phorescent organs along the sides were in good condition. One of the specimens was given to the Boston Society of Natural History as a member of the New England fauna; the other was presented to the Museum of Comparative Zoology at Harvard. The swordfish was taken on the eastern border of the Georges Banks, a little inside the 500 fathom line. From this it would appear that the swordfish do descend to considerable depths for their meals, and, from the good condition of the specimens, it would appear that they make a rapid transition from the feeding grounds to the surface for the after-dinner siesta.

J. S. KINGSLEY

2500 CEDAR STREET,
BERKELEY, CALIFORNIA

EXPERIMENTAL TRANSFORMATION OF THE SMOOTH-BLADDER OF THE DOG

THE essential difference between the pale smooth muscle of the bladder and the red involuntary striated muscle of the heart is dependent upon the differential intensity of the hydro-dynamic pressure to which the vesicular and cardiac mesenchymal cells have been subjected, respectively. By experimentally varying the velocity of application and the intensity of the intra-vesicular pressure, which causes tension of the smooth bladder muscle, during a period of eight weeks, to a point comparable with that found in the heart the non-striated bladder muscle is transformed histologically into cross-striated muscle, and physiologically into an organ manifesting rhythmicity as long as the hydro-dynamic pressure stimulus is applied.

From the dynamic or functional, embryological viewpoint the various muscles, smooth, cardiac and skeletal represent differences in the amount of *work* that has been done upon them by the differential growing parts of the embryo during the active periods of growth.[1] The essential difference then physiologically between the various muscles is their capacity for work which in turn is dependent upon the amount of work that has been expended in their production. The reason for the different degrees of energy possessed by the types of muscle is purely an embryological bio-mechanical problem and corresponds to the differential amount of optimum tension which these muscles have experienced during their formative period because of a dominant energetic zone extrinsic to the region of myogenesis. The evidence presented by these experiments warrants the conclusion that as regards cross-striated muscle, function determines structure and not the reverse.

The writer wishes to thank Dr. Charles R. Bardeen, University of Wisconsin, for rechecking the evidence leading to the above conclusions.

EBEN J. CAREY
MARQUETTE UNIVERSITY MEDICAL SCHOOL,
MILWAUKEE, WISCONSIN

AN ALBINO MUTATION OF THE DEMATIACEOUS FUNGUS BRACHYSPORIUM TRIFOLII

THIS fungus has been under study in culture since October, 1919, when it was first isolated from clover plants. A description was published in *Phytopathology,* October, 1920, and an intensive culture study of the fungus has been continued since that time. The cultures were started from a single spore and have been kept going as a pure strain ever since.

The normal fungus is of the dematiaceous type, with dark brown hyphæ, forming in culture a very dense black mat on and in the medium.

On one of a series of cultures made early in November 1921 there appeared, starting from the point of inoculation, a sector of growth which completely lacked the black-brown color of the normal mat. A microscopic examination showed that the mycelium and conidia of this light-colored area were morphologically identical with those of the normal growth of the fungus, except for the lack of the dark brown color.

Isolation cultures were made of this albino material by the isolation of sclerotia-like

[1] Carey, E. J., 1919-20, *Journ. of Gen. Physiol.*, (*a*) ii, 357; (*b*) iii, 61; (*c*) *Anat. Record,* 1920, xix, 199.

bodies which are formed abundantly on certain media. From these pure cultures were made and subcultures have been carried on through sixteen consecutive non-sexual generations, both by the single spore method and by ordinary transfers from one tube to another, without any variation in the appearance or nature of this strain. The mycelium in mass is a true albino or may at times take on a light flesh color.

Throughout an intensive study in culture covering thirty months' time, and employing every variation in condition that could be thought of as an influencing factor, there has been no ascus or sexual stage developed either in the normal or albino strain. With these facts in mind, it would seem that the phenomenon here reported can only be referred to some sudden change which occurred in the mycelium or conidia of the normal strain, and in any case has no connection with any sexual process.

The abruptness of this change, and the continual difference shown by contrasting cultures of the albino and the normal strain, is very striking. This change does not seem to fall into that class of somatic mutations so far reported in fungi which are usually described as a dwarfing or reduction of the development of the normal form, but it is a complete loss of the dark-color character which is typical for the normal original strain.

LEE BONAR.

CRYPTOGAMIC LABORATORY,
UNIVERSITY OF MICHIGAN

A DAMP CHAMBER FOR MICROSCOPES

IN the study of cultures of mycelia of fungi it is desirable that they be observed under the 4 mm. objective of the microscope without disturbing the hyphæ by transferring them to a microscopic slide and making a fresh mount in the usual fashion. The type of damp chamber described below has been found especially adaptable to this purpose. It affords a chamber of considerable volume, with a humidity which is constantly near the saturation point, and of such a proportion that the greater part of the enclosed space may be observed through the 4 mm. objective.

This damp chamber is a modification of the one used by Blaauw in his recent work on the growth and phototropism of roots. It is made by using a large-sized microscopic slide, 2 x 3 inches, and a large-sized No. 2 coverglass, 45 x 72 mm., such as are used for making mounts of brain sections. These two pieces of glass are separated by several layers of filter paper, the central portions of which have been cut out, so that the filter paper is in the form of a frame about 5 mm. in width. Slits in this frame may be made for the purpose of ventilating the chamber, if such is desired.

The mount is made by placing the filter paper frame on the slide, then dropping a bit of nutrient agar just on the inner edge of the frame and inoculating it with the fungus to be studied. The large-sized coverglass is then placed over the filter paper and the mount is bound together with white linen thread and placed erect in a tumbler containing a little water. It is desirable that the mount be kept in a place which is slightly cooler than the room in which it is to be examined in order that the condensation of water on the inner surface of the coverglass may not interfere with observations.

This damp chamber has been found by the writer to be an excellent means of preparing mycelia of fungi for use in general courses in botany. Mounts so constructed can be used repeatedly in successive sections of the same or different classes. For this purpose only the low-power, 16 mm., objective is necessary and therefore the coverglass referred to above may be replaced by another large-sized slide, making the damp chambers much less expensive. The details of the structure of the hyphæ are well shown, the normal position in which they develop, and the streaming of the protoplasm in the hyphæ of Rhizopus, for example, are very distinct. Also the general form and arrangement of the fruiting bodies may be studied here.

By making a slit in the filter paper frame at one end, this damp chamber may be advantageously used for the study of roots and root-hairs. A seedling with a radicle a centimeter or more in length may be inserted in the slit and development allowed to proceed. This method of the study of root-hairs even under low power is found to be far superior