A circular scale graduated to degrees, with its centre just below the centre of the coil and its plane horizontal, is placed with its zero point on a line drawn on the mirror bottom of the box at right angles to the plane of the coil, so that when the needle and coil are in the magnetic meridian the index may point to zero. The accuracy of the adjustment of the zero point is to be tested by finding whether the same current produces equal deflections on the two sides of zero. To test whether the centre of this divided circle is accurately under the centre of the needle supposed at the centre of the coil, draw from the point immediately under the centre of the needle two radial lines on the mirror bottom, one on each side of the zero point and 45° from it, and turn the needle round without giving it any motion of translation. If the index lies along these two radial lines when its point is at the corresponding division on the circle the adjustment is correct.

When taking readings the observer places his eye so as to see the index just cover its image in the mirror bottom of the box, and reads off the number of degrees and fraction of a degree, indicated on the scale by the position of the index. Error from parallax is thus avoided.

A mirror with attached magnets may be used, as in the magnetometer, instead of the needle and index. When this arrangement is employed the coil is in the magnetic meridian, when equal deflections of the spot of light on the scale on the two sides of zero are observed. These scales, as has been already remarked, should always be carefully glued to a wooden, piece instead of being, as they frequently are, fixed with drawing pins.[1]

ANDREW GRAY

(*To be continued.*)

PROFESSOR HENRY DRAPER, M.D.

THE late Professor Henry Draper, whose death we announced last week, was born in Virginia in 1837, but three years later removed to New York, at the time when his father, Prof. J. W. Draper, was appointed to the Chair of Chemistry in New York University. At this University Dr. Draper was educated, graduating in Medicine in 1858, after which he travelled abroad. In 1860 he was elected to a professorship in his own University, which he retained till his death the other day. In 1866 he was elected Professor of Physiology in the Medical Department of the University and managing officer of the institution, a position he resigned in 1873.

Dr. Draper's scientific work began with a series of experiments in 1857 on the function of the spleen, carried out by the aid of microscopic photography, an art then in its infancy. On his return from Europe, stimulated by a visit paid to Lord Rosse's 6-foot reflector, he began the construction of a 15½-inch reflecting telescope, and with this, when completed, he took photographs of the moon. A full account of the methods of grinding and polishing reflecting mirrors and the system of testing them was printed in 1864 in the Smithsonian "Contributions to Science."

Dr. Henry Draper subsequently constructed an equatorial reflecting telescope of 28 inches aperture, making both the mounting and the silvered glass speculum himself. The object for which this instrument was intended, and which it succeeded in accomplishing in 1872, was photographing the spectra of the stars, a work which has been carried on with such success by Dr. Huggins in this country. Since the invention of the gelatino-bromide dry process the difficulties of this research have much decreased; all the more credit is therefore due to Draper and the other pioneers in this branch of inquiry; he had taken more than a hundred spectra of various stars.

In 1872 Dr. Draper produced a photograph of the diffraction spectrum of great excellence. It comprised the region from below G, wave length 4350, to O, wave length 3440, on one plate.

In 1874 Draper was appointed by the United States Transit of Venus Commission, Superintendent of its Photographic Department, and his duties in this connection were so satisfactorily performed, that in the fall of that year the United States Government caused a special gold medal to be struck in his honour at the Mint in Philadelphia, bearing the inscription, "Decori Decus Addit Avito." This was the first time that such a public recognition had ever been accorded to a scientific man in the United States by the Government.

In 1877 Dr. Draper printed his paper on the "Discovery of Oxygen in the Sun and a New Theory of the Solar Spectrum." This research has given rise to as much interest as any in recent times; whatever the future verdict may be upon it, it was the result of several years' work and most costly and elaborate apparatus. In 1877 Dr. Draper went to the Rocky Mountains, and made experiments on the transparency and steadiness of the atmosphere at elevations up to 11,000 feet. In the succeeding summer he took a party into the same region to observe the total eclipse of the sun, and was fortunate enough to photograph the diffraction spectrum of the solar corona, which on this occasion was shown to be continuous.

During the last autumn and winter he took photographs of the nebula in Orion. These were the first he ever made, and required an exposure in the telescope up to 140 minutes, even when the most sensitive of Eastman's gelatine plates were used.

Dr. Draper's work has been done mainly at his observatory at Hastings-on-Hudson, and at his laboratory in New York. In the former he had three large telescopes.

Dr. Draper's genial nature won him many friends and many English men of science well know the hospitable home at Dobb's Ferry. These and many more will sympathise with Mrs. Draper in the loss which not only she but science has sustained in the death of so earnest a seeker after truth.

THE COMET

WE have received the following communications on this subject:—

The latest information indicates that the September comet was first seen on the 3rd of that month at Auckland.

The sketch, No. 1, represents the appearance of the spectrum of this comet on October 15 and 16, and subsequent mornings. The spectroscope used was one of Browning's direct-vision, with five prisms. It was attached to the comet-seeker, which has a 4-inch object-glass, the focal length of the instrument making a distinct general view of the spectrum easy. As the spectroscope was not furnished with any means of comparing spectra, the positions of the bands, as shown in the sketch, were obtained by adjusting the viewing telescope so that each band was, in succession, just in the edge of the field, clamping the telescope, and then viewing the spectrum of a candle. This operation was repeated several times on October 16, and subsequently on the 25th. The position of the band in the orange-yellow was referred directly to the sodium line in the candle-flame. The band in the middle of the green was much the brightest, and on the least refrangible side was sharply defined; but, in the other direction, gradually diminished in brightness. When the slit of the spectroscope was gradually closed, the light was gradually diminished, but no separate line made its appearance, as the well-defined edge of the band would have led one to expect.

The other two bands were of about equal brightness; both of them fading rapidly on the more refrangible side, but much more slowly in the other direction.

[1] ERRATUM.—In the preceding art of this article, p. 30, col. 1, line 24 from top, for $2r$ read r.