The spore trap was set up at a height of 6 ft. above ground-level. A thin film of paraffin and rubber lubricant spread over the slide surface was found to be a satisfactory sticker. The treated slides were easily placed in position, were protected from rain, and could be changed as frequently as desired.

Such a spore trap has been in operation for more than a year and has given very satisfactory results.

I am indebted to Flight Lieut. H. Pringle, of the Royal Rhodesian Air Force, for his practical assistance and advice in connexion with the development of the spore trap.

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¹ Hirst, J. M., *Ann. App. Biol.*, **39**, 257 (1952).

Appraisal of Total Activity in Laboratory Animals

THE effect of environmental conditions on the activity of small laboratory animals is usually recorded in terms of locomotor activity as indicated by the revolutions of rotating cages. Work in progress with an animal calorimeter¹ indicates that a considerable amount of time and energy is spent in other activities such as washing, scratching and gnawing. The apparatus described below has been constructed to record evidence of all types of activity.

A triangular plywood table has three metal legs ending in flexible feet made from short lengths of rubber tubing. Half-way down its length each tube is encircled by a metal cylinder. The rubber tube stands on the base of a copper vessel the inner vertical surface of which is insulated. This vessel contains carbon granules which provide a resistive path between its base and the metal cylinder. These three carbon resistance units are connected in series with an accumulator and a fixed resistor.

The animal, in a light cage, is placed on the table. As the animal moves the table vibrates, thus changing the resistance of the carbon units. This gives rise to a variation in the current and hence in the potential difference across the fixed resistor. This variation in potential difference is amplified and applied to a pen recorder.

Fig. 1

A typical trace for a single mouse (25 gm.) in a standard cage (600 gm.) is shown in Fig. 1. The trace was recorded on an 'Ediswan' oscillograph (type EPR). The sensitivity to movement can be varied by altering the length of rubber tubing as well as by adjusting the amplifier gain. This enables background vibrations to be eliminated. As the vibrations of the table are heavily damped, the trace obtained follows animal movement very closely.

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New Routes to Tetrahalomethanes

TETRAHALOMETHANES, such as carbon tetrachloride, dichlorodifluoromethane, or chlorotrifluoromethane, are prepared commercially in a variety of ways. New routes to such compounds have now been found starting from carbonyl halides such as COCl_2 , COF_2 , COFCl or COFBr .

Reaction of phosgene with phosphorus pentachloride at 350° C. under pressure yields carbon tetrachloride in 60–70 per cent conversion. Carbonyl fluoride similarly gives dichlorodifluoromethane between 100° and 400° C., though in much lower yield:

Chlorotrifluoromethane, carbonyl chlorofluoride, and, under certain conditions, carbon tetrachloride, are also produced when $\text{X} = \text{F}$ by the following side-reactions:

Phosphorus trifluorodichloride, PF_3Cl_2 , or phosphorus pentafluoride, can be used instead of phosphorus pentachloride for reaction with phosgene; similarly, carbonyl chlorofluoride can be treated with phosphorus pentachloride.

It is known that phosphorus oxychloride can be reconverted to phosphorus pentachloride by reaction with carbon monoxide or phosgene in presence of carbon:

Reaction of carbon monoxide, chlorine and phosphorus trichloride is thus the basis of this synthesis of carbon tetrachloride which involves the conversion of acyl carbonyl into CCl_4 .

Fluorochloromethanes have also been obtained by pyrolysis or copyrolysis of carbonyl halides in flow systems or in an autoclave, for example,

Temperatures between 250° and 700° C. are used, and the conversions are greatest under super-atmospheric pressure. Carbonyl chlorofluoride, trichlorofluoromethane, chlorotrifluoromethane, carbon tetrafluoride and carbon tetrachloride are by-products in amounts

depending upon the temperature and pressure used:

Reaction of phosgene, or of carbon monoxide and chlorine, with hydrogen fluoride thus provides a new route to the useful compound dichlorodifluoromethane: