berg. Prof. Schlegel at first identified them with the Mooruk, but afterwards admitted their distinctness. My belief is that they are probably the same as the next species (*C. westermanni*), although the colours of the neck, as restored in the stuffed specimens, do not quite agree.

7. WESTERMAN'S CASSOWARY (*C. westermanni*).—This species I established on a bird still living in the Zoological Gardens, which we received from Mr. Westerman in 1871. At first I referred this bird to *C. kaupi*, of Rosenberg, until that naturalist showed that the pretended species which he had so named was nothing more than the young of *C. uniappendiculatus*. I then changed our bird's name to *C. westermanni*. I have recently seen two other living specimens of this bird in the Zoological Gardens at Rotterdam. It has been suggested that its true home is the island of Jobie, in the Bay of Geelvink, where Dr. Meyer ascertained the existence of a Cassowary, but was not able to procure specimens.

8. THE PAINTED-NECKED CASSOWARY (*C. picticollis*).—This species was likewise established by me on a specimen now living in the Zoological Gardens, which was obtained by the officers of H.M.S. *Basilisk* at Discovery Bay, on the east coast of New Guinea. It greatly resembles the Mooruk, but differs in its brilliantly-coloured neck, of which I have given a drawing in the P. Z. S. for the present year (1875, Part I.)

9. THE MOORUK, OR BENNETT'S CASSOWARY (*C. bennetti*).—In 1857 Mr. Gould described this Cassowary from a drawing sent to him by Dr. George Bennett, of Sydney, and soon afterwards a living pair were sent to us by our excellent friend, after whom the species had been named. These birds bred in the Gardens in 1864, but we have now unfortunately lost them. Bennett's Cassowary is an inhabitant of New Britain, to the east of New Guinea, and is easily distinguishable from its congeners by its blue throat and back of the neck.

Omitting for the moment the doubtful *C. papuanus*, it will be thus seen that we have tolerably certain indications of the districts in which the other eight Cassowaries are found. It would be very desirable, however, to get further information concerning them, and also to ascertain what is the Cassowary of Jobie, and whether the other islands adjacent to New Britain possess, as is probable, indigenous species of this group.

P. L. SCLATER

ANOTHER MONSTER REFRACTOR

THE experiment rendered possible, now some ten years ago, by Mr. Newall, and made with such triumphant success by Mr. Cooke, is again bearing fruit. Another monster telescope, indeed the largest yet attempted, is now in course of construction at Mr. Grubb's new works, near Dublin. This instrument has been ordered by the Imperial and Royal Austro-Hungarian Government for the new Observatory now in course of erection at Vienna. The object-glass will have an aperture of over 26 inches, probably about 27 inches, according as the discs of glass, which are being manufactured in the rough, by M. Feil, of Paris, may turn out on finishing. The focal length is to be about 32 feet. The general form of mounting will be modified to suit the special requirements of such a monster instrument. The great base casting (weighing some seven to eight tons) will form a chamber (about 12 feet long, 4 feet 6 inches wide, and 8 feet high) for the clock, which will be massive in proportion to the other parts. The axes will all have their friction relieved by anti-friction apparatus. The tube will be entirely of steel, and all the various motions of the instrument, as well as the reading of the different circles, will be available to the observer from the eye-end of the telescope.

A circular chamber of 45 feet diameter has been provided in Mr. Grubb's new workshops, to be covered for the present by a corrugated iron roof 50 feet high. In this the telescope is to be set up, and over this will be meanwhile erected an enormous steel dome, revolving on the system of rollers designed some years since by Mr. Thomas Grubb, and adopted at Dunsink Observatory, near Dublin, and at Lord Lindsay's Observatory. All of this dome and revolving machinery is afterwards to be removed to Vienna. Thus, by taking down the stationary iron roof, when the steel dome is erected over it, the equatorial will be placed in perfect working order, under its own roof in Dublin, for trial. It is proposed to attempt to illuminate the verniers and circles by Geissler's tubes. If M. Feil can, as he hopes, perfect the pair of discs required within twelve months, Mr. Grubb expects to have the whole instrument complete by the autumn of 1878, in which year, we may remark, it is not impossible that the British Association may be invited to Dublin. Should Lord Rosse's reflector be in order and the Vienna telescope complete, Section A will certainly muster in great force.

THE DIFFERENCE OF THERMAL ENERGY TRANSMITTED TO THE EARTH BY RADIATION FROM DIFFERENT PARTS OF THE SOLAR SURFACE

PÈRE SECCHI, in the second edition of "Le Soleil," published at Paris 1875, again calls attention to the result of his early investigations of the force of radiation emanating from different regions of the sun's surface, reiterating without modification his former opinions regarding the absorption of the radiant heat by the solar atmosphere. It will be well to bear in mind that the plan adopted by the Italian physicist in his original researches, on which his present opinion is based, was that of projecting the sun's image on a screen, and then, by means of thermopiles, measuring the temperature at different points. The serious defects inseparable from this method of measuring the intensity of the radiant heat I need not point out, nor will it be necessary to urge that a correct determination of the energy transmitted calls for direct observation of the temperature produced by the rays projected towards the earth. Accordingly, on taking up that branch of my investigations of radiant heat which relates to the difference of intensity transmitted from different parts of the sun's surface, I adopted the method of *direct* observation. The progress was slow at the beginning, owing to the necessity of constructing an astronomical apparatus of unusual dimensions, but having devised means which rendered the employment of any desirable focal length practicable, the work has progressed rapidly. An instrument of 17·7 metres (58 feet) focal length, erected to conduct preliminary experiments, has proved so satisfactory that the construction of one of 30 metres focal length, which I supposed to be necessary, has been dispensed with. Considering that the apparent diameter of the sun at a distance of 17·7 metres from the observer's eye is 162·4 millimetres even when the earth is in aphelion, the efficacy of the instrument employed might have been anticipated. The nature of the device will be readily comprehended by the following explanation:—Suppose a telescopic tube 17·7 metres long, 1 metre in diameter, devoid of object-glass and lenses, and mounted equatorially, to be closed at both ends by metallic plates or diaphragms, at right angles to the telescopic axis. Suppose the diaphragm at the upper end to be perforated with two circular apertures 200 millimetres in diameter, situated one above the other in the vertical line, 360 millimetres from centre to centre; and suppose a third circular perforation whose area is one-fifth of the apparent area of the solar disc, viz. 72·6 millimetres diameter, to be made on either side of the vertical line. Suppose, lastly, that the diaphragm which closes the lower end of the tube be perforated with three small apertures 6 millimetres in diameter, whose centres correspond exactly with the centres of the three large perforations in the upper diaphragm. The tube being then directed towards the sun, and actinometers applied below the three small apertures in the lower diaphragm, it will be evident that two of these instruments will, after due exposure to a clear sun, indicate maximum solar intensity, say 35° C., while the actinometer applied in line with the perforation whose area is one-fifth of the apparent area of the solar disc, will indicate $\frac{35}{5} = 7°$ C., unless the central portion of the solar