

## OUR GREEN WORLD

BY B. E. DAHLGREN  
Chief Curator, Department of Botany

In the humid tropics, where seasons may be said not to exist, the world appears always green. The inhabitants take the verdure for granted and often are bored by its interminable prevalence.

In our northern latitude of contrasting seasons, we are thrilled each spring by the appearance of millions of new leaves. But even here, after a few weeks, when the foliage has attained its full summer color, we think of the verdure, if at all, simply as the natural and commonplace characteristic of plants in general—which it is.

The green of plants, however, may truly be called the most significant and fundamental single fact of natural history, a *sine qua non* for the existence of all life on this planet. Without it, the utilization of the radiant energy of the sun would be quite impossible to living organisms as now constituted, and life in the sea as on land would perish speedily. The entire animal creation, lacking ability to sustain itself on inorganic matter, is dependent on plants for food in the form of organic compounds. These organic compounds can be produced by the plants themselves only by virtue of the presence of the green coloring matter in the plant cells. The process does not take place in plants like the fungi, or in those parts of green plants which are devoid of the essential pigment. In the sea, with its teeming animal life, myriads of microscopic plant organisms constitute the ultimate and indispensable food supply. There are even a few animals which have minute green plants enclosed within their tissues. On land the dependence of animals on the plant world for food is too well-known and obvious to need comment, other than that the animals which live on prey or carrion and may seem to form an exception, are merely a step farther removed from the source of supply.

Water with mineral salts in solution, and air, are the elements from which the plant produces its substance. The "factories" in which the process is carried on are the green cells, especially those of the leaf, which is essentially an adaptation of the plant body to its food manufacturing function. No factory can work without expenditure or conversion of energy. That employed by the plant is the radiant energy of sunlight. The energy transformer is the green pigment called chlorophyll. This in itself is a complex substance related to hematin, the red coloring matter of the blood of animals, from which it differs chiefly in containing magnesium instead of iron.

The process which takes place in the green leaf under the influence of sunlight is called photosynthesis. In this the carbon dioxide of the air and water are combined and built up in a few steps into a form of simple sugar which may be converted into starch or transported as sugar in solution to various parts of the plant for use or for storage in the form of starch until needed. In terms of energy, that portion of the sunlight which is employed is converted into chemical potential that may be released by breaking down the organic compounds produced. Hence this is the source of energy not only of all animal and plant life, but also the main source of power of our whole industrial world. The motive power of factories, railroads, steamships and motor-cars, as well as our electric light and heat, are almost all obtained by releasing now from coal and petroleum the energy built up by the green coloring matter of the plants of past eras.

A long list of chemists have devoted themselves to the study of the chemical changes involved in photosynthesis. Great progress has recently been made in this direction. Dr. Paul W. K. Rothmund, of Antioch College, reports having reached the half-way mark toward the synthesis of the most important pigment in the world, chlorophyll, with its relative hematin.

## HAPALOPS, THE "GENTLE-FACED" FOSSIL GROUND SLOTH

BY ELMER S. RIGGS  
Curator of Paleontology

A skeleton of the ground sloth *Hapalops* recently was added to the exhibits in Ernest R. Graham Hall (Hall 38). This is one of the smaller of the many kinds of sloths which lived in South America in Miocene time, some ten million years ago. It was an animal about as large as the common black bear of North America, but had a very much smaller head. The amiable-sounding name *Hapalops* comes from the Greek and means "gentle face."

This skeleton was found on one of the tide-flats of the Atlantic coast in southern Argentina. There the sea is encroaching upon the pampa and cutting away the land which stands as a bold sea-wall two hundred or more feet in height. Ledges of soft sand-



**Hapalops Passes Inspection**

Curator Elmer S. Riggs making final check on installation of addition to prehistoric mammal collection before exhibition case is glazed and made available to public.

stone laid thus bare by erosion yield many specimens of fossil mammals of which this is a good example.

*Hapalops*, like all the sloths of its time, was a herbivorous animal. Its teeth are simple cylinders which, lacking the enamel coat of higher animals, wore away into cup-like shapes at the crown. The fore and hind feet each bear five toes, four of which are armed with claws. The fore legs are much longer than the hind ones, and were capable of free movement like those of the apes. With them the animal was able to climb among low trees, pull down branches to feed upon the leaves or fruits, or dig in the ground for roots and tubers.

The specimen was collected by the Marshall Field Paleontological Expedition to Argentina, and has been prepared and mounted by Assistant Phil C. Orr.

## ARCHAEOLOGICAL EXPEDITION TO THE SOUTHWEST

Leaving Chicago early in June, Dr. Paul S. Martin, Chief Curator of the Department of Anthropology, will spend most of the summer on archaeological work in southwestern Colorado. The purpose of this expedition will be to excavate several small ruins in the vicinity of Lowry Pueblo. A report on Lowry has already been published by Field Museum under Dr. Martin's authorship, as a result of excavations he conducted there in previous years.

Outlining the objectives of this summer's work, Dr. Martin states: "To understand the importance and significance of the small ruins in which I shall dig, it should be explained that most prehistoric pueblos in the Southwest were inhabited only for short periods. Communities constantly shifted their dwelling places, the settlement of any one site often having been only twenty to fifty years. As a result of this restlessness, thousands of ruins, each containing objects in vogue during its short existence, are widely scattered. Consequently, archaeologists can recover from small ruins mere segments of the long cultural history which is gradually being reconstructed. Connecting these segments in correct chronological order is a difficult task.

"On sites that were occupied for several hundred years, however, the total changes in culture may be relatively great and well differentiated, and may lie in stratigraphic order—the oldest at the bottom, the next oldest above, and so on. Lowry Ruin was of this character, and has thus supplied archaeologists with standards for making comparisons.

"My earlier surveys in southwestern Colorado revealed the presence of many ruins, but their relative age and therefore their historical meaning were unknown. Some ruins contained one type of pottery, some another, and some contained several types. Comparative studies indicated that some groups of ruins were older than others. Lowry Ruin provided a cultural sequence which should now be applied to the small near-by ruins, so that they may be properly and correctly ranked as to absolute age and historical meaning.

"It is planned, on the present expedition, to excavate ten or twelve small three- and four-room buildings. The data thereby collected could easily be dated in accordance with findings at Lowry Ruin. No one has ever attempted to carry out such a plan for southwestern Colorado, although Dr. A. V. Kidder of the Carnegie Institution, Washington, D.C., has done it at Pecos, as has Mr. H. S. Gladwin of Gila Pueblo, at Snaketown, Arizona.

## Botanical Expedition Reports Progress

A recent report from Mr. Llewelyn Williams, Curator of Economic Botany, who is conducting an expedition on the Isthmus of Tehuantepec, Mexico, states that he has completed the collecting of plants and wood specimens in the forests of the Fortuno region. To bring his collections to the coast for shipment to Chicago required an arduous trip by canoes, banana barges, and on foot. He is now at work in another region, in the vicinity of Ubero, Oaxaca.

Turpentine orcharding is the subject of an economic exhibit in Hall 28 (Case 660). The methods of tapping pine trees used in the southern United States, Portugal, and France, are illustrated.



Riggs, Elmer S. 1937. "Hapalops, the "Gentle-Faced" Fossil Ground Sloth."  
*Field Museum news* 8(6), 3-3.

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