generally 15 to 30 feet above the streams, and slopes down-valley in general accordance with them. Its smooth portions lie above the range of all but exceptional floods, but these smooth tracts are separated from each other and somewhat scored on top by true flood channels. Active erosion occurs especially along these channels during floods so that the smooth tracts are thought to be not a true floodplain of active alluviation but rather the remains of an earlier episode of alluviation now undergoing removal. The scant weathering of the material subsequent to its deposition as shown by a youthful soil indicates that this low terrace plain is not older than late Wisconsin and may be Recent. It is possibly to be correlated with a weak stage of valley glaciation shown by fresh till and an associated outwash plain near Zigzag on Sandy River, with a similar low terrace of fresh pumiceous gravels in Cowlitz River Valley of southwestern Washington, and with equivalent penultimate surfaces along the Columbia River and its tributaries. In Recent time the streams have cut through this inner plain or the earlier deposits, in many places to the underlying solid rock.

The air-laid pumice deposits of the Crater Lake field[4] which extend into the upper end of the Willamette drainage basin overlie the youngest moraines of the area and are clearly post-glacial, both by position and by feeble soil development.

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FRESH-WATER JELLY-FISHES IN ILLINOIS[1]

IN recent years there have been many records of the occurrence of fresh-water jelly-fishes in the eastern United States, but the occurrences seem to be sporadic and the species does not seem to become permanently established. Though known from adjoining states there has been no previous record of Craspedacusta in Illinois. The object of this note is to make available two instances which have come to my attention. Mr. John Cralley has sent me specimens of Craspedacusta from near Carmi in White County, Illinois. He reports that they were found in a concrete fish and lily pond filled from the Carmi water system. The pool consisted of two approximately circular basins, each ten to twelve feet in diameter and three feet deep, connected by a narrow channel. Plants, including water lilies and water hyacinths, had been introduced and the water was stocked heavily with goldfish.

Jelly-fishes were found on August 8, 1933. When first discovered they were abundant and remained so until about September first, disappearing entirely about September 20. Specimens transferred to balanced aquaria remained alive for two weeks. In the two succeeding summers the pool has been closely watched, but no jelly-fishes have been found.

Preserved individuals submitted to the writer have been compared with specimens from two lakes in Indiana, and from Gatun Lake, Canal Zone, and have been found identical in all important characters. Hence they have been identified as *Craspedacusta sowerbyi*.

Another Illinois record of Craspedacusta which has not been published is based on a series of observations by Mr. D. J. O'Donnell. On September 5, 1932, Mr. O'Donnell found jelly-fishes in a rock-garden pool in Vandalia, Fayette County, Illinois. This pool is of concrete construction, irregular in shape, about fifteen by seven feet and three feet deep. It is fed through a spray head from the Vandalia water system. Medusae were first noticed in this pool in the summer of 1931, about two months after water lilies, from a St. Louis dealer in supplies for tropical aquaria, had been introduced. The pool was drained for winter, but medusae reappeared in the summer of 1932. Mr. O'Donnell recorded the presence of medusae on September 5, 1932, and later observed that on September 20 they had disappeared.

In both of these instances at Carmi and at Vandalia in southern Illinois it seems probable that the medusae were carried into the small artificial pools along with introduced aquatic plants. This supposition is strengthened by the fact that though the water supply of both of these communities is derived from adjacent rivers, in both instances the water passes from settling tanks through filters before entering the supply mains.

It has been the belief of the present writer that Craspedacusta is more abundantly represented than records of its occurrence might indicate. Observers not directly acquainted with these medusae might readily overlook them. For several years students in field zoology in the University of Illinois have been warned to be on the lookout for Craspedacusta. The two instances here recorded are gratifying illustrations of directed attention yielding results.

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THE BIOLOGICAL EFFECTS OF THYMECTOMY IN SUCCESSIVE GENERATIONS OF RATS[1]

IN a previous communication, attention was called to the accruing acceleration in the rate of growth and

[4] B. N. Moore, *Jour. Geol.*, 42: 358–375, 1934.

[1] Contributions from the Zoological Laboratory of the University of Illinois, No. 481.

[1] From the Samuel Bell, Jr., Laboratory of the Philadelphia Institute for Medical Research in the Philadelphia General Hospital. This work was supported by a grant from the Penrose Fund of the American Philosophical Society. Part of thesis studies submitted by N. H. Einhorn to the Faculty of the Graduate School of Medicine of the University of Pennsylvania in partial fulfilment of the requirements for the degree of doctor of medical science, Sc.D. (Med.).

development when successive generations of rats were given daily intraperitoneal injections of 1 cc of potent thymus extract (Hanson). It would seem likely that if an excess of thymic tissue or extract resulted in acceleration in the rate of growth and development in the young, removal of the gland from successive generations of parents should result in retardation in growth and development in the offspring.

Accordingly, four pairs of animals were thymectomized under ether anesthesia. When possible the thymus gland was removed intact. Occasionally, however, it divided into its two lobes and each was removed separately. No animal was closed until it was thought that the entire thymus gland had been removed.

The earliest age at which animals were thymectomized was 17 days, the latest 24 days, the determining factors being the condition of the animals and whether or not they could be successfully weaned. All the surviving rats were weaned between the ages of 21 and 28 days. Occasionally, weaker animals were returned to their mothers post-operatively for a few days before being weaned.

In order to control more accurately the results in the offspring of thymectomized animals, a study was made of a special group of rats whose parents were subjected to the surgical technique concerned in thymectomy but in whom the thymus gland was not actually removed. This group showed no significant deviation from normal controls.

To date, five successive generations of the thymectomy strain have been observed. An analysis of the biological data of each of these generations reveals significant facts. In the first generation, no effect on weight or on growth was noted. However, litters were cast earlier, and more frequently than normal; the litters were large, the offspring at birth strong, healthy and of good size. In the second generation, a definite retardation in growth was noted between the tenth and thirtieth days of life, reaching its maximum of 14 per cent. at the age of 30 days. In the third generation, this retardation in growth was greater than in the second, reaching a maximum of 29 per cent. at the age of 30 days. In the fourth and fifth generations, retardation in growth occurred, although this was not as marked at 30 days as in the preceding generations, but became more evident at 70 days. In addition to their underweight, the test animals of the second to the fifth generations were shorter in stature between the ages of 20 and 30 days.

From the second to the fourth generations, no uniform or marked retardation in the opening of the ears, the eruption of the teeth, the development of fur, the opening of the eyes, the descent of the testes, or the opening of the vagina was noted, although these somatic changes often appeared at the outer limits of the normal range or just beyond it. However, in the six litters which have been observed in the fifth generation, a slight but definite delay in development has been noted; for example, in four of the six litters, the teeth erupted late, on the ninth day instead of on the eighth day, and in two on the tenth day. In two of the litters, the eyes opened on the seventeenth day, and in one litter on the nineteenth day, instead of on the fifteenth day. The time of appearance of these somatic changes indicates slight but definite delay in development.

The effect of thymectomy on the rate of growth is revealed in Fig. 1, which represents the average

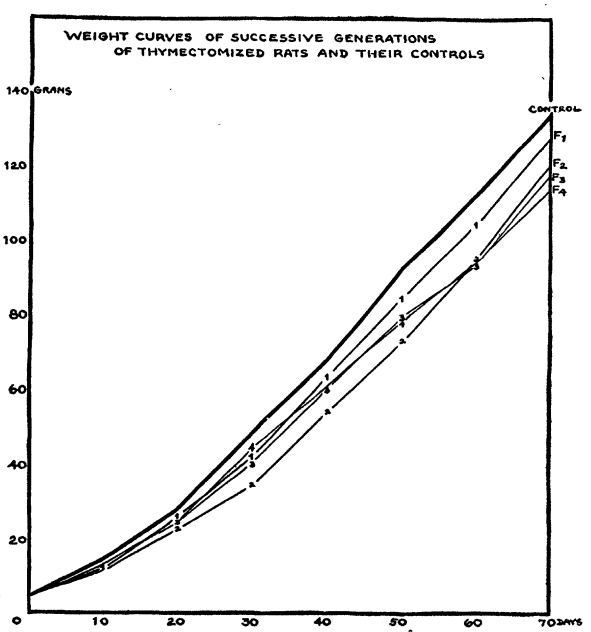

FIG. 1. The number of rats constituting the basis for the weight curves is as follows: For the controls 199 rats; for the F_1 generation, 191 rats; for the F_2 generation, 160 rats; for the F_3 generation, 166 rats; for the F_4 generation, 40 rats.

growth curves of all the young of four successive generations of rats subjected to thymectomy. Reference to this figure shows that the retardation in growth is greatest between the ages of 10 to 50 days. At 70 days, the average weight of the thymectomy test strain in all 4 generations is still below the average weight of the operated controls, but at 120 days the weights of the test and control groups are practically identical. It can also be seen in Fig. 1 that at the end of the 70-day period of observation of the young, the average weight curves of successive generations show an accruing retardation in growth.

In Table 1 is presented briefly the significant biological data on somatic development. Although there

TABLE 1
SOMATIC DEVELOPMENT IN SUCCESSIVE GENERATIONS OF THYMECTOMIZED RATS SHOWING RANGE AND AVERAGE VALUES

	Teeth erupted	Eyes opened	Testes descended	Vagina opened
Controls	7–9 (8.2)	13–16 (15)	25–33 (28.6)	41–50 (44.5)
F_1	8–10 (9.3)	13–18 (15.9)	24–38 (30.4)	40–53 (45.1)
F_2	8–10 (9.5)	15–18 (16.2)	24–36 (30.7)	42–61 (46)
F_3	8–10 (9.6)	15–18 (16.3)	26–33 (30.3)	41–52 (46.5)
F_4	9–10 (9.3)	16–19 (17)	30–33 (31)	44–48 (46)

is no marked retardation, it is seen that these somatic changes occurred at the outer limits of the normal or just beyond it.

From the foregoing data, based on a study of 555 rats in four successive generations of offspring of thymectomized parents, it is evident that thymectomy has resulted in retardation in the rate of growth and in a slight delay in the rate of development.

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GROWTH STIMULATING PROPERTIES OF GRASS JUICE

IN earlier studies on the nutritive value of milk produced at different seasons of the year[1,2] it was found that milk produced on summer pasture had a higher nutritive value, as measured by growth of young rats, than milk produced under winter-feeding conditions. At that time we made this statement, "The significance of these studies lies in the relation of fresh plant tissue as contrasted with field dried material to subtle changes in the milk secreted." More recent and direct studies have confirmed this point of view. Young rats, fed a mineralized milk produced on winter rations and giving an average daily growth of the male of about 2 grams, grew at the rate of 4+ grams per day when the daily allowance of the whole winter milk was supplemented with three cc of fresh, clear grass juice (principally Kentucky blue grass). See the chart for this record.

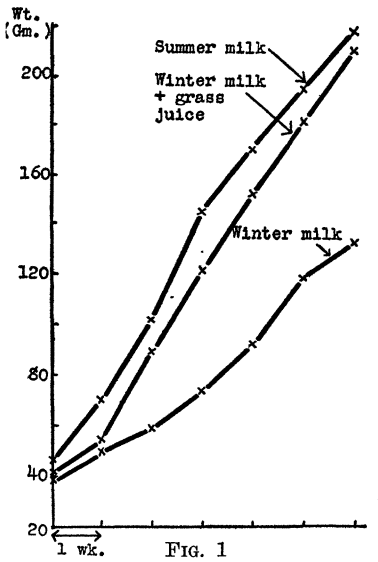

FIG. 1

Studies on the characterization of the factor or factors responsible for this growth response are now in progress. It is evident that in this fresh tissue there are important water-soluble substances which contribute to the difference between the nutritive value of summer and winter milks, and are directly stimulating to growth when added to a winter milk.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A DEVICE FOR COPYING SINGLE SOUNDS FROM A PHONOGRAPH RECORD OF SPEECH OR MUSIC

INVESTIGATORS in the psychophysics of speech and music frequently find it desirable to reproduce single speech sounds or individual musical tones in isolation from the performances in which they occur. The present paper describes an electrical and mechanical technique, developed in the Psychological Laboratories of the State University of Iowa, which makes it possible to copy from a phonograph record single sounds of short duration.

The essentials of the apparatus are: (1) Phonograph recording equipment, including an amplifier and two constant speed, 78 r.p.m. turntables, one for cutting and the other for playback; (2) a photoelectric relay; (3) a 32 c.p. light source; and (4) two shields of thin galvanized iron. The shields are shaped as in A, Fig. 1, and are designed to be placed upon the playback turntable, their inner diameters being equal to that of the latter. In position, as shown in side view at B, Fig. 1, they form a one-inch projection beyond the rim of the turntable, C. The projection is capable of being varied in length from 180° to 360° of the circumference of the turntable. As the turntable revolves, the projection interrupts periodically the light from a 32 c.p. lamp, D, placed beneath the projection. When not interrupted, light

[1] C. A. Elvehjem, E. B. Hart, H. C. Jackson and K. G. Weckel, *Jour. Dairy Science*, 17: 763, 1934.
[2] F. E. Stirn, C. A. Elvehjem and E. B. Hart, *Jour. Dairy Science*, 18: 333, 1935.