Letters to the Editor

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NOTES ON POINTS IN SOME OF THIS WEEK'S LETTERS APPEAR ON P. 509.

CORRESPONDENTS ARE INVITED TO ATTACH SIMILAR SUMMARIES TO THEIR COMMUNICATIONS.

Observations of the Solar Eclipse of June 8, 1937

A SCIENTIFIC expedition was organized early in the present year to observe the total solar eclipse of June 8 from somewhere on the coast of Peru, and the party of three sailed from Yokohama in the beginning of April. I was in charge, and arrived at Lima on May 10; after consultations with the Eclipse Committee of the University Mayor of San Marcos, I decided to have the observing station at Huanchaco, some 14 kilometres north-west of Trujillo. Two other members of the party, together with the instruments, landed at the port of Salaverry on May 20, and immediately proceeded to the station.

A large house of Sr. Victor Larco Herrera was kindly put at our disposal, where a large party of Peruvian scientific workers under Dr. G. Garcia was staying for the same purpose. Early in June, Dr. Clyde Fisher's American party also came to the same spot.

The main object of our party was to take large photographs of the inner corona with a ten-metre camera in conjunction with the 30-cm. cœlostat. Further, I had an independent set of cinematographic arrangements to get a rapid succession of photographs of three visible contacts, spectra of the flash and the corona, the extensions and the brightness of the corona. As the sun was about 9½° in altitude at the time of the eclipse, all instruments were set conveniently inside the rooms of the house and the sun could be observed through the available windows. A separate room was used for meridian observations of longitude and latitude made by me with a 38 mm. astronomical theodolite, the roof being taken away temporarily.

The weather was generally good during the interval of our stay at the camp, except for a few days in the very beginning of June when the skies were continuously overcast. The rehearsals and other preparatory work were well carried out.

On the day of the eclipse, the sky was overcast in the morning, but later it became clear and by 3 o'clock we had a perfect sky. The three visible contacts were observed as follows:

	1st Contact	2nd Contact	3rd Contact
Observed standard time	$16^h\ 15^m\ 29^s$	$17^h\ 18^m\ 20^s$	$17^h\ 20^m\ 57^s$
Corrections to computed time	+6	+3	+5
Observer	M. Horii	I. Yamamoto	I. Yamamoto

With the ten-metre camera, four plates were exposed for the partial phase and eight for the totality, with the exposures ranging from one tenth to 30 seconds. Upon developing, these plates have revealed splendid structures of the inner corona. My own cinematographic arrangements were partially successful, revealing good images only of the inner corona and the flash spectra.

According to these photographs, the coronal streamers are well developed around the sun. Especially in the north-east portion of the sun's limb there is a group of strong streamers and arches over a wide area, where daily observations of the sun's surface during previous weeks suggest an activity area of large sunspots. Characteristic rays from both the north and the south poles of the sun are completely hidden by strong coronal streamers. Hence the present corona is of the 'sunspot maximum' type.

There are about a dozen prominences visible around the sun. Two of them are magnificent, one in position angle 35° and the other in 290°.

I observed the longitude and latitude of our station on three nights. The preliminary result for the latitude is $-\ 8°\ 4'\ 46{\cdot}6''$, but that of the longitude has not yet been reduced.

ISSEI YAMAMOTO.
(Director, Kwasan Observatory, Kyoto Imperial University.)

Lima.
June 20.

Photo-conductivity and Phosphorescence of Zinc-blende

FROM early experiments on the photo-conductivity of zinc-blende, Gudden and Pohl[1] deduced that the current must be transported by two kinds of carrier, and according to present-day theory these must be electrons and 'positive holes'—vacant places left in a normally full electron energy band when an electron is ejected. While electrons are liberated by blue light, positive holes do not become mobile until a subsequent illumination by light of longer wave-length, for example red or infra-red, but the reason for this need not be discussed here.

The photo-induced conductivity is proportional to the intensity of illumination, which shows that electrons travel a finite distance (*Schubweg*) and are then 'trapped', the trapping *not* being in general due to recombination; for if it were, the current would be proportional to the square root of the illumination. The mechanism of this trapping need not concern us here; but either under infra-red illumination or thermal agitation the trapped electrons can be set free again. Trapping and re-liberation occur a number of times in succession, but the electrons finally come to rest by combining with a positive hole. The crystal is then said to be quenched.

That this is the case is shown by the way in which the conductivity dies away during quenching. If n is the number of electrons (a constant proportion of which will be in the conducting state), and also the number of holes, then if they are recombining their number will decrease according to

$$\frac{dn}{dt} = -\ c_1 n^2,$$

whence, integrating, we obtain

$$\frac{1}{n} = c_1 t + c_2,$$

c_1 and c_2 being constants. Thus we shall expect the