

SCIENTIFIC PROCEEDINGS.

ABSTRACTS OF COMMUNICATIONS.

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President Lusk in the chair.

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The effect of potassium iodide, methylene blue and other substances applied to the embryo sacs of seed-plants.

By **D. T. MACDOUGAL.**

[From the Desert Laboratory, Tucson, Arizona.]

The results of some experiments at the New York Botanical Garden in 1905 showed that it was possible to introduce foreign substances into the ovaries of the higher plants, in such manner that the egg, or pollen-nuclei, were affected as to their genetic capacity.

Similar results were achieved independently four years later by Major Firth, of the British Royal Army Medical Corps, Dr. Firth being unaware of the previous discoveries.

The removal of my work to the Desert Laboratory in 1906 made it necessary to find new experimental material. Species suitable for the study of the modification of the germ-plasm by external agencies should be genetically simple, and preferably perennial, so that successive generations may be kept alive for comparison, and it is a great advantage if the plant can be brought to maturity in a single season.

Many-seeded ovaries, with the ovules standing in an open chamber, offer the best mechanical features, and naturally, only those which will recover from the traumatic effects of the necessary operations are of value to the experimenter. The above

conclusions are based upon a long series of failures of ovaries to mature upon cultures of treated species showing no departures, and upon progenies including notable departures, the parental forms of which proved to be a complex of elementary forms. Satisfactory conditions were finally obtained with a *Scrophularia*, native to the mountain tops of Arizona. Ovaries treated in 1911 with a solution of one part potassium iodide to 40,000 of distilled water, and the seedlings grown in 1912, included two individuals unlike the parental strain. These and their progeny are unlike their progenitors in the color-pattern of the flowers, the water-relations of the stems, the degree of differentiation of the tissues, the shape of the wings of the stems, the form and size of the flowers, the growth-correlations and venation of the leaves. The continuance of these features in the successive generations indicates a permanent modification of the germ-plasm.

Studies of the behavior of methylene blue, and other dyes, in the ovaries, show that, in some plants, introduced solutions may be taken up by the placenta and conducted through the funicular stalk to the antipodal region of the embryo-sac, finally staining the egg-cell.

In other cases, the cells of the micropylar opening are stained, and the pollen tube in passing through this might be affected, and might also take up free foreign solutions in the open cavity. It is evident, therefore, that in the introduction of substances into such an ovary, the effect would depend upon the simpler mechanical features of the operation, the stage of development of the separate ovules, the progress of the advancing pollen-tubes, and the varying dilution of the reagent in its diffusion through many membranes. The individuals resulting from a treatment, affecting one element only, would be of a hybrid nature: and might be if both were affected to an unlike degree, or in an unlike manner.

Duplication of effects is therefore not to be demanded as a test of such results and, if strict repetitions were obtained, the implication that premutations were present would be strong. The range of the departures is limited in expression by the morphological possibilities, but instead of being premutatory, may be considered to be the result of the direct action of the reagent

upon the colloidal complex of living matter. The compound used in obtaining the results described would have a neutralizing or coagulatory effect on protoplasm. Other reagents, facilitating hydration, have been used on ovaries from which seeds have been obtained, the capacities of which are yet to be tested.

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Studies on so-called protective ferments. II. Proteolytic enzyme is not specific.

By J. BRONFENBRENNER.

[From the Pathological and Research Laboratories of the Western Pennsylvania Hospital, Pittsburgh, Pa.]

If the serum of a pregnant woman is placed in a dialyzing thimble together with placenta in all respects as for an Abderhalden test, only at a temperature of 0° C., dialysis does not take place. Both the serum and placenta however undergo certain changes. Such a serum, when separated from the placenta and placed in the dialyzing thimble with fresh placenta, can no more induce any specific changes in placenta. And the placenta once placed in contact with a positive serum on ice and then separated from it, although it is not able to give up dialyzable substances by itself (if suspended in salt solution), acquires the property to do so in presence of any positive or negative, male or female fresh serum. The placenta was evidently "sensitized" and the serum exhausted of the specific substances present in pregnant serum. Moreover such a serum deprived of its specific properties still retains the ability of causing the appearance of dialyzable substances in presence of the sensitized placenta. Evidently we have here complete parallelism between this phenomenon and that of sensitization of erythrocytes by an active hemolytic serum.

In studying the complement activity of a pregnant individual's serum exhausted of its specific elements by the above method, it was found that the complement tends to deteriorate very rapidly, much more rapidly than in the male serum treated in an exactly