with the glass rod (7), which is dipped in one normal solution of the reagent before insertion.

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A NEW METHOD OF OBTAINING MOSAIC "VIRUS"[1]

IN connection with certain studies on the nature of the causal agent of the mosaic disease it became desirable to secure "virus" with less mixture of foreign substances than could be obtained by filtration of plant extracts through Pasteur or similar filters. It is quite evident that the causal agent of mosaic is carried in the sap of the vascular system of infected plants. By submitting the root system (or the end of a cut stem) to a pressure[2] of about one hundred pounds, it was found that the contents of the vascular bundles could be forced out of the plants and collected with capillary pipettes or medicine droppers. This was accomplished by placing the washed-out roots of the plants in a metal container attached to the city water supply, the stem of the plant extending through a split rubber stopper inserted in a "packing box," similar to that used around valve stems. With a little experience no difficulty was found in making this connection water tight around the plant stem. A succulent mosaic plant with hydathodes readily yields considerable quantities of the liquid water containing the infectious principle, though apparently the "virus" was not as concentrated as when secured from crushed tissue. By cutting the leaf or petioles so as to expose the ends of the bundles the liquid may be secured in a more concentrated form from plants with or without hydathodes. Modifications of the above apparatus and method will be evident to the experimenter to suit the particular needs in hand. It is important to use rapidly growing succulent plants for the best results.

A comparative microscope study of the liquid exuded from healthy and mosaiced plants did not lead to any conclusive results as to the presence of an organism. On slides stained with carbol-fuchsin bodies closely resembling very small bacteria were abundant, but apparently similar bodies occurred in the exudate from healthy plants.

Virus obtained in this way probably closely approximates the virus transmitted by sucking insects, and the method may, therefore, be useful for cross-inoculation studies. This material is also useful in other ways, as, for instance, in attempts at culturing the mosaic agent. The sap as it comes out of the vascular system is usually sterile. It may also prove interesting in studies with other plant diseases, particularly where vascular parasites are concerned.

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[1] Published with the permission of the director of the Wisconsin Agricultural Experiment Station.

[2] This principle was first described by De Bary in studying exudation of liquid water from plants.

SPECIAL ARTICLES

CHROMOSOMAL CHIMERAS IN THE JIMSON WEED

THE production of so-called bud sports is not a rare phenomenon in plants. In general, they may be classified either as sectorial chimeras in which a branch or other portion of the plant shows morphological differences from the rest of the individual, or as periclinal chimeras in which an internal tissue of one type is surrounded by tissue of a different type. The cause of these chimeras has been carefully studied in relatively few cases. Their origin has generally been assumed to be due to somatic mutations in the genes effecting the visible changes. Evidence has been accumulating during the last few years' study of the Jimson Weed (*Datura Stramonium*) that in this species chimeras are brought about by changes in the somatic number of chromosomes, and at least three types of sectorial chromosomal chimeras have been established: (a) those in which one of the sets shows a deficiency of a single chromosome and hence can be represented by the formula $(2n-1)$; (b) those in which the aberrant branch has an extra chromosome, the formula of which would be $(2n+1)$; and (c) those in which one branch has 4n chromosomes or double the number of the normal 2n branch.

(a) *Chimeras with chromosome deficiencies.* In the summer of 1922, two plants from different lines were found each with a branch which showed certain slight deviations from normal. The pollen from both these abnormal branches had considerably more than 50% of abortive grains. Counts of chromosomes in their dividing pollen mother-cells demonstrated a deficiency of one of the largest chromosomes which has been shown to be the extra chromosome present in our $(2n+1)$ mutant known as Rolled. Offspring from these $(2n-1)$ branches failed to show individuals of the parental type, a fact which indicates that gametes deficient for the Rolled chromosome are rarely if ever capable of functioning. In the summer of 1923, a single individual was found with a branch similar in appearance and in the degree of pollen abortion to the two chimeras already mentioned, but the failure of grafts to set prevented a count of its chromosomes. Counts of chromosomes in pollen mother-cells reveal the cytological condition in the subepidermal tissue only and it is possible that these sectorial chimeras were at the same time periclinal chimeras with an epidermal tissue having