its thanks. Although it is unlikely that funds for endowment can be secured during the present economic depression, the trustees are aware of the need and will continue efforts to secure them. Modern biological research is unavoidably expensive and will probably continue to be so for years to come. In order to maintain its facilities offered to biologists of the world, the Mt. Desert laboratory must secure some sort of guaranteed income. The investigators themselves cannot be expected to bear the major portion of the expense involved.

RESEARCH ABSTRACTS

As in the past four years the following summaries of research accomplished are presented for the season of 1934. The reports have been edited only to insure uniformity of arrangement, and are otherwise in the form contributed by the authors. (For bibliographic reference it is recommended that the following form be used: "Bull. Mt. Desert Is. Biol. Lab., 1935, p----".)

A STUDY OF THE PITUITARY GLAND OF CERTAIN FISHES BY MEANS OF TISSUE CULTURES

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Only a few of the many kinds of fish to be found in the waters of the Mount Desert Island region were studied—the dogfish and skate representing the cartilaginous group; the flounder, sculpin and angler fish (*Lophius piscatorius*) as specimens of the bony variety.

Some preparations were stained supra-vitally with neutral red, janus green, brilliant cresyl blue and fluorescent X. Brilliant cresyl blue stained the cells more differentially than the other dyes.

The striking difference between the pituitary gland of the fish and that of other animals is the presence of a highly vascular organ, the saccus vasculosus. In the dogfish and skate the pituitary is a conspicuous body attached to the ventral surface of the fore-brain and composed of three lobes, which can be easily separated. There is a definite anterior lobe, lying between the mammillary bodies and connected with a large flattened posterior lobe containing both the pars nervosa and the pars intermedia, joined to this is a slender stalk-like body, the ventral lobe, which is peculiar to the selachians. In the bony fish, on the other hand, the parts of the pituitary gland are inseparably joined together to form one body. In the sculpin and flounder it is attached to the ventral surface of the brain, while in the angler fish it is carried forward at the end of a long infundibular stalk to a position anterior to the brain and midway between the olfactory nerves. In this fish there is also a small portion of pituitary tissue at the junction of the infundibular stalk and the saccus vasculosus. That the pars intermedia tissue containing the chromatophore -expanding hormone, is present in both regions was determined by injecting extracts of each part into sun-bleached frogs.

The cultures were prepared in autoplasma or homoplasma in the customary manner. Many difficulties were encountered by reason of the fact that the osmotic pressure and the hydrogen-ion concentration of these tissues were different in the different kinds of fishes studied. The hydrogen-ion concentration varied from 6 to 6.4. The osmotic pressure varied from one equivalent to about 2 per cent sodium chloride in selachians; 1.2 per cent in the angler fish and 0.9 per cent in the flounder. Locke's solution, or a concentration of it, Fühner's solution (water 100 c.c., NaCl 2 gms., CaCl₂ 0.02 gms., KCl 0.01 gms., NaHCO₃ 0.02 gms.) or some modification of this was used in preparing the cultures. The addition of urea to the salt solution did not result in better growths of the selachian gland. The chief difficulty was caused by the rapid liquefaction of the autoplasma or homoplasma clots, but it was found that this could be prevented by the addition of chicken plasma. The most extensive outgrowths were obtained by cutting up the tissue in a salt solution as isotonic as possible with the tissue in question and explanting it into hanging drops composed of one part of chicken plasma to two or three parts of autoplasma. The cultures were kept at room temperature.

Extensive outgrowths, composed of networks of long delicate fibrils, arose from the pars nervosa within 12 to 24 hours and attained a maximum within 24 to 48 hours.

The characteristic outgrowths from the glandular portions of the pituitary glands took the form of epithelial membranes, usually only one or two cells in thickness. Growth began in 2 or 3 days and continued for two to three weeks, forming wide-spreading sheets of cells, partly or entirely surrounding the explant. The epithelial cells were often ciliated, and the cilia continued to beat for eight to ten days. Patches of granular cells were present here and there throughout the epithelial membrane. In the skate particularly beautiful granular cells grew from the neuro-intermediate lobe. In cultures of the ventral lobe of both the dogfish and the skate were many large frothy looking cells, full of large colloidal vacuoles. These cells did not seem to multiply but migrated out among the growing cells.

Cells of the stroma usually grew out later than the epithelial cells and increased in number slowly. They formed wide-spread outgrowths of large, flat, spindle-shaped cells with large round or oval nuclei, and usually contained many irregular granules, probably composed of ingested foreign protein.

These preliminary observations have shown that the pituitary gland of the fish, particularly that of the dogfish and skate, in which the lobes are easily separated, furnishes favorable material for a study of different kinds of pituitary gland cells.

STUDIES ON THE SPONTANEOUS CARCINOMA OF THE MAMMARY GLANDS OF MICE

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The effect of ascorbic acid, dibenzanthracene and fluorescent X (reduced neutral red, Clark) was studied upon in vitro growth of mammary gland tumors of three mice of the Murray strain and ten mice of the Strong strains.

It was found that all three of these substances produced a different effect upon the cultures of carcinomatous tissue than they had exhibited in cultures of chick embryo tissue.

Ascorbic acid and dibenzanthracene had an inhibiting rather than a stimulating effect upon the growth of the cultures. Fluorescent X, instead of remaining in bright red granular form, as it does in supravitally stained cultures of normal cells, frequently formed into clusters of yellow crystals within the cell vacuoles of the growing cancerous epithelial membranes.

STUDIES IN TISSUE CULTURES

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The work of the summer consisted of growing in vitro, at laboratory temperature, various tissues of cold-blooded animals. The work was carried on in consultation with Dr. and Mrs. W. H. Lewis. The hanging drop method on a coverglass was used exclusively. The amount and character of growth in the various cases differed according to the tissue and the composition of the nutrient medium. Briefly, the results were as follows:

a) Lobster heart. The growth of the lobster heart was made up of long cells, resembling the fibroblasts of mammals and birds. These cells grew out in the blood or in centrifuged plasma of the animal itself.