DIRECTOR'S REPORT FOR 1931

THE WHITE CELLS IN CULTURES OF THE BUFFY COAT OF HUMAN BLOOD

By WARREN H. LEWIS AND MITCHELL I. RUBIN Johns Hopkins University

Within half an hour after the cultures were put in the incubator many neutrophiles were migrating from the little piece of buffy coat onto the coverglass and within an hour occasional monocytes were seen. During the next two or three hours more neutrophiles than monocytes migrated from the tissue. In the course of the next five or six hours the migration of monocytes increased while that of the neutrophiles decreased. By the time the cultures were from 12 to 24 hours old there were few or no neutrophiles and many monocytes on the coverglass. There were in addition often many cells which seemed at first glance to be transitionals between the two types. Many of the neutrophiles lost many or all of their granules, had somewhat swollen nuclear lobules and cytoplasm which stained grey or grey-blue with Wright instead of the usual pink color. The monocytes also became modified. The nuclei of some of them became more or less lobulated, occasionally with three or four lobules connected together by slender bridges. The cytoplasm developed a central area, which stained pink with Wright. Such modified neutrophiles and modified monocytes resembled one another to such an extent that it was not always easy to differentiate between them, but repeated reexamination of our preparations led to the conclusion that there was no transition between these two types of cells. In addition to these changes numerous other changes occurred such as the accumulation of neutral red staining granules and vacuoles and various types of cell degeneration and death. That a great variety of changes took place was to be expected since there are in the blood stream cells of various ages and of different metabolic conditions. The migration of lymphocytes was very rare but eosinophiles and basophiles were frequently seen. They retained their usual complement of granules which stained in the usual manner with the Wright stain even when the neutrophiles revealed few or no granules. This would seem to indicate that there was an actual reduction of the specific granules of the neutrophiles. Parallel with the migration of cells from the explant on the coverglass great hordes of cells oozed out of the explant to the lower surface of the drop. Some of them migrated about and most of them underwent various changes.

REPORT OF WORK DONE IN 1931 By Isidor Greenwald, New York University

The work consisted chiefly in the collection of material for the following four purposes.

1. An attempt to trace the origin of creatine. It is well known that the muscles of vertebrates contain creatine but the substance has

never been demonstrated in the muscles of invertebrates, and its presence in any of their tissues is generally denied. I intended to determine the creatine content, if any, of *Salpa, Balanoglossus* and one or more tunicates. The first two forms were not available at Mount Desert, but the large tunicate, *Boltenia* was suitable. Examination of Boltenia indicated that creatine, or a substance resembling it, is present in the gonads. This finding suggested examination of the gonads of other invertebrates, and a similar substance was found in the gonads of *Echiurus*, although the muscle contained traces. It is necessary to collect much larger amounts of material in order to make identification certain. If established, it will be the first time that creatine has been found in invertebrates.

2. An investigation of the nature of the slime of *Myxine*. This appears to consist of a true mucin and of another protein which is more like fibrin in its appearance. The slime scems to owe its peculiar tenacity to the combination of these two kinds of protein, one protecting the other.

3. An examination of the extractives (water-solube substances) of *Myxine* muscle.

4. An examination of the extractives of *Echiurus* muscle. Both seem to contain previusly unknown substances.

STUDY OF THE LICHENS ON MOUNT DESERT ISLAND 1931

By CHARLES C. PLITT, University of Maryland

During the summer of 1931 I continued my studies of the lichens of Mount Desert Island, being particularly interested in the marine and maritime species. I also paid attention to the Cladoniae, and was surprised to find 34 different species. Some of the species have two, three or even more varieties or forms, making a grand total of 84 different Cladonia forms.

THE DEVELOPMENT OF THE SUPERFICIAL VOLAR ARTERIAL ARCH IN MAN

By H. D. SENIOR, New York University

As part of a study of the development and anomalies of the arteries of the human upper extremity, the conditions in Harvard embryos 2051, 2095, 2246 and 1913, and Carnegie embryos 940, 423, 424 and 409 were collated. It became clear for the first time that the vessel which afterwards becomes the superficial volar arterial arch is originally a subsidiary channel of drainage between the deep volar arterial