

larvæ were washed in water several times and transferred in threes to test-tubes containing a mixture of 1 per cent potassium cyanide with 1 per cent potassium ferricyanide in proportion of 1 to 1.5. The hæm content was then determined by the modified Czezug method¹.

The results are given on Fig. 1. Each point on the graph was plotted from the average of three measurements. The curve shows that the concentrations of polyvinyl alcohol from 0.001 to 0.1 per cent have a stimulating effect on hæm content. The greatest increase is seen when the solution contained a concentration of 0.005 per cent polyvinyl alcohol. At higher concentrations of polyvinyl alcohol the amount of hæm decreases.

From this experiment and those on increased chlorophyll synthesis, it can be presumed that the same mechanism is operating in both cases. Probably polyvinyl alcohol effects the biosynthesis of the porphyrine parts or makes easier the synthesis of metalloporphyrine.

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¹ Czezug, B., *Roczniki Akademii Medycznej w Białymstoku*, 4, 134 (1958).

Increase in Level of Chlorophyll in *Pisum sativum* L.

IN experiments on the effect of polyvinyl alcohol on the development of *Pisum sativum* L., it was found that plants growing in water cultures to which the substance had been added grow more rapidly than control plants¹. Polyvinyl alcohol has a similar effect on the growth of the plant mass. We wished to determine whether this substance has the same effect on the growth of *Pisum sativum* in soil to which it had been added as in the aqueous cultures.

For our experiments pea seeds of the variety 'May' were used. Seventy seeds were planted in boxes each containing hot-bed soil. The boxes were then placed in a room where the average daily temperature varied from 22° C. to 4° C. All the boxes were placed on window sills in the same light.

Four boxes with *Pisum sativum* sowings (group 1) were watered with an aqueous solution of polyvinyl alcohol at a concentration of 0.0001 per cent and four boxes (control, group 2) with water. Seventeen days after the plants had germinated, the shoots above ground were measured (from two boxes in each group). Those parts of the shoots which appeared above ground

were then cut off in order to determine the amount of fresh plant bulk. Chlorophyll was extracted by the T. Godniewa method and its level determined by means of a Lang photocolormeter. The plants in the next four boxes were measured and cut on the twenty-second day of the experiment in exactly the same manner. The level of chlorophyll was calculated in mgm. per 1 gm. of fresh shoot mass above ground.

As a standard, a solution of 8 per cent chlorophyll solution appropriately diluted (R. Marck, Darmstadt) was used. The results are given in Table 1.

Table 1. COMPARISON OF THE RESULTS OF THE EXPERIMENT
Plants growing in soil to which an aqueous solution of polyalcohol vinyl had been added

Box No.	Date of shoot cutting	Average length of plants	Fresh plant mass in gm.	Amount of chlorophyll in mgm. per gm. of fresh plant mass
1	July 10	27.5 cm.	13,500	2.25
2	" 10	26.0 "	14,100	3.55
3	" 14	42.0 "	24,200	3.66
4	" 14	44.0 "	26,500	3.39
Control plants				
5	July 10	22.0 cm.	9,650	1.56
6	" 10	25.5 "	13,400	2.23
7	" 14	34.0 "	9,800	3.32
8	" 14	39.0 "	18,500	2.03

The observations presented in our first report¹ on the intensity of coloration in the parts above ground, which is, in our opinion, directly connected with an increase in chlorophyll content, have been confirmed in this experiment.

In series I, the difference in chlorophyll content between plants growing in polyvinyl alcohol and the controls is considerable—1.01 mgm./1 gm. of fresh mass; in series II this difference is 0.85 mgm./1 gm. of fresh mass. The average for series I and II is 0.93 mgm./1 gm. of fresh shoot mass above ground.

This experiment demonstrates that not only in water solutions but also in soil the growth of plants treated with polyvinyl alcohol is more rapid than the growth of control plants.

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¹ Nowak, H. Fr., and Rejniak, L., *Acta Societatis Botanicorum Poloniae*, 2 (1958).

SOIL MOVEMENT BY DENUDATIONAL PROCESSES ON SLOPES

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TWO aspects of geomorphology which have recently received increased attention are the rate at which changes in landforms take place, and the study of erosional and denudational processes. Estimates of the rate of landform evolution have been made from indirect geological evidence¹⁻³, or by relating measured river loads⁴⁻⁶ or rates of sedi-

mentation⁷⁻⁹ to the catchment areas from which they are derived. These results combine the material removed in bank and bed erosion with that supplied to the rivers by denudational processes. Direct measurements of the rapidity of denudational processes on hill slopes have related mainly to slope-wash, undertaken in connexion with investigations of