

in a group of faculae near the north-east limb in the place indicated by Herr Weber's observation. The position of the spot has now been measured on the two photographs, which were taken at 21h. 46m. 35s. and 22h. 1m. 4s. Greenwich mean time respectively, and the following are the means of the two sets of results which agree very closely:—

1876, April 3d, 21h. 54m.	
Distance from sun's centre along arc of } parallel	788"
Diff. of R.A. (Spot - ☉)	+ 52 ^s .3
Diff. of N.P.D. (Spot - ☉)	- 218 ^m .5
Distance from sun's centre	817"
Distance from N.E. limb	145"
Diameter of spot	4"

As Herr Weber's observation was made at 4h. 25m. Berlin mean time, or 3h. 31m. Greenwich mean time, the sun's rotation in the interval—5h. 37m.—would have carried the spot to a distance of about 163" from the limb, as appears from a rough computation, and thus the position would agree tolerably well with that given by Herr Weber. There can be no question that the spot on the Greenwich photographs, which is the same as that observed by M. Ventosa, is an ordinary sun-spot without penumbra, and not an intra-mercurial planet.

Royal Observatory, Greenwich, October 4

CAUTIONS AS TO INTRA-MERCURIAL OBSERVATIONS

AT the Paris Academy on the 2nd instant, Dr. Janssen read a paper containing some very timely cautions as to the observation of the transit of intra-Mercurial bodies across the sun. He maintains that we have the means of investigating the problem which at present is interesting astronomers of a most satisfactory kind and leading to a certain and rational result. The first of these means is the knowledge we now possess of the solar envelope, and the second is photography. A criterion of a true transit is that the spot be well rounded against the solar disc, that it have a rapid displacement on the surface of the disc, a motion quite different from the apparent motion of solar spots. These requirements would eliminate a great number of doubtful observations, and even then the transit might not be a real one. Many solar spots are distinctly rounded, but then error is apt to creep in in the observation of the proper movement, especially when the observation is made with a telescope having no equatorial mounting, the diurnal motion making the spot appear to be constantly changing place. The rapid disappearance of a spot is no proof that it is outside the sun; at the minimum period spots have a tendency to dissolve rapidly. It follows that the isolated observations made by persons who have no thorough knowledge, or who have not suitable instruments, are comparatively valueless. While giving the highest place to photography, Dr. Janssen thinks telescopic observations of so great importance that he gives some hints for the guidance of observers.

There are circumstances connected with the constitution of the photosphere which may afford guidance even in fugitive observations. Briefly, as a solar spot is a phenomenon of the photosphere, a disturbing phenomenon at the highest point of the region where it is produced, it follows that the ordinary aspect of the photosphere is modified all round it. Moreover, if the spot is sufficiently distant from the centre of the disc, it ought to present the perspective effects of an object placed upon the vanishing surface of a globe. Finally the region of the sun where the spot appears ought to be attended to, to discover its solar latitude, since we know that the spots are located in two main regions, to the north and to the south of the sun's equator. More valuable still is the following test. It is evident that a moving body interposed between our eye and the solar surface ought to produce a succession

of eclipses of the granulations covering that surface; to cover successively those towards which it moves and uncover those on the opposite side. This phenomenon of emersion and immersion is the most decisive of all tests of the value of a brief observation; it requires, however, a good instrument of considerable power. Dr. Janssen advises moreover that the regions around the sun's disc to three or four minutes angular distance should be explored with the greatest care; as at that distance the coronal atmosphere is bright enough for a body of a fraction of a minute in diameter to give a visible eclipse. A trustworthy observation of a body seen either entering or leaving the sun's disc under such circumstances, is of the very highest value; moreover the field of observation is thus greatly increased. But eye observations of the sun must at best be but isolated, and photography furnishes the only sure method of unerring, precise, authentic observation, surpassing in value that of the ablest astronomer.

The question of intra-Mercurial bodies shows once more the immense importance of obtaining uninterrupted international observation of the sun's face. Hence the value of a mechanical photographic revolver that would, every hour, say, photograph the sun, without requiring the interference of any one. A number of these distributed over the globe would, in a few years, give us such a knowledge of the sun's surface as it would be impossible to obtain under any other circumstances.

RUSSIAN EXPLORATION IN ASIA DURING THE PAST SUMMER

THE following information as to the different scientific expeditions sent during the past summer by the Russian learned societies for the exploration of various parts of Russia and of the adjacent territories will probably be of interest. We begin with Central Asia, leaving for another paper the report upon the proceedings of the expeditions to the Obi and Jenissei.

M. Prshevsky has left Omsk, and we have already given some account of the scientific staff of the expedition and the route he proposes to follow.

M. Severtsoff, as reported by the *Turkestaniskija Vedomosti*, was to begin his travels in the Fergana district and in the adjoining hilly tracts during this autumn. He will be accompanied by M. Sharz, astronomer, M. Mushketoff, mining engineer, M. Smirnoff, botanist, M. Skvortsoff, zoologist, one topographer, and six Cossacks. During next summer he proposes to explore the Alai and the mountains south of Kokan, and to penetrate about the autumn into the Pamir, reaching here the route followed by the members of Mr. Forsyth's expedition.

M. Potanin, as reported by the *Sibir*, reached Omsk on June 27. The object of his expedition is the geographical, ethnographical, and economical exploration of North-western Mongolia, for which purpose 9,400 roubles were allowed by the Geographical Society and by the Government. He will be accompanied by his wife, M. Posdnéeff, linguist, M. Raphailoff, topographer, M. Beresoffsky, volunteer, and M. Kolomiitseff, zoologist, sent by M. Severtsoff. Starting from the Zaisansky post on the Irtysh, M. Potanin will follow the steppe-valley of the Black Irtysh and proceed to Urumga, Khobdo, the Oobsa-nor. For winter-quarters he will then go south, through Oolassootai to the eastern parts of the Tian Shan. During the following summer, taking a northern course, the expedition proposes to reach the sources of the Jenissei and the Kossogol lake, returning south again for the winter to the eastern foot of the Shangai-alin and to the expansion of the Onguin river. During his stay in Omsk, M. Posdnéeff has assiduously visited the town's archives, and has found some very interesting documents; for instance, letters from the Telengot chiefs written in Kalmuck with Mongolian alphabet, whilst now the Telengots do not use any written language.