

somes of the larger cell divide equally, thus producing two spermatids with three chromosomes each. These spermatids become spermatozoa. They correspond in their mode of development to the "female-producing" spermatozoa of other insects. Hence we can understand why all of the fertilized eggs become females!

The question still remains as to how the males and the sexual females are produced from the parthenogenetic eggs. Here I have some observations to report which seem to indicate how this process takes place.

I find that the somatic cells of the males of the species referred to above contain only five chromosomes. These five give in the spermatogenesis the reduced number three by two uniting with each other and the third having no partner. I find that the somatic cells of the female contain six chromosomes. It follows that at some time in the life-cycle of the parthenogenetic eggs one chromosome disappears in those eggs that become males, while the full number is retained in the female. It seems plausible that this change takes place in the formation of the single polar body given off by the parthenogenetic egg.

The results seem to show that while the sex of the stem-mother is connected with the presence of "female-producing" spermatozoa, the production of males and of sexual females is dependent on a process that takes place in the egg analogous to the same process that takes place in the spermatogenesis of other kinds of insects. Hence it follows that the egg as well as the sperm has the power of determining sex by regulating the number of its chromosomes.

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### **Physiological problems of the geographical distribution of *Partula* in Polynesia, with demonstration of specimens.**

By **HENRY E. CRAMPTON.**

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The speaker described briefly the geographical features of the distribution of *Partula* in Polynesia, known through the researches of Mayer, Garrett, Cumming, and others, as well as from personal

observations. The snails of this genus are so distributed that each archipelago and each island where they occur possesses unique types, while often single valleys will comprise the habitat of a species. Only two exceptions to the former statement are known.

A detailed demonstration was made of the snails from 55 valleys of Tahiti, and from 19 valleys of Moorea, the two islands of the Windward division of the Society group. The present communication consisted chiefly of a description of the features presented by the demonstrated valley populations. The general conclusions of the survey are (1) that there is a general correlation between geographical proximity or isolation on the one hand and specific resemblance or divergence on the other hand; (2) that some species (*e. g.*, *P. hyalina*) are wide-spread and relatively invariable, while other forms exhibit variations and mutations that seem to be the antecedents of fixed independent varieties of the future; (3) and that variation does not seem to be referable to environmental influences.

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**Note on the isolation of carnaubic acid from beef kidneys.**

By **EDWARD K. DUNHAM.**

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A lipid obtained from beef kidneys and having solubilities similar to those of Liebreich's "protagon," yields, on cleavage with alcoholic hydrochloric or sulfuric acid, an ester of carnaubic acid, which separates on cooling. From this ester the free acid may be obtained by saponification with sodium ethylate and decomposing the resulting soap with a mineral acid. The free acid and its ethyl ester are freely soluble in ether and chloroform; also, in hot alcohol, benzene, acetone, ethyl acetate or acetic acid, but separate from these solvents on cooling. The acid melts at 72.4°, the ethyl ester at 50°, both uncorrected.

*Analysis of the acid.* It was purified by fractional precipitation with magnesium acetate. The magnesium soap was decomposed with hydrochloric acid. The acid was recrystallized from acetone :