humic acids media. The organisms utilized the coal substance for their food and energy requirements up to the point where almost the entire carbonaceous material was consumed. By bacterial action over a period of at least six weeks, the originally dark-brown solutions became colorless, indicating that the humic acids were completely destroyed.

A preliminary chemical investigation has shown that the breakdown of the coal substance does not yield volatile compounds, such as methanol or acetic acid but gives rise to non-volatile acids, which are now under investigation.

It is believed that the products formed by the activities of microorganisms on coal solutions may prove of economic value. In addition, a knowledge of the type and the mechanism of metabolism of such microorganisms will assist in a better understanding of the decomposition of humic acids in soils.

FRIEDA WEINSTOCK FUCHS
THE PENNSYLVANIA STATE COLLEGE

SOCIETIES AND MEETINGS

THE FIRST SOUTH AMERICAN BOTANICAL CONGRESS

THE first South American Botanical Congress held its meetings at Rio de Janeiro, Brazil, during the week from October 12 to 19, 1938. The congress was the result of efforts made by some of the leading botanists of South America to bring about such a gathering in order that a definite program of cooperation in botanical research could be initiated for the several South American nations and colonies.

Although the congress was specifically for South American botanists, other nations were invited to send botanical representatives, and Cuba, England, The Netherlands, Germany and the United States were represented. Chile, Peru, Paraguay and British and French Guiana were not represented by botanical delegates, but were represented at the general meetings by their embassies.

The greater part of four days was occupied in the reading and discussion of well over a hundred technical papers on various botanical and agricultural subjects. The papers given were about equally divided in the following fields of research: Systematic Botany, Microbiology, Morphology, Physiology, Genetics, Phytogeography and Applied Botany. Since the time was short and the papers numerous, the various fields of work were discussed in concurrently running sections and the delegates attended the sections which dealt with their particular field.

Two days of the congress were devoted to trips out of the city in order that visiting delegates could see some of the distinctive features in the nearby country. One of the trips was to the beautiful resort area about the town of Petropolis, which lies well up in the mountains some three hours' drive by car on an excellent highway from Rio de Janeiro. Here the delegates caught glimpses of virgin forest and made a highly interesting visit to a large private display of orchids. The officials of the town of Petropolis were hosts at a luncheon for the delegates. The other trip was a more extensive journey by rail to view the "restinga" vegetation of the seacoast.

Dr. P. Campos Porto, director of the Biological Institute and Botanic Garden at Rio de Janeiro and also president of the Committee of Organization for the congress, was host at a garden party for the delegates. The setting was of exquisite beauty, in the Botanic Gardens, with Royal palms and mountains for background and countless orchids blooming on all sides. Leading Brazilian artists contributed to the entertainment with folk dances and songs as well as classical music.

Two plenary sessions of the congress were held, during which several important resolutions were approved for recommendation to the respective governments. The following, of general interest, may be mentioned here:

To establish regional botanic gardens. Each country to choose areas within its limits to set up arboreta or botanic gardens where the representative flora of the region may be studied. These botanic gardens will form a South American System for exchange of information between the various regions of South America.

To establish a South American Botanical Bureau. Each country will establish a central bureau, which will be charged with the task of bringing together botanical information pertinent to that country. It is intended that the bureaus in each country will eventually become federated for the whole of South America and that eventually there will be established a central bureau for the continent.

To supervise and regulate exploration. Each country shall recommend that its government promulgate regulations so that such exploration can not take place without the previous knowledge and permission of the government. Duplicates of all collections shall be left in the country and unique or rare collections shall have their export forbidden.

At the opening meeting permanent officers were elected for the years 1939 to 1942. They are as follows: *President,* Dr. Alberto Castellanos, Museum of Natural History, Buenos Aires, Argentina; *Vice-president,* Dr. Fernando Rosa Mato, Museum of Natural

History, Montevideo, Uruguay; *Secretary-General,* Dr. Fernando Silveira, Institute of Education, Rio de Janeiro, Brazil. It was proposed by the delegation from Argentina that the Second South American Botanical Congress be held at the Institute Miguel Lillo at Tucuman, Argentina, in 1942. This was unanimously approved.

Brazil, famous for its generous hospitality, surpassed even this reputation as host to the delegates of the congress, and congratulations should be extended to Dr. Campos Porto and the Committee of Organization for a well-planned and well-executed program.

C. O. ERLANSON
U. S. DEPARTMENT OF AGRICULTURE

SPECIAL ARTICLES

SEX MECHANISM IN POLYPLOIDS OF MELANDRIUM[1]

LAST spring a series of experiments designed to determine the effect of polyploidy upon sex in various dioecious plants was undertaken. A preliminary report on this investigation was given in December.[2] This present paper is a summary of work on colchicine-induced polyploids of a white-flowered race of *Melandrium dioicum.*

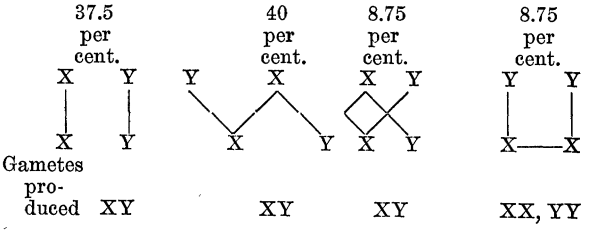
Fifteen out of 19 seed-treated plants examined proved to be entirely or partly 4n (8 XXYY males and 7 XXXX females). These plants were intercrossed and a second generation of over 100 3*n* and 4*n* plants was grown. There is enough difference in size between the sex chromosomes and autosomes and between the X and Y to determine the chromosomal constitution of a plant by cytological methods. The following is a tabulation of sex and chromosome constitution in second generation plants:

Type	Chromosomal constitution*	Number of plants and sex
2n (control)	2A + XX	17 ♀
	2A + XY	20 ♂
3n	3A + XXX	1 ♀
	3A + XXY	4 ♂; 1 ± ☿
4n − 1	4A + XXX	1 ♀
	4A + XXY	1 ♂
4n	4A + XXXX	3 ♀
	4A + XXXY	65 ♂; 3 ± ☿
	4A + XXYY	2 ♂
4n + 1	4A + XXXXY	1 ☿
	4A + XXXYY	3 ♂

* Irregularities in number of autosomes have been observed in plants in this table but for simplicity have not been indicated in the tabulation.

Among the 2n plants there are 20 males to 17 females. The preponderance of males among the 4n plants (67 to 3) is due to the fact that the XXXY individuals are very numerous, as Muller[3] and Westergaard[4] have predicted, and because XXXY plants are male. (Three XXXY male plants occasionally bear hermaphroditic (☿) blossoms; the 65 other plants of this genotype are vigorous, fertile males.)

Peculiar conjugation and segregation of the sex chromosomes is responsible for the large number of XXXY plants. The following types of association have been observed at MI in 80 P.M.C. of 2 of our XXYY males, in addition to 5 per cent. of infrequent types:



Ninety per cent. or more of the gametes produced by the original 4n males (XXYY), therefore, should be XY, and when these unite with the XX gametes from the female, the excess of XXXY individuals should result. Westergaard[4] has observed the X − X and Y − Y conjugation to be the most frequent type; he has not reported quadrivalent association.

In a state of nature the excess of the XXXY males would likely lead to their fertilizing a large majority of the 4n females. Since the XXXY males are completely fertile and produce XX and XY gametes, such hybridization should give rise to a population of equal numbers of 4n females of the constitution XXXX and of 4n males of the constitution XXXY (aside from occasional males with a few hermaphroditic flowers). Thus a new 4n race with approximate numerical equality of males and females should be possible. The conclusions of Muller[3] and Dobzhansky[5] that doubling of chromosomes could not be a factor in evolution of dioecious forms therefore appears unfounded.

In the plants with three sex chromosomes of one size and the fourth of a different size, the 3 similar chromosomes must be X, for it is impossible to obtain an

[1] This investigation has been supported in part by a grant from the Carnegie Corporation to the Carnegie Institution of Washington.

[2] H. E. Warmke and A. F. Blakeslee, *Genetics,* 24: 88, 1939.

[3] H. J. Muller, *Amer. Nat.,* 59: 346, 1925.

[4] M. Westergaard, *Nature,* 142: 917, 1938.

[5] T. Dobzhansky, "Genetics and the Origin of Species," Columbia Univ. Press, pp. 219, 1937.