The discordance in

$$\frac{a}{r}\,W_0$$

is large, but I cannot account for it.   Lastly

$$A_0{}^{(c)} = -3.3824082 \qquad\qquad B_0{}^{(c)} = -0.0003263$$
$$\tfrac{1}{2}A_1{}^{(c)} = -0.0719575 \qquad\qquad \tfrac{1}{2}B_1{}^{(c)} = -0.0057844$$
$$\tfrac{1}{2}A_1{}^{(s)} = +0.0194409 \qquad\qquad \tfrac{1}{2}B_1{}^{(s)} = +0.0098052$$
$$\tfrac{1}{2}A_2{}^{(c)} = -0.0132740 \qquad\qquad \tfrac{1}{2}B_2{}^{(c)} = -0.0041664$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\quad \tfrac{1}{2}B_2{}^{(s)} = -0.0030421$$

$$C_0{}^{(c)} = -0.0114629$$
$$\tfrac{1}{2}C_1{}^{(c)} = +1.2651658$$
$$\tfrac{1}{2}C_1{}^{(s)} = +2.7113348$$

S and S_1 for $\tfrac{1}{2}C_1{}^{(c)}$ are respectively

$$+7.5928286 \text{ and } +7.5891614,$$

and for $\tfrac{1}{2}C_1{}^{(s)}$

$$+16.268854 \text{ and } +16.2671640.$$

The equation

$$\sin\phi\ \tfrac{1}{2}A_1{}^{(s)} + \cos\phi\ B_0{}^{(c)} = 0$$

I find equal to

$$-0.00000016.$$

The epoch is 1850.0

Sydney, N.S.W.:
    1892 *November* 4.

Photograph of the Cluster M 34 Persei.
By Isaac Roberts, D.Sc., F.R.S.

The photograph of the cluster M 34 *Persei* R.A. 2^h 35^m Decl. north $42° 20'$ was taken on 1892 December 26, with an exposure of the plate during sixty minutes.   It is No. 584 in the *General Catalogue,* and is described by Sir J. Herschel as bright, very large, little compressed, scattered stars, 9th mag.

The Earl of Rosse, in his *Observations of Nebulæ and Clusters of Stars,* p. 31, describes the cluster as large, bright, scattered cluster.   An isosceles triangle of stars on the north side points south to a red star which has a small companion *s. p.*

The photograph confirms the general descriptions, and presents to the eye the component stars in the cluster in their true relative positions and magnitudes for future reference.   Several of the stars in and around the cluster have faint stars like

comites near them, and the photograph shows the stars down to 14th or 15th mag.

Neither Herschel nor Rosse has published drawings of the cluster, and the value of the photograph will chiefly be in the future, when other photographs have been taken and correlated with it.

Photograph of the Nebula ♁ II 240 *Pegasi.*
By Isaac Roberts, D.Sc., F.R.S.

The photograph of the nebula ♁ II 240 *Pegasi*, an enlargement of which to the scale of 15 seconds of arc to one millimetre is now presented, was taken on 1891 December 2, with an exposure of the plate during 2 hours and 36 minutes. The nebula is No. 5,046 in the *General Catalogue*, R.A. $23^h 58^m$, Decl. $15° 33'$ north. It is figured in the *Phil. Trans.* 1861, pl. 30, fig. 42, p. 736, where the Earl of Rosse describes it as bright, pretty large, elongated, gradually much brighter in the middle ; and in his *Observations of Nebulæ and Clusters of Stars* 1855 to 1860, p. 177, pl. 5, he gives another drawing of the nebula, and states that a decided dark lane runs through it, in the direction of its major axis. This feature is also shown on both the drawings which have been referred to.

Sir John Herschel, in his *Observations of Nebulæ and Clusters of Stars*, p. 481, describes the nebula as bright, large, irregularly round, 2′ or 3′ diameter, no nucleus, but he does not refer to the dark lane or to the surrounding nebulosity.

The photograph very fully confirms the observations, and the drawings made by the Earl of Rosse, excepting the widening out of the faint nebulosity at each extremity of the major axis, which the photograph does not show. The dark lane is conspicuously visible, and it divides the major axis into two equal parts. The central part of the nebula is a globular mass, and measures 41 seconds of arc in diameter, but it differs from a star in not having a central inner condensation or nucleus. The dark lane measures about eight seconds of arc in breadth, which is uniformly maintained as far as it can be traced on the photograph, except at the place where it crosses the denser part of the globular mass. There it is narrower, and less distinctly visible.

The inferences that I draw from the photograph are, that the dark lane is a ring, seen edgewise, surrounding the globular mass, and that there is another very wide, nebulous, faint ring surrounding the central mass, between it and the dark outer ring. The outer ring intercepts the light of the inner nebulous ring, and where it crosses the luminous central condensation the light is intercepted in a lesser degree, in the manner seen when the ring of *Saturn* is viewed nearly edgewise across the planet.