THE OBSERVATORY OF THE U. S. MILITARY ACADEMY AT WEST POINT, N. Y.

Memorandum by Lieut. F. S. HARLOW, U. S. A. (in charge).

"The permanent observatory at the Military Academy is provided at present with a REPSOLD Meridian Circle, a CLARK Equatorial, and a BOND Chronograph used in connection with a HOWARD mean time and a HARDY sidereal clock.

"The circle is 26 inches in diameter, graduated to 2′, and reads directly to 1″ by means of four reading microscopes fitted with micrometers. Each micrometer screw carries two pairs of parallel wires.

"The telescope has a free aperture of 7 inches, a focal length of 81.5 inches, and is provided with five positive eye-pieces of powers 70, 150, 210, 280, and 350, together with two sun-glasses, and the R. A. and Declination micrometers. The reticle carries 23 transit wires. For use with the nadir basin a reflecting nadir cap is provided. The illumination of the several microscopes and of the main field is in accordance with the REPSOLD design.

"Two collimators are mounted on piers in the meridian. Free aperture, 3 inches. Focal length, 38 inches.

"The CLARK Equatorial has a free aperture of 12 inches, and a focal length of 15 feet. Powers of the negative eye-pieces, 150, 300, 600, and 1200. The declination circle is graduated to 10′, and is provided with two verniers read by micrometer microscopes directly to 10″. The hour circle is graduated to 1^m and reads by verniers to 1^s. These circles are all illuminated by small incandescent lamps in connection with a battery of 4 or 5 bichromate cells. The filar position micrometer has 3 positive eye-pieces of powers, 110, 155, and 210, and the wires are illuminated by electricity.

"The equatorial is also fitted with a 'telespectroscope,' in which two gratings are used, one on speculum metal by ROWLAND, with 14438 lines per inch, and one on glass by RUTHERFORD, with 17100 lines per inch.

"The electric connections of the BOND chronograph provide for switching either the mean time or sidereal clock, and either

the meridian circle or sidereal clock, and either the meridian circle or equatorial, into circuit with itself.

"A building is now in process of construction in which we hope to have mounted within a few months, a 9⅝ inch equatorial for photograhic purposes, and a concave grating by ROWLAND, 6 inch, with camera complete.

"In the field observatory we have two transits, a zenith telescope, an altazimuth, and several STACKPOLE sextants."

MEASUREMENT OF *JUPITER'S* SATELLITES BY INTERFERENCE.

BY A. A. MICHELSON.

It has long been known that even in a telescope which is theoretically perfect, the image of a luminous point is composed of a series of concentric circles with a bright patch of light at the common center. This system of circles can easily be observed by examining any bright star with a telescope provided with a circular diaphragm which diminishes the effective aperture. The appearance of the image is shown in Fig. 1. In the case of an object of finite angular magnitude the image could be constructed by drawing a system of such rings about every point in the geometrical image. The result for a small disc (corresponding to the appearance of one of the satellites of *Jupiter* as seen with a 12-inch telescope whose effective aperture has been reduced to six inches) is given in Fig. 2, the chief points of difference between this and Fig. 1 being the greater size of the bright central disc and the lesser clearness of the surrounding rings. The larger the disc the more nearly will the appearance of the image correspond to that of the object; and the smaller the object the more nearly does it correspond with Fig. 1, and the more difficult will be the measurement of its actual size. Thus, in the case just cited, the actual angular diameter is about one second of arc, and the uncertainty may amount to half this value or even more.

The relative uncertainty, other things being equal, will be less in proportion to the increase in the aperture, so that with the 36-inch telescope, the measurement of the diameters of *Jupiter's* satellites should be accurate to within ten per cent. under favorable conditions.