

## CORRESPONDENCE.

*To the Editors of 'The Observatory.'*

*The Einstein Effect and the Eclipse of 1919 May 29.*

GENTLEMEN,—

In photographing faint stars near the Sun at an eclipse, and attempting to determine with certainty a displacement which, with an astrographic telescope of 13-feet focus, would be of the order of 0.01 mm., it is obviously of importance that the definition at the time of the eclipse should be at least comparable with the night definition when control-plates are obtained. This, however, is probably impossible to realize at any land-station that may be chosen as an observing-site, especially if a hill-top is selected, owing to the inevitable convection-currents and irregular temperature-gradients in the air over the land. The best conditions would probably be found near a large lake in an extensive valley.

I note that Mr. Hinks suggests the high country west of Lake Tanganyika as offering possible sites for the eclipse of 1919; but my experience in Kashmir would suggest that on the lake itself, or its eastern shores, the definition would be vastly better than on any neighbouring hills. In the Kashmir Valley floor in summer, when the rice-fields are flooded so that the valley becomes a virtual lake, solar definition is extraordinarily good throughout the day—ininitely better than on the neighbouring hills. Also a remarkable uniformity is observed day by day and

month by month. However, on the eastern shores of Tanganyika the eclipse would be too low in the western sky for favourable results—to say nothing about the tse-tse fly; and my suggestion would be to make great efforts to secure an oceanic island site.

At sea the atmospheric conditions are totally unlike those on land. There is a very much smaller diurnal-temperature range, and nothing to produce violent convection. I have little personal experience of solar definition on small islands; but I may mention that on the coast of New Zealand I found definition near midday quite equal to that in Kashmir, but only during calm weather with a slight breeze blowing off the sea; and this has been amply confirmed by a series of observations made since my visit by Mr. F. G. Gibbs of Nelson, N.Z., who, in a letter to me, reports that, during the typical winter weather with very light sea-breezes during the day, the definition on a scale of 5 ranges between 4,  $4\frac{1}{2}$ , and 5 practically from dawn to dark—a state of things which we at Kodaikanal may only dream about. Mr. Gibbs further states that when the wind is strong and from the south-west, or, still worse, from the south-east, definition is bad. These winds at Nelson are off the land. It seems clear that the sea-breezes bring in the remarkably uniform temperature-conditions which must obtain over the ocean.

These and other experiences that I might mention have impressed me so strongly with the disadvantages of hill-tops for solar observation that, were the eclipse to pass over Kodaikanal during our dry-season—when we might reasonably hope for a sky of the deepest blue from zenith to horizon and right up to the Sun's limb,—I should unhesitatingly abandon this observatory as an eclipse station, and should select a sea-level site either on the coast, or, much better, on an island as far from land as possible.

The only possible islands near the central line of the eclipse of 1919 appear to be Prince's Island, in the Gulf of Guinea, and Corisco Island, near Libreville. In view of the importance and interest of the special problem to which the Astronomer Royal calls attention, it would seem worth while to send a preliminary expedition to these islands in May 1918 to test the conditions of weather and definition.

I am glad that Prof. Turner has called attention to the *coelostat* driving-clocks of the Eclipse Joint-Committee. They should, in my opinion, be scrapped at once and new ones provided. For the particular work proposed first-class clock control is essential, and it would be far better to take the entire astrographic telescope mounting, with its driving mechanism, to the eclipse than to use a *coelostat*.

I am, Gentlemen,

Yours faithfully,

Kashmir Temporary Observatory,  
1917, May 22,

J. EVERSHED.