and consult with medical societies, medical schools, health organizations, public health agencies and governmental agencies with respect to vitamins and the vitamin industry. The foundation will be administered by a board of trustees. Details of the organization are to be formulated by a committee of which Basil O'Connor, New York, president of the National Foundation for Infantile Paralysis, has been named chairman.

*Industrial Standardization* reports that the work of the British Standards Institution has been more than doubled since the beginning of the war as the result of requests from the government for standards for all kinds of war commodities. The institution is conducted by industry, but has a financial grant from the government. About 1,500 standards have been issued to date, and an active postwar program, particularly in the field of building materials, is being planned.

# DISCUSSION

## UNIPARENTALISM IN THE HYMENOPTERA AND ITS RELATION TO POLYPLOIDY

DURING the period from 1850 to 1853, Foerster[1] noted that the eulophid *Astichus arithmeticus* reproduced generation after generation in the absence of males. This was probably the earliest observation of the uniparental reproduction of females which now is known to occur commonly in the more primitive and biologically plastic groups of Hymenoptera. According to Clausen,[2] the uniparental reproduction of females is not yet known to occur in the Serphoidea, which is perhaps the most consistent of the superfamilies of the Hymenoptera both in host preferences and in relationships.

The capacity to produce males and females without fertilization is characteristic of the Hymenoptera; the normal hymenopterous male having only one parent, the normal female having either one or two parents.

In most, if not all, species each of the sexes produced uniparentally is morphologically capable of mating. The sex attraction, however, may be so weak that mating never occurs. This is known to be the case in certain species of Chalcidoidea and Cynipoidea.

In the majority of known species of Hymenoptera the progeny of the unmated female consist almost entirely of males. In such species the females are biparental provided the conditions of reproduction are those usually prevailing.

In many species, however, both sexes are usually, if not always, uniparental. In such species it is possible that mating may be necessary for providing a stimulus to oviposition.

Certain species consist of geographical races, reproduction being biparental in one and uniparental in the other. Many genera are made up of uniparental and biparental species.

Mackensen[3] observed 21 virgin queen honey-bees which produced bisexual broods. The number of uniparental females from any queen, however, was estimated not to exceed one per cent. of her progeny. The unmated workers of certain species of bees and ants commonly produce female offspring.[4]

The female of many hymenopterous species, therefore, is capable of producing two kinds of eggs; one kind yielding only uniparental females, the other either uniparental males, or, if fertilized, biparental females. Studies by Speicher and Speicher[5] on *Microbracon hebetor* indicate the probable origin of the two kinds of eggs. The occasional uniparental female appearing in this species originated from patches of tetraploid tissue in an ovary, which otherwise was diploid. The unfertilized eggs from such an ovary subsequent to the reduction process would be either haploid (male) or diploid (female).

It is not impossible that changes in the tetraploid and diploid composition of the ovarian tissues of the hymenopterous female result from changes in the environment. It has been observed in a number of species in which both sexes are uniparental that certain changes in the environment produce a marked change in the sex ratio. For example, when peach twigs bearing San Jose scale parasitized by *Prospaltella perniciosi* are brought into the laboratory, males and females of *P. perniciosi* emerge and mate.[6] The first generation reared under laboratory conditions in San Jose scale growing on cow-melons (*Citrullus*) also consists of both sexes. All the subsequent generations on cow-melons, however, consist only of females.

It is evident that the ovaries of females developing in San Jose scale growing on cow-melons are entirely thelyotokous, whereas in females developing in San Jose scale growing on peach twigs the ovaries either are entirely arrhenotokous (the haploid egg being fer-

[1] Arnold Foerster, "Hymenopterologische Studien," Heft 2—"Chalcidiae und Proctotrupii." Aachen, Ernst ter Meer. 152 pp. 1856.

[2] C. P. Clausen, "Entomophagous Insects." 688 pp. New York: McGraw-Hill Book Co., Inc. 1940.

[3] Otto Mackensen, *Jour. Econ. Ent.*, 36: 465–67, 1943.

[4] William Morton Wheeler, "The Social Insects." 378 pp. New York: Harcourt, Brace and Company. 1928.

[5] Kathryn G. Speicher and B. R. Speicher, *Biol. Bul.*, 74: 247–52, 1938.

[6] Stanley E. Flanders, *Jour. Econ. Ent.*, 37: 105, 1944.

tilized to produce females) or they are partially arrhenotokous and partially thelyotokous. Since it is unlikely that the change in host plants would cause the chromosome number to change in all the cells of the germarium, it is logical to assume that irrespective of the host plants the females are uniparental and that the production of males when the peach is the host plant is the result of the occurrence of patches of diploid tissue in ovaries that otherwise are tetraploid.

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## DIFFERENTIATION OF THE LATERAL MOTOR COLUMN IN THE AVIAN SPINAL CORD

IT has been shown that the periphery is necessary for the differentiation of the lateral motor column in the embryonic chick;[1,2] also, that this process completes itself to a large extent after the brachial and lumbosacral spinal cords have been isolated from the rest of the nervous system.[1,3] Because of the importance of the peripheral musculature, it was thought that it might be possible to induce a lateral motor column in non-limb segments of the spinal cord from a 2½ day chick embryo. These non-limb segments were removed and transplanted so they would be under the influence of the developing hind limb primordium. In no case was it possible to induce a lateral column.[3]

Brachial spinal cord segments will differentiate a lateral column which will be within 30 to 60 per cent. of the normal number of cells when grafted so as to develop in the presence of the growing hind limb.[3] This indicates that the peripheral requirements for the brachial cord are at this time highly non-specific as to level. Because of the non-specificity of the periphery as to region, it was thought that the peripheral requirements might be non-specific as to genus and species. To test this possibility the lumbosacral spinal cord of the guinea hen (*Numida meleagris*) embryo of 2½ days was removed and transplanted so that it would be under the influence of the developing hind limb of the chick (*Gallus domesticus*). Ten grafts were completed; three were successful. After a total of 9 days incubation the grafted guinea hen spinal cord had given off peripheral nerves which had fused with the lumbosacral plexus, and the side which was next to the limb had a well-developed lateral motor column. The cell count of this column for the three cases studied was within 20 to 50 per cent. of that for the control.

1 V. Hamburger, *Jour. Exp. Zool.*, 68: 449, 1934.
2 E. D. Bueker, *Jour. Exp. Zool.*, 93: 99, 1944.
3 E. D. Bueker, *Anat. Rec.*, 88: 424, 1944.

The above evidence indicates that the limb periphery of another genus is an adequate environment for making possible the partial development of the lateral motor column, and that the peripheral requirements are not specific as to location, since the wing level will differentiate a column when grafted in the leg region. To get the maximum differentiation, however, the volume, growth rate and developmental pattern of the musculature must be that for which the particular segments of the spinal cord are adapted and only the normal periphery can meet these requirements.

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## SNOW MELTING AND EVAPORATION

MELTING and evaporation of snow during the winter and spring seasons on the high mountains and plateaus of the Intermountain region are processes of considerable interest to water users in the adjacent arid valleys because they have a direct bearing on the timeliness, rate and amount of streamflow that becomes available during the remainder of the year for irrigation, power and other purposes. Records show that snow accumulates on the watershed lands during the period November 1 to April 1 to depths of from 4 to 10 feet, and that the snow mantle just prior to active melting in the spring may contain from 10 to 50 inches of water. Relatively little is known, however, about the rate at which the snow melts or the amount of water that is lost from the snow mantle by evaporation. To augment the meager knowledge of these phenomena, preliminary studies of snow melting and evaporation were conducted at elevations from 8,700 to 10,000 feet on a portion of the Wasatch Plateau in central Utah during the snow melting season of 1942, some results of which are herein presented.

The snow mantle on a study area at 10,000 feet elevation was 60 inches deep and contained 23 inches of water when measurements of melting began on April 29. All the snow originally on the area, together with an additional 2 inches which fell during the period of measurement, was gone by June 1. During this 33-day period, melting took place only in the daytime, usually from about 2 hours after sun-up to within one-half hour of sun-down. Melting rates varied from 0 to 1.97 inches of water per day by reason of differences in temperature, insolation and air movement.

Snow temperature throughout the daytime melting periods remained at about 32° F., although air temperatures up to 67° F. were recorded at a distance of 4.5 feet above the snow surface. At night a crust often formed on the snow surface which extended to depths of from 1 to 4 inches. Temperatures of 32° F.