Letters to the Editor.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, nor to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Stark Effect in the Ultra-violet Spectrum of Neon.

THE ultra-violet spectrum of neon consists of the lines belonging to the principal series of the arc spectrum and the lines of singly and doubly ionised neon. To obtain the Stark effect for these lines it is essential to increase the field strength for the lower members and the intensity for the higher members. The spectrograph used was the Steinheil Q.D. type. The field strength was determined from helium lines.

It was found that sixty lines of the principal series are affected, and these practically include the most important lines. As an illustration, the accompanying photographs are reproduced (Fig. 1). Most of these lines are deflected toward the negative side, but six of them are deflected toward the positive. Some of the higher members accompany the *sd* combination lines, which in turn are slightly deflected in the same direction as the associated principal series lines. It is remarkable how these *sd* combination lines appear. As the figure illustrates, the *sp* lines lose their intensities almost abruptly at about the same field strength as the *sd* lines appear, so that they can be recognised only with caution. The discontinuity of the intensity (that is, *sp-sd*) shifts toward the upper part of the

change of sign (in the electrical deflection) at $1s_2 - 4p_1$ and then regains the original positive sign as m increases (for $1s_2 - 2p_1, +$).

As regards the spectrum of ionised neon, it is a peculiar fact that the affected lines are very weak in intensity at low electric fields, and disappear altogether in high fields, the optimum field being in the interval of 120-250 k.v. per cm. The presence of helium tends to reduce the intensity of the ionised neon in general, but with these affected lines it is very decidedly so, for with helium they totally disappear. These lines are deflected to the positive side, and most of them accompany combination lines at the more refrangible side, the deflections of which

FIG. 2.

are negative, the magnitude being nearly as large as that of the associated lines. All the affected lines are grouped in the range $\lambda 2915-3123$. The non-combination lines were recorded by Bloch¹ but were not investigated by the Bruin² system. The lines considered by Bruin are scarcely affected and they, too, disappear in high fields. The effect on the doubly ionised neon is uncertain at present.

Both groups of the affected lines are only slightly polarised. Details will be published in the Scientific Papers of this Institute.

YOSHIO ISHIDA.

Institute of Physical and
Chemical Research,
Tokyo, Japan.

¹ L. Bloch, E. Bloch, and G. Déjardin: *Comptes rendus*, vol. 180, No. 10, p. 131; 1925.

² T. L. de Bruin: *Zeit. f. Phys.*, vol. 46, p. 856; 1928.

FIG. 1.

spectrum with increase of the maximum field strength as expected (the field strength being distributed in the same spectral length, the point corresponding to the same field strength would shift toward the upper part as the maximum field is increased). Another remarkable feature is that Pashen's $1s_2 - mp_1$ series suffers a

Stability in Soap Films.

SOAP films exhibit a stability (permanence and mechanical strength) which is without parallel in films of water or other pure liquids which contract almost instantaneously to spherical droplets under the influence of surface tension. In a letter to NATURE of May 31, p. 815, Mr. Green attributes this stability to "stratifications . . . almost certainly pervading the whole film". This conclusion is directly opposed to the view, now widely held, that soap films have a 'sandwich' structure, as I have called it (*J. Phys. Chem.*, **34**, 263; 1930); that is, that they consist of a pair

of surface layers adsorbed at the liquid/air interface and enclosing a layer of liquid, identical in composition with the channel of liquid around the boundary of the film and its rigid support (often called the Gibbs' ring) and with the solution from which the film was made. In reply to Mr. Green's contentions,