Note on Photographs of Stars in Cygnus taken in August 1886.
By Isaac Roberts.

The negatives which I now exhibit were taken with my 20-inch Reflector on the nights of August 17, 23, 24, and 25 this year, and they represent parts of the constellation Cygnus, corresponding with those photographed by MM. Henry with their 13-inch refractor in June and August 1885, copies of which have been presented to the Society as well as to some of the Fellows.

The celestial position of the centre of each plate is as follows:

<table>
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<th>No.</th>
<th>R.A.</th>
<th>Decl.</th>
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<tr>
<td>3</td>
<td>19 45</td>
<td>35 30</td>
</tr>
<tr>
<td>4</td>
<td>19 55</td>
<td>37 45</td>
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<td>5</td>
<td>20 4</td>
<td>35 30</td>
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The enlargements have been made to the scale corresponding with that adopted by MM. Henry so as to facilitate comparisons between them. The time of exposure, namely, 60 minutes, is common to all the photographs.

If we compare these plates with those by MM. Henry there are striking differences observable in the sharpness of the margins of the star discs, in the density of the images, and in the number of stars photographed in 60 minutes by the two instruments respectively.

In the Henry plates the margins of the stars are remarkably sharp and clearly defined. The brightness or density of the images also, whether the stars are of the second or of the fifteenth magnitude, is equal in all without perceptible gradation. The reflector, on the contrary, shows the margins somewhat undefined, and the stars of the first to the third magnitude show prominently diffraction effects around them. Not less noticeable is the gradation of the light of the stars between the brightest and the faintest shown on the plates; the gradations are such that the stars are ultimately lost in the colour of the background or film, and to define their magnitudes will severely tax the powers of classification.

In drawing inferences from the relative numbers of the stars,
photographed by the two instruments in sixty minutes, it must be remembered that besides the difference between them in principle and aperture, there may be difference in the sensitivity of the plates used, also difference in the atmospheric conditions when the photographs were taken as well as difference in the method of developing the images; but, subject to these reservations, we may, in the absence of more exact methods, make approximate comparisons by counting the number of stars on a given area, such as a square inch, on the enlarged photographs respectively. In this manner I counted on one of the reflector photographs 109, 93, and 70, or an average of 91 stars on one square inch. The numbers on the corresponding areas on the refractor photograph were 59, 64, and 47, or an average of 55 stars on one square inch. It therefore appears that the reflector has over the refractor the advantage of number in the average ratio of nearly two stars to one.

In view of others entering upon the work of photographing the stars, and to save them much waste of time and resources, it would be desirable to make comparisons between the relative efficiency of existing refractors and reflectors as instruments for photographing.

The comparisons might be made in some such manner as the following:

1stly. A sufficient number of photographic dry plates should be obtained from some reliable maker. They should be made from one uniform admixture of emulsion, and the plates distributed among those who would engage in the enquiry.

2ndly. A given number, such as ten, of the plates should be exposed for thirty minutes each on ten different clear nights (one plate each night) upon such sky spaces as may be determined.

3rdly. The plates should be developed by the same chemical formulae with an immersion in the developer, say of five minutes.

4thly. The number of stars upon each plate should be counted and the density of the images noted.

The result would at least be some guide to those who intend to engage in photographing the stars, to enable them to choose their instruments and to compare their work afterwards. In addition to the information thus to be obtained, a report upon the driving-clock used in the experiments should be prepared, and its errors given during each exposure of the plates. An accurate and reliable driving-clock and gearing are absolutely essential in star photography, for any appreciable error would distort the star discs, and so prevent accurate micrometrical measurements of their relative positions being made.

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Mr. Roberts, Photographs of the Pleiades. XLVII. I,

Note on two Photographs of the Nebulae in the Pleiades taken in October 1886. By Isaac Roberts.

On the night of October 23 (last month), I had an opportunity of taking a photograph of the Pleiades, and intended to expose the plate for three hours so as to be able to compare the result with that obtained by MM. Henry, but clouds caused me to stop the exposure after eighty-nine minutes. The plate when developed showed clearly that the stars Aelyone, Moja, Electra, and Merope are surrounded by nebule, indications of which about three of the stars are shown on MM. Henry's chart, which is published in the Annales de l'Observatoire de Paris.

On the following night (the 24th) I exposed another plate for three hours, which, after development, showed that not only are the stars which I have just named surrounded by nebule, but that the nebulosity extends in streamers and fleecy masses, till it seems almost to fill the spaces between the stars, and to extend far beyond them. It suggests the probability that these principal stars in the Pleiades, together with many of the stars around them, are involved either directly or else in sight alignment with one vast nebula. The negatives and the enlargements to six diameters, which I now exhibit, will enable you to appreciate and to form your own judgment as to the credibility of the evidence upon which these inferences rest, and I await with watchfulness for a clear interval which will enable me to try an exposure of five hours in order to obtain more light upon the subject.

The star discs upon the photographs are somewhat deformed by refraction and uncorrected instrumental movements, but I think you will not have much difficulty in mentally making the corrections necessary to form accurate judgment; and I anticipate being able to obviate this slight distortion in future exposures.

The Orbit of Comet II., 1883, discovered by Mr. Ross.

By Lieut.-General J. F. Tennant, R.E., F.R.S.

Some considerable time ago I made some efforts to get a satisfactory orbit for this comet, but circumstances were unfavourable and I had to give it up. More recently I was induced to take it up to see if there were any real departure from a Parabolic Orbit such as Mr. Bryant found, or whether his result was only due to the selection he had made of observations. My conclusion was that there was no real justification for departing from the parabola. Then I found that the compilers of the Annuaire du Bureau des Longitudes had adopted Mr. Bryant's