

one half have to be rejected, yet, if the chances of error at each particular station be calculated, it will be found that there still remain abundant observations for the purpose required.

The phenomenon of the black drop or ligament connecting the planet with the sun's limb at the time of contact in very many stations was missing. This, together with the light ring round Venus, caused by its atmosphere, it is believed puzzled many observers, and perhaps may have caused them to record contact a little late. In one case, from my own knowledge, one observer was so engrossed in watching the line of light round the planet's edge, that he failed to record contact till 20 seconds after it had actually taken place.

Photography, however, cannot err in this manner, and from the results produced at various stations, there seems to be an absolute certainty that the correct time of contact at these stations will be known. Photographs of the sun, when visible, were taken by the English parties at intervals of every two minutes while the transit was taking place. The planet's central distance from the sun's centre is now being accurately measured, and it has been found that such measurements are comparable to the  $\frac{1}{15}$ th second of arc, a result which is four times better than was anticipated. It may prove that the photographic results are more reliable than those obtained by the eye observations; at all events, it is presumable that they will be equally trustworthy, and will therefore be great checks on the accuracy of the latter. The spectroscopic observation of the contacts has led to a supposition that the diameter of the sun's disc which emits so-called actinic rays is not quite coincident with that which emits the visual rays. Be this well founded or not, it is quite evident that the times of contact formed photographically must be comparable, whilst those arrived at by visual observations may have to be taken by themselves.

The longitudes of the English stations, except one, were obtained by the method of observing moon culminating stars and the transit of the moon, and involved an arduous series of observations extending over several lunations.

The exceptional station referred to was Cairo and Egypt generally, where the telegraph was used for obtaining true Greenwich time. All the Egyptian localities selected were connected by telegraph, and thus no difficulty was found in accurately determining the longitude of both Thebes and Suez. In the map it will be seen that some stations obtained their longitude by chronometers. The number of chronometers used ensured accuracy, and the longitude obtained by this method may therefore be relied upon.

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W. de W. A.