will no doubt, as Dr. Dobson says, depend on the locality itself.

While taking the greatest care in the examination of observations, any probable connexion should not be overlooked.

K. SREENIVASAN.

643 Fulham Road, London, S.W.6.

Higher Hydrocarbons from Methane.

MESSRS. Stanley and Nash, in their interesting letter on the production of higher hydrocarbons from methane, NATURE, Nov. 10, p. 725 (cf. also Prof. Wheeler's comments, Nov. 17, p. 773), have inquired whether the carbon which is formed during the thermal decomposition of methane could combine with hydrogen to form gaseous hydrocarbons.

In attempting to extend the methods of measuring the area of catalytically active surfaces to non-metallic surfaces (*Proc. Roy. Soc.*, A. vol. 119, p. 196; 1928) I have studied the action of a graphite surface supported on china clay rods on methane, ethylene, acetylene, propylene, and hydrogen. The graphite film was heated by an electric current to temperatures varying from 800° C. to 1200° C., estimated by a disappearing wire optical pyrometer. In the case of these hydrocarbons, gas carbon was always deposited on the exterior of the graphite film. A good deposit of carbon was also found in the pores of the china clay rods, so much so that the initially white rod was turned black throughout, and the rate of diffusion of gas from the centre of the rod to the outside was cut down ten times by heating for 5 min. at 1100° C. in propylene.

During the experiments with methane and propylene, these gases were suddenly removed and replaced by pressures of 5, 10, 20, and 50 cm. of pure hydrogen. In only one case was there any change in the pressure of the hydrogen introduced, this being a slight increase in pressure of 0·15 cm. mercury, and fully accounted for by the fall in the barometric pressure during the experiment.

The conclusion seems evident that under these conditions the carbon deposited is incapable of combining with hydrogen at any appreciable speed. Whether carbon could combine with hydrogen at the instant of deposition seems doubtful.

F. HURN CONSTABLE.

St. John's College, Cambridge.

Rotation of Molecules induced by Light.

IN an earlier note to NATURE (Aug. 25, p. 278) we ventured to suggest that the nebulosity or wings which accompany the original lines of the mercury arc after scattering in benzene liquid, are the effect of those collisions of the incident light-quanta with the molecules which result in a change of their rotational state. At the present time we are not very clear as to the conditions under which a spin may be set up in the molecule when it collides with a light-quantum. It appears, however, reasonable to suppose that the probability of such spin being induced should depend, among other factors, on the degree of optical anisotropy of the molecule.

In agreement with this supposition it is found that while the aromatic compounds such as benzene, toluene, pyridine, etc., which have a strong optical anisotropy, exhibit the wings of the scattered lines in a striking manner, the aliphatic compounds such as carbon tetrachloride, ether, alcohol, etc., which are much more nearly isotropic optically, exhibit the effect only very feebly. A further confirmation of this idea is furnished by photographs of the scattered spectrum from carbon disulphide taken by Mr. P. V. Krishnamurthy in our laboratory.

It is well known that the carbon disulphide molecule has a high degree of optical anisotropy. The photographs show, as expected, besides some displaced lines, also strong wings accompanying the original lines of the mercury arc. Incidentally, we may mention that the wings appear to consist of unpolarised light.

C. V. RAMAN.
K. S. KRISHNAN.

210 Bowbazar Street,
Calcutta, Oct. 18.

The Chromomeres of *Lilium*.

IN specially well-fixed preparations of the pachyphase (pachytene stage) of *Lilium*, stained with iron-brazilin, the following phenomena were observed:

The homologous chromomeres of the two conjugated threads are split, and the two halves of each (chromioles) remain in contact (as Gelei also found; *Archiv f. Zellforsch.*, **22**; 1921).

These two pairs of chromioles become joined (if small) by transverse threads (as Gelei also observed), and if large by lateral fusion.

Rather often both the sister chromioles of one homologue do not unite with their partners, but only one unites. Thus a transverse V is formed. Sometimes a number of such V's follow one another in the thread.

In a small percentage of cases the two sister chromioles of one chromosome are not equal to the homologous pair, but are much smaller.

In a somewhat larger number of cases, both homologous chromomeres are markedly smaller than the general size (although this is variable). They are connected by two transverse threads. This double connexion is an indication that they are divided, which is not otherwise visible.

In quite a small percentage of cases only one homologous chromomere is visible. It is large and well stained, sometimes showing indications of division into two. On the other side there is a blank, and there are no transverse threads.

JOHN BELLING.

Carnegie Institution of Washington,
Department of Genetics,
Cold Spring Harbor, New York, U.S.A., Oct. 1.

The Electrical Conductivity of Metals.

IN the recent theories of metallic conduction the exchange of electrons between neighbouring atoms has perhaps not been sufficiently considered. The new quantum mechanics as applied to molecules has shown that, for distances of the order of those which separate the atoms in a crystal lattice, electrons go over from one atom to the other more than 10^{10} times per sec. Roughly, this frequency of interchange is a function of the nuclear charge, of the number of the electrons per atom, as well as of the average distance of the atomic neighbours (number of atoms per cell; temperature). These variables have been shown by K. F. Herzfeld (*Phys. Review*, vol. 29, p. 701; 1927) to be decisive in making an element a metallic conductor. An applied external field will favour the rate of exchange with the neighbours lying in the direction of the electric field, and cause a flow of electrons in one direction. For certain appropriate values of the atomic properties, super-conductivity may result.

By admitting this sharing of electrons it is possible to account for the magnetic properties of single metal crystals of zinc and cadmium, which have recently been investigated at my suggestion (*Proc. Roy. Society*, in course of publication; NATURE, Mar. 10, 1928.)

RICHARD RUEDY.

Toronto.