To recapitulate, our data show conclusively that normal rats are far superior in maze learning to rats which have been depleted of vitamin B during their nursing period. In so far as deficiency of vitamin B is etiologically associated with changes in the nervous system, our investigation has opened a new avenue in attacking the problem of the relation between nervous system and learning ability.

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SAVING TIME AND STORAGE IN BREEDING SUGAR-BEETS[1]

RECENT trials at the Utah Experiment Station have established the feasibility of producing in that region, in one year instead of two, successive seed generations of sugar-beets for breeding purposes.

In New Mexico, Overpeck[2] has reported that early seeding makes it possible to produce seed the succeeding summer without moving the beets. In Utah, fall or winter seeding can not be practiced, as the beets freeze in the ground. In attempts to breed sugar-beets, or to produce seed without breeding, two years have been required for each seed generation. Winter storage has proved to be a major problem, at least when attempted on a large scale.

In the spring of 1926, about seventy sugar-beet roots were set out to produce inbred and normal seed, which practically all of them did. Under the conditions prevailing at Logan, Utah, small amounts of selfed seed[3] were produced by bagging branches. Some of the selfed seeds from twelve plants were sown in the greenhouse during November, and the rows thinned to ten plants in the row. After the tops had made enough growth to begin to cover the ground, the plants were exposed to electric light from twilight to about 11 P. M.

The roots from one half of each row were harvested early and put in an ordinary potato cellar for a month. The other half continued to grow in the greenhouse until transplanting time. Water was withheld until the leaves were well wilted down. At this time, all the roots were set out in the field—the ones from the greenhouse first. All save two grew after being transplanted to the field. Most of them produced seedstalks and successfully matured seed. A summary of the data is given in Table I.

Out of twelve strains involving 114 beets, twenty failed to set seed—six in the half transplanted directly from the greenhouse and fourteen in the half given a storage period of one month.

TABLE I

NUMBER OF SUGAR-BEET ROOTS SET OUT IN FIELD DIRECTLY FROM GREENHOUSE, NUMBER STORED IN CELLAR ONE MONTH BEFORE BEING SET OUT, NUMBER AND PERCENTAGE PRODUCING SEEDSTALKS FROM EACH TREATMENT. ALL SEEDED IN GREENHOUSE IN NOVEMBER AND SET OUT IN FIELD IN LATE APRIL. GROWN WITH THE ASSISTANCE OF ELECTRIC LIGHT DURING THE WINTER OF 1926–27 AT LOGAN, UTAH

Pedigree No.	Roots set out		No. plants seeding		Percentage seeders	
	Directly from greenhouse	Stored in cellar one month	Directly from greenhouse	Stored in cellar one month	Directly from greenhouse	Stored in cellar one month
14	5	5	5	4	100	80
23	5	5	4	4	80	80
24	5	5	5	3	100	60
36	4	4	2	1	50	23
37	5	5	4	5	80	100
59	5	5	5	1	100	25
69	3	4	3	4	100	100
101	5	5	4	4	80	80
105	5	5	5	5	100	100
106	5	5	4	4	80	80
158	3	5	5	4	100	80
160	4	5	4	5	100	100

About four hundred beets were grown in the greenhouse, in 1928, and transplanted directly to the fields. Some of the beets were started in the greenhouse in early December and others in late January. All the early-seeded plants set seed successfully in 1928, but of the late-seeded group only a few set seed. This indicates that probably a minimum size or age or light exposure is required before the plants will seed normally.

CONCLUSIONS

(1) By seeding sugar-beets in the greenhouse in early December or sooner, by exposing the growing beets to electric light for a few hours in the evening and by transplanting the roots into the field in spring, a seed generation may be produced every year.

(2) The beets must have reached a minimum stage of maturity at transplanting time, otherwise many may fail to produce seed.

(3) Storage for one month in a cellar before transplanting failed to give any observable benefit.

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[1] Publication authorized by the director, May 1, 1929.

[2] J. C. Overpeck, "Sugar-beet Investigations," *New Mex. Agr. Exp. Sta. Bul.*, 162: 3–16. 1927.

[3] G. Stewart and D. C. Tingey, "A Method for Controlling Pollination of Sugar-beets," *Jour. Amer. Soc. Agron.*, 19: 126–128. 1927.