developed for the purpose of holding the bodies of their prey; Gillett and I[2] suggested that it might be of use in holding the other sex during copulation.

In unpublished observations on the bed-bug *Cimex*, we could obtain no evidence that the similarly placed organ will assist this insect in walking on glass; the 'fossula' appeared equally unsuited to this purpose in dried specimens of various Reduviids. It is only moderately efficient for this purpose in *Triatoma*[2]; but as anyone can satisfy himself in a few minutes, the adult *Rhodnius* is able to hold and climb on clean glass, even when nearly vertical, by means of this tibial organ. For that reason, it was described as a 'climbing organ'[2]. But since this type of 'climbing' is only a special case of adhesion, and since the natural purpose of such organs is not always clear, it might be preferable to refer to them simply as 'adhesive organs' without prejudice to the question of their normal function. Though very different in appearance from the homologous 'fossula spongiosa' of some other Reduviids, this highly efficient adhesive organ of *Rhodnius* is certainly not a vestigial structure.

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Viscosity of Monomolecular Films

Two letters by Harkins and Myers, and by Harkins and Kirkwood respectively, concerning a surface viscosimeter have recently appeared in NATURE[1]. We wish to direct attention to the previous results that we have obtained with a viscosimeter of the same type[2].

We have shown experimentally that the surface flow per second, Q, is in fact proportional to the difference of pressure and inversely proportional to the length of the channel, but we think it necessary to insist that there is no law analogous to Poiseuille's law concerning the width of the slit. The corresponding Poiseuille equation for a two-dimensional fluid should contain a factor d^3 (d = width of slit). The results of our systematic study with channels of different widths show clearly that the problem is much more complicated. There is no doubt that we have simultaneous entrainment of the water and that the viscosity of the substrate becomes the preponderant factor as soon as channel widths of the order of 1 cm. are reached, that is, the flows per unit time become independent of the nature of the fluid film as the diameter increases, finally reaching the same value. The relation with d^3 would be valid only as a limiting law for very narrow channels, since, as the diameter decreases, we find *linear* variation up to 5 mm., this variation gradually changing to d^2 at 0·5 mm.

We think that, even with corrective terms, one can hope to attain only the order of magnitude of the two-dimensional viscosity of the film. The calculation made by Kirkwood is valid only for a deep channel, which is not the case for the viscosimeters used by us and by Harkins. The theory introduced by Bresler and Talmud[3] would give results in better qualitative accord even for large channels, although it introduces arbitrarily a frictional term proportional to the speed in the differential equation. Unfortunately, an error in the integration prevented these authors from observing the accordance cited above.

The correct integrated form should be:

$$Q = \frac{2\varphi}{SA\varkappa}\left[R - \sqrt{\frac{\eta}{A\varkappa}} \tanh \sqrt{\frac{A\varkappa}{\eta}}\, R\right],$$

where φ is pressure gradient; S is surface per gram; A is a constant; $\varkappa$ is the viscosity of water; $R = d/2$; η is viscosity of the film. This gives for large channels the approximate expression:

$$Q = \frac{2\varphi R}{SA\varkappa},$$

and for infinitely small channels

$$Q = \frac{2\varphi R^3}{3S\eta}.$$

Nevertheless, in spite of this theoretical difficulty, one can, by using the experimental values of the flow for a given channel, detect very accurately changes of state in monolayers. We have shown[4], for example, that a liquid film of triolein exhibits at about 115 A.[2] a sharp change in the variation of the viscosity. In the same manner, a fluid film of stearic acid on 0·001 N hydrochloric acid gives changes at about 20·5 and 22 A.[2]. Thus, from this point of view alone, the measurements of surface viscosity constitute already a very promising new method of investigation.

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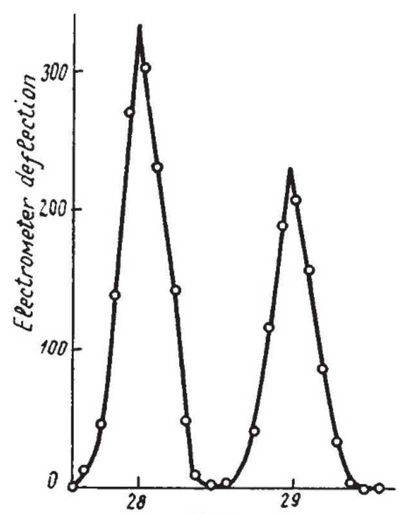
Direct Evidence for the N_2H^+ Ion in the Discharge Reaction between N_2 and H_2

So far as I am aware, no attempt has been made to study chemical reactions and in particular dis-



charge reactions by means of the mass-spectrograph. Thus Lunt[1], in reviewing the numerous theories of discharge reactions including ion clusters, excited or