

attempt to develop a homogeneous strain of blow-flies for genetical studies.

The male and female *F*<sub>1</sub> progeny of the initial cross were intermediate in resistance. A dosage of 0.1 µgm. dieldrin/fly (the dose which consistently kills all susceptible flies) gave no mortality, while 4 µgm. dieldrin/fly gave complete mortality. Application of the discriminating dose (0.1 µgm. dieldrin/fly) on both males and females of the *F*<sub>2</sub> resulted in close agreement with a 1 : 3 ratio (1 dead : 3 alive). The tests were made on 1,007 flies. The above ratio applied more closely to female than male flies.

In the back-crosses an approximate 1 : 1 ratio and complete survival resulted when the discriminating dose of 0.1 µgm. of dieldrin was applied to the progeny of *F*<sub>1</sub> females × susceptible male (287 flies) and *F*<sub>1</sub> females × resistant male (136 flies) respectively. Flies of both sexes were again treated.

The insecticide, dissolved in kerosene, was applied topically with a micro-applicator which delivered 0.5 µl./fly.

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<sup>1</sup> Davidson, G., *Bull. World Health Org.*, **18**, 579 (1958).

<sup>2</sup> Milani, R., *Riv. Parassit.*, **17**, 233 (1956); **18**, 43 (1957).

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### Amounts of Deoxyribonucleic Acid in the Silk Glands of the Spider *Nephila maculata*, Fabr., 1763

THE major chemical components of a chromosome so far described are two types of protein and deoxyribonucleic acid. The amounts of the two types of chromosomal protein vary considerably between the tissues of one animal<sup>1</sup>. Deoxyribonucleic acid content is much less variable, however, and appears<sup>2-4</sup> to be approximately constant in the nuclei of the same species. However, recent work by Leuchtenberger and Schrader<sup>5</sup> indicates that the quantities are likely to vary in secretory tissues.

In the course of this investigation the silk glands of *Nephila maculata* were selected for analysis. There are five types of silk glands in this spider, namely: (1) aggregate glands; (2) ampullate glands; (3) cylindrical glands; (4) aciniform glands; and (5) pyriform glands. All these glands are highly secretory and are concerned with the production of silk for the construction of the web.

The tissues were removed from freshly killed animals as quickly as possible and were fixed in Carnoy's acetic alcohol (3 parts of absolute alcohol : 1 part of glacial acetic acid). The fixation period was usually 4 hr. The fixative was then thoroughly washed off the tissues, which were then embedded in paraffin, cut at varying thickness, and stained with Feulgen stain as described by Stowell<sup>6</sup>.

Measurements were made on an apparatus similar to that described by Pollister and Moses<sup>7</sup>, with an RCA 931A electron multiplier phototube and a light source consisting of a tungsten ribbon filament lamp, from which the 546-mµ wave-length was isolated by the Farrand interference filter (peak 550 mµ) to

Table 1

Cell type	No. of nuclei measured	Volume of nuclei (µ <sup>3</sup> )	Deoxyribonucleic acid (arbitrary units)
Aggregate gland	49	36.810 ± 11.453	2.339 ± 0.444
Ampullate gland	49	44.525 ± 15.058	2.495 ± 0.477
Cylindrical gland	40	29.981 ± 6.082	2.475 ± 0.397
Aciniform gland	49	31.535 ± 6.260	2.435 ± 0.461
Pyriform gland	50	42.662 ± 13.23	2.891 ± 0.595

estimate the Feulgen reaction. Readings were taken on a 'Rubicon' galvanometer. The final values in arbitrary units were obtained as described by Swift<sup>8</sup>.

Table 1 gives the results obtained by photometric estimations.

It will be seen that there is considerable variation in the volume of the nuclei from different silk glands. Even in the nuclei of the same gland the deviation is quite significant. This is indicative of the differential secretory activity in the nuclei, as the volume of the nuclei will be directly related to the accumulation of the products of secretion liberated into the cytoplasm. On the other hand, the quantities of deoxyribonucleic acid are remarkably constant not only in the nuclei of the same gland but also in the nuclei of the different glands. This indicates that the quantities of deoxyribonucleic acid are not directly related to the secretory activity of the nucleus. This finding is in agreement with the hypothesis of constancy, but differs from the observations of Leuchtenberger and Schrader<sup>5</sup>, who find that the quantities of deoxyribonucleic acid in *Helix*, though generally constant in body tissues, are likely to vary in secretory tissues. The decrease of deoxyribonucleic acid in the nuclei of the salivary gland of *Helix* is, according to Leuchtenberger and Schrader, the result of its utilization in the formation of secretory products in the cytoplasm. In *Nephila*, however, the amount of deoxyribonucleic acid is constant and does not bear any direct relation to the secretory activity.

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## HYDROLOGY

### Marine Studies in the Inshore Waters of Antarctica near Mawson, 1956

THIS investigation, aimed at obtaining information concerning the hydrology and biology of the inshore waters of Antarctica, especially during the winter period, formed part of the scientific programme of the 1956-57 Australian National Antarctic Research Expedition to Mawson (67° 31' S. lat., 62° 53' E. long.) in MacRobertson Land. After a period of establishment, I began regular observations in June and continued at weekly intervals until February