AUTUMN COLORING

By Julian A. Steyermark
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One of the chief attractions of our countryside in autumn is the color of the woodlands. By most people this coloration is taken as a matter of course. Few perhaps realize that seasonal color change of foliage is not a uniform phenomenon the world over. A native of the tropics on his first trip during the autumn to the central United States, or to any other temperate section where broad-leaved trees predominate, might think he was in some strange wonderland, so impressed would he be with the brilliant scene surrounding him. A native of northern and eastern Europe or of the Pacific coast states might be almost equally impressed, for in certain parts of the United States, such as the Ozarks, the Allegheny plateau, and some regions of New England, autumn coloring is much more brilliant and diversified than in most other sections. This is due to the great variety of trees and shrubs, particularly oaks and hickories, in these areas.

The onset of color change in the autumn is coincident with the coming of cooler days and nights which results in the gradual dying of the leaves and their fall from the trees. The disintegration of the green coloring matter gives rise to yellow pigments and unmasks the reds, while the frost initiates a whole series of chemical changes which produce the kaleidoscopic display.

To a careful observer an autumn landscape is not just another scene for an artist to paint, nor is it just a motley and extraordinary conglomeration of tints—it will be found that each species of tree and shrub each fall assumes its own characteristic coloring. Of course, some trees have a variety of shades, and yet this very variety is quite characteristic of them. Hickories always have some shade of golden or russet-yellow, the flowering dogwood a deep rose-red, and the linden a pale lemon yellow. In the north and west the quaking aspen brightens the landscape with yellow or orange. Perhaps the acme of color is attained by the deep blood red or scarlet of the black or sour gum. Closely competing in brilliant red is the scarlet splash of the red maple as well as the scarlet oak, while rivaling these are the sumacs which exhibit gaudy shades of oranges and crimsons. With some practise the oaks can be distinguished by their color. The true white oak has a deep mauve or rose tint, while the northern red oak is usually green and yellow. The many species of oaks in the central and eastern states account for much of the varied coloring in those sections. Sassafras, which is common in northern Indiana, southern Illinois and Missouri, has a brilliant orange and yellow combination splashed with green. The sugar maple, so frequent in rich woods, and its cousin, the Norway maple, planted as a shade tree in the central states, have a gorgeous deep yellow lightened in places with green or bordered with shades of red, pink, or orange.

Among the common vines, the Virginia creeper and poison ivy display shades of red, while the bittersweet, whose crimson-red fruit is such a temptation to ornament-pickers, has only a pale green foliage. The honey locust, of pale lemon yellow throughout, contrasts with the black cherry whose dark green foliage gradually turns all the way from blood and rose red to pale and bright yellow. The persimmon, whose fruit is well-known to people of the southern and central portions of this country, always has a bright light yellow, while the papaw changes to a pale light yellow.

PALEONTOLOGICAL PUZZLES, AND HOW THEY ARE SOLVED

By Bryan Patterson
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The accompanying photograph illustrates a phase of Museum activity rarely seen by visitors—the preparation of fossil mammals. The specimens shown were collected by a Museum expedition of the past summer.

After a paleontological expedition returns from the field, its more important discoveries are usually announced in the daily press and Field Museum News. Visitors often expect to see the material on exhibition within the ensuing weeks, and are astonished upon learning that it may be months or even years before the specimens will be ready for public view. The illustration, a scene in the Museum's paleontology laboratories, graphically presents the reasons for this delay.

Although collecting a fossil vertebrate is in itself an operation requiring experience and skill, it is actually the easiest part of the work that must be done upon a specimen before it is ready for study or display. Bones that have lain in the ground from a few hundred thousand to many millions of years are as a rule badly broken and distorted, especially the older ones.

The field collector has to prevent the fossils from falling to pieces during excavation and shipment. This he does by bandaging them with strips of burlap soaked in plaster of paris. He also gathers all the pieces that have weathered out and broken up on the ground surface.

But it is when the collection reaches the Museum that the really difficult and tedious work begins. In the laboratory the plastered sections are opened, the rock surrounding the specimen is carefully scraped or chipped away, and the innumerable cracks and breaks in the bone are cleaned and cemented. Each white line on the specimens in the illustration represents a break that has been mended with plaster.

The surface pieces are unpacked, spread out, and carefully inspected for fragments that may fit onto one of the incomplete bones, or that may themselves fit together to form a bone that had completely weathered out before the collector found it.

A tray of such fragments appears in the foreground of the photograph. The worker, Mr. James H. Quinn, experienced both as a collector and a preparator, has assembled from these bits the lower jaw seen behind the tray, and has fitted many pieces to the skull under his hands. Laymen who see this part of the work usually remark that it is "just like a jig-saw puzzle." Actually the fitting of fragments is infinitely more difficult than any manufactured puzzle. A jig-saw fitter works in only two dimensions, has a picture to guide him, and can usually count on all the pieces of the puzzle being present. The fitter of bone fragments works in *three* dimensions, has no picture, and can be almost certain that many of the most important pieces *will* be missing.

After the bones are cleaned and mended, and as many fragments as possible fitted together, there remains the problem of distortion. Many specimens while in the ground are crushed and warped by pressure until the bones, as now preserved, bear little resemblance to the shape they had in life. Skulls are especially liable to such distortion. Usually distortion cannot be corrected, but in a few cases it is possible to reconstruct a skull with considerable accuracy. The three specimens on the table in the photograph are excellent examples. The one on the right has been cleaned and mended, but not restored. The skull upon which Mr. Quinn is working had the top crushed downward, but it proved possible to lift the top off and replace it in its natural position, after adjusting the displaced bones on the side of the skull. In the black specimen on the stand the right side originally was almost undistorted, but the left side was crushed into it. Reconstruction of the left half gives an excellent idea of the entire skull.

Photograph courtesy of The Chicago Tribune

Piecing Together Fossil Fragments

In the reconstructed skeletons of prehistoric animals displayed in Ernest R. Graham Hall, often thousands of tiny bits of bone have to be fitted together. This picture shows Mr. James H. Quinn, one of the preparators, at work in the paleontological laboratory on a specimen of a rare extinct mammal collected by an expedition to Colorado last summer. The work requires the utmost skill and precision—complete coordination of eyes, fingers and mind.