control of eelworm may be obtained, and this in addition to the already established control of onion fly and onion white rot, it would seem that the use of calomel in respect of onion crops may be very valuable.

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[1] *Nature*, 155, 241 (1945).

Insect Epicuticle

Alexander, Kitchene· and Briscoe[1,2] have shown that the desiccation of many insects caused by inert dust insecticides is due to adsorption of the epicuticle wax film, which becomes discontinuous and allows of increased loss of water through the cuticle. Further, Wigglesworth[3,4] has demonstrated abrasion of the wax film and increased evaporation of water caused by the application of an inert dust. It is evident, however, that insects differ conside ably with regard to the epicuticle, for nymphs of *Rhodnius* are unaffected by adsorption but are susceptible to abrasion[3], whereas *Tenebrio* and other larvæ are more susceptible to adsorption than to abrasion[1].

Experiments with 'Neosyl' (a proprietary adsorbent silica dust) and carborundum powder show that *Sarcophaga* larvæ are affected neither by adsorption nor abrasion, suggesting that they differ from both *Rhodnius* and *Tenebrio* larvæ with regard to their epicuticular waxes. Histological examination shows that lipoid substances are confined to a very thin layer at the surface of a thin (4μ) protein epicuticle. This surface layer differs from the remainder of the cuticle in being insoluble in cold concentrated hydrochloric acid, and may therefore be isolated as a thin membrane. Prolonged treatment with lipoid solvents does not destroy the ability of this membrane to stain with Sudan Black B, and on account of its integrity after these treatments it is justifiable to regard it as a constituent layer of the cuticle, the outer epicuticle consisting apparently of a very stable lipo-protein complex. The bulk of the protein epicuticle does not stain readily with Sudan Black B, and is almost completely untanned.

A similar double epicuticle is present in the cockroach *Periplaneta*[5], which also possesses an external layer of labile fatty substance[6]. It seems, therefore, that lipoid substances may be associated with the insect epicuticle in one or more of a number of ways. They may be present as a readily removable surface layer; they may form a complex with the surface of the epicuticle so as to produce a distinct structural layer; and they may impregnate the whole of the epicuticle when this layer is tanned[7]. Variations in lipoid distribution in the cuticle must clearly be taken into account as one of the many factors determining the effectiveness of an inert dust insecticide on different insects.

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[1] Alexander, Kitchener and Briscoe, *Ann. Appl. Biol.*, 31, 143 (1944).
[2] Alexander, Kitchener and Briscoe, *Trans. Faraday Soc.*, 40, 10 (1944).
[3] Wigglesworth, *Nature*, 153, 493 (1944).
[4] Wigglesworth, *Nature*, 154, 333 (1944).
[5] Richards and Anderson, *J. Morph.*, 71, 135 (1942).
[6] Ramsay, *J. Exp. Biol.*, 12, 373 (1935).
[7] Pryor, *Proc. Roy. Soc.*, B, 128, 393 (1940).

Units for Degree of Vacuum

It has long been considered in this laboratory that when working in the field of medium and high vacua (pressures of 1 mm. mercury or less), the usual methods of referring to and recording the degree of vacuum are extremely awkward verbally and little less so when written.

There are a number of known systems of recording such pressures, the bar and the millimetre of mercury pressure (mm. Hg) and their subdivisions being most widely known, the micron being a subdivision of the mm. and the Torr, found in German practice, being a name given to the millimetre of mercury pressure as a unit of pressure. The millimetre of mercury pressure is almost universally used, but when subdivisions of this unit are used, recourse is necessarily made to either the negative index method or the decimal method of reference or recording. Thus, a pressure of, say, 2×10^{-5} mm. mercury may be written so, or as 0·00002 mm. Hg; both methods are lengthy to write, but verbally these expressions are even more unwieldy.

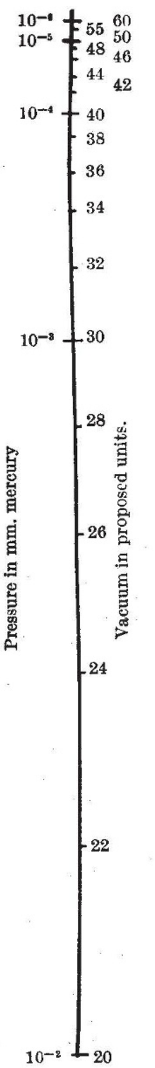

Fig. 1. Scale of typical McLeod gauge. Full size.

It is proposed, therefore, that a new unit be adopted, based on the logarithm of the numerical value of the pressure in millimetres of mercury. The reading in these units is, in fact, the logarithm of the pressure in millimetres, reduced to its all-negative form and multiplied by minus 10, this being similar to the method of measuring power ratios, etc., in decibels, the reference-level in this case being 1 mm. mercury pressure. A scale formed on this basis is very simple in use, both for written record and verbal reference, resulting in pressures of 10^{-1}, 10^{-2} . . . 10^{-6} mm. mercury, etc., becoming vacua of 10, 20 . . . 60 units, etc. The pressure of 2×10^{-5} mm. mercury referred to becomes a vacuum of 47 units. This system also leads to the logical result, that a 'higher' vacuum has a higher numerical value.

Such a system as that suggested could, of course, be based on any other unit of pressure, such as the bar or the standard atmosphere; but it is considered that the basic level of 1 mm. mercury pressure gives the working-range fitting best with current practice. Also a pressure of 1 mm. mercury is, in a most marked manner, the border-line between the field of medium- and high-vacua work and the field of low-vacuum work, and there is seldom any overlap between the two fields. Consequently the fact that a pressure of greater than 1 mm. mercury would have a negative value on the suggested scale is of little disadvantage, since where work is consistently done in the low-vacuum range it is recommended that the scale of millimetres be adhered to.

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