

CORRESPONDENCE.

To the Editors of 'The Observatory.'

The Displacement of the Solar Lines reflected by Venus.

GENTLEMEN,—

Since my article* on the displacement of the cyanogen bands was written, I have completed a long series of measures of Venus and Fe arc spectra, and control plates of sunlight and Fe arc, with the very remarkable result, already indicated in previous work, that the integrated light of the Sun reflected by Venus differs from ordinary sunlight in the mean wave-length of the iron lines being quite appreciably smaller when the angle Venus-Sun-Earth exceeds 90° . Favourable weather this year and the fortunate arrival of fast plates, which escaped the submarine, enabled me to secure four series of high-dispersion Venus spectra when the angle at the Sun was approximately 45° , 75° , 95° , and 135° . At 45° the Sun-arc displacements are nearly the same as in ordinary sunlight, but there is a progressive diminution of wave-length as Venus passes round towards superior conjunction; and those lines which ordinarily show larger displacements

* *Observatory*, vol. xli. p. 371, October 1918.

towards red than the average diminish in wave-length more than those lines which show smaller displacements. The September series, taken from a hemisphere of the Sun turned 135° from the Earth, show a shift to *violet* of the solar Fe lines compared with the terrestrial Fe lines.

The bearing of these results on the "Relativity" effect is obvious, for we now find that the shift towards red of the solar lines only occurs on the side of the Sun facing the Earth. It cannot, therefore, be a gravitational effect which would be constant all over the Sun.

I have been reluctant to accept the Venus results, since they seem to prove a recessive motion of the solar gases controlled by the Earth. But the evidence now appears to me to be conclusive: not a single Venus plate gives a contrary result, and the better the quality of a photograph the clearer is the evidence deduced from it.

I attempted to explain the result by supposing that on one side of the Sun there may have been some exceptional movement taking place on a large scale and counteracting the ordinary redward shift of the lines, this side being the part reflected by Venus. But this appears to be negatived by a new series of spectra of sunlight and Fe arc. This series was photographed at weekly intervals so that the Sun-arc shifts could be compared in solar longitudes differing by 90° . The results from the four sides of the Sun successively directed towards Earth showed that the shift towards red is practically constant, only a very small variation being suspected.

The motion interpretation of the shift towards red of the solar iron lines is supported by my measures of the cyanogen bands; and whether we like it or not it seems necessary to admit that the Earth does affect the Sun, causing a movement of gases analogous to that taking place in a comet. Is it possible that this action controls to some extent the distribution of sun-spots and prominences, which seem also to betray an earth influence?

Kodaikanal.
1918, Oct. 24.

I am, Gentlemen,
yours faithfully,
J. EVERSIED.