Structure of the Proboscis in Blood-sucking Diptera

In his letter in NATURE¹, Dr. S. K. Sen still upholds the view, which I have criticised², that the salivary duct of *Stomoxys calcitrans* terminates at the base of the hypopharynx, the lumen of the latter being a groove running centrally to near its tip.

The hypopharynx (*h.*) of Diptera is formed by an external and an internal tube. The external tube or the external wall of the hypopharynx of *S. calcitrans* (*e.t.*) is formed by the evagination of the floor of the mouth-cavity and is crescent-shaped in transverse sections (Fig. 1). The internal tube (*s.d.*) represents the elongated anterior portion of the common salivary duct and is rounded. Even in *Culicoides*, where the hypopharynx is partly guttered, the part of the salivary duct forming this gutter extends to near the tip of the hypopharynx.

Fig. 1.

What Dr. S. K. Sen has named hypopharynx in his drawing (No. 2) of the transverse section of the proboscis of *S. calcitrans*³, is actually the most anterior part of the hyoid. His section was evidently cut posteriorly to the base of the hypopharynx.

Fig. 1 shows transverse sections of the hypopharynx of *S. calcitrans* cut through the basal and the distal part of this organ respectively. The drawings also show the position of the hypopharynx in the labial gutter (*l.g.*) and the hypodermis (*hyp.*) occupying the space between the salivary duct (*s.d.*) and the external wall (*e.t.*). In these drawings I have intentionally not shown the theca of the labium, which lies ventrally to the labial gutter, nor the labrum-epipharynx, which lies dorsally to the hypopharynx.

B. JOBLING.

Wellcome Entomological Field
Laboratories,
Claremont, Esher, Surrey.

¹ NATURE, 138, 479, Sept. 21, 1935.² NATURE, 138, 145, July 27, 1935.³ NATURE, 135, 915, June 1, 1935.

Surface Structure beneath the Pacific

In a letter in NATURE of November 2, p.723, it is stated by Mr. H. F. Baird, acting director of Apia Observatory, that I have found from the velocities of seismic surface waves evidence of the existence of a layer of granite some 10 km. thick below the Pacific Ocean. This statement, based on an abstract only of my paper, is liable to be quite misleading. One extract from the actual paper will make the position clear: "Our ignorance of the structure of the Pacific floor gives no ground for applying the theory of a double surface-layer; it might be worth applying a single layer theory if we had any idea of the properties of that layer. The order of magnitude of the thickness of an equivalent single layer of granite can be found. . . ." If that layer happens to be granite,

then the theory gives 10 km. with fair accuracy; if diorite, the thickness is about 16 km.

Independent evidence of the nature of the Pacific floor is badly needed, and it is important that Mr. Baird should have found some evidence of upper and "intermediate" layers from the records of earthquakes that occurred near Samoa. Some years back I endeavoured to trace pulses analogous to P_g , S_g , P^* or S^* in the Suva and Apia readings recorded in the "International Seismological Summary", but without success. A network of seismological stations on some of the Pacific islands, even if established for a limited period of a few years, would give valuable information concerning the structure of the earth's crust beneath the Pacific Ocean.

R. STONELEY.

65 Barton Road,
Cambridge.
Nov. 19.

Electrical Moments of *p*-Quinone and Related Compounds

A DETERMINATION of the electric dipole moment of *p*-benzoquinone in benzene solution by Hassel and Naeshagen¹ gave the value of 0.67 D ($D = 10^{-18}$ E.S.U.). Since *p*-quinone is usually assigned a symmetrical planar structure which should have zero moment, a further investigation of this anomaly was undertaken. The re-measurement confirmed Hassel and Naeshagen's value, and the work was extended to similar compounds with the following results:

Compound	Solvent	Temp.	P_{A+0}	μ
<i>p</i> -Benzoquinone	Benzene	25.0° C.	8.9 c.c.	0.65
"	Carbon tetrachloride	"	9.6 "	0.68
"	<i>n</i> -Hexane	40.0° C.	8.6 "	0.66
2:5 Dimethyl-1:4 quinone	Benzene	25.0° C.	9.4 "	0.68
2:5 Dichloro-1:4 quinone	"	"	8.8 "	0.64
Tetramethyl-cyclobutane-1:3-dione	"	"	11.0 "	0.73

The possibility of polar impurities being present can definitely be ruled out, since different specimens prepared or purified by different methods gave identical results. As regards a solvent effect, the values for *p*-quinone in benzene, carbon tetrachloride and *n*-hexane are identical within experimental error, and so if the moment is to be attributed to a solvent effect, it cannot be a specific effect of one solvent.

The construction of a model for *p*-quinone indicated that the molecule was not nearly as rigid as the graphic formula would lead one to expect, only a small force being required to distort the molecule into a multiplanar configuration by simultaneous rotation about the four single bonds.

If a strain of 10° in the carbon angle is produced by an increase in energy of 750 cal. per gram molecule², it follows that thermal energy at ordinary temperatures would be far more than sufficient to cause the observed moment for *p*-quinone. Pauling and Sherman³ have calculated the resonance energy of *p*-quinone, and find the large value of 13,000 calories, and it is probably this high resonance energy which tends to prevent the above type of oscillation in the quinone molecule.

The moments observed for 2:5 dimethyl- and 2:5 dichloro-*p*-quinone, being the same as that of *p*-quinone itself, offer a serious objection to the flexibility theory. The theory was further tested by measuring the moment of tetramethyl-cyclobutane-1:3-dione, where, owing to the large strain already present in the four-membered ring, a further