l'animalisation apparaissent susceptibles d'en éclaircir le mécanisme.

Les substances à groupements sulfoniques provoquent également la radialisation des larves. GUSTAFSON et SÄVHAGEN[5] l'ont observée avec différents détergents. Nous avons d'autre part montré que les colorants sulfoniques exerçant un effet radialisant en solutions diluées, sont de puissants agents animalisants aux concentrations plus élevées. Cette relation s'observe également avec certains ions de métaux lourds chez *Paracentrotus lividus* (LALLIER[6]). La radialisation apparaît ainsi comme une forme mineure de l'animalisation.

R. LALLIER

Institut de Biologie Physico-chimique, Paris, le 6 mars 1956.

Summary

The effects of two compounds with sulfonic acid groups, chlorazol sky blue and Germanin (Bayer 205), are being studied on the developing egg of the sea urchin, *Paracentrotus lividus*. The chlorazol sky blue ($^1/_{5000}$) is a very effective animalizing agent. In dilute solutions ($^1/_{25000}$ and $^1/_{100000}$), it induces the development of radial larvae. The lithium chloride counteracts the animalizing effects of chlorazol sky blue. The Germanin has an animalizing effect only at high concentrations. The penetration of these agents appears essential for the animalization. The reaction of the sulfonic acid groups with the basic groups of the intracellular proteins appears to be concerned with the animalizing effect. The results of these experiments are discussed in relation to the animalizing effects of various sulfonated dyes and zinc ions.

[5] T. GUSTAFSON et R. SÄVHAGEN, Ark. Zool. *42 A*, N° 10, 1–6 (1950).

[6] R. LALLIER, Arch. Biol. *66*, 75 (1955).

Effect of Seed Treatment on Sex Expression in the Cucumber

Investigations conducted by various authors, as reviewed by LEOPOLD[1] showed that treatment of seeds with plant growth substances, whether followed by vernalization or not, resulted in earlier flowering in a number of plant species. In preliminary studies[2] only plant growth substances were utilized, while in later experiments[3] the combined effect of auxin and cold treatment, a case of "chemical vernalization", was investigated. Chemical vernalization proved effective in peas, as well as in other plants.

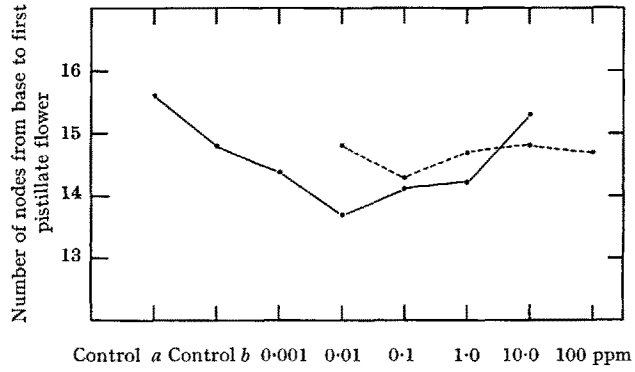
In attempts to change the "sex tendency"[4], i.e., the ratio between pistillate and staminate flowers of a given individual, in the cucumber, a monoecious species, the petioles of the lower leaves were cut and the cut surfaces of the plant were treated with auxin paste[5]. This treatment brought about an increase in sex tendency.

Data accumulated in our laboratory[6] show, that the number of nodes preceding the first pistillate flower on the main axis of a cucumber plant is a good indicator of sex tendency. Indeed, *node number* is less variable than the pistillate/staminate ratio, used previously by other workers to denote sex expression. Furthermore, while the latter is obtained by counting numerous flowers on each plant, quite a time-consuming procedure, node number can be determined in a few seconds. The effect of seed treatment on sex tendency in cucumbers was therefore studied by following the change in node number. The subject of the present paper will be confined to the effect of seed treatment upon node number. The relationship between node number and sex expression will be discussed in detail elsewhere[6].

The Table shows the results of an experiment conducted in 1954. Two varieties of cucumbers were used: Yorkstate and Beit-Alpha. Samples of seed, soaked in various solutions of naphthaleneacetic acid (NAA), ranging in concentration from 0·001 to 1·0 ppm, were placed under laboratory conditions for 18 h, they were then maintained at 3°C for 3 days and planted in the open field. During the blooming period, the mean node number to the first pistillate flower was calculated on the basis of 10 plants per treatment. The data show that cold treatment alone is effective in reducing the node number of the variety Yorkstate, but not significantly so in the case of the variety Beit-Alpha. The 0·1 ppm NAA solution has the most pronounced effect on node number in both varieties, while the highest concentration of NAA (1·0 ppm) delayed the appearance of the first pistillate flower.

It should be emphasized that chemical treatment alone, applied in another experiment, had no effect on node number.

Additional tests, carried out in 1955, confirmed essentially the results obtained during the previous year. Indoleacetic acid (IAA) which was included in these trials produced an effect similar to, but less pronounced than NAA.



The effect of chemical vernalization on the occurrence of the first female flower on the main axis of *Cucumis sativus* L. (var. Packer). Control *a*: without cold treatment; control *b*: with cold treatment. Smooth line: NAA; broken line: MH; (LSD at 5% level = 1·04; at 1% level = 1·41).

[1] A. C. LEOPOLD, *Auxins and Plant Growth* (University of California Press, 1955).

[2] P. S. TANG and S. W. LOO, Amer. J. Bot. *27*, 385 (1940).

[3] A. C. LEOPOLD and F. S. GUERNSEY, Amer. J. bot. *41*, 181 (1954).

[4] O. SHIFRISS, *Genetics*, 1956 (in press).

[5] F. LAIBACH and F. J. KRIBBEN, Ber. dtsch. Bot. Ges. *67*, 53 (1950).

[6] O. SHIFRISS and E. GALUN, Proc. Amer. Assoc. hort. Sci. *1956* (in press).

The effect of chemical vernalization on the average node number in two cucumber varieties (Mean ± Standard error).

Variety	Control *a* (No cold)	Control *b* (Cold treated)	0·001 ppm NAA	0·01 ppm NAA	0·1 ppm NAA	1·0 ppm NAA
Yorkstate	9·2 ± 0·6	5·9 ± 0·2	5·8 ± 0·2	5·9 ± 0·3	5·1 ± 0·1	
Beit-Alpha	7·3 ± 0·4	6·6 ± 0·6	6·6 ± 0·4	6·5 ± 0·5	5·9 ± 0·2	7·6 ± 0·3

The results of an experiment with the cucumber variety Packer are represented graphically in the Figure. Samples of seed, soaked in solutions of NAA varying in concentration from 0·001 to 10 ppm, or in solutions of maleic hydrazide (MH), the concentration of which ranged from 0·01 to 100 ppm, were placed under laboratory conditions for 21 h; they were then maintained at 6° C for 8 days and planted in the field. The mean node number of the 32 to 40 plants subjected to each of the treatments was found. The analysis of variance showed that the least significant difference (LSD) was 1·04 at the 5% level and 1·41 at the 1% level. Whereas NAA solutions of 1·0, 0·1, 0·01 and 0·001 ppm cause a significant reduction in node number, the 0·01 ppm solution of NAA causes a highly significant reduction as compared with control *a* (without cold treatment). In the latter case the reduction was also significant as compared to control *b* (with cold treatment). According to the Figure, control *b* appears to reduce node number but the effect is not statistically significant. Increasing the concentration of the NAA solution from 1·0 to 10·0 ppm delays the appearance of the first pistillate flower. The MH had no appreciable effect on the node number.

THIMANN and LANE[7] regard vernalization as the "prolonged exposure of the seed to its internal auxin supply". This may be interpreted as meaning that in cold-treated soaked seed the auxin retains its potential properties, while its destruction is very slow. Therefore, chemical vernalization seems to produce effects similar to, but stronger than auxin treatment alone.

The effect of chemical vernalization on the number of nodes preceding the first *pistillate* flower in the cucumber is similar to the influence of chemical vernalization on the number of nodes preceding the first perfect flower in peas, as reported by LEOPOLD and GUERNSEY[3]. This raises the question as to whether or not the position of these two different flower types is determined by the same factor.

ESRA GALUN

The Weizmann Institute of Science Rehovot, January 30, 1956.

Résumé

Il a été trouvé que l'immersion des graines de concombres dans des solutions d'auxines végétales de concentrations déterminées, suivie d'un traitement par le froid, peut amener dans la plante adulte un changement dans les manifestations du sexe. La relation possible entre ce traitement et la vernalisation ordinaire est brièvement discutée.

[7] K. V. THIMANN and R. H. LANE, Amer. J. Bot. *25*, 535 (1938).

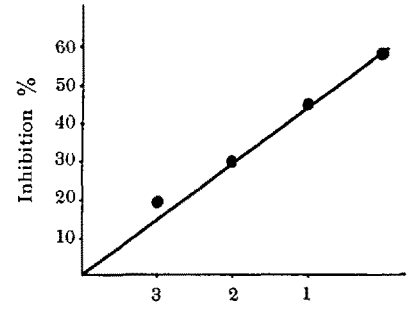
Studies on a Polyphenolase in *Scopolia japonica* III On the Inhibition of DOPA Oxidation

It was previously reported[1] by the author that a polyphenolase prepared from the subterranean stem of *Scopolia japonica* catalyzed the aerobic oxidation of DOPA to form a melanine-like substance, whereas it did not catalyze the oxidation of L-tyrosine[2].

The present report deals with the effects of various inhibitors on the activity of this enzyme preparation.

The subterranean stems of plants were washed and peeled. About 30 g of this material was blended with 150 ml of cold phosphate buffer (M/30). It was filtered through gauze, centrifuged for 30 min at 4000 rpm and the sediment discarded. The supernatant liquid (I) was either assayed directly for polyphenolase or was partially purified (II) by acetone precipitation and dialysis in the cold for 24 h against distilled water.

Fig. 1.–Inhibition of DOPA oxidation by thiosulphate.



–log [thiosulphate].
Final concentration of DOPA is $1{\cdot}25 \times 10^{-3}$ Mol.

The effects of various inhibitors upon the oxidation of DOPA are listed in the Table. It has been shown previously[3] that the inhibition of polyphenoloxidase by phenylthiourea is typical, but that cytochrome oxidase activity is little inhibited by this reagent. According to the present experiment, the oxidation of DOPA by the polyphenolase is much inhibited by this substance at a lower concentration.

The inhibitory effect of sodium diethyldithiocarbamate (which is a precipitant almost specific of copper) was more pronounced than with cyanide. On the other hand, carbon monoxide with 5% oxygen mixtures caused 73% inhibition, most of which was non-reversible by light, and this is characteristic of polyphenoloxidases[4]. This enzyme, therefore, is probably concerned with the copper.

[1] Y. SUZUKI, Bot. Mag., Tokyo *68*, 227 (1955).
[2] Y. SUZUKI, Bot. Mag., Tokyo (in press).
[3] K. P. DUBOIS and W. F. ERWAY, J. biol. Chem. *165*, 711 (1946).
[4] O. WARBURG, *Schwermetalle als Wirkungsgruppen von Fermenten* (Berlin 1949).