roots per treatment was also obtained from the data of the second experiment. The regression equation for this experiment was $\log Y = 1{\cdot}87 - 0{\cdot}013\,X$, where Y equals predicted mm² Ehrlich area per gram of root, and X equals the fresh weight of the roots (g).

The positive correlation between shoot/root ratios and indicated growth substance content, and negative correlation between indicated growth substance content and root growth (fresh weight), was considered to be direct evidence in support of Söding's suggestion that high levels of endogenous hormones in roots may inhibit root growth. The average root lengths in Exp. 2 were 51, 42 and 34 for the one, four and eight levels of nitrogen, respectively: thereby showing general agreement with Bosemark[2] that root length also was reduced by higher levels of nitrogen fertilization.

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Determination of Cell Numbers in Dried Leaf Material

The method of maceration in chromic acid followed by counting, using a hæmocytometer, has been widely used in the estimation of cell numbers in fresh leaf material[1–3]. A new method has been developed by means of which cell numbers can be estimated for leaf material which has been oven-dried. The method has the following advantages: direct estimates of cell number can be obtained using dried material from growth-analysis investigations without the necessity of providing separate plants for sampling; this may be especially advantageous for work in glasshouse or constant environment rooms where space is often limited, average cell dry-weight is obtainable directly without the use of a separate sample, and dried material can be stored indefinitely without deterioration and macerated when opportunity arises. The procedure using dried material takes somewhat longer and the estimate of cell number obtained is sometimes slightly lower than that using comparable fresh leaves.

The method has been applied to leaves and leaf disks of French bean and *Canna edulis*, which have been oven-dried at 80° for 24 h and then weighed and stored. The first treatment consists of soaking the dried material in 50 per cent ethanol for 16–24 h. The alcohol is then drained off and the material soaked for a further 6–12 h in two changes of distilled water. The leaves or disks are then carefully blotted to remove the surface liquid and macerated overnight for 14 h in 5 per cent chromic acid (2 ml. per cm² was found to be sufficient for the materials investigated). The cells are then separated by tapping with a glass rod and the resulting suspension is passed rapidly through a fine pipette, made up to a suitable volume and counted, using a hæmocytometer. Results comparing this method with that for fresh material are given in Table 1.

The new method gave estimates that were 1–17 per cent lower than the conventional method. As part of this difference could be due to genuine differences between similar leaves, a further comparison was made using disks punched from the same leaves and macerated either fresh or after drying. Here the number of cells per disk ($\times 10^{-6}$) was 2·046 ± 0·175 for fresh material and 1·876 ± 0·138 for dried disks. This difference of 9 per cent was statistically significant ($t = 2{\cdot}86$, $n = 22$). However, a lower value is not always obtained. A comparison for disks taken for the same leaves of *Canna edulis* gave the following values of cell number ($\times 10^{-6}$): for fresh disks 3·962 ± 0·580, and for dried disks 4·008 ± 0·424, the difference not being significant.

Table 1. Comparison of Cell Numbers in the First Pair of Leaves of French Bean Plants, One Leaf Macerated after Drying, the Other Macerated Fresh

Plant	'Fresh' estimate ($\times 10^{-6}$)	'Dried' estimate ($\times 10^{-6}$)	Difference (%)
1	30·28	28·36	6·8
2	36·11	35·61	1·4
3	43·57	40·33	8·0
4	45·32	39·28	15·4
5	52·76	47·86	10·2
6	23·99	20·47	17·2
7	26·02	24·09	8·0

Where differences occur in the values obtained using the two methods it seems likely that they originate in the drastic disruption of the cell wall during the drying process, with the result that a certain number of cells are 'lost' since broken cells are not counted. In the case of *Canna*, disintegration does not appear to occur at all extensively, so that maceration after drying gives an accurate assessment of cell number. The differences can probably be disregarded for most purposes since variation in cell number in comparable leaves can be of the order of 15–25 per cent.

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ENTOMOLOGY

Spinning Apparatus of the Caterpillar of *Leucinodes orbonalis*

The spinning apparatus which has so far been investigated in Noctuidae, Saturnidae and Sphingidae becomes more specialized in the case of *Leucinodes orbonalis* (Pyralidae) with respect to its musculature and the structure of the silk press.

The silk glands are elongated tubular structures occupying a great part of the body cavity and lying below the alimentary canal. The accessory acinous glands described in noctuid and saturnid caterpillars[1] are absent in *Leucinodes orbonalis*. The ducts of these glands open at the base of the silk press, which has muscular walls and is completely enclosed within the hypopharyngeal-premental lobe. The hypopharynx is completely united with

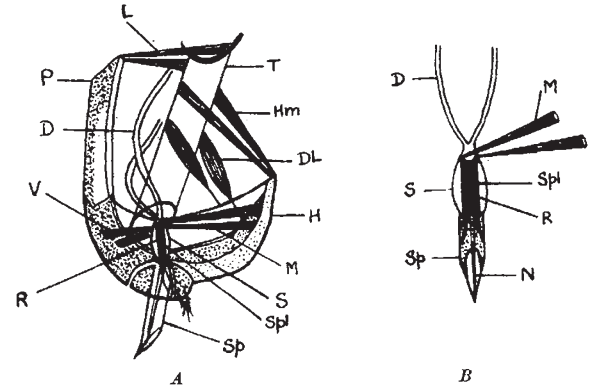

Fig. 1. *A*, Lateral view of the hypopharyngeal-premental lobe of *Leucinodes orbonalis*. *B*, Dorsal view of the silk press. *D*, duct of silk gland; *DL*, dorsal labial muscles; *H*, hypopharynx; *Hm*, hypopharyngeal muscles; *L*, ventral labial muscles; *M*, muscles of the sclerotic plate; *N*, terminal duct; *P*, prementum; *R*, sclerotic bar; *S*, silk press; *Sp*, spinneret; *Spl*, sclerotic plate; *T*, tentorial arm