readable original might have resulted. Biologists generally are most assuredly under great obligation to the editors who are constructing this grand master key to our literature, and especially are they indebted to the Rockefeller Foundation, which through its support is making this fine work possible. It is indeed encouraging that a great foundation recognizes the fundamental importance of such instruments in the progress of science, especially with the increasing complexity of the literature, and is facilitating their development through a broad program of support. Few opportunities present themselves where limited funds accomplish so much for the general welfare of the science.

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SWARMING AND MATING OF ANTS

VARIOUS kinds of ants are present on lawns in Columbia, Missouri, including large black and brown forms measuring about 1 cm in length and the smaller ones 2 to 5 mm. For 30 years it has been observed that they swarm between August 15 and 20 each year, the average date being near the 20th. This usually takes place about 4 o'clock in the afternoon and it has frequently happened that the swarming has occurred following rain the previous night or forenoon. All varieties swarm at this time, and the start, heralded by the expulsion of the queens to the surface of the ground, is remarkably simultaneous between the different colonies. Once started, within the space of a few minutes, the surface of the ground for a foot or more surrounding the comparatively inconspicuous nest, as judged by the entrance or chimney, is occupied by scores or hundreds of queens, each queen being in charge of several workers who groom her for her flight. Intermingled with the queens and workers are many male ants nervously darting about. Soon after the first queens are expelled from the chimney by workers pushing and pulling—the grooming process is completed and she takes wing. Likewise the male ants take wing. At varying distances the queens alight, as do also the males, but no individual queen is followed by males. After alighting the queen mounts some object as a blade of grass where she is found by a male and the mating process is accomplished in a minute or two and the male departs. After a short interval of quiescence the female becomes nervously active and in a minute or two while clinging to a blade of grass or similar object—by means of her legs she detaches her wings. Immediately she descends to the ground and rapidly searches for a place to begin burrowing. In the average case this is accomplished in a very short time and she starts a tunnel for a new colony. In size the male is much smaller, while the queens are many times larger than the ordinary worker.

Last August while observing a small colony of small brown ants possessing not more than a dozen queens, which had just been removed to the surface and were being groomed for flight, a large black worker ant joined the group—whether by accident or design not being apparent—and instantly a remarkable change in the colony's activities occurred. The queens instantly were seized by several workers and rushed underground, while a mob of other workers attacked the intruder, literally overwhelming it, almost concealing its body. Within less than a minute it was stretched flat with the earth—each appendage, as the limbs, being grasped near the end by an ant which in turn was grasped posteriorly by another ant which in turn was similarly grasped by another ant, so that each limb was stretched by three or more ants which formed radiating lines from the victim's body. Within another minute apparently the victim was dead or rendered harmless, for all but two or three workers abandoned the carcass and retired to the colony, which at this time showed little evidences of activity, the only inhabitants on the surface being the two or three workers engaged in dragging the carcass to the entrance of the colony. The episode was a miniature, but thrilling enactment, with exaggerated ferocity, of Gulliver's experience in Lilliput.

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GOITER PREVENTION WITH FOOD PLANTS GROWN ON IODIZED SOIL

BEAUMONT and Karns[1] have recently published analyses indicating that the iodine content of turnips can be increased by the application of potassium iodide to the soil. "The iodide-treated plants contained 441 and 950 parts per billion of iodine in the roots and tops, respectively, against 165 and 441 parts in chloride-treated plots."

In connection with this "large relative increase in iodine content" the authors raise the question as to "whether these quantities of iodine in food have therapeutic value."

The answer to this question is of considerable practical interest, in view of the well-recognized pathologic changes in the thyroid gland dependent upon a deficiency of iodine in the soil of certain rather extensive regions of the United States sometimes called the "goiter zones."

A significant contribution concerning the prophylactic value of iodide fertilization of the soil is the extensive study carried on by H. Hunziker,[2] in Swit-

[1] A. B. Beaumont and Geo. M. Karns, SCIENCE, 76: 567, 1932.

[2] H. Hunziker, *Schweiz. Woch'schr.*, 45: 2, 1920.

zerland, a country where thyroid pathology constitutes a national problem.

In a preliminary field experiment Hunziker determined (1916) that application of a small amount of iodide of potassium to the soil did not affect the yield of grass unfavorably.

During the following 3 years (1917 to 1919 inclusive) iodide of potassium was added to the fertilizer used for the garden from which Dr. Hunziker's family was supplied with such vegetables as spinach, rhubarb, cabbage, lettuce, beans, etc. (In 1918 the amount of KI applied to the soil was 17 grams to 1,200 square-meters; in 1919 about 20 grams to the same area.) The iodized vegetables were served to his 5 children (2 boys, 3 girls) ranging in age, at the beginning of the experiment, from 3 to 8 years.

As a control 5 children (2 boys, 3 girls, from 7 to 12 years old) from another family were supplied with vegetables raised on soil which was not iodized.

Hunziker's graphs of the measurements of the circumference of the neck in the thyroid region show plainly the influence of the iodized vegetables on the growth of the thyroid gland. (For the exact mode of the measurements and for the construction of the graph I refer the reader to Hunziker's publication.[2])

The effect of the iodine deficiency of the food was so decided that in July, 1919, after the experiment had lasted 2½ years, the oldest girl of the non-iodized food-group asked that she be treated for a rapidly enlarging struma.

Hunziker's results are corroborated by the findings of von Fellenberg,[3] in Switzerland, and of McClendon and Hathaway,[4] in the United States. According to these authors the development of goiter may be prevented in goitrous zones by administering food-plants raised in goiter-free regions.

Hunziker did not determine the amount of iodine in his vegetables which prevented goiter formation in his children, but McClendon and Hathaway state that 1 part of sodium iodide in 100,000,000 parts of water suffices for this purpose.

It is of historic interest in this connection that in 1850 a commission appointed by the Academy of Science in Paris refused to concur in A. Chatin's[5] conclusion that deficiency of 1/400 milligram of iodine *pro die* might result in goiter development.

I would like to add that Dr. Hunziker carries on his investigations of the goiter problem, while engaged in an active and arduous medical practise in a small country town. Fifteen publications dealing with various aspects of the problem attest his zeal.

[3] von Fellenberg, *Biochem. Ztschr.*, 142: 246, 1923.

[4] McClendon and Hathaway, *Jour. Am. Med. Assn.*, 82: 1668, 1924.

[5] A. Chatin, *Compt. rend. Academ. d. Sciences*, 30: 82, 1850.

Being on the subject of iodized alimentation (under which heading I include the ingestion of the condiment, iodized salt) I take occasion to mention an observation gathered in the field of my specialistic medical endeavor, that is to say, dermatology. I refer to the phenomenon that, due to an existing idiosyncrasy or a developing sensitization (allergy?), the administration of even such minute quantities of iodine as are needed for goiter prophylaxis may be followed, in certain individuals, by a follicular eruption of pustular character. Etiologically, these cutaneous lesions must be differentiated from the juvenile form of acne, which they resemble. Iodide acne seems to occur more frequently since our drinking water is chlorinated, a circumstance which is not surprising, as all the halogens act as follicular irritants ("poisons des follicules," according to Thibierge).

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A BACTERIAL GALL DISEASE OF THE DOUGLAS FIR

A GALL disease of the twigs and stems of the Douglas Fir (*Pseudotsuga taxifolia* Doug.) has been observed quite commonly in parts of Napa, Lake, Santa Cruz, Amador and Siskiyou Counties in California, in marginal localities for the growth of this tree. Infection apparently takes place only on younger trees (about 3 to 15 years old), more abundantly in stands of thrifty, crowded and shaded reproduction. Galls once started on the main stem may continue to live and increase in size for many years. Young trees are sometimes killed by the disease or may have dead tops (spike top) due to girdling by a gall.

The galls are globular in shape, varying in size from a pin head to several inches in diameter, with a rough, spongy, fissured surface breaking out in typical, more or less cross-shaped patterns. The gall is composed of hypertrophied tissues, involving both stele and cortex, and is very similar in structure to the olive tree galls produced by the bacterial pathogene *Bacterium savastanoi* E. F. S.

The causal organism occurs in and among the hypertrophied gall cells and is very easily isolated in pure cultures. It is a non-motile rod averaging $1.9–3.9 \times 0.5–1.5\ \mu$, frequently occurring in pairs. The colony is white with a metallic sheen, rather smooth surface and undulate margin.

Inoculation of the twigs of Douglas Fir trees with this organism gave rise to typical galls from which the organism was again isolated.

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