their outer walls are notably thickened. A well-developed cuticle is present.

It has been found that all of these xerophilous characters may be produced by growing the plant in an undrained wet sphagnum substratum, whose temperature is maintained several degrees below that of the air. This effect is obtained even in subdued light. Further, under these conditions the drops of oil or resin, so characteristic of bog xerophytes, are formed in the epidermis and the cells adjacent to the bundles. Such resinous deposits occur also in the plants grown on dry sand, but are wanting under favorable moisture conditions. It is believed that these modifications are, in the case of the bog habitat, a response to the unfavorable conditions for absorption by the roots, occasioned by the low substratum temperature and lack of proper aeration.

That palisade tissues may be greatly increased or developed in shaded conditions is also evident. The experiments suggest that even when such a response is obtained in strong light, it is to be correlated with drouth rather than with light. The increased transpiration brought about by direct insolation, as it increases the temperature and decreases the relative humidity of the air, would seem to be an efficient cause for palisade development. The elongated cells of the palisade, therefore, appear to be an adaptation for the ready transferrence of food materials in the leaf tissues, under the stress of a reduced water supply. The analogy of dry sand habitats and undrained wet bog habitats is certainly indicated.

The details of these experiments and others tending in the same direction will be published elsewhere.

EDGAR N. TRANSEAU.

UNIVERSITY OF MICHIGAN,
May 11, 1904.

ALBINO BROOK TROUT.

AMONG the brook trout hatched at the Adirondack Hatchery, Saranac Inn, N. Y., in March, 1902, there appeared to be some distinct albinos. There were about fifty of these fry out of an entire hatching of 800,000 ordinary brook trout eggs, taken from both wild and confined trout. These albinos were put by themselves, and four reached maturity.

Two of them are typical albinos. They are the same in outline as the ordinary brook trout. The skin is white, mottled with an ochraceous yellow, colored with the typical red and yellow spots. The fins are white, with the red band and yellow mottling. Eyes red. The general appearance of the fish is delicate, and the bones are apparently visible through the seemingly transparent skin. As these fish were reared in captivity they have been confined to the ordinary fish races, and fed on ground liver. One is a male, the other a female. The former now measures seven inches in length; the latter, nine inches.

The other two fish are a grayish white, with dark fins and black eyes.

On November 10, 1903, when the two albinos were twenty months old, they were stripped for eggs and fertilization. At this time their combined weight was approximately one half pound, the female being much the larger. Mr. G. E. Winchester, foreman of the Fish Hatchery, made the following experiments in fertilization: viz., first cross, 527 eggs from female albino $\times$ albino male; second cross, 103 eggs from female albino $\times$ natural male; third cross, 424 eggs from natural female $\times$ albino male.

The eggs, after fertilization, were placed in the hatchery races the same as all brook trout eggs. The hatching began March 1, 1904, and continued until the thirteenth of the month, the period of incubation being the same as that of the ordinary brook trout egg.

The result of the hatching was as follows: From the first cross 32 hatched, or approximately 6 per cent.; from the second cross 43 hatched, or approximately 42 per cent.; from the third cross 416 hatched, or approximately 98 per cent.

At the present time—one month after all the fish were hatched—the following number is living: from the first cross 20, or 62 per cent.; from the second cross none; from the third cross all, or 100 per cent.

The weakness of the pure albinos is indicated by the fact that only 6 per cent. of the eggs proved fertile, and several of these are

not perfect fish. Yet they have the characteristics of the albino parents.

Of the fry from the second cross 42 per cent. hatched; but none were alive at the end of one month. Some of them were imperfect in form, and were colored more like the natural male parent, but not entirely so.

From the third cross all the eggs were fertile except eight—a loss of but two per cent.—and all are living at the end of thirty days. There are practically no cripples, and the coloring is typical of the natural female parent.

The silver gray albinos did not spawn. They have the appearance of barren fish.

These fish were exhibited by this department at the New York state fair last fall and attracted much attention.

C. R. Pettis.

Forest, Fish and Game Commission,
Albany, N. Y.,
April 15, 1904.

BOTANICAL NOTES.

WEEDS USED IN MEDICINE.

Under this title the United States Department of Agriculture issues an interesting bulletin (Farmers' Bulletin, No. 188) prepared by Alice Henkel, assistant in drug and medicinal plant investigations. The author calls attention to the fact that many of the common weeds of the farm and garden possess medical properties, and in some cases might be collected and made a source of revenue. Thus in his fight with the plant pests in his fields the farmer may actually turn them to some account, by collecting and preparing them for the market as crude drugs. Directions are given for collecting and curing, and suggestions are made as to their disposal when ready for the market. They are first considered under roots, barks, leaves and herbs, flowers and seeds. Following this are descriptions of some of the more common weeds which have medicinal importance, illustrated by a number of good figures. No less than twenty-four species are taken up in this part of the bulletin. It should prove very useful to many farmers and gardeners.

THE DATE PALM IN AMERICA.

In a recent bulletin (No. 53) of the Bureau of Plant Industry of the United States Department of Agriculture, Walter T. Swingle makes a report of his investigations of the date palm as grown in Algeria, and of the attempts to introduce it into California and Arizona. The purpose of the bulletin, as stated by the author, "is to call attention to the peculiar suitability of the date palm for cultivation in the hottest and most arid regions in the southwestern states, and to its remarkable ability to withstand large amounts of alkali in the soil. The most intense heat, the most excessive dryness of the air, the absence of all rainfall for months at a time during the growing season, and even the hot, dry winds that blow in desert regions, are not drawbacks, as in almost all other cultures, but positive advantages to the date palm, enabling it to mature fruit of the highest excellence." The author shows that the Salton Basin in California 'is not only the most promising region in the United States, or in North America, for the culture of the best sort of dates, but that it is actually better adapted for this profitable culture than those parts of the Sahara Desert where the best exported dates are produced.' It is shown to be probable that this single region is capable of producing dates enough to supply the demand for the whole country. Other regions in California, Nevada, Arizona, New Mexico and Texas are discussed, the conclusion being that in all of these states date palms of certain varieties may be grown with profit.

From the bulletin it appears that there are three principal types of dates cultivated by the Arabs, viz: 'soft dates,' which are very sugary and include the sorts with which we are familiar; 'sour dates,' which contain a much lower percentage of sugar, not enough, in fact, to preserve them; 'dry dates,' which are not at all soft or sticky when ripe, and which may be stored and kept indefinitely. None of the last are to be found in the American markets, and scarcely any of the second type. Of the 'soft dates,' the variety which bears the name of 'Deglet Noor' is the most famous. It is very late in maturing,