. Kirkwood."

DAYLIGHT METEORS.

JOHN A. MILLER.

THE CENTER OF POPULATION OF THE UNITED STATES.

JOHN A. MILLER.

A THEOREM IN GEOMETRY.

JOHN C. GREGG.

DEF is the triangle formed by the tangents at the vertices of a triangle ABC inscribed in the circle O. Draw EOP meeting BC in P and join PF. Show that EPF is a right angle.

DEMONSTRATION.

Draw FG perpendicular to CA produced, and join OF. Denote the angles of ABC by A, B, C, and the sides by a, b, c. Then

$$\begin{aligned} FG &= AF \sin B \\ &= \frac{c}{2} \sec C \sin B \\ &= \frac{b}{2} \sin C \sec C \\ &= \frac{b}{2} \tan C \\ &= HP, \text{ which is perpendicular to CG.} \end{aligned}$$

Hence HPG is a rectangle and EPF is a right angle.

