Chicago Natural History Museum
BULLETIN
Formerly Field Museum News

Vol. 15 JANUARY–FEBRUARY, 1944 Nos. 1–2

HOPEWELL AND OTHER PRE-COLUMBIAN CULTURES SYNTHESIZED IN EXHIBITS

By PAUL S. MARTIN
CHIEF CURATOR, DEPARTMENT OF ANTHROPOLOGY

Another section of Hall B, devoted to the history or archaeology of American Indians, is now open to the public. This section, although not completed, is dedicated to the American Indian civilizations as they were prior to the coming of the white man—that is, before 1492.

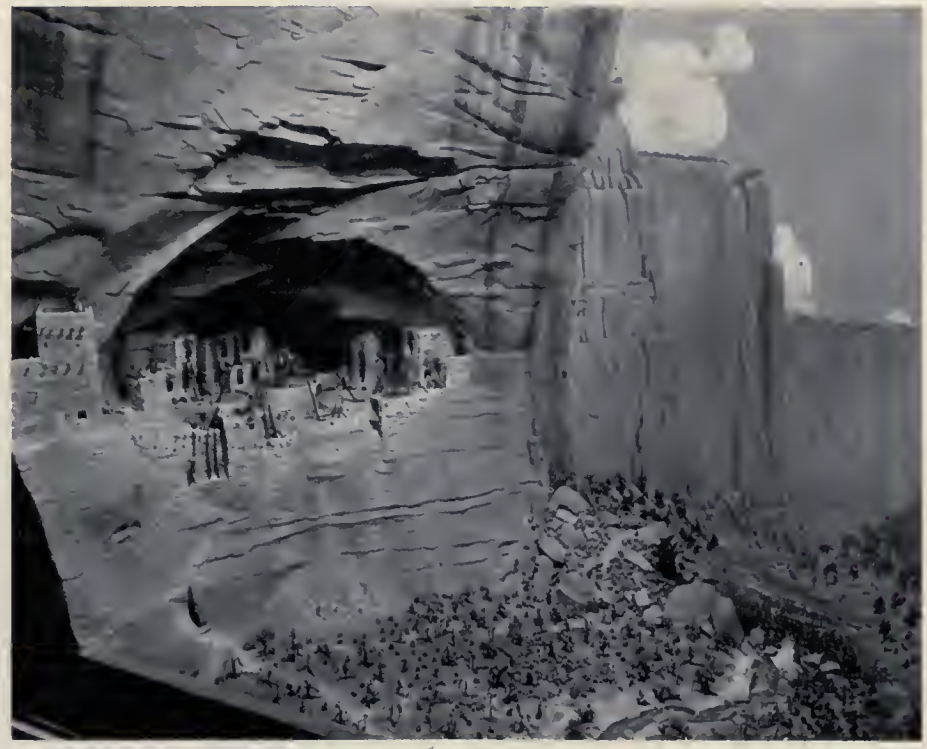
At present there are ten exhibits ready. Seven of these deal with the Hopewell Indians who lived in southern Ohio from about A.D. 1100–1400. The civilization of these Indians was well developed and was probably more advanced in many ways than that of any other Indians east of the Rocky Mountains.

Although the Hopewell Indian farmers were fairly advanced in arts and crafts, and although their civilization has been studied rather intensively, very little actually is known about their way of living. A few guesses can be made, however, and these are presented in our exhibits and summarized in this article.

The Hopewell farmers probably lived in skin or bark covered huts which were grouped together in small hamlets or towns. Near the houses were large and small burial mounds, from which all of our materials were dug. A low, earthen wall enclosed some of these hamlets and their burial mounds. This enclosing wall probably did not serve as a fortification, but was, rather, sacred in character.

The people of these villages raised corn and, perhaps, squash and beans. They obtained other necessary items for their diet by fishing and hunting. They made pottery, wore cloth and basketry, and produced extraordinarily varied and beautiful ornaments of copper, mica, stone and silver.

It is believed that the Hopewell farmers were united with other near-by Indians in some sort of a political confederacy. From the meager evidence which is now available, it seems likely that there were privileged classes among the Hopewell Indians, some of whom may have held a high rank of some kind; that elaborate ceremonies were performed from time to time; that special guilds of craftsmen existed; that commerce and trade were carried on with far distant tribes; and that the people were organized socially in such a way as to permit the completion of large jobs (such as building large mounds) by means of co-operative labor.



MODEL OF MUMMY-CAVE VILLAGE (HALL B)

Diorama showing in miniature a cliff-dwelling as built in a cavern of Canyon del Muerto, Arizona, and occupied about A.D. 1250. The Indians abandoned the cave about fifty years later because of drought and a military defeat, archaeological evidence indicates.

Our exhibits attempt to portray all these phases of the daily life of these ancient Indians. For example, there are exhibits illustrating man's work; woman's work; personal ornaments of copper, stone and silver; a Hopewell woman; a Hopewell man wearing a ceremonial deer-antler headdress; and finally a display showing the artistic skill and the interest of the Hopewell craftsmen in man and nature. We shall soon install other displays which will show: Hopewell villages and burial mounds; sculpture; ceremonies; and the materials which they received by means of trade.

Thus, the round of daily activities of an important group of Indians who lived in southern Ohio about 700 years ago has been carefully reconstructed from evidence secured by studying Hopewell burial mounds. We have presented this round of daily activities by means of carefully planned exhibits which are attractive in layout and color. Labeling has been reduced to a minimum and no scientific terms have been used.

Another exhibit, called "The Death Cult," is unique and illustrates a curious period of emotionalism in the life of the American Indian. This exhibit shows some of the symbols and objects associated with what was really a religious revival. This religious outburst, which lasted from about A.D. 1550–1650, centered in the southeastern part of what is now the United States, and manifestations of it were present in large portions of the east.

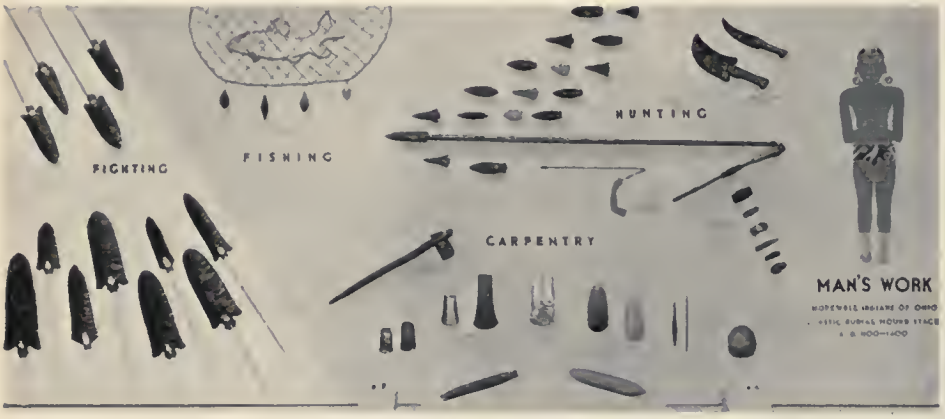
It is presumed that at about A.D. 1525 most of the Indians of North America had at least *heard* about the white man and the many unpleasant and cruel tricks he played on the Indians; although few of them had ever *seen* a white man. At any rate, by the year 1550, the Indians of eastern America

must have unconsciously experienced a premonition of impending doom. Wild rumors and stories about the Spanish conquest of the Aztec empire by means of treachery and the consequent rapacious pillaging and plundering had probably reached their ears. They had probably also heard of the barbarous treatment accorded the Southwestern Indians by the Spaniards. Then the De Soto expedition which started from Florida and wandered through many of the southern states (1539–1542) had certainly made a most unpleasant impression on the terrified Indians and had probably given them some inkling as to how their wives, children, property, and their own lives would be ravaged. The Indians sensed the fact that they had "three strikes" on them, and that the horses, guns, cannons, and armor of the whites made them unconquerable.

It is also probable that, in addition to their fear of the white man, the Indians may also have been experiencing other tough luck, such as crop failures and new and strange diseases which swept the country in epidemic form. The population may also have declined.

THEN, AS NOW, FIGHTING DOMINATED MAN'S WORK . . .

. . . as this exhibit of Hopewell activities indicates by its emphasis on weapons, shown at left. Hunting, fishing, and carpentry were also important elements in the lives of these Indians who lived in southern Ohio about A.D. 1100-1400, the display of implements shows.



PREPARATIONS FOR SURVIVAL

Apparently, then, about 1550, the Indians of eastern North America unconsciously knew that their civilizations were going to pieces. It was a time of chaos, despair, unhappiness, and general tension. The Indians were scared and the future looked black and uncertain. Even the art of this period is "nervous" and does not reflect the tranquillity and stability of previous periods.

During such times of stress and strain, what do people usually do about such problems over which they have no control? They often turn to religion. The Indians of the period between 1550 and 1650 did just this. Religion and ceremonial forms became more important than ever before. It seems probable also that there was greater preoccupation with death. Death symbols —such as skulls and crossbones, trophy heads severed from the bodies of enemies, and representations of human bones—became very important in the sacred art and may be seen on pottery, shell pendants, copper ornaments, and stone paint palettes. Furthermore, religious art forms similar to those found in Mexico—such as the weeping eye symbol, the fighting turkey cock, the woodpecker, the spider, and eagles—were borrowed and adapted to the needs of this religious revival.

WOMAN'S WORK, THEN, AS NOW, WAS "NEVER DONE" . . .

. . . judging from the variety of tools and utensils used for cooking, sewing, and weaving by the Hopewell housewives and recovered from the ruins of their unique hamlets for this new exhibit.

Additional evidence of the restlessness and the dismal spirit of the times is reflected by the sudden movement of the people. Heretofore, the Indians had built their villages near large and important rivers—the highways of those times. Now during this Death Cult or religious revival period, the people left their ancient and favorite village sites and retreated into less desirable, small, unimportant and inaccessible river valleys. And most of these villages were now fortified against possible enemies. In other words, they were trying to hide from the white man and his devastating and upsetting ways; and judging from the fortified villages, we assume the Indians were preparing to make a fight for their lives. Before this time of religious revival, each village contained at least one "temple" mound, that is a flat-topped mound (about 20 feet high) on top of which stood a religious structure. But now, after the people became scared and retreated into remote areas, these "temple" mounds became much larger (some being 75 feet high). This increase in the size of mounds may also indicate a deeper concern with religion.

One important fact about the Death Cult should be noted: the "death cult" idea and all the objects and symbols associated with it were independent of people, area, and civilization. In other words, the revival of interest in religion and possibly in life after death was widespread and was not limited by language, culture, or tribe. It was, in a way, similar to the European Crusades—an hysterical religious outburst which swept over the continent without respect to language, people, political borders, or civilizations.

THE "DYSPHORIA COMPLEX"

Thus, the Death Cult exhibit shows some of the symbols, art, and sacred objects used during this time of renewed interest in religion. The general psychological symptoms typical of this period are characteristic of a state of mind sometimes called dysphoria—that is, a general feeling of dissatisfaction, unhappiness, unrest, and perhaps despair.

From time to time, more exhibits will be added to this section. These will deal with such subjects as: Where the American Indian came from and how long he has been in the New World; the civilizations of ancient Peru, Mexico, the Southwestern United States, the Great Lakes region, California, Alaska and New England.

MORE DIORAMAS PLANNED

In addition to the diorama of an ancient cliff house in Arizona (now on exhibition in Hall B), there will be three more: one dealing with the Inca civilization of Peru; one, with one of the civilizations of Mexico;

and one, with the Temple Mound Period of the Southeastern United States. Mr. Lee Rowell is working on one now.

This newly opened section, when finished, will then present to any interested adult or child a bird's-eye view of the ancient civilizations of the American Indians. Then, equipped with the background furnished by this section, the visitor can more easily understand and enjoy the exhibits concerned with present-day Indians of North, Central, and South America. Furthermore, from a study of the ancient civilizations of the Indians, we can learn some lessons which will be helpful in our daily life.

HOPEWELL INDIAN

Restoration with ceremonial deer-antler headdress of copper.

All of these exhibits have been carefully planned and simplified so that they may easily be understood. The original ideas and the general tone of the new types of exhibit were formulated by Mrs. Anne Spoehr and her husband, Dr. Alexander Spoehr, who is temporarily serving in the United States Navy; and they carried out these ideas in Section 1 of Hall B. After the completion of the first section (opened to the public in January, 1943), Mrs. Spoehr resigned as staff artist of this department and joined her husband on the west coast.

Since that time, the exhibits in the second section of Hall B have been skillfully planned and executed by Curator Donald Collier, Curator George Quimby, and Mr. Gustav Dalstrom, our present departmental artist. Mr. Dalstrom is well known for his paintings which have been widely exhibited, and for his murals.

By constant co-operation we have achieved in this new hall a harmonious balance between color, layout, and objects. I believe that we have established a new precedent in museum exhibition work and one of which the Museum may be proud.

Mutilations of the Body

Throughout the ages men and women have mutilated themselves either to enhance their powers of attraction to the opposite sex, as marks of social status, or for therapeutic reasons. Examples of tattooing, scarification, deformation of the skull, binding of the feet and ear lobes, filing the teeth, hair shaving in patterns, and splitting the nasal septum, are shown in photographs in Case 7, Hall 3 (Races of Mankind).

Bronze busts, by Malvina Hoffman, of an Ubangi "duck-billed" woman of French Equatorial Africa, and a Padaung "giraffe-necked" woman of the Karen tribe of upper Burma, are on exhibition at the east end of the hall. Examination of these body mutilations demonstrates the remarkable lengths in voluntary torture to which mankind subjects itself for the sake of "decoration."

A HISTORICAL NOTE FOR TEA DRINKERS

Confirmed tea-drinkers (aren't tea-drinkers always "confirmed" when mentioned in conversation?) may find academic interest, thinks Dr. C. Martin Wilbur, Curator of Chinese Archaeology and Ethnology of this museum, in a bit of tea history which he recently discovered. Tea, like "T," seems to stand for Tyranny—it's always turning up in history—and Dr. Wilbur's item concerns a sort of one-man revolt that occurred about 2,000 years ago in China.

Dr. Wilbur (who prefers coffee) has found what probably is the earliest written reference to tea—a reference that dates some three centuries earlier than "the earliest previously known literary reference to tea drinking that has been commonly accepted by Sinologists." This occurs, of all places, in a contract for the purchase of a slave. The document bears a Chinese date which corresponds to February 18, 59 B.C. of our calendar.

"Tea is casually mentioned twice in the T'ung yueh 'contract for a slave,' by Wang Pao, a writer who lived in the first century B.C.," says Dr. Wilbur. "This is recounted in a humorous essay in verse form which describes, perhaps fictitiously, a visit by the author, a native of Chengtu in Szechwan, to a widow who owned an unruly male slave. Wang Pao requested that the slave, Pien-lao by name, be sent to buy some wine, but the slave refused to go, contending that his late master had not contracted for him to do errands for other gentlemen. Wang then offered to buy the slave, who promptly insisted that the purchase contract list every duty the new master would call on him to perform (apparently slaves had some rights in those days). The remainder of the document is a detailed, humorous, and very revealing list of Pien-lao's future duties. The first mention of tea is in a list of preparations to be made for dinner parties. In addition to fetching wine and cooking various foods, the slave is instructed to 'boil tea and fill the utensils.' Then, in a description of the slave's marketing duties it is instructed that 'at Wu-yang he will buy tea.'"

If one is going to camp or travel in the wilds it is well to have some knowledge of poisonous snakes. The only poisonous snakes found in North America are the rattlesnakes, water moccasins, copperheads, and coral snakes. Examples may be studied in Albert W. Harris Hall (Hall 18).

THE OPAL SUPERSTITION

By HENRY W. NICHOLS

CHIEF CURATOR, DEPARTMENT OF GEOLOGY

The superstition that the opal is a bearer of ill fortune—a belief that prevailed during the 19th century—is now rapidly disappearing. Such fear of the opal was comparatively recent in origin, for during the Middle Ages and earlier times the opal was regarded contrariwise as a gem bringing much good fortune to its owner. How and just when the superstition arose is unknown. Certainly during the early 17th century the opal was held in higher esteem than it is at present. One authority states that the belief came from an old German superstition. Others say that it came from the influence of Sir Walter Scott's novel, *Anne of Gierstein*, in which an opal played such a malignant part. It seems more probable, however, that Scott conceived the idea of an opal of evil influence from an already existing belief.

In ancient times the opal was believed to have all the virtues of all the gems whose colors appeared in it. As the fire of the opal includes the colors of all gems, and as in those superstitious days each kind of gem had a long list of cures and many beneficial influences ascribed to it, the opal possessing all these must have been highly prized.

BELIEVED AID TO VISION

Opals were especially potent as charms to avoid or cure diseases of the eye. It increased keenness of vision of the wearer and dimmed that of the onlooker. One virtue of the greatest value to the wearer, but surely not to society, was its property of making a thief invisible so that he could pursue his vocation unhindered. If only this were true, it could be used to advantage now by equipping commando units with opal rings!

The list of curative and other virtues especially ascribed to the opal is too long to record here and does not differ much from those credited to other gems. The high regard in which the opal was held by the Romans is illustrated by the case of the Roman senator, Nonius. He possessed an opal the size of a filbert set in a ring. Because he refused to part with it he was banished by Marc Antony and preferred life in exile with his opal to life in Rome without it.

The most extravagant praise ever given any gem is found in a description of an opal written by Petrus Arlensis in 1610. He must have had a stone equal to the Sun God opal in this museum's collection (H. N. Higinbotham Hall of Gems and Jewels—Hall 31), for, among other equally extravagant things, he says, "in which such beauty, loveliness and grace shown forth that it could truly boast that it forcibly drew all other gems to itself while it surprised, astonished and held captive without escape or intermission the hearts of all who beheld it."

NEW ZEALAND EXHIBITS INCLUDE RARE MAORI BUILDING

By WILFRID D. HAMBLY
CURATOR OF AFRICAN ETHNOLOGY

New Zealand, a critical war area, is well represented by collections filling approximately half of Hall F (Polynesia and Micronesia) at the Chicago Natural History Museum.

The outstanding exhibit in this hall—and one which has no equal in any other museum—is a Maori council house nearly sixty feet long, twenty feet wide, and fourteen feet high inside. Maori council houses more than twenty-five feet long were always exceptional, and today very few of these council houses of any size have been preserved anywhere. In addition to being the largest such house extant, the Museum's example is one of the finest ever encountered by ethnologists, and it is the only one now existing which has a completely carved front. Its decorations show Maori art at its best.

MAORI COUNCIL HOUSE AT MUSEUM

Very few such structures remain in existence either in use by New Zealand natives, or preserved in museums, and this one, on exhibition in Hall F, is believed to be the largest and finest in the world today.

The Maori were the best wood-workers in the Pacific, and all their mechanical skill and artistic ability were lavished on the construction of their great council houses (*whare whakairo*). These were primarily council and guest houses, but were also used as dormitories. They were usually erected as memorials of some great event, such as the birth of an heir to the principal chief of the tribe. The materials were selected with great care, the framework being hewn from trees which had been buried in river beds until they had lost their sap wood and become thoroughly seasoned. The ridge-pole was the most important member, and was always made from a single log. That of this house is nearly sixty feet long, and weighs a ton and a half. All the upright timbers were carved with conventionalized figures of ancestors, while the rafters and ridge-pole were painted with scroll designs. The spaces between the side posts were filled with panels of woven reeds. The roof and walls were covered on the outside with a thick reed thatch. Long beds were made along either side of the house, and there was a small fire-place near the door.

PARLIAMENTARY GHOSTS

We may not regard the Maori council house merely as a building to accommodate what corresponds to a legislative or governmental body. The council house of the Maoris has a strong spiritual significance and the ghosts of dead chiefs were believed to attend the meetings.

In the first place the choice of a site was of extreme importance, and trees which were chosen to provide the building material were chopped to the accompaniment of chants and incantations. Laying of the foundation stone near the doorway was accompanied by human sacrifice of a person of importance, sometimes the son of a chief. The heart of the victim was removed and eaten by the priest who performed the sacred rites. Jade ornaments were buried near the foot of one of the house-posts.

The council house in the Chicago Natural History Museum provides an excellent example of the type of carving which the Maoris applied with lavish hand to their canoes, food bowls, and ornamental staffs. The work was done with tools of stone, shell, and bone; for before the landing of Europeans the Maoris had no knowledge of metal tools. The designs are for the main part geometrical, consisting of a very accurate spiral design. But the human face is often portrayed with a protruding tongue which was a symbol of defiance to enemies, and the gesture was made repeatedly during a war dance.

Accompanying the elaborate designs of the wood-carver was a color scheme usually carried out with red ocher mixed with fish oil, and additional decorations were provided by the insertion of mother-of-pearl.

DESIGNS CARVED IN FLESH

Some of the best Maori carving, strangely enough, the Maoris applied to their own faces in the form of "moko." This should not be described as tattooing which is marking of the skin by small punctures. The Maori made designs in the flesh by chiseling little grooves which were filled with a blue-black dye. "Moko" heads became objects of trade when they were desired by European collectors, in the same way that the shrunken heads made by the Jivaro Indians of South America have acquired high value.

It is hardly necessary to say that when the demand was great "moko" was faked after death. But a scientist can tell whether the "moko" was pre-mortem or post-mortem by a microscopic examination of the coloring matter in the tissue. The pre-mortem process allowed the dye to sink deeply into the dermis or true skin while on the contrary post-mortem "moko" work usually affected only the epidermis or the outer skin.

OPENING CEREMONY

The opening of a new council house required the attendance of a priest who climbed to the top of the house where he performed a ceremony to keep away evil influences. In performing this acrobatic and undignified feat he had to be careful not to slip or fall, for any action of that kind would be the worst kind of omen. Immediately on descending from the roof the priest entered the house through a window and unfastened the door. The ceremony was completed sometime later by three elderly women of high social status who were the first to cross the threshold, which they did to the accompaniment of chants invoking the god of the house to protect the building.

The Maoris had an elaborate sort of government carried out by greater and lesser chiefs who were the only ones allowed to do any talking when the house was in session. This they did with great volubility, and at the present day Maori councilors in the New Zealand House of Representatives are noted for their eloquence. With these associations in mind we now regard this rare object in the Chicago Natural History Museum, not merely as an example of Maori art. The house is a structure representing the magic, religious beliefs, and entire system of government of the distinguished Maori people, many of whom are now playing an active part with the Allies in the present war.

Other New Zealand material on exhibition at the Museum illustrates well other features of the culture of the ancient Maori. Prominent among these is a collection of jade implements and feathered robes which is regarded as the best in the United States.

SOME LAND ANIMALS OF BERMUDA

By KARL P. SCHMIDT
CHIEF CURATOR, DEPARTMENT OF ZOOLOGY

If you are accustomed to thinking of Bermuda as a naval base and airplane station, as a place for honeymooners and convalescents, and as the source of onions and lilies, it may surprise you to learn that the islands have received no little attention from scientists, especially the small group of biologists who are interested in the hows and whys of the distribution of animal life. Even if you know about the interesting deep-sea dredging, and the spectacular descents with the bathysphere made by Dr. William Beebe, you may not have heard of the more permanent foothold of science in the form of the Bermuda Biological Station for Research, at Shore Hills, St. George, where students of marine life find an opportunity for research under most pleasant conditions.

But the marine animals of Bermuda are for the most part like those of the West Indies. It is not because of the animal life of the sea that Bermuda is mentioned in textbooks of zoology, even elementary ones. It is the land animals that are especially interesting to animal geography, both because there are a few kinds that are found on Bermuda and nowhere else, and because of their very fewness. Striking also is the fact that the abundant types of animal life on the mainland of North America are so poorly represented in these islands. Oceanic islands are wonderful natural laboratories where "new species" have been produced, as is demonstrated by the existence of distinctive island faunas; and great controversies have been waged again and again over the problem of the origin of such seemingly orphaned species.

North American birds and bats visit Bermuda in the course of their migrations, and it is of course obvious that they cross the ocean by flying, influenced no doubt to some extent by storms. Seven species of land birds are resident in Bermuda, and six of these are now regarded as distinct from their relatives in the eastern United States. In Darwin's time it was thought that they were identical with the American species, and the fact is that they are only slightly different.

FEW MAMMALS, AND NO SNAKES

Turning to the land mammals, we find only the rats and mice, and the goats, cows, and ponies that have come with the human population. There are no field mice, no deer mice, no gophers or squirrels, no deer or raccoons, in short none of the different kinds of wild mammals that inhabit the mainland of the United States to this day.

There are no snakes of any kind, but there is a lizard, a handsome shiny-scaled species, related to the common five-lined skinks of North America. This species, however, proves to be a very distinct one, not to be confused with any of the mainland forms. It is known in zoology as *Eumeces longirostris*, which may be translated as "long-snouted skink." Many specimens of this interesting and of course harmless creature have been collected; but no detailed studies of its habits, its food and egg-laying, growth or mating have been made. This lizard affords an opportunity for some amateur naturalist to make a real, if humble, contribution to science by undertaking such studies and by making a photographic record of them.

There are no native frogs or toads, which may be rather difficult for the visitor to believe if he happens to arrive when the big Trinidad toads (misnamed by scientists "marine toads") are engaged in their mating chorus, which sounds like hammering on boards, or when the little West Indian tree frogs sound their bell-like notes in the very hotel gardens. The toad and the tree-frog are both introduced species. The toad was brought in to aid the gardeners in destroying insect pests, which were likewise imported. The tree frog seems to have been introduced by accident from Jamaica.

FROGS TRAVEL IN PLANT IMPORTS

Now you may well ask, how could frogs be brought in by accident? The ordinary frogs of the United States probably would not be subject to such accidental transport; but in a large group of West Indian frogs the eggs are laid on land, in moss, or in the axils of leaves; and, as many types of plants have been imported into Bermuda from Jamaica, it seems certain that clusters of eggs must have been brought in this manner, or that some of the small frogs stole a ride hidden in moss or in the leaves of shrubs. In any case, the Jamaican frog with the long but euphonious name *Eleutherodactylus luteolus* is now common and wide-spread in the Bermudas.

When I made a short visit to Bermuda in November, 1928, as scientist for an expedition of Field Museum of Natural History sailing in the *Illyria*, the private yacht of Mr. Cornelius Crane (of Ipswich, Massachusetts, and Bermuda), the little tree-frog was singing in the gardens of Hamilton. While searching for lizards on a nearby hillside, I found one of these frogs at the opening of an excavation under a flat stone. When this was turned over, three clusters of pearl-like eggs were seen in the burrow. It seems that the male finds a suitably moist egg-laying site and stations himself there, inviting successive females to place their egg-masses in his charge. The three egg-masses, at any rate, were in different stages of development.

In the oldest of the eggs the fully formed froglets could be seen through the gelatinous covering, each with arms and legs well developed and wholly unlike the tadpole stage that always develops in the more familiar American frogs. The only suggestion of the tadpole stage was the large flattened tail, which can be seen to be filled with blood vessels by means of which the developing frog breathes. The jewel-like perfection of these frog-atoms never fails to draw a gasp of admiration from the observer. Here is another opportunity for the amateur naturalist with note-book and camera!—although probably not feasible until after the war.

Lieutenant Traylor Wounded

A dispatch from a combat correspondent of the U.S. Marine Corps, published in Chicago newspapers December 8, reports that First Lieutenant Melvin A. Traylor, Jr. (Associate in Ornithology on the staff of the Museum) was wounded during the Marines' assault on the island of Tarawa. According to the dispatch, Lieutenant Traylor was engaged in directing artillery fire against Japanese pillboxes and bunkers when he was struck by an enemy bullet. His injuries are believed to be not serious and he is reported to be receiving expert medical care. Earlier in the year Lieutenant Traylor had been awarded the Silver Star for similar gallantry and intrepidity during action on Guadalcanal.

If birds are inevitably associated in your mind with flying, you will be surprised by the number and variety of flightless birds on display in the Halls of Birds (Hall 20—Habitat Groups, and Hall 21—Systematic Series).

CHICAGO HAS PHOTO RECORD OF BOMB-RUINED "TYPES"

BY PAUL C. STANDLEY
CURATOR OF THE HERBARIUM

At the outset of the war, the dire possibilities of bombing were recognized by museums, especially in England where valuable and often irreplaceable collections were quite promptly removed to places of comparative safety. Even in the United States similar precautions were taken, at least by institutions situated near the Atlantic and Pacific coasts. In Chicago no removals were actually carried out, but definite plans were made for speedy action in case warning should be given by bombings on the coast. This seemed to be sufficient and events have proved it to be so.

Early in the war the American section of the herbarium containing the great historic collection of dried plants of the British Museum in London was destroyed by German attackers. This was doubtless a grievous loss, but it was greatly mitigated by the fact that the more valuable parts of the collection had been placed in safety.

It is now reported via Sweden and Switzerland, and confirmed by our State Department, that the Botanical Museum in Dahlem, a suburb of Berlin, was struck during an air raid and that the herbarium building with all its collections, and its large library, were completely destroyed, either by direct hit or by ensuing fire and water. Practically nothing had been evacuated and nothing was salvaged except the ferns and some of the fungi.

GOERING: "BERLIN SAFE FROM BOMBS"!

It seems fair to assume that the German botanists would have been just as careful to seek safety for their principal treasures as the British and the Americans if they had been permitted or encouraged to do so by their government. Since Goering had assured them they would never be bombed, however, and since this idea continued to be promoted for supposed reasons of morale, nothing seems to have been done.

The Berlin Museum was one of the largest botanical institutions of the world, and the one most active in recent years. It was particularly rich in plants of Africa and tropical America, especially of South America. Since it had been a center of botanical research for perhaps 150 years, it possessed a vast number of type specimens of plants, that is, the standards or historical specimens used by botanists in describing and publishing new species. The loss, therefore, is a very great one. Its magnitude, however, is somewhat reduced by fortunate and foresighted action taken before the war on the initiative of the Department of Botany of our own Chicago Natural History Museum.

FORTY THOUSAND PHOTOGRAPHS HERE

More than fifteen years ago, this museum, in anticipation of the possible destruction of historic botanical collections in Europe, proposed a plan for photographing such specimens, which was carried out in part with the co-operation of The Rockefeller Foundation. Mr. J. Francis Macbride, Associate Curator of the Herbarium, spent more than ten years photographing type specimens in the herbaria of Berlin, Copenhagen, Munich, Vienna, Paris, Geneva, Madrid, and elsewhere, making more than 40,000 photographs. Included are 15,800 Berlin types. The negatives and prints are now in Chicago, and many prints have been distributed to other botanical institutions in North and South America, and Europe.

This foresight is well justified by what has happened. These type specimens are indispensable for standardizing the names of plants. Many thousands of them were destroyed at Berlin, and they represent not the property of the German botanists but the yardsticks, so to speak, by which thousands of our American plants are to be judged. Many of the types are duplicated by specimens distributed to other botanical institutions of Europe and America, but many others were unique. The only substitute for them hereafter will be these photographs made by our museum, which may be duplicated indefinitely for distribution to other institutions.

The Berlin Museum apparently has announced officially the discontinuance of all its publications, most ambitious of which was a flora of the whole world. With its contents there presumably were lost collections of material on loan there from herbaria of America, including several lots of specimens lent before the war by our museum. One correspondent has hinted that in addition to its own rich collections, no one knows what may have been removed by the Nazis to Dahlem from botanical museums of conquered nations. There were great herbaria in Paris, Brussels, and Leyden.

THE MUSEUM HONOR ROLL

Now in the Nation's Service

Army

THEODORE ROOSEVELT, Trustee—Brig.Gen.
GEORGE A. RICHARDSON, Trustee—Lt. Col.
CLIFFORD C. GREGG, Director—Colonel, G.S.C.
DR. JOHN RINALDO, Associate, Southwestern Archaeol.—Staff Sgt.
DR. SHARAT K. ROY, Curator, Geol.—Capt.
D. DWIGHT DAVIS, Curator, Anat. and Osteol.—Corp.
BRYAN PATTERSON, Curator, Paleontology—Pvt.
EMMET R. BLAKE, Asst. Curator, Birds—Special Agent, War Dept.
RUPERT L. WENZEL, Asst. Curator, Insects—Capt.
HENRY S. DYBAS, Assistant, Insects—Pvt.
WILLIAM BEECHER, Temp. Asst., Zool.—Pvt.
HENRY HORBACK, Asst., Geol.—Pvt.
JAMES C. MCINTYRE, Guard—2nd Lt.
RAYMOND J. CONNORS, Guard—Pvt.
FRANK J. DUTKOVIC, Janitor—Pvt.

Navy

LESTER ARMOUR, Trustee—Comdr.
SAMUEL INSULL, JR., Trustee—Lieut. Comdr.
JOSEPH NASH FIELD, Trustee—Lieut.
COLIN CAMPBELL SANBORN, Curator, Mammals—Lieut.
DR. ALEXANDER SPOEHR, Asst. Curator, N. Amer. Ethnol.—Lieut. (j.g.)
LOREN P. WOODS, Asst. Curator, Fishes—Ensign
JOHN W. MOYER, Taxidermist—Ch. Specialist (Bur. Aeronautics)
PATRICK T. MCENERY, Guard—Master-at-Arms
JOHN SYCKOWSKI, Guard—Ch. Commissary Stewd.
GEORGE JAHRAND, Guard—Ch. Water Tender
CLYDE JAMES NASH, Guard—Ch. Gunner
NICHOLAS REPAR, Printer—Aviation Machinist's Mate 2C.
MORRIS JOHNSON, Carpenter—Carpenter's Mate 2C.
HERBERT NELSON, Painter—Painter 1C.
ELIZABETH BEST, Guide-Lecturer—Ensign, WAVES
MARIE B. PABST, Guide-Lecturer—WAVES

Marine Corps

MELVIN A. TRAYLOR, JR. Associate, Birds—1st Lt.

Coast Guard

M. C. DARNALL, Jr., Guard—Ensign
JOHN MCGINNIS, Guard—Ch. Boatswain's Mate

Other Services

RUDYERD BOULTON, Curator, Birds—Staff of Office of Strategic Services
BRYANT MATHER, Asst. Curator, Mineralogy—Civilian Worker, Corps of Engineers, U.S. Army
LLEWELYN WILLIAMS, Curator of Economic Botany—on special service for U.S. Government
DR. JULIAN A. STEYERMARK, Asst. Curator, Herbarium—field work for Board of Economic Warfare
DR. C. MARTIN WILBUR, Curator, Chinese Archaeol. and Ethnol.—Staff of Office of Strategic Services

. . and Some Who Have Served and Been Honorably Discharged:

FRANK BORYCA, Asst. Prep., Bot.—Pvt. U. S. Marine Corps.
BERT E. GROVE, Guide-Lecturer—Medical Aide, American Field Service, Africa.

NATURE AS A BONESETTER FOR INJURED ANIMALS

By DOROTHY FOSS
ASSISTANT IN ANATOMY AND OSTEOLOGY

In time of war, men may well yearn for a magic power to regenerate lost fingers or limbs. Such a power would erase the heartbreak of crippling accidents, diseases, or war wounds. If a limb could be replaced in a few months, and the incapacitated person made whole again, it would indeed be "too good to be true;" unfortunately it *is* too good, for such regeneration does not occur for any animal higher on the tree of life than the salamander, which does regrow whole limbs, although frogs and lizards and all higher animals have lost this capacity.

All the lower animals have great powers of regeneration. This ranges from the earthworm's ability to grow two worms from the halves of one cut in two to the sea cucumbers, which are able to eject their internal organs to a predaceous enemy, and within a short period grow a complete new set. Likewise, the latter's relatives, the starfishes, can grow a whole new "star" from an arm if it is cut off.

Nature hasn't entirely forgotten the higher animals, however. As animals have progressed from the simple forms toward complexity and specialization, the powers of regeneration have become increasingly restricted. Above the level of the frog, loss of power to replace lost parts becomes evident. A good many lizards leave their wriggling tails in the grasp of their enemies, and in a few months grow others. The new tail is supported by a cartilaginous rod, to replace the lost caudal vertebrae, and may have a different type of scales, but it it is otherwise as good as new. Lizards, however, are unable to regrow lost limbs or toes. Turtles grow new shells to replace injured parts, although lost limbs, and even tails, are irreplaceable.

In still higher forms of life this power is limited to mending broken bones, and to filling in muscle and skin wounds with scar tissue. When a doctor fits the broken ends of a man's bone together, and immobilizes the limb, the organism immediately begins to cover the break with new bone. When the healing is complete, the fracture will have a heavy layer of new bone, which shows as a slight bulge. Thus at the point of the original break the bone will be much stronger than the adjoining bone. We can be sincerely thankful that this fragment of the remarkable power of regeneration has not been denied us, and should hope that the overspecialization of the cells will not become a fact.

Animals in the wild have no recourse but "Mother Nature" when a fracture occurs, and sometimes these breaks heal as cleanly and neatly as though a doctor had set them. Ribs and vertebral processes usually heal without much distortion, but in the case of legs it is a different matter. Because of the pain, the animal uses the limb as little as possible, but in the course of searching for food, and escaping enemies, the leg inevitably gets a good deal of rough handling. the powerful muscles in contracting pull the broken ends of bone together, and thus often past each other, and this causes the peculiar distortion of the limbs that is frequently observed. Natural healing of broken bones, even of limbs, is quite well known to observant hunters and naturalists. They have been observed even in fossil skeletons.

The recent receipt at the Museum of a naturally healed leg bone of a pheasant, shot by Mr. E. W. Atkinson calls attention to this subject. The bone in question represents a case of natural healing with little distortion. The new bone is strong and solid, and although the healed bone is three-fourths of an inch shorter than the femur of the other leg, the bird's limp was obviously no great handicap.

RESTORED BY NATURE

Femur of a pheasant as healed after fracture, compared to normal leg bone.

In the case of the tibia of a caribou, the broken ends of the bone were approximately two inches apart. The leg was shortened about five inches. The new bone encasing the break was not solid but took the form of a hollow sphere which was approximately six inches wide, and sixteen and one-half inches in circumference. In this case, the new growth of bone was very thin. This is contrary to most breaks, in which the healed break is much stronger than before.

Such cases of natural healing are of interest as showing the great tenacity of life, and the powers even of higher animals to heal grave wounds under natural conditions Nevertheless, it must be admitted that such crippling is usually a handicap leading to the destruction of the animal in question by its natural enemies.

Exceptional cases of healing naturally attract attention because of the unique way in which nature takes care of her own, without doctors or hospitals.

CATTLE DECEIVE SCIENTIST

Louis Agassiz, who first developed the theory of the Ice Age and continental glaciers, visited the "Mount" near Montevideo, Uruguay, during the voyage of the *Hassler* in 1872. In a large boulder of red granite found there, he noticed that crystals projecting on its lower quarter were roughly polished and that there were a few parallel scratches. From these he concluded erroneously that the rock was a glacial boulder and that Uruguay had once been covered by the ice of an ice age—a conclusion which is now known to be untrue.

In 1926 a member of a Field Museum expedition made a careful study of the rock shown him by a geologist of the Uruguay National Museum, and photographed it. For reasons which need not be detailed here he saw that the markings could not be of glacial origin, but was at first unable to explain them. The true explanation as given him by a geologist from the National Museum in Montevideo is absurdly simple.

Uruguay is a cattle country. The cattle rub against any convenient surface to rid themselves of ticks and flies. They even rub through unprotected telegraph poles until they fall. Constant rubbing of the rough hides of cattle against the boulder amply accounts for the mysterious smoothing and scratching. —H.W.N.

Technical Publications Issued

The following new technical publications have been issued by Chicago Natural History Museum Press:

Zoological Series, Vol. 24, No. 26. *Peruvian Snakes from the University of Arequipa.* By Karl P. Schmidt and Warren F. Walker, Jr. October 20, 1943. 18 pages. $0.15.

Zoological Series, Vol. 24, No. 27. *Snakes of the Peruvian Coastal Region.* By Karl P. Schmidt and Warren F. Walker, Jr. October 20, 1943. 28 pages, 1 text figure. $0.20.

Zoological Series, Vol. 24, No. 28. *Three New Snakes from the Peruvian Andes.* By Karl P. Schmidt and Warren F. Walker, Jr. October 20, 1943. 6 pages. $0.10.

Zoological Series, Vol. 24, No. 29. *Amphibians and Reptiles from the Sudan.* By Karl P. Schmidt. October 20, 1943. 8 pages, 1 text figure. $0.10.

Zoological Series, Vol. 24, No. 30. *The* White Sands Earless Lizard. By Hobart M. Smith. October 20, 1943. 6 pp. $0.10.

Botanical Series, Vol. 20, No. 7. *Myxophyceae of Eastern California and Western Nevada.* By Francis Drouet. November 20, 1943. 34 pages. $0.15.

Zoological Series, Vol. 24, No. 31. *A Study of the Torrent Ducks.* By Boardman Conover. November 20, 1943. 12 pp. $0.10.

Zoological Series, Vol. 24, No. 32. *The Odonata of Chile.* By James G. Needham and Dillman S. Bullock. November 20, 1943. 18 pages. $0.15.

Zoological Series, Vol. 24, No. 33. *Bird Lice from the Tinamidae.* By Theresa Clay. November 26, 1943. 12 pages. $0.15.

Zoological Series, Vol. 29, No. 2. *Notes on Coral Snakes from Mexico.* By Karl P. Schmidt and Hobart M. Smith. November 26, 1943. 8 pages. $0.10.

Zoological Series, Vol. 30. *The Mammals of Chile.* By Wilfred H. Osgood. December 28, 1943. 268 pages, 33 text figures, 10 maps.

Geological Series, Vol. VII, No. 6. *Measurements of the Age of the Solar system.* By Robley D. Evans. December 28, 1943. 20 pages, 5 text figures.

Zoological Series, Vol. 29, No. 3. *The Auditory Region of the Arctoid Carnivores.* By Walter Segall. December 31, 1943. 28 pages, 4 text figures.

SUNDAY LECTURES IN FEBRUARY ON LORE OF DIAMONDS

Although Paul G. Dallwig, the Layman Lecturer of the Museum, will make no appearances here during January because of a lecture tour to other cities, he will resume his Sunday afternoon lectures at the Museum on the first Sunday in February (*February 6*).

"The Romance of Diamonds From Mine to Man" will be the subject of Mr. Dallwig's lectures at the Museum in February, and will be given each Sunday afternoon. In this lecture Mr. Dallwig will tell the story of diamonds from their original "find" through the various stages of mining, sorting, cutting, polishing, pricing, and marketing. He will also dramatize in word pictures the finding and mining of diamonds in South Africa. The dramatization will be divided as follows:

Act I.—The Original Find

Act II.—The Diamond Rush

Act III.—A Trip Through A Diamond Mine

In addition, this lecture will include the fascinating stories of hate, love, greed, and murder attached to the successive ownership of the world's "famous historic diamonds." The program will be given in the Museum Lecture Hall, and end with a "social hour" in H. N. Higinbotham Hall of Gems and Jewels. Mr. Dallwig's lectures all begin promptly at 2 P.M. and end at 4:30. During a half-hour intermission the audience has opportunity for smoking, refreshments, and relaxation.

The size of Mr. Dallwig's audiences is necessarily limited; for this reason it is essential to make reservations in advance by mail or telephone (WABash 9410). The experience of past seasons is that long waiting lists are quickly formed for each title. There is no charge for the lectures or reservations, and admission to the Museum itself is free to everyone on Sundays.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the last month:

Department of Anthropology:

From United States Marine Corps—55 photographs, South Pacific Islands; from Mrs. John H. Harmon, Highland Park, Ill.—a Chaco jar, New Mexico.

Department of Botany:

From Brazilian Consulate, Chicago—88 economic plant products of Brazil; from Donald Richards, Chicago—800 cryptogams, Vogeso-rhenanae; from Forest Service, United States Department of Agriculture, Washington, D.C.—17 herbarium specimens, Costa Rica.

Department of Geology:

From Brazilian Consulate, Chicago—5 specimens of bauxite and one of monazite sand, Brazil; from George J. Carson, Akron, Ohio—2 specimens of stromatopera and one of agate, California and Ohio; from Edwin C. Galbreath, Ashmore, Ill.—a fossil crane bone, Illinois; from an anonymous donor—20 specimens of gems and minerals, including 16 small cabochon-cut opals.

Department of Zoology:

From Mrs. Edw. F. Lustig, Elkhart, Ind.—408 butterflies and 2,381 moths, United States—mostly Illinois, Indiana, and Michigan; from Lt. Harold Trapido, Camp Davis, N. C.—26 frogs, lizards, and salamanders, Washington; from Chicago Zoological Society, Brookfield, Ill.—30 birds and 5 mammals; from Bernard Benesh, North Chicago, Ill.—44 stag-beetles; from Gordon Johnson, Hinsdale, Ill.—a rattlesnake, Indiana; from Edward W. Atkinson, Evanston, Ill.—a pair of pheasant femurs, Minnesota.

Library:

Valuable books from Francisco Tamayo, Caracas, Venezuela; from Department of Subways and Superhighways, Chicago; from Dr. Henry Field and Carleton R. Ball, Washington, D. C.; from Council on Intercultural Relations, New York; from Dr. George B. Cummins, Lafayette, Ind.; and from Dr. Wilfred H. Osgood and Boardman Conover, both of Chicago.

Staff Notes

Mr. Donald Collier, Curator of South American Ethnology and Archaeology, has been appointed Editor of South American Archaeology for the *Handbook of Latin American Studies*, an annual publication which lists and reviews scholarly publications in the Latin American field.

Mr. Paul G. Dallwig, the Museum's Layman Lecturer, in recognition of his research on gems, has been elected an associate member of the American Gem Society (national and international). He has lectured several times before the society.

Mr. Oscar Neumann, formerly of the Berlin Museum and well-known among European ornithologists, is now in Chicago and in daily attendance at the Museum, pursuing studies in the Division of Birds. He is especially known for his expeditions to Africa and subsequent research on his collections.

WEEKDAY LECTURE TOURS, JANUARY AND FEBRUARY

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given, covering all departments. Special subjects are offered on Wednesdays and Fridays; a schedule of these for January and February follows:

January

Wed., Jan. 5—Customs and Costumes (Mrs. Roberta Cramer).

Thurs., Jan. 6—SPECIAL: Teddy Roosevelt, Naturalist—25th anniversary of Theodore Roosevelt's death (Miss Miriam Wood).

Fri., Jan. 7—South Sea Island Foods (Miss Miriam Wood).

Wed., Jan. 12—Reptiles of Ancient and Modern Times (Bert Grove).

Fri., Jan. 14—Sleepy Heads—Animal Habits of Slumber (Miss Loraine Lloyd).

Wed., Jan. 19—Decorative Art of the American Indians (Mrs. Roberta Cramer).

Fri., Jan. 21—Sheltering the World—Housing Plans from the Native Viewpoint (Miss Emma Neve).

Wed., Jan. 26—Expeditions into the Past (Bert Grove).

Fri., Jan. 28—Nature's Hoarders (Miss Loraine Lloyd).

February

Wed., Feb. 2—The Ground Hog's Shadow (Miss Loraine Lloyd).

Fri., Feb. 4—Skeletons of the Past (Bert Grove).

Wed., Feb. 9—Plants of Illinois (Miss Miriam Wood).

Fri., Feb. 11—Animal Life Around Lincoln's Home (Miss Loraine Lloyd).

Wed., Feb. 16—Why People Wear Ornaments (Mrs. Roberta Cramer).

Fri., Feb. 18—History Making Stones (Bert Grove).

Wed., Feb. 23—Living to Eat (Miss Emma Neve).

Fri., Feb. 25—Leap Year Customs (Mrs. Roberta Cramer).

Apply at North Entrance; tours are free. By prearrangement, groups of ten or more persons may make tours at hours and on subjects they select.

NEW MUSEUM MEMBERS ELECTED FROM NOV. 16 TO DEC. 15

The following persons became Members of the Museum during the period from November 16 to December 15:

Associate Members

Byron Harvey III, James Donald Richards, Dr. Otto Schwartz, John O. Stoll, Mrs. Melvin A. Traylor, Jr., Mrs. Horace E. Turner.

Annual Members

William U. Bardwell, Dr. Charles L. Bidwell, W. E. Bishton, Patrick C. Burns, Joseph T. Carp, William J. Dressel, George C. Derkers, Mrs. Fred A. Hansen, Mrs. H. C. Havighurst, Theodore D. Hazen, Louis R. Hazzard, Gordon Heaney, Guy J. Henry, E. E. Hesse, Henry J. Jacobi, Saul Kaufer, Miss Nellie M. Krotter, James F. Leahy, John Michael Levy, Mrs. Ernest G. Loeb, Mrs. L. E. Naffz, E. W. Quackenbush, Frank R. Reid, Earl F. Reinhart, Mrs. Charles Reyher, Harold T. Segil, Mrs. Frank E. Selz, Wilbur Smart, Mrs. Roland M. Torgerson, Guy R. Turner, Charles Tuteur, William H. Waddington, Miss Dorothy Weeks, Frank M. Whiston.

CHICAGO NATURAL HISTORY MUSEUM PRESS

Chicago Natural History Museum
BULLETIN
Formerly Field Museum News

Vol. 15 MARCH–APRIL, 1944 Nos. 3–4

ZEBRA WAS ORIGINALLY NORTH AMERICAN NATIVE—A MILLION YEARS AGO

By PAUL O. McGREW
ASSISTANT CURATOR, PALEONTOLOGY

During the past several years, as their expeditions traveled to and from fossil beds of western Colorado, Mr. Bryan Patterson, Curator of Paleontology, and Mr. James H. Quinn, Chief Preparator, have stopped at a locality in north-central Nebraska, and each year they have thus added a few specimens to a collection of fossil mammals from deposits of Pleistocene age. In itself the assemblage is small and composed of fragmentary specimens, but despite this fact it has yielded important clues which, added to other available evidence, have permitted what may be solutions to some rather important geological and paleontological problems. Indeed, if the conclusions derived from the study of this collection are substantiated, significant changes in our concepts of the prehistory of the horse family will be necessary.

Of the new conclusions, probably the most interesting is that the striped horse or zebra was originally a native of America—not Africa, its present home, and neither Europe nor Asia, where it occurred during certain extensive periods.

A new exhibit to illustrate graphically these findings, including both specimens and an artist's conceptions of the appearance of extinct horses as they appeared in life (based upon careful studies of fossils), is already partially completed in Ernest R. Graham Hall (Hall 38), and will be completed in a few days after appearance of this issue of the Museum BULLETIN.

Nearly everyone has heard of the glacial period—that unit of geologic time during which great sheets of ice advanced from the north to cover some four million square miles of our continent. Geologists have learned much about that period: They know that the ice reached thicknesses of more than a mile; they know that there were four major glacial advances; they also know that in the intervals between these advances, when the ice melted back, the climate was warm—probably even warmer than now.

The vast regions once overridden by the ice are now covered by thick deposits of detritus that were carried down by the ice and dropped as the ice melted. This is known as glacial till and forms most of the hills that are found in the Chicago region.

HIPPOTIGRIS

Restoration of prehistoric zebra from the Great Plains of North America. A painting by Artist John Conrad Hansen.

It was by these successive deposits, separated by non-glacial sediments, that the existence of four great ice cycles have been determined. This series of glacial and interglacial deposits has served as a calendar by which Pleistocene time (the million or so years just preceding Recent time) has been subdivided by geologists.

An important problem in geology and paleontology has been to correlate deposits that lie outside the glaciated regions with actual glacial deposits. Exact solution to this problem has been beset with many extreme difficulties.

The locality in north-central Nebraska lies some 250 miles from the ice front. Deposits in this area, even though some distance from the glaciated region, were strongly affected by the advance and retreat of the ice sheets. It has been demonstrated by a Nebraska geologist that it is possible to correlate the fossil-bearing deposits with the earliest interglacial period of the glaciated region. The fresh-water shells are of the same species that are found in the interglacial deposits and offer considerable supporting evidence to the correlation. But of equal importance is the fact that, by means of the fossil mammals, it has been possible to make correlations with beds as much as 2,000 miles from the glaciated parts of the country. Thus the fossil mammals from this locality have proved of special geologic interest.

The fossil horses from this locality have contributed evidence that has helped toward the solution of problems concerning the evolution of the horse family. This new evidence, combined with what we already knew about horse evolution, unfolds a rather complete picture of the evolution and distribution of the family.

Horses were so closely associated with the conquest and development of America that it is hard to conceive of this country without them, yet at the time the first Europeans set foot in the Western Hemisphere the horse was not among the animals present. Nevertheless, during a period of 50,000,000 years the horse had been among the most abundant of American mammals.

It has been the consensus of most paleontologists that the true horse originated in North America and later spread to the Old World; and that comparatively recently (in geological terms) it became extinct in America. The date of extinction was apparently less than 25,000 years ago, shortly after the arrival of the first Indians from Asia, as bones of horses have been found quite frequently in association with early Indian artifacts.

The zebra heretofore has been presumed

to be merely a horse with stripes that developed from the true horse after the latter's expansion into the Old World. However, it has been possible, from specimens in the paleontological collections of this museum, to trace the ancestry of both groups, separately, back some four million years. The history of their evolution and dispersal must have been very different and much more complex than previously believed, the evidence indicates.

Most of the evolution of the horse family took place in North America during the 50 million years of Tertiary time. About 3,000,000 years ago the ancestor of the true horse spread into Asia and became extinct in America.

The true horse, as we know it today, evolved in Asia about a million years ago; from there it spread throughout Eurasia and to North and South America.

The zebra evolved in North America about a million years ago and from there spread to Asia, Europe and Africa.

In historic times wild members of the horse family have been confined to Africa and southwestern Asia. They were totally extinct in the Western Hemisphere when European explorers and settlers first arrived.

It has been well known that the family Equidae (which includes horses, asses and zebras) went through most of its evolution in North America between Eocene and middle Pliocene time. The earliest known member of the horse family is from rocks deposited in inter-mountain basins of western North America during the Eocene epoch, some 55,000,000 years ago. *Hyracotherium*, the rather imposing name given this earliest of horses, was tiny, little more than a foot in height. It bore four toes on its front feet and three on the hind. So different was it from its modern descendant, in fact, that were it not for the intergrading forms that are found in the successive rock layers, it is extremely doubtful if this primitive animal would be recognized at all as a member of the horse family.

EVOLUTION OF TRUE HORSE

By late Pliocene time, about 3,000,000 years ago, the horses, through gradual evolutionary change, had progressed so they differed only in slight details from our modern horses. Through these details of teeth and skeleton, however, we see that branching of the horse line had occurred. One branch, known as *Astrohippus*, was destined to give rise to the true horses; another, *Pliohippus*, to the zebras. During the several intervening epochs some other side branches had risen, but all were poorly adapted and sooner or later became extinct. Some of these aberrant groups spread to the Old World, but those leading to the living members of the family were confined to North America.

During the late part of the Pliocene epoch the true horse branch spread over the Bering region (which was dry land and warm at that time) into Asia. There it continued in its evolutionary path and evolved into a full-fledged horse belonging to the genus, *Equus*, the same as our domestic horses of today. In North America this true horse line must have become extinct about that time because no fossils representing it are found in rocks deposited during a long time span. Soon after the *Equus* stage was reached in Asia, however, the true horse spread throughout Europe and Asia, back to North America and even into South America. Finally, however, something went wrong—something of which no satisfactory explanation seems possible—and horses became extinct in the Western Hemisphere before the white man came. All horses in the Americas today spring from stock introduced from the Old World after the white man's invasion.

THE ZEBRA'S PROGRESS

The ancestral zebras continued their evolution in North America until the modern form was reached. About a million years ago this animal, whose origin was in North America, expanded its range into Asia, Europe, and throughout Africa. This great geographic expansion of the zebra was short lived, however, because by middle Pleistocene time, or about 500,000 years ago, the zebra had become extinct everywhere except in Africa. Before recent times the true horse also greatly reduced its range and has been found in its wild state only in a small portion of Asia.

PLIOHIPPUS

An ancestral horse that lived in the Great Plains of North America during early Pliocene time, 7,000,000 years ago. Restoration by Artist John Conrad Hansen.

SKELETON OF AMERICAN ZEBRA
(Hippotigris)

The now extinct American zebras were presumably striped like the modern African ones, but stripes are not very important distinctions between horses and zebras as far as paleontologists are concerned. Early examples of the true horse were probably also striped, as indicated by drawings prehistoric men have left in caves in early Europe—drawings made at a time when there were no zebras on that continent. Further, there is a modern zebra known as the quagga which has practically lost its stripes. Important distinctions between horses and zebras are found in the teeth and certain features of the skeletons. One lower milk tooth is sufficient to identify a skeleton as that of a horse, zebra, or ass.

The asses, natives of North Africa, are unknown as fossils, and at present practically nothing is known of their history. In some respects they resemble the zebra in their basic structure, and in others they resemble more closely the true horses. Clearing up the history of the ass will depend on future paleontological discoveries.

EDITOR'S NOTE: The subject of the above article is covered in a detailed technical paper by Dr. McGrew, published on January 20, 1944, by Chicago Natural History Museum Press: Publication 546, Geological Series, Vol. 9, No. 2, *An Early Pleistocene (Blancan) Fauna from Nebraska;* 37 pp., illustrated.

MUSEUM RECEIVES RARE EGGS OF CALIFORNIA CONDOR

By ELLEN T. SMITH
ASSOCIATE, DIVISION OF BIRDS

Two eggs of the California condor (*Gymnogyps californiana*) have recently been presented to this institution by Judge R. Magoon Barnes, noted oölogist who is Curator of Birds' Eggs on the Museum staff. Judge Barnes' extensive egg collection was given to the Museum in 1925, and included the only two other California condor eggs owned by the Museum. These rare eggs, valued conservatively at $100 each, were taken in California in 1879, 1900, and 1915. They are dead dull white, with a faint green tinge, slightly rough, and nearly perfectly elliptical—about 4½ inches long and 2½ in diameter.

A pair of condors lays only a single egg each year. Had the eggs been allowed to hatch—a seven weeks' process—there would have emerged from each a downy white chick, floundering helplessly, and giving no hint of the dignified monarch of the skies which it would soon become.

When grown, the condor in flight resembles a turkey vulture (or buzzard) in the fingering-out of the feathers at the wing tips, but it can be distinguished from the latter by the large white patch on the forepart of the under side of each wing, and by its enormous size. Its wing-spread ranges from nine to ten feet as contrasted with the vulture's five and one-half to six feet. Its head and neck are bald and reddish-orange; the strength of its great beak is astonishing.

A NUISANCE TO EXPLORERS

It is possible that the two eggs just acquired, both taken in 1879, were an easy mark for the collector, as the condor was once a common sight over California, nesting in hollow trees and stumps. It ranged as far north as the Columbia River, congregating there each fall to feed on salmon.

Lewis and Clark, and other early explorers of the northwest, complained of the difficulty they encountered in hiding their large game from these birds, which could devour in an hour enough meat to feed a man for a month. It is only natural that under these circumstances the hunter's gun was frequently aimed at the condor, while a further incentive to its destruction was added during the gold-rush, by prospectors, who found the large hollow wing-quills convenient for carrying gold dust, lessening the fear of detection and theft when sewn into their clothes.

Fate ironically conspired against the condors in the early 1900's, when it became known that they were getting scarce. According to Dawson, "Anyone who could stuff a bird and any village junk-pile calling itself a 'museum', promptly went out to get a bird while the getting was good." Oölogists joined in the rush, and the remaining birds were driven to nest on the high cliffs of the mountains of southern California (west of Santa Barbara) in the most inaccessible cave-like nooks.

The present rate of reproduction is barely sufficient to sustain the race, but regardless of this, the fight for preservation is a losing one, as sooner or later civilization will abolish the carrion on which the condor completely depends for food. The forty or more birds still in existence must eventually go the way of the dodo and the passenger-pigeon. And yet, in contrast to those two species, the condor is one of the most intelligent members of the animal kingdom. One condor, nicknamed "The General," was taken when very young by Mr. William Finley, and made the most extraordinary pet, equal to a good dog or horse in intelli-

(*Please turn page*)

RAYMOND FOUNDATION OFFERS FREE MOVIES FOR CHILDREN ON MARCH–APRIL SATURDAYS

America's neighbor nations of the western hemisphere, the Arctic regions, Africa, lands of the Mediterranean, Australian animals, and life underneath the sea, are among the subjects of motion pictures to be presented on free programs for children in the spring series under the auspices of the James Nelson and Anna Louise Raymond Foundation. For "spice," there will also be a number of animated cartoons. These programs will be given on Saturday mornings during March and April in the James Simpson Theatre of the Museum. Each will be presented twice, at 10 A.M., and again at 11, in order to accommodate the maximum numbers of children. Children from all parts of Chicago and suburbs are invited, and no tickets are necessary for admission. They may come alone, accompanied by adults, or in groups from schools and other centers.

Many of the films to be shown are in natural colors, and sound effects and talking are now regulation fare on Museum programs. Following is the schedule:

March 4—WHEELS ACROSS AFRICA
Also two cartoons

March 11—CENTRAL AMERICA—OLD AND NEW

March 18—THE STORY OF MOUNTAINS
Also a cartoon

March 25—FATHER HUBBARD AMONG THE ESKIMOS
Also a cartoon

April 1—WITH WILLIAMSON BENEATH THE SEA
Also a cartoon

April 8—THE HOLY LAND BY WAY OF THE MEDITERRANEAN
Also a cartoon

April 15—WILD INNOCENCE (*Australian animal story featuring Chut, a kangaroo*)

April 22—AMERICA SOUTH OF THE TROPICS (*Deep in South America*)
Also a cartoon

April 29—AN ALL-CARTOON PROGRAM

Crucibles, flasks, and other utensils blown from quartz are used in chemical laboratories to fit conditions that the best glass cannot endure.

Manufacture of glass ornaments is a rare occupation of west African Negroes, who melt European bottle glass. In Hall D, Case 21, are some glass bangles. Beads made by rubbing and boring hard stone are shown in Hall D, Case 16.

gence and appreciation of human companionship. "The General" eventually ended up in the New York Zoo.

Contrary to popular belief, the condor cannot seize its prey in its claws, because, unlike the eagle or the hawk, its hind toe is completely undeveloped. It does not attack or feed off living things, and although undisputed master over turkey vultures and coyotes, has often been seen calmly and graciously allowing them to share its meal. When the farmers of the west poisoned carrion to rid the country of the plague of coyotes, it was feared that condors also would suffer. But their stomachs can stand great abuse, and when necessary they disgorge something that does not agree with them, so that in spite of tales to the contrary none of these birds has been known to perish from this cause.

CALIFORNIA CONDORS

One of the series of bird habitat groups in Hall 20 of the Museum.

TAKE-OFF LIKE BOMBER'S

Their feeding and perching is limited to the open country or the cliffs, for unless they can catapult themselves into the air, they need room, like a bomber, for a take-off, and run along the ground flapping vigorously till they have gained enough speed to commence sailing. Their instinctive knowledge of aerodynamics is extraordinary, and once in the air they do not use their wings in any forward motion, but like the perfect glider, they soar majestically, by means of the most correct use of air currents. They cannot make headway straight into a hard wind, but tack back and forth like a sailboat.

One day three condors, which had only a mile farther to go to reach their nests, were prevented from doing so by the strong north wind suddenly turning into a roaring gale. After repeatedly tacking back and forth to no avail, they headed for the Carissa plains, which were baking in the sun twenty-five or thirty miles away. Rising with the column of heat, the birds were soon above the gale, sailing north again, and reached their nests from the northwest, aided by their former foe, the north wind. This "slight" detour of some sixty or seventy miles was accomplished in about thirty minutes, according to Mr. Claude C. L. Brown, who had the birds under observation the entire time.

Condors like water, and spend hours preening themselves, for obviously every part of their flying equipment must be kept in perfect condition; the fifteen- to eighteen-inch tail and the huge thirty- to thirty-six-inch wings must not have a feather out of place.

LARGEST OF FLYING BIRDS

The California condor and its near relative from South America, the condor of the Andes (*Vultur gryphus*) are the largest birds that fly. Reports as to their relative wing spread are contradictory and unreliable, but lead one to believe that while individual California birds may have larger measurements throughout, the South American bird probably averages slightly larger. The Andean condor is said to weigh more, but no one seems actually to have weighed it to find out if it surpasses the twenty-six pounds at which one California condor tipped the scales after a meal. The normal weight of the California bird is nearer twenty to twenty-two pounds.

One other bird, the wandering albatross (*Diomedea exulans*), an inhabitant of the cold southern seas, has a greater wing-spread, reaching eleven feet four inches, but it is a smaller bird in every other way.

Examples of these three birds can be seen at the Chicago Natural History Museum in Halls 20 and 21. In Hall 20 is a habitat group of a pair of California condors.

NEW MEMBERS

The following persons became Members of the Museum during the period from December 16 to February 12:

Contributors

Lieut. Alvin R. Cahn, U.S.N.R.

Associate Members

Mrs. A. W. Anderson, Robert N. Chatain, L. Charles Cook, Louis T. Cook, Thomas H. Cook, Mrs. John E. Cornell, William C. Danne, Don L. Davis, Mrs. William Warren Dixon, Karl Eitel, Dr. A. G. Falls, Frederick M. Gottlieb, Dr. Daniel W. Jeffries, Solomon Katz, Miss Paula Knickerbocker, Carl Kresl, George C. Lazear, George Moeller, Edmund Daniel O'Connell, William F. O'Keeffe, Comer Plummer, Sydney Stein, Jr., Felix VanCleef, Miss Cecilia Wells.

Sustaining Members

A. E. Meyerhoff

Annual Members

Dr. Walter A. Adams, Jay Adler, R. J. Anschicks, Guy T. Avery, T. D. Beven, John W. Blackburn, Maurice C. Blaz, O. D. Borcherding, Mrs. J. Stewart Boswell, Mrs. Rolland I. Bosworth, Dr. Garnet Bradley, Chesser M. Campbell, H. R. Carpenter, William B. Coggin, Miss Bonnie Colvin, A. D. Davis, John S. Dempsey, Mrs. Andrew R. Dole, Mrs. Charles Eichin, Mrs. Cyril Farney, Max Feld, John S. Field, Edward Fitzgerald, Adolph R. Floreen, E. W. Fritzell, Miss Josephine Goodrich, A. S. Gourfain, Jr., Harry Green, Miss Rose Grossfeld, David L. Harrington, Mrs. John H. Harrison, Mrs. Henry T. Heald, Dr. S. C. Henn, Charles L. Henry, Mrs. Howard C. Hill, Edwin W. Hirsch, Joseph Hoffman, E. N. Hope, Stephen E. Hurley, S. L. Hypes, Max E. Immerwahr, Scott R. Johnson, Mrs. Walter N. Jones, Gerald C. Kimes, Mrs. Marian K. Lamb, A. Pope Lancaster, James Lawrence, C. A. LeBeau, Theodore Levin, W. F. Lochridge, Mrs. Richard J. Massey, Irving McHenry, Eugene Miller, Frederic Kimball Mizen, J. J. Nance, Mrs. Leland R. Newell, Mrs. Charles B. Nolte, V. W. Peterson, William Henry Phelps, Joseph Richard Pick, M. C. Pond, Frank Rasmussen, Mrs. Allen M. Reed, Courtney H. Reeves, C. G. Rhodes, Burr L. Robbins, Hugh Rodman, Mrs. L. L. Schaffner, Mrs. Barrett Scudder, Myron M. Segal, Victor Segal, John P. Spencer, Dr. Julius L. Spivack, J. M. Symes, Mrs. A. D. Taylor, Mrs. Albert H. Tippens, Mrs. Ben E. Ursin, R. G. Wallace, Herbert J. Watt, A. Webster, William Yates.

OSA JOHNSON, AND CHINESE SHADOW PLAYS, FEATURED IN SATURDAY LECTURE COURSE

One of the world's most daring and successful women explorers—Osa (Mrs. Martin) Johnson—will appear before a Chicago Natural History Museum audience during this year's annual spring course of Saturday afternoon free illustrated lectures on science and travel. Mrs. Johnson will show some of the exciting motion pictures for the filming of which both she and her late husband became famous.

The annual spring course will open March 4, and lectures will be presented each Saturday afternoon from then until April 29 inclusive, at 2:30 P.M., in the James Simpson Theatre of the Museum.

The demand for seats makes it necessary to restrict admission to adults; for children free motion pictures are given on Saturday mornings. Following are the dates, subjects, and speakers for the adult programs:

March 4—THE NEW AIR WORLD.
Canfield Cook.

Mr. Cook, who has devoted years to study of the many factors involved, will discuss the influences, past, present, and future, of the development of aviation on peoples and places all over the world. He will emphasize the changes which may be expected in world economy in the peace which is to come, as a result of the expected growth of transportation of persons and goods by airplane. The lecture will be illustrated with color films.

March 11—WORLD ADVENTURE FILMS.
Osa Johnson.

Mrs. Johnson and her late husband, Martin Johnson, were famous for their adventuring and their notable motion picture work, particularly in the jungles of Africa and Asia, for many years. Since the airplane death of her husband, in a crash in which Mrs. Johnson was also injured, she has gone ahead on her own, exploring in far places and bringing back magnificent film records of what she has observed. Her films often are made under conditions of personal danger. She is noted for a sparkling personality which results in a lecture as humorous and whimsical as it is interesting and informative.

March 18—WE RE-MAP THE WORLD.
Clarence Sorensen.

Mr. Sorensen's lecture is described as: "a report in new horizons—global dimensions, modern maps, strategic crossroads, great circles, the geography for peace." As a geographer and foreign correspondent for the Columbia Broadcasting System, Mr. Sorensen's work has since 1934 taken him to more than thirty-five countries. Buenos Aires and Burma are alike familiar. He first packed his bags for Europe to watch Hitler's rise to power and the re-arming of the Reich. The great Arab world was next. With headquarters in the Near East, Clarence Sorensen covered thousands of desert miles. Later he went on to India, Burma, Malaya, Java, China, the Philippines, and other regions.

March 25—FOUR CORNERS—THE LAND OF THE NAVAJOS.
Alfred M. Bailey.

Formerly a member of the Chicago Natural History Museum zoological staff, and now director of the Colorado Museum of Natural History, Mr. Bailey presents in this lecture the story of the home of the Navajos at the "four corners," the meeting place of Colorado, New Mexico, Arizona, and Utah. In color films to be shown with the lecture he has faithfully recorded the plants and animals encountered. Included are views of the high mountains of Colorado with bird life; views down the Colorado River in Utah; the Arches National Monument; the Goose-necks of the San Juan, and Mesa Verde National Park.

NAVAHO
(Sculpture by Malvina Hoffman)

April 1—ALASKA AND ITS HIGHWAY
William L. Darden.

Alaska is very much the subject of the hour. Alaska's air bases are closest to Japan. They are our stepping-stones to Tokyo. William L. Darden, a resident of Alaska for many years, shows this great territory of ours in a complete manner. Not only points in the news, but scenery, animals, industries—everything.

April 8—MIDNIGHT MOVIES IN ANIMAL LAND.
Howard Cleaves.

Even many people familiar with the haunts and habits of wild animals in their daytime hours have little knowledge of life in the animal kingdom after dark. Mr. Cleaves has devoted himself to study and observation in this special field, and has made most unusual motion pictures.

April 15—CHINESE SHADOW PLAYS.
The Red Gate Players (directed by Pauline Benton).

Shadow plays have long been a favorite entertainment in China. With simplicity and charm they interpret the art, the drama, the music and the customs of the Chinese. The shadow actors used by the Red Gate Players are made of transparent parchment, carved and painted by Chinese craftsmen. Each is a masterpiece of design and color; each is imbued with its own personality. The action of the drama takes place behind a screen where the shadow actors move, live, dance, and talk. A light illuminates the stage, which is decorated with elaborate and delicately wrought settings, and shines through the players who appear to the audience in jewel-bright and crystal-like colors.

April 22—WINGS ACROSS THE MIDNIGHT SUN.
Dr. Arthur Twomey.

This lecture follows the course of a recent Carnegie Museum expedition across the 10,000 square miles of the Mackenzie delta region and adjacent arctic islands. It contains many intimate shots of tundra birds never before photographed in color on their nesting grounds; immense colonies of snow geese on the outer fringe of islands that skirt the Arctic Ocean, and magnificent sweeps of arctic flora.

April 29—SUMMER AND WINTER IN THE WESTERN RANGES.
John Claire Monteith.

Mr. Monteith has made an enviable reputation for his studies on many phases of life on the other side of "the great divide," and his natural color motion picture films are regarded as ranking among the outstanding achievements in photography representing the lives of our Indians, and the story of plains, deserts, and mountains.

No tickets are necessary for admission to these lectures. *A section* of the Theatre *is reserved for Members* of the Museum, *each* of whom is *entitled to two reserved seats* upon presentation of membership ticket to the Theatre attendant before 2:30 o'clock on the day of the lecture, or by writing to the Museum (or telephoning WABash 9410) for reservation. Seats will be held until 2:30.

Technical Publications Issued

The following technical publications recently have been issued by the Chicago Natural History Museum Press:

Zoological Series, Vol. 28, No. 2. *On the Classification of the Histerid Beetles.* By Rupert L. Wenzel. January 19, 1944. 104 pages, 9 plates, 3 text figures. $1.00

Geological Series, Vol. 9, No. 2. *An Early Pleistocene (Blancan) Fauna from Nebraska.* By Paul O. McGrew. January 20, 1944. 36 pages, 9 text figures. $0.40

Geological Series, Vol. 8, No. 11. *Two New Thalassemyd Turtles from the Cretaceous of Arkansas.* By Karl P. Schmidt. January 21, 1944. 12 pages, 5 text figures. $0.25

Zoological Series, Vol. 29, No. 4. *Masticatory Apparatus in the Giant Panda and the Bears.* By Harry Sicher. January 28, 1944. 14 pages, 5 text figures. $0.15

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Field Drive, Chicago
TELEPHONE: WABASH 9410

THE BULLETIN

EDITOR

WILFRED H. OSGOOD.....*Curator Emeritus, Zoology*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
B. E. DAHLGREN.....*Chief Curator of Botany*
HENRY W. NICHOLS.....*Chief Curator of Geology*
KARL P. SCHMIDT.....*Chief Curator of Zoology*

MANAGING EDITOR

H. B. HARTE.....*Public Relations Counsel*

Members are requested to inform the Museum promptly of changes of address.

MUSEUM "GOES ON THE AIR" FOR SCHOOL CHILDREN

"Places and People," a series of radio broadcasts, has been begun by the James Nelson and Anna Louise Raymond Foundation of the Chicago Natural History Museum, in co-operation with the Radio Council of the Chicago Public Schools.

On February 16, the series was introduced by Mr. Orr Goodson, Acting Director of the Museum, and on February 23 there was a broadcast on Alaska. The rest of the programs, to be given over FM station WBEZ at 11:30 A.M., and over both WIND and WBEZ at 1:30 P.M., on the dates indicated, are as follows:

March 1—Middle America
March 8—South America (Part I)
March 15—South America (Part II)
March 22—Africa
March 29—Solomon Islands and New Guinea
April 5—Polynesia: Samoa, Fiji, Hawaii, Tonga.
April 12—Australia and New Zealand
May 3—Philippine Islands
May 10—Malay Archipelago, and Borneo, Sumatra, and Java
May 17—Malaya
May 24—India
May 31—China
June 7—United States

In conjunction with the broadcasts, the Museum will present two follow-up programs for groups of children brought from the schools to this institution. The first of these, "Peoples of Alaska, Middle and South America, and Africa," will be given on March 23 at 10:30 A.M.; the second will be "Peoples of the South Pacific, Australia, India and China," on June 1.

The Museum and the schools' Radio Council have jointly prepared a booklet of suggestions for teachers, to aid them in making most effective use of the series. The purpose of the series of broadcasts and related programs is expressed in this pamphlet as follows:

"Our world is being brought closer together, partly because of easy and fast transportation. The present war has forced us to be interested in people and places little known or thought of before. Many of these people are our allies; many of the places are the temporary homes of our relatives and friends. After the war is over, many of these people will have a part in the world peace plans; if the world peace is to be lasting, we must try to understand their needs and problems."

In charge of the series for the Museum is Miss Miriam Wood, chief lecturer of the James Nelson and Anna Louise Raymond Foundation; for the schools, Mr. George Jennings, director of the Radio Council. Script writer is Joseph H. Spear.

Staff Notes

Word has been received that Ensign Maynard C. Darnall, Jr., a former student guard at the Museum, has been promoted to lieutenant (j.g.), U. S. Coast Guard.

Mr. Raymond H. Hallstein, for over 23 years connected with the F. J. Riley Printing Company, Chicago, and for eight years its superintendent, has been appointed as head of the Division of Printing.

Mrs. Marion Grey has been appointed Associate in the Division of Fishes in recognition of her continued effective aid to the work of the division.

Mr. Henry Dybas, formerly Assistant in the Division of Fishes, has been transferred to the Army Sanitary Corps.

Dr. Julian A. Steyermark, Assistant Curator of the Herbarium, on leave for government war work, has been transferred recently from Ecuador where he was engaged in quinine investigations, and is now carrying on the same work in Venezuela.

First Lt. Melvin A. Traylor, U.S.M.C., (Associate, C.N.H.M. Division of Birds) visited the Museum while invalided home from action at Tarawa. Ensign Loren P. Woods, U.S.N.R. (Assistant Curator of Fishes) visited the Museum while on furlough and conferred about various projects in his division of the Museum. Capt. Rupert L. Wenzel, U. S. Army (Assistant Curator of Insects), also visited the Museum recently.

Dr. Wilfred H. Osgood, Curator Emeritus of Zoology, will spend some weeks in the west where he will visit museums and collect mammals as opportunity presents.

THE MUSEUM HONOR ROLL

Now in the Nation's Service

Army

THEODORE ROOSEVELT, Trustee—Brig.Gen.
GEORGE A. RICHARDSON, Trustee—Lt. Col.
CLIFFORD C. GREGG, Director—Colonel, G.S.C.
DR. JOHN RINALDO, Associate, Southwestern Archaeol.—Staff Sgt.
DR. SHARAT K. ROY, Curator, Geol.—Capt.
D. DWIGHT DAVIS, Curator, Anat. and Osteol.—Corp.
BRYAN PATTERSON, Curator, Paleontology—Pvt.
EMMET R. BLAKE, Asst. Curator, Birds—Special Agent, War Dept.
RUPERT L. WENZEL, Asst. Curator, Insects—Capt.
HENRY S. DYBAS, Assistant, Insects—Pvt.
WILLIAM BEECHER, Temp. Asst., Zool.—Pvt.
HENRY HORBACK, Asst., Geol.—Pvt.
JAMES C. MCINTYRE, Guard—2nd Lt.
RAYMOND J. CONNORS, Guard—Pvt.
FRANK J. DUTKOVIC, Janitor—Pvt.

Navy

LESTER ARMOUR, Trustee—Comdr.
SAMUEL INSULL, JR., Trustee—Lieut. Comdr.
JOSEPH NASH FIELD, Trustee—Lieut.
COLIN CAMPBELL SANBORN, Curator, Mammals—Lieut.
DR. ALEXANDER SPOEHR, Asst. Curator, N. Amer. Ethnol.—Lieut. (j.g.)
LOREN P. WOODS, Asst. Curator, Fishes—Ensign
JOHN W. MOYER, Taxidermist—Ch. Specialist (Bur. Aeronautics)
PATRICK T. MCENERY, Guard—Master-at-Arms
JOHN SYCKOWSKI, Guard—Ch. Commissary Stewd.
GEORGE JAHRAND, Guard—Ch. Water Tender
CLYDE JAMES NASH, Guard—Ch. Gunner
NICHOLAS REPAR, Printer—Aviation Machinist's Mate 2C.
MORRIS JOHNSON, Carpenter—Carpenter's Mate 2C.
HERBERT NELSON, Painter—Painter 1C.
ELIZABETH BEST, Guide-Lecturer—Ensign, WAVES
MARIE B. PABST, Guide-Lecturer—WAVES

Marine Corps

MELVIN A. TRAYLOR, JR. Associate, Birds—1st Lt.

Coast Guard

M. C. DARNALL, Jr., Guard—Lieut. (j.g.)
JOHN MCGINNIS, Guard—Ch. Boatswain's Mate

Other Services

RUDYERD BOULTON, Curator, Birds—Staff of Office of Strategic Services
BRYANT MATHER, Asst. Curator, Mineralogy—Civilian Worker, Corps of Engineers, U.S. Army
LLEWELYN WILLIAMS, Curator of Economic Botany—on special service for U.S. Government
DR. JULIAN A. STEYERMARK, Asst. Curator, Herbarium—field work for Board of Economic Warfare
DR. C. MARTIN WILBUR, Curator, Chinese Archaeol. and Ethnol.—Staff of Office of Strategic Services

. . and Some Who Have Served and Been Honorably Discharged:

FRANK BORYCA, Asst. Prep., Bot.—Pvt. U. S. Marine Corps.
BERT E. GROVE, Guide-Lecturer—Medical Aide, American Field Service, Africa.

SOME SOLOMON ISLANDERS

By KARL P. SCHMIDT
CHIEF CURATOR, DEPARTMENT OF ZOOLOGY

Since American service men have been stationed in the Solomon Islands, the Museum has had frequent inquiries about the animal life of that region. These have often been in the form of requests for some illustrated guidebook to the birds, or insects, or reptiles, suitable for a far-off boy who had been interested in natural history at home, and now finds himself seeing white-crested cockatoos, hearing the choo-choo, choo-choo, of the black hornbill's wings, or listening to strange sounds from the forest at night. With regret we have had to reply that knowledge of the natural history of the Pacific islands, though considerable, is for the most part locked in technical volumes.

Museums engage in the preparation of handbooks suitable for the general public as one of their manifold activities associated with the attempt to describe the life of the world; but museums are under-financed and under-staffed, and the handbooks must often wait for essential primary research. It may be enough to recall to the reader that there was no good popular guide even to the birds of the eastern United States until 1895.

My own interest in the frogs and lizards of the Solomon Islands was aroused by the beautiful lithographs in G. A. Boulenger's papers, based on the collections of H. B. Guppy and C. M. Woodford, made on Guadalcanal and various other islands in the eighteen eighties. Further knowledge of the animal life of the Solomons has accumulated. In 1929, in the course of the Museum's Cornelius Crane Pacific Expedition, considerable collections of frogs, lizards, and snakes were made on the islands of Ugi, Malaita, Tulagi, Isabel and Kulambangra.

SOLDIER SENDS COLLECTION

Our nucleus of Solomon Island collections in these groups has now been greatly increased by the receipt of two collections made by Pvt. William J. Beecher (Temporary Assistant in Zoology at the Museum), now with the Army Medical Corps.

The Solomon Islands are distant enough from the larger areas of New Guinea and Australia to have far fewer kinds of amphibians and reptiles, as indeed of all kinds of animals; this is a general characteristic of the life of islands as contrasted with that of the continents. At the same time, the separation of the islands from New Guinea came at a time so ancient that there has been opportunity for the evolution of numerous distinct species of animals, and some of the frogs and lizards are very distinct indeed. Only some of the very small lizards that may be transported by floating logs, the exceedingly active and partly aquatic monitor lizard, and a few tree snakes appear on New Guinea as the same *species*. The relations of the animal life of the Solomons are nearly all with New Guinea rather than with Australia or any other region, and the archipelagos of smaller islands to the eastward have still fewer kinds of animals.

"WHO COMES?"

One March night in 1929, on Tulagi Island, Walter Weber, the artist, and I were engaged in the naturalist's perennial search of the forest for its nocturnal inhabitants, on a forest floor of extraordinary beauty. When we put out our flashlights, the leaf-mold was dotted with gleaming fox-fire. Whole clumps of tiny mushrooms glowed with yellow light, as did particles of rotten wood and leaf, and an occasional whole dead stick or even a log. We had caught a tiny froglet (*Batrachylodes*) in some numbers,

PREHENSILE-TAILED SKINK

Also called giant skink, this unique lizard is found nowhere in the world except the Solomon Islands. The tail aids its arboreal existence. Specimen shown above is on exhibition in Albert W. Harris Hall (Hall 18).

and we heard the loud quack of a big geckonid lizard, but could not find it. While standing some yards apart, we each heard a loud "squunk" startlingly like the suck of a foot in a loose wet boot; and as we both had wet feet, we looked at each other for the source of the sound, only to hear it repeated from another direction.

When traced to its source the sound was found to be made by a good-sized frog—a species confined to the Solomons, and in some ways the most distinctive amphibian of the area. It is characterized by triangular flaps of skin on the head and limbs that give it the scientific name *Cerotobatrachus*. Other Solomon Island frogs include a true tree frog (i.e., a *Hyla*) and several representatives of the family of true frogs, including a big species of bullfrog size. The commonest frog, whose scientific name is *Platymantis solomonis*, is a small relative of the big fellow. It has a startlingly loud and clear note resembling the syllables "whoo-ee."

The snakes of the Solomons are few. There are burrowing blind snakes (*Typhlops*) with the eyes concealed beneath the scales. Small boas that reach a length of about three feet, with strongly prehensile tails, are remote relatives of the American boa constrictors. A green tree snake and a black and yellow tree snake are widespread in the New Guinean region. All these snakes are quite harmless. There are three kinds of land snakes that are undoubtedly poisonous, related by their fixed fangs to the front-fanged snakes of Australia. There is no record of any human being having been bitten by these snakes, and none of them are aggressive creatures. In such densely forested areas as the Solomons, snakes are usually found only by accident, or perhaps in jungle-clearing operations like the preparation of an airfield. The sea snakes that come to shore to lay their eggs in the rock crevices at high tide level are deadly poisonous, but they are never known to bite anything except the eels on which they prey. Even if roughly handled by fishermen, they do not bite at all.

The lizards exhibit a great variety of form and color, and the shiny-scaled skinks are especially abundant. Little golden striped skinks (*Emoia*) would remind many an American soldier of the blue-tailed lizard of the southeastern United States. A larger green skink (*Dasia*) is to be seen only in the trees. Another good-sized lizard (*Riopa*) is dull brown, and with its short legs must be a slow moving ground dweller.

A UNIQUE LIZARD

The real prize among the lizards of the Solomons is the "prehensile-tailed skink," a lizard some two feet in length, with the tail developed as a prehensile grasping organ to aid in locomotion in the trees. This lizard is found only in the Solomons. The largest lizard of the islands, the black and yellow monitor, was mentioned above as a more widespread type. Another large tree lizard has a crest of sharp spines on the back.

Novel to most Americans are the soft-skinned and big-eyed geckos. These are lizards that come out at night, and they are remarkable for their loud voices. There are several kinds in the Solomon Islands—small ones only two inches long, medium sized gray ones, and a brown species with a bright yellow line down the back, large for a gecko, as it reaches a length of a foot. The natives are apt to be much afraid of geckos, apparently on account of the disagreeable feel of the clinging pads on their feet, but all geckos are entirely harmless. Many inhabit houses and come out at night from the thatch, or from behind picture frames (if there are picture frames) to hunt their insect prey on the walls and ceilings.

Mr. Beecher's collections, including a few fishes, birds, mammals, insects, and crustaceans besides his reptiles, came to the Museum as almost the only accessions for 1943 from foreign lands. They serve to remind us all the more that the interests of a museum of natural history are dependent on a peaceful world.

SUNDAY LAYMAN LECTURES IN MARCH AND APRIL

Paul G. Dallwig, the Museum's Layman Lecturer, will make nine more appearances on Sunday afternoons during the current season.

On Sundays *in March* his subject will be "Who's Who in the Mounted Zoo." Features of this lecture include the story of the giant panda, Su-Lin; the history of the man-eating lions of Tsavo which devoured more than 130 human beings; a dramatization of a day in the African jungles, and interesting tales of psychological and behavioristic observations on the life of various animals.

THE LATE SU-LIN

In April the subject of Mr. Dallwig's Sunday lectures will be "Mysterious 'Night-Riders' of the Sky." The lecturer will explain the differences between comets, meteors, and meteorites, and relate incidents concerning some of the most important meteoritic falls. Of special interest is his dramatization in "three scenes" of an imaginary trip to the moon by rocket plane.

The lectures all begin at 2 P.M. and end at 4:30. For smoking, refreshments and relaxation there is a half-hour intermission during which the audience gathers in the Museum Cafeteria. The size of audiences is necessarily limited; for this reason it is essential to make reservations in advance by mail or telephone (WABash 9410). Long waiting lists form for each title. The lectures are given in the Museum Lecture Hall, and there is no charge for admission or for reservations.

On February 20 Mr. Dallwig made his 200th lecture at the Museum. He began this activity in the autumn of 1937.

Dice in Ancient Egypt

If a gambler of the present day could go backward into history like the hero of Mark Twain's *Connecticut Yankee at King Arthur's Court*, taking with him a pair of modern "galloping dominoes" (especially if the dice were loaded to throw the present day game in his favor), he would create a lot of havoc. For the ancient Egyptians whom he would meet, while having dice almost identical with the modern ones in size, form, and appearance, nevertheless used numbers paired in different combinations.

Some dice dating back to Cleopatra's time and earlier, are on exhibition in the Hall of Egypt (Hall J) at this museum. Most of them are made from bone, but some are of steatite. Tested out by Museum archaeologists before being placed on exhibition, the dice showed a tendency to throw 2's and 5's most readily, indicating that cheating was probably as common among the early gambling fraternity as among those who make their livings from games of alleged chance today. According to Mr. Richard A. Martin, Curator of Near Eastern Archaeology, there has been little change in the manner of playing games with dice from Ptolemaic times down to the present.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the last two months:

Department of Anthropology:

From Col. H. W. Jarrow, Chicago—a model of an outrigger canoe, Samoa; from Kennett L. Rawson, Chicago—15 ethnological specimens, Greenland and Labrador.

Department of Botany:

From Dr. Walter Kiener, Lincoln, Neb.—357 specimens of algae, Nebraska; from William A. Daily, Indianapolis, Ind.—71 specimens of algae, Indiana; from Professor F. Miranda, Mexico City—10 herbarium specimens (type material), Mexico; from Harry K. Phinney, Evanston, Ill.—119 specimens of algae, Illinois and Michigan; from Ted Flanagan, Warren, Pa.—41 specimens of algae, Pennsylvania; from Donald Richards, Chicago—68 moss specimens, chiefly Asia; from J. Francis Macbride, San José, Calif.—200 specimens of algae, California; from Professor Maximino Martínez, Mexico City—43 herbarium specimens, Mexico; from G. Ruegg, La Junta, Colo.—a fossil palm wood specimen, Colorado; from Hermann C. Benke, Chicago—31 herbarium specimens, Illinois and Indiana; from Dr. Henry S. Conard, Grinnell, Iowa—35 moss specimens, Iowa; from Señorita Delia Rabinovich, Buenos Aires, Argentina—13 specimens of algae, Argentina.

Department of Geology:

From R. H. Finch, Hawaii National Park, Hawaii—a specimen of Pele's Hair, Hawaii; from G. Ruegg, La Junta, Colo.—8 fossil and mineral specimens, Colorado and Oregon; from Jim Breslan, La Junta, Colo.—2 specimens of polished dinosaur bone, Colorado; from Miss Miriam I. Schad, Bellefonte, Pa.—a clay specimen, Pennsylvania.

Department of Zoology:

From William J. Beecher, U. S. Army—a crayfish, 19 fishes, 40 lizards, 17 snakes, 6 frogs, 52 bats, a cuscus skull, 3 birds, 49 insects and allies, Solomons and other South Pacific Islands; from Lincoln Park Zoo, Chicago—2 birds, 2 mammals, and a salamander; from Lieut. Colin C. Sanborn, Talara, Peru—3 fox skins and skulls and a fox skeleton, Peru; from Chicago Zoological Society, Brookfield, Ill.—a duck, Australia; from Sidney Camras, Chicago—2 conopid flies (type and allotype), North Carolina; from Dr. J. N. Knull, Columbus, Ohio—20 buprestid beetles, comprising 13 species, United States; from Joseph P. E. Morrison, Washington, D. C.—a freshwater shell (paratype), British Guiana; from Dr. Paul E. Thompson, Chicago—5 lizards, New Guinea.

WEEKDAY LECTURE TOURS, MARCH AND APRIL

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given, covering all departments. Special subjects are offered on Wednesdays and Fridays; a schedule of these follows:

March

Wed., Mar. 1—Nature's Circus (Loraine Lloyd).

Fri., Mar. 3—Weathering Heights (Bert Grove).

Wed., Mar. 8—Messages to and from the Unknown (Mrs. Roberta Cramer).

Fri., Mar. 10—Ambassadors from Space (Bert Grove).

Wed., Mar. 15—Social Climbing (Emma Neve).

Fri., Mar. 17—Snake Stories (Miriam Wood).

Wed., Mar. 22—Housekeeping Customs the World Around (Mrs. Roberta Cramer).

Fri., Mar. 24—Trees—in Blizzards or Sunshine (Miriam Wood).

Wed., Mar. 29—Crime—Threat to Primitive Societies (Emma Neve).

Fri., Mar. 31—April Fool in the World of Animals (Loraine Lloyd).

April

Wed., Apr. 5—Our Allies in Asia (Mrs. Roberta Cramer).

Fri., Apr. 7—Stones of the Ancients (Bert Grove).

Wed. Apr. 12—Peaks of Two Civilizations (Emma Neve).

Fri., Apr. 14—Wild Flowers of the Chicago Region (Miriam Wood).

Wed., Apr. 19—Animals Our Soldiers See (Loraine Lloyd).

Fri., Apr. 21—Adventures of a Fossil Hunter (Bert Grove).

Wed., Apr. 26—Spring Moving (Loraine Lloyd).

Fri., Apr. 28—Interior Decorating in the Primitive Motif (Mrs. Roberta Cramer).

Library:

Valuable books from Alfredo Barrera Vasquez, Tacubaya, Yucatan; from Abdul Bunny, Mosul, Iraq; from Roy Cross, Kansas City, Mo.; from Raymond Pitcairn, Philadelphia, Pa.; from Manuel Liendi Lazart, La Paz, Bolivia; from C. C. Burford, Springfield, Ill.; from Elmer S. Riggs, Lawrence, Kan.; from American Forestry Association, the National Academy of Sciences, and Dr. Henry Field, Washington, D. C.; from Jacques Marchaio, New York; from Dr. H. H. Tucker, Columbus, Ohio; from Orr Goodson, Glencoe, Ill.; from Capt. Rupert Wenzel, U. S. Army; from Col. Clifford C. Gregg, U. S. Army; and from Dr. D. Ricardo Calatroni, Henry W. Nichols, Karl P. Schmidt, Bert Grove, Boardman Conover, Paul C. Standley, Dr. W. L. McAtee, Frank L. Heyser, Mrs. Charles W. Dempster, and Henry Miller, all of Chicago.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

Chicago Natural History Museum
BULLETIN
Formerly Field Museum News

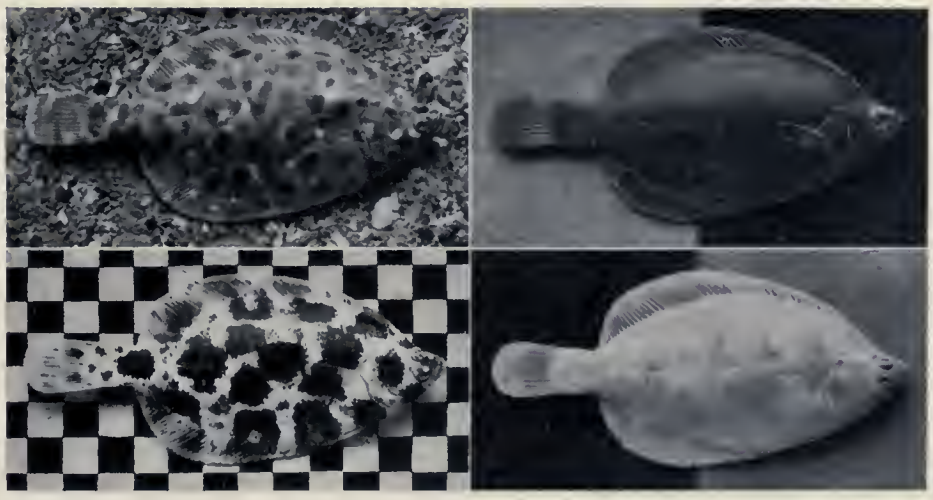
Vol. 15 MAY–JUNE, 1944 Nos. 5–6

REMARKABLE CHANGES IN FISH COLORATION DEMONSTRATED IN EXHIBIT

By KARL P. SCHMIDT
CHIEF CURATOR, DEPARTMENT OF ZOOLOGY

Notable examples of various types of fish coloration, experiments with color change in fishes, and models to explain how fishes are colored and how some of them change color, are shown in a new exhibit under the title "Coloration in Fishes." This exhibit is in a series of cases adjacent to the Hall of Fishes (Hall O) on the ground floor of the Museum.

Besides greatly enlarged models of sections of fish skin and of single color cells, the topics presented are: variability of coloration; concealing coloration including resemblance to the background and "ruptive markings"; color mutations such as albinism, melanism, golden coloration, etc.; and the nuptial coloration of male fishes in the breeding season. Transparency of small fishes of the surface waters of the ocean and the loss of color in cave fishes are represented by models of the eel larva and of the cave fish of Mammoth Cave.



INTRICATE PATTERN demonstrates capacity of common winter flounder for imitating even a complex background on which it may be placed.

THE EYES CONTROL. Experiments with winter flounder show entire fish takes on color of background over which the head finds itself.

In fishes with the capacity for rapid change of color, the color and pattern may be under two entirely different sets of controls, and these may be combined in the same fish. It has been shown that much color change in fishes is controlled by the secretion of the pituitary gland at the base of the brain, and that when the hormone from this gland is poured into the blood in response to nervous stimuli such as fright, aggressiveness, or other exciting factors, radical reversals of color or shimmering waves of color passing over the body may be observed.

A familiar aquarium example is the male Siamese fighting fish, in which color change obviously has no relation to the background. Such color change is shown on the first panel of the new exhibit by models of the Nassau grouper, a fish familiar to Florida fishermen. The six models exhibit the extremes of color and pattern out of the hundreds of different colorations possible in this species.

The second type of color control is directly through the nervous system and is governed by the sensory impressions received through the eye. The classic example of such color change is the adjustment of the color and pattern of the flounder to that of the sea-bottom on which it lies. This adjustment has been studied by the experiment of placing the living fish on a great variety of natural and even artificial backgrounds. That the flounder's color change is controlled through the eye is proved by the adjustments to radically different backgrounds, and still more clearly by the fact that the whole fish takes on the color of the part of the bottom on which the head lies. If the fish is blind, no color change takes place, the color cells are gradually lost, and the upper surface becomes white like the lower side, which is colorless in the normal fish.

Many fishes have a rather fixed coloration, little subject to change. Important types of background resemblance have been developed in such fishes in the course of their evolution, and it is assumed that concealing coloration in general develops in response to the struggle for existence. The most widespread principle of such coloration in the animal kingdom is that of countershading, in which the upper side is dark, the lower light, usually with a gradual transition from one to the other. Such coloration is familiar in the black bass of American fresh waters.

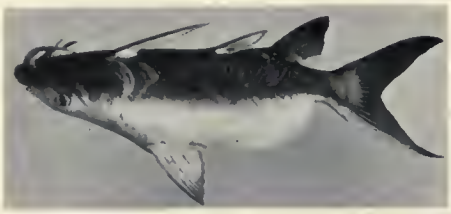
Countershading is especially noteworthy in the pelagic fishes of the surface waters of the open sea, whose dark blue backs tend to hide them from enemies above them, while their silvery bellies make them difficult to see from below. The principle of countershading among fishes is sharply illustrated by the Nile catfish, which swims and feeds belly upward at the surface of the water instead of being a bottom dweller like most of its relatives. Consequently, in this fish the belly is dark and the back light.

The third panel of the exhibit shows examples of natural camouflage in which the principle of "ruptive markings" forms the dominant feature of the pattern. Bold lines across the body at first glance seem to make the fish conspicuous; but against their natural colored backgrounds, such markings break up the outlines of the fish. A black line through the eye is a recurring feature of such markings, not only in fishes but in many other animals. In fishes, concealment of the eye is frequently furthered by radiating dark lines, as may be seen in several of the models.

The development of form to go with color resemblance to the background is especially noteworthy in the sargassum fish and in the wonderful sea-weed-like seahorse of Australian seas, *Phyllopteryx eques*. Another remarkable example of "cryptic coloration" is represented by the "dead-leaf fish" (*Monocirrhus polyacanthus*), in which the resemblance appears to be as useful to the fish in enabling it to approach its prey as to hide it from its enemies. The leaf resem-

blance is strikingly supported by the side-slipping movements in the water, and a chin barbel may be interpreted as the leaf-stem.

Other general topics in the coloration of fishes are treated on the second and third panels. Models show what is meant by



COUNTERSHADING IN REVERSE

Coloration phenomena follow the fish's habits of life. In most counter-shaded fishes the upper parts are dark and the lower parts light, but this species, the Nile catfish, normally swims upside down, so Nature has accommodated by making its belly dark and its back light in accordance with the general "safety first" principle for protection from various enemies.

albinism, melanism, and the golden coloration known as xanthism. The common local minnow, the horned dace, exhibits the striking seasonal difference in coloration of the sexes—the brilliant colors of the male appear only during the breeding season. Such sexual differences usually accompany some remarkable courtship and breeding behavior.

A fourth panel now in preparation for the coloration exhibit, will show the characteristic color profile of the depth zones of the ocean from the brilliantly lighted surface waters to the dark abyssal depths.

The plans for the exhibit of the principles of coloration in fishes were drawn up by Ensign Loren P. Woods, Assistant Curator of Fishes, before his entry into the Navy. The models and installation are the work of Staff Taxidermist Leon L. Pray.

BIRDMAN'S-EYE VIEW OF WAR

From Emmet R. Blake, the Museum's Assistant Curator of Birds, who is now in Italy as a special agent in the Counter-Intelligence Corps of the War Department, the Acting Director has received an interesting letter. It gives as intimate and vivid a picture of the fighting front as censorship will permit. Excerpts follow:

"Dear Mr. Goodson:

". . . After some months of action in the mountains, I had a brief vacation. It was much too good to last, so I wasn't particularly surprised when I 'made the team' for the present engagement. No doubt the papers are giving you a general idea of the situation here on the Anzio beachhead, but you would have to be here conducting business as usual, in view of enemy artillery observers, to really appreciate it.

"A typical twenty-four hours includes attacks and counter-attacks, numerous assorted sneak air raids, harassing artillery fire, plain and fancy bombardment by long-range railroad guns and general slapstick. All in all it proves to be very fascinating—like a street accident. There is a very extensive wine cellar thirty feet below the battered structure I infest, but I've not devised a means of carrying it about with me. Mussolini did a pretty fair job of draining his malarial marshes but I would settle for a better crop of trees to hide behind.

"Business is brisk and quite satisfactory in my department. It is probable that I will be an awfully cynical guy to have around after the war. . . . . .

"The enclosed clipping is probably the only thing ever published about the CIC for the public. From it you may get a very pale idea of what goes on. The inside story must be left to the imagination until after the war.

"Sincerely yours,
"Bob Blake"

Following is the Army newspaper clipping Mr. Blake refers to, giving an account of the work of units of the type to which he is attached:

"FASCIST RING BREAKUP PUTS CIC IN SPOTLIGHT

"Allied Force Headquarters—Behind the battling Yank, inching his way through the rains and retarding mud of Italy, move units of one of the Army's hush-hush departments. Their job is to see that the fighting man is not stabbed in the back by sabotage or any other subversive act in the territory through which he has passed.

"Wherever there are vital roads or rail lines to be kept open, wherever there is a loaf of bread or a flagon of blood plasma to be forwarded to the front, wherever expediency demands the constant use of telephone and power lines, there you will find members of these highly specialized units known as the Counter-Intelligence Corps.

"The CIC was mentioned this week in the breaking up of a ring of youthful Fascists in Trapani, Sicily. A CIC investigation resulted in the detention of 15 men and a wealthy Italian girl accused of planning acts of sabotage against the Allies.

"CIC men operate all the way from points forward of the actual front to positions deep in the echelons to the rear, and, paradoxically, while anonymity is sought at the rear of the theater of operations, they break out bright red brassards bearing the initials 'CIC' when they move into freshly taken territory.

"The explanation is simple. They wish to excite the curiosity of natives, and thus acquire contact with all the informants usually found in captured communities and without whom no investigating agency could function at highest efficiency.

"On occasion, men of the CIC have entered towns ahead of advancing troops. Three intrepid members of the corps took over a small island off Sicily during the Sicilian campaign.

"The CIC co-operates with, but is in no way connected with, the Military Police. Ordinary crimes, such as murder, rape or robbery, are turned over to the Military Police for handling. The Military Police, on the other hand, will place in the hands of the CIC the names of any persons it runs across suspected of being active or passive agents of the enemy."

MOYER ALSO IN AREA

John W. Moyer, also of the Division of Birds as Staff Taxidermist, and now a Navy Chief Specialist in photography, has written from North Africa and Italy. He was at work with a Medical Photo Unit, not far from the area where Mr. Blake is located, when last heard from.

"This was at one time a very beautiful city, but is now partly in ruins from bombing, and they still come, every night or so," writes Mr. Moyer. . . . . "I flew here all the way from America."

MUSEUM BOTANISTS PREPARE PLANT MANUAL FOR NAVY

Dr. B. E. Dahlgren, Chief Curator of the Department of Botany, and his associate, Paul C. Standley, Curator of the Herbarium, are co-authors of a special pamphlet for men in service, recently issued by the United States Navy Department.

Entitled *Edible and Poisonous Plants of the Caribbean Region*, the pamphlet is published by the Navy's Bureau of Medicine and Surgery. It includes 72 illustrations of tropical American plants that are either edible or poisonous, thus providing servicemen in the Caribbean area with information enabling them to discriminate as to which of the plants they encounter will be valuable additions to their diet, and which they must shun. The edible plants constitute by far the great majority.

The pamphlet, designated as Navmed 127, is obtainable from the Superintendent of Documents at Washington (price 20 cents). Although published by the Navy for its personnel, it is reported that twice as many copies as the Navy itself is using have been distributed to the Army.

ARE YOU MOVING?

Members of the Museum who have changed residences or plan to do so are urged to notify the Museum of their new addresses so that THE BULLETIN and other communications may reach them promptly. A post card for this purpose is enclosed with this issue.

Members going away during the summer, who desire Museum matter sent to their temporary addresses, may have this service by notifying the Museum.

MUSEUM RECEIVES LARGE GIFT FROM MARSHALL FIELD

The Pittsfield Building and the Loop site it occupies, together with 10,000 shares of Marshall Field and Company 6 per cent preferred stock, have been transferred to the ownership of the Chicago Natural History Museum as a gift from Mr. Marshall Field, Publisher and Editor of *The Chicago Sun*, and member of the Museum's Board of Trustees, it was announced on April 4 by Mr. Stanley Field, President of the Museum.

MARSHALL FIELD

The contribution, one of the largest ever received by this institution from any source, is in fulfillment of a pledge made by Mr. Marshall Field last September 15 on the occasion of the celebration of the fiftieth anniversary of the Museum.

At that time he authorized President Stanley Field to inform the institution's Board of Trustees, and the public, of his intention to give the Museum "certain pieces of property that should produce an income at least equivalent to what his annual contributions have been in recent years." It was coincident with this announcement that President Field made public the unanimous decision, since carried into effect, of Mr. Marshall Field and all other Trustees, to change the name of the institution from Field Museum of Natural History to its present designation, Chicago Natural History Museum.

PITTSFIELD BUILDING

The Pittsfield Building, erected in 1928, is an important modern office structure of 38 stories, located at the southeast corner of Wabash Avenue and Washington Street. The first twelve stories are occupied by shops and commercial establishments; the upper floors are divided principally into suites of offices and laboratories occupied by the medical and dental professions.

Mr. Field's gift becomes a part of the permanent endowment of the Museum and is subject to no special restrictions.

"COMIC STRIP" METHODS MAKE EXHIBITS MORE VIVID

By PAUL S. MARTIN
CHIEF CURATOR, DEPARTMENT OF ANTHROPOLOGY

Some months ago, I read an article in *The New Yorker* on the "funnies." I was amazed to learn that, according to various dependable polls, comic strips or funnies are read by well over half of the country's adults and by two-thirds of the children over six. This constitutes a public of about sixty-five million people who read comics *every day!*

It seems apparent that the comic strip is a medium of expression to which many people are accustomed, and one which is probably adaptable to museum usage. The big question, of course, is how to use it most effectively. I was eager to try to fit the comic strip into our schemes of new exhibition techniques because in essence it is merely a form of pictorial representation.

We know that visitors will seldom read labels more than two or three lines in length; and yet many times we have interesting information which we want to convey to our visitors and cannot because they will not read long explanatory labels. But almost anyone will look at a picture or series of pictures, and most people will glean more information from a *pictorial* than from a *word* stimulus. We determined therefore to use this pictorial means of expression.

STRIPS HAVE ANCIENT ROOTS

There are some who abhor comics and think of them as "cheap," "degrading," "lacking in imagination" and ruinous to good taste for better things. But such a view is somewhat biased and unperceiving; for, in the opinion of many people of good taste, the comic strip is really part of our folklore, and, as such, is very important. Many of my "highbrow" friends feel cheated if they do not have a chance to read their favorite comic strips each day. Mr. Lovell Thompson, of Houghton Mifflin and Company, wrote in *The Atlantic Monthly* for September, 1942 that the tendency of the comics is to prolong a period (or era) by anticipating it before it arrives, sustaining it during its brief passage, and maintaining its illusion after it is gone. He also explains opposition to such strips as resulting from man's fear of change; and says that when some men have been shown the future in comics, such as "Batman" or "Flash Gordon," they resent it and may forbid their children to have anything to do with such types of comics.

However, the ancestry of the comics is so long and distinguished that it could claim a coat of arms from the college of heraldry. The painted bas reliefs in Egyptian art are really nothing more or less than pictorial representations, many of which depict scenes of daily life and even of life after death. The Aztec Indians developed a system of writing which was also pictorial representation and which in some ways resembled our comic strip technique.

The most striking parallel lies in the use of the *speech scroll* or *speech balloon*. The Aztec scribe used a speech scroll or speech balloon (just like the circlet which issues from the mouths of the characters to enclose dialogue in our funnies) when he wished to indicate that a certain character in the text was talking; or used a similar symbol when he wished to show that noise was issuing from a trumpet or a drum.

"COMICS" NOT NECESSARILY FUNNY

Some critics may object to this comparison between our comics and the art of the ancient Egyptians or the Aztec hieroglyphic writing. They may point out that comics are funny, and that the Egyptian and the Aztec homologues are not. But all of our comics are not funny. Many of them contain no humor at all and are merely serialized stories in picture form. At any rate, the pictorial representation or comic strip technique offers too good a bet to overlook. We have therefore worked very hard to adapt it to a form suitable for our particular needs.

When the idea was first considered, we were about ready to prepare an exhibit for Hall B on the Indians of the Shell Mound Period, in Kentucky. There were several items to bring out: (1) These Indians used a spear-thrower and a spear and did not have the bow and arrow; (2) they did not make or use pottery; (3) they planted no crops; but due to their clam-eating habits, were as sedentary as any agricultural group; (4) they lived on the banks of rivers, from which they gathered clams—their staple food; (5) they ate so many clams and deposited the discarded shells in such restricted areas that large shell-mounds or middens gradually came into being—some of these shell-mounds are 18 feet high and 300 feet or more long; (6) they built their houses on top of the clam-shell mounds, possibly because the mounds provided good drainage; (7) they buried their dead in shallow pits dug into the shell-mounds; (8) they carried on simple daily tasks such as fishing, chopping wood, scraping skins, making baskets, cracking nuts, and sewing skins with the aid of simple bone and stone tools.

Now, this Kentucky Shell Mound civilization is very simple but very important because it is the earliest evidence of man in the eastern United States (probably before 500 A.D.), and because it underlies all later Southeastern cultures.

But how is one to show all of these daily activities, each one of which is important to an understanding of this civilization as a whole? By means of ten specimens? No; absolutely not. Ten specimens or even a thousand could not illuminate all aspects of their daily life. For example, take merely those parts which center around clams. Archaeological objects, such as stone knives

(*Continued on page 5*)

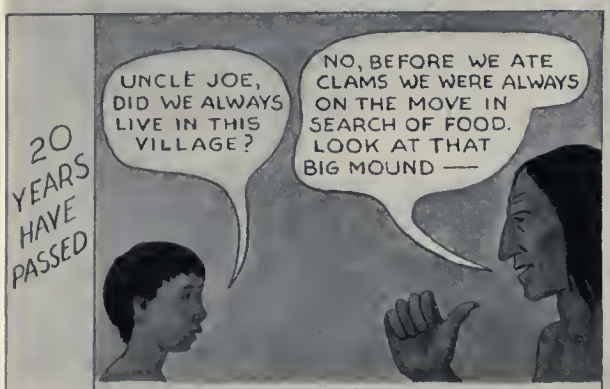
THE LIFE OF JOE ELK

JOE HELPS HIS MOTHER GATHER CLAMS

JOE AND FAMILY THROW SHELLS ON GROUND

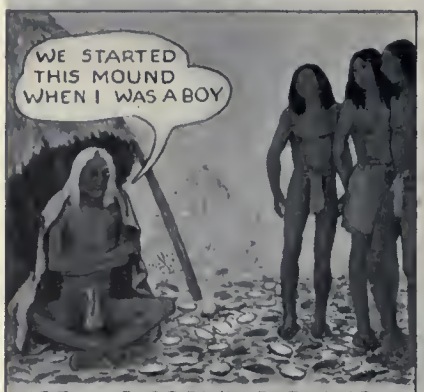
JOE IS NOW OLD ENOUGH TO GO HUNTING

GAME AND FISH SUPPLEMENT THE CLAM DIET



JOE, NOW A GROWN MAN, TALKS TO HIS NEPHEW

JOE TELLS HIS NEPHEW ABOUT THE 300-FOOT-LONG MOUND



JOE HAS GROWN OLD AND DREAMS OF THE PAST


JOE DIES AND IS BURIED IN THE MOUND

2000 YEARS LATER JOE'S BONES ARE FOUND BURIED IN THE SHELL MOUND


ARCHAEOLOGISTS DIG MOUND

How a shell mound grows

(Included in a new exhibit in Hall B)

(*Continued from page 3*)

or axes, recovered from the shell mounds, would not show our visitors how the shell mound came into being or why it was so important. Therefore, it will be seen, objects alone would not serve.

LENGTHY LABELS SUPPLANTED

What then? Formerly, it was our custom to explain by means of word pictures those aspects of the exhibition which could not be brought out by specimens. Thus, in this particular exhibit on the shell mound civilization, we would have prepared a long label to explain that clams were the staple food, that because of them the Indians could live in villages long before farming was invented, and that shell mounds were the sites for the villages and came into being because many thousands of clams were eaten.

But what a label! It would be long and dry, and would only give a *word* picture of what we were talking about. Most people do not assimilate a word picture so readily as a real picture in color. And, worst of all, most people will not read a label consisting of 100 or more words. I don't blame them—it is not easy to read standing up.

And so, what would have been our end product? A case containing some bone awls, stone axes, knives, and scrapers, without any story or meaning behind those tools, whereas the interesting and meaty part of our exhibit would be wasted because it would have been contained in a label which few if any would read.

"ONE PICTURE EXCELS 10,000 WORDS"

Therefore, the pictorial representation or comic strip seemed like manna from heaven. For with a series of pictures one can express several ideas so graphically that the visitor can quickly grasp them and will remember them longer than if he had stopped to read any labels. Pictures are like dioramas in miniature.

But how to use this pictorial idea? At first, we thought of creating a strip of pictures showing such activities as clam gathering, hunting with a spear thrower, and crushing nuts on a stone mortar. Then we intended to connect each picture with the proper objects by means of an arrow (e.g., an arrow running from the hunting scene to the spear and spear thrower). But this scheme failed for two main reasons: (a) it was not easy to show the tieup between the picture and the object, and the exhibit was unattractive because there were too many arrows; and (b) because the strip of pictures did not make a continuous story.

After many other experiments we finally decided to create a series of nine pictures arranged like the Sunday comics. These pictures tell the story of why the people settled near a river (because of a plentiful supply of clams) and how the shell mound came into being. Thus we could eliminate a long label and still put over our story in a dramatic, graphic, unforgettable manner.

ANCIENT AZTEC COMIC STRIP PARALLEL

The symbols in interrogation-point shape issuing from mouths of characters at right were equivalent in style and purpose to "speech balloons" used by modern cartoonists.

The remainder of the screen is devoted to a story of daily life which is explained with a minimum of labels. By means of actual tools and sketches showing how the tools were used, nine daily activities of these Indians are illustrated. For example, one important daily activity was to chop wood. This is shown by means of two actual stone axes placed next to a drawing in color of an Indian chopping wood with a stone ax. The other daily activities are demonstrated in the same way. This exhibit is now open to the public in Hall B.

The task of adapting this new technique to museum exhibits and to our particular needs in Hall B (Archaeology of the New World) has been a co-operative one. Artist Gustaf Dalstrom, Curators George I. Quimby and Donald Collier, and the writer have striven to make the final product attractive, beautiful, educational, and worthy of our ideals for advancing the art of teaching through exhibitions.

OVERPAINTING TECHNIQUE

For rendering the comic strip, Artist Dalstrom used a technique employed by many of the famous Rennaissance masters—a technique called *overpainting*. The method consists of applying transparent layers of oil paint over a prepared tempera painting. This technique gives the painting a translucent quality which would be unobtainable by other means. A translucent quality is desirable because it brings out detail with clarity and delicacy. Naturally, this technique, plus Mr. Dalstrom's artistry, produces an unusually beautiful type of comic strip. Looking at it, one is reminded of the skill of the old masters as exemplified by 15th Century paintings in Italian churches.

RESTRICTED USES

We think the comic strip technique is a useful exhibition tool, but one which should be used with restraint. Constant use of any good tool dulls it. We shall therefore use this technique only when good taste and urgent need make it desirable. I can think of one exhibit where a comic strip will be a necessity—an exhibit showing the immigration of the Indians to North America from Siberia. We know fairly well the story of this great trek of Mongoloids from Asia to America, and we know about when the first migration took place (some 20,000 to 30,000 years ago), but we possess none of the tools, equipment or gear of these first discoverers of North America. All of their houses, tools, clothing, and the like have been lost for all time or have long since turned to dust. Therefore, the only way in which we could tell this epic story in an exhibit would be by means of pictorial representation, such as our comic strip.

FEDERAL ADMISSION TAX RISE AFFECTS MUSEUM

The increase in the Federal tax on admissions to amusement places, which became effective April 1, applies also to all such educational institutions as the Museum.

On the days when admission of 25 cents is charged (Mondays, Tuesdays, Wednesdays and Fridays) the tax is now 5 cents, making a total entrance fee of 30 cents.

Children will be admitted free on all days, as in the past, as will also teachers, uniformed members of the armed forces of the United Nations, and Museum Members.

In the case of children admitted free on the days when adults are charged, the government requires payment of the tax for those 12 years of age, or over, but this charge will be absorbed by the Museum itself, as has been the practice ever since the former 3-cent tax was imposed. Thus, every child over 12 admitted on a pay-day will cost the Museum five cents in actual cash outlay, but the Trustees regard this as a worthy expenditure justified in the accomplishment of the educational aims of the Museum.

Layman Lectures Resume In October

Mr. Paul G. Dallwig, the Layman Lecturer of the Museum, ended his season of Sunday afternoon lectures on April 30, after appearing before the largest audiences since he began this activity in 1937. He will return for a new series on the first Sunday in October.

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Field Drive, Chicago
TELEPHONE: WABASH 9410

THE BULLETIN

EDITOR

WILFRED H. OSGOOD.....*Curator Emeritus, Zoology*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
B. E. DAHLGREN.....*Chief Curator of Botany*
HENRY W. NICHOLS.....*Chief Curator of Geology*
KARL P. SCHMIDT.....*Chief Curator of Zoology*

MANAGING EDITOR

H. B. HARTE.....*Public Relations Counsel*

Members are requested to inform the Museum promptly of changes of address.

WORTHY OF ATTENTION—

Included in this issue of The BULLETIN are several items which may bring a measure of satisfaction to all who are interested in this Museum.

The article on the war experiences of Emmet R. Blake, Assistant Curator of Birds, and John W. Moyer, Bird Taxidermist, is a matter for pride not only as a testimony of what these particular men are doing, but because it is broadly representative of what all of the 40 Museum Trustees, employees and volunteer associates who have entered war service are doing.

That the scientific research sponsored by this institution can be of practical value to the nation is again attested in an item telling of the Navy Department's publication of a manual for service men on edible and poisonous plants, prepared by the Chief Curator of the Department of Botany and one of his associates.

We are proud, too, that the news contents of this issue indicate no complete cessation of regular work due to war preoccupation. Accounts of the installation of additions to the exhibits, presenting new subjects in new types of display, point the fact that the Museum is still progressing.

One item we have to print is discouraging—the one about the increase in the Federal tax on admissions, which emphasizes again the Congressional myopia that resulted in the grouping of educational institutions such as this in the classification of "Amusements" to be taxed on the same percentage basis as movies and other theaters.

SUMMER PROGRAMS

FOR ADULTS

Backgrounds of the War. On Thursday afternoons at 2:30, beginning July 6, the Museum will present its third series of programs relating Museum material to the news of the day. Like the "Backgrounds of the War" series given in 1942 and 1943, these programs will give information on the various geographical areas involved in current fighting, and their inhabitants. The programs are now in preparation, and a complete schedule will appear in the next issue of The BULLETIN. Talks in the Lecture Hall, motion pictures and slides, and tours of exhibits will be among the features.

FOR CHILDREN

Raymond Foundation Movies. During the summer, the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures will again offer its annual summer series of free motion pictures for children on Thursday mornings in the James Simpson Theatre. Each program will be presented twice, at 10 A.M., and again at 11, in order to accommodate maximum numbers of children. The July-August BULLETIN will contain an announcement of the full schedule of dates, and titles of the films to be shown on each.

Staff Notes

Mr. Henry F. Ditzel, Registrar of the Museum, retired on pension March 15. He had served on the staff since 1905.

Mr. Timothy Reedy, night sergeant of the Museum guards, has been retired on pension after many years of faithful service.

Mr. James H. Quinn, Chief Preparator in the Division of Paleontology, has enlisted in the Navy, and left the Museum April 25 to take up his duties. He has been given the rating of Metalsmith 2c.

Mr. George I. Quimby, Jr., formerly Assistant Curator of North American Archaeology and Ethnology, has been promoted to Curator of Exhibits.

Curator Hambly and Dr. Cole in University Lectures

Dr. Wilfrid D. Hambly, Curator of African Ethnology, was one of the two featured speakers in a series of lectures on "Peoples and Customs of the Pacific" presented at the Art Institute by the Department of Anthropology of the University of Chicago in cooperation with the Chicago Natural History Museum. Dr. Hambly appeared on April 7, 14, and 21, his subjects being: "Australia: 'The Black Boy' "; "Melanesia: The Stone Age in the Pacific"; and "Polynesia: 'Sailors of the Pacific.' "

The other lecturer is Dr. Fay-Cooper Cole, Professor of Anthropology at the University (also Research Associate in Malaysian Ethnology on the Museum staff), who spoke April 28 on "The People and Courts of Java"; and who will present "Pagan Tribes of the Philippines" on May 5, and "The Japanese Trail to Singapore" May 12.

THE MUSEUM HONOR ROLL

Now in the Nation's Service

Army

THEODORE ROOSEVELT, Trustee—Brig.Gen.
GEORGE A. RICHARDSON, Trustee—Lt. Col.
CLIFFORD C. GREGG, Director—Colonel, G.S.C.
DR. JOHN RINALDO, Associate, Southwestern Archaeol.—Staff Sgt.
DR. SHARAT K. ROY, Curator, Geol.—Capt.
D. DWIGHT DAVIS, Curator, Anat. and Osteol.—Corp.
BRYAN PATTERSON, Curator, Paleontology—Pvt.
EMMET R. BLAKE, Asst. Curator, Birds—Special Agent, War Dept.
RUPERT L. WENZEL, Asst. Curator, Insects—Capt.
HENRY S. DYBAS, Assistant, Insects—Pvt.
WILLIAM BEECHER, Temp. Asst., Zool.—Pvt.
HENRY HORBACK, Asst., Geol.—Pvt.
JAMES C. MCINTYRE, Guard—2nd Lt.
RAYMOND J. CONNORS, Guard—Pvt.
FRANK J. DUTKOVIC, Janitor—Pvt.

Navy

LESTER ARMOUR, Trustee—Comdr.
SAMUEL INSULL, JR., Trustee—Lieut. Comdr.
JOSEPH NASH FIELD, Trustee—Lieut.
COLIN CAMPBELL SANBORN, Curator, Mammals—Lieut.
DR. ALEXANDER SPOEHR, Asst. Curator, N. Amer. Ethnol.—Lieut. (j.g.)
LOREN P. WOODS, Asst. Curator, Fishes—Ensign
JOHN W. MOYER, Taxidermist—Ch. Specialist (Bur. Aeronautics)
JAMES H. QUINN, Chief Preparator, Paleontol.—Metalsmith 2C
PATRICK T. MCENERY, Guard—Master-at-Arms
JOHN SYCKOWSKI, Guard—Ch. Commissary Stewd.
GEORGE JAHRAND, Guard—Ch. Water Tender
CLYDE JAMES NASH, Guard—Ch. Gunner
NICHOLAS REPAR, Printer—Aviation Machinist's Mate 2C.
MORRIS JOHNSON, Carpenter—Carpenter's Mate 2C.
HERBERT NELSON, Painter—Painter 1C.
ELIZABETH BEST, Guide-Lecturer—Ensign, WAVES
MARIE B. PABST, Guide-Lecturer—WAVES

Marine Corps

MELVIN A. TRAYLOR, JR. Associate, Birds—1st Lt.

Coast Guard

M. C. DARNALL, Jr., Guard—Lieut. (j.g.)
JOHN MCGINNIS, Guard—Ch. Boatswain's Mate

Other Services

RUDYERD BOULTON, Curator, Birds—Staff of Office of Strategic Services
BRYANT MATHER, Asst. Curator, Mineralogy—Civilian Worker, Corps of Engineers, U.S. Army
LLEWELYN WILLIAMS, Curator of Economic Botany—on special service for U.S. Government
DR. JULIAN A. STEYERMARK, Asst. Curator, Herbarium—field work for Board of Economic Warfare
DR. C. MARTIN WILBUR, Curator, Chinese Archaeol. and Ethnol.—Staff of Office of Strategic Services

Served and Honorably Discharged:

BERT E. GROVE, Guide-Lecturer—Medical Aide, American Field Service, Africa.

In Memoriam

CHARLES E. HELLMAYR

A brief cable received a few weeks ago records the recent death in Switzerland of Charles E. Hellmayr, Associate Curator of Birds, at the age of sixty-six. Since 1942 it had not been possible to communicate with him by mail, and although it was known that his health had been threatened, it had been hoped that he would survive.

Hellmayr joined the staff of the Museum in 1922, coming from Europe after the first World War to carry on ornithological research which had been interrupted by the death of the former Curator of Zoology, Charles B. Cory. Mr. Cory had planned the publication of a large work entitled *The Birds of the Americas*. Two parts had been issued, and manuscript partially prepared for another in a series which promised to run to ten or twelve large volumes.

SOUTH AMERICAN AUTHORITY

The completion of this series by Hellmayr was especially welcomed by ornithologists throughout the world, since he was known to be especially qualified for it. At the time, his reputation was established as the leading authority on the classification of the birds of South America, and he brought to the work a large mass of accumulated notes, a familiarity with the more important museums of Europe, and an unsurpassed knowledge of the special literature concerned. In his earlier years he had been especially associated with Ernst Hartert, ornithologist of the Tring Museum in England, and later at Munich with Count von Berlepsch whose great collection of South American birds had received his particular attention.

Beginning in 1922, he remained in residence in Chicago until 1931, diligently and most effectively engaged in the tremendous amount of research involved in the project. Four large volumes were published and data compiled for others. Meanwhile he published numerous other ornithological papers, the most important being a lengthy volume on *The Birds of Chile*, a report on *Birds of Northeastern Brazil*, and another on *Birds of the James Simpson-Roosevelts Asiatic Expedition*.

CONFINED BY NAZIS

In 1931, for personal reasons, he requested permission to return to Europe to continue there the preparation of the remaining volumes to complete the series started in Chicago. This was arranged and he established himself in an attractive home in Vienna with access to the library and collections of the Vienna Museum. For several years he continued to produce without interruption, but when the Nazis took over Austria he was suddenly seized and confined with other intellectuals for real or suspected expression of anti-Nazi sentiment. Fortunately he was enabled after a time to regain his freedom and to make his way to Switzerland, having lost most of his property and having suffered much anxiety.

First in Zurich and later in Geneva, he found excellent libraries and was able to go on with his work. Under difficulties, therefore, the entire series of books was finished and all but two parts of the final volume are printed and issued. Manuscript of the unpublished parts is deposited in Switzerland to be forwarded to Chicago whenever war conditions will permit.

EPOCHAL RESEARCH

The series *The Birds of the Americas* is one of the most important publications ever issued by this Museum, and one of the largest pieces of bibliographic and ornithological research ever undertaken by a single author. Like the famous British Museum *Catalogue of Birds* it will for years be consulted by students and specialists of all nations.

Hellmayr was known for a very genial personality, as well as his tremendous concentration on his task, an encyclopedic mind, a marvelous memory, and an enormous capacity for application of his talents. His hobbies were the study of the French Revolution and collecting orchids. In early life he had been fond of mountain climbing. He is survived by his widow, Mrs. Kate Hellmayr, who is in Geneva, Switzerland.

—W.H.O.

BOOK REVIEW

A Guide to Bird Watching.—The arrival of the migrant birds in spring serves to remind us of the intrinsic charm of these travelers and of the marvel of their travels. The avocation of bird-study has grown in every part of the world during the past two generations, with a steadily increasing literature directed especially to the bird lover. At first this literature was primarily for the purpose of identification: everyone making birds a hobby seemed to be interested in recognizing the different kinds and in knowing their names—sometimes indeed, to have little if any other interest.

While the knowledge of migration dates, supported by banding records, and of the life habits of birds in general was accumulating, the classification of North American birds was refined, and the literature for their identification became more and more voluminous. This literature, indeed, has reached the point of diminishing returns. Every newcomer to bird study now must feel the need for advice as to the value of the books about birds with which he is confronted. It is evident to the more thoughtful naturalist that he needs also a guide to direct his love of birds into more fruitful lines of endeavor than mere identification.

A Guide to Bird Watching, by Joseph J. Hickey, accomplishes the end described by its title most satisfactorily. One may well hope that bird-lovers may become bird-watchers, and that their bird watching may be directed into the more interesting and more valuable studies of migration, population estimates, ecological distribution, and of individual and group behavior. These subjects are effectively introduced by Mr. Hickey.

The success of Mr. Hickey's book is plainly due to the fact that he has a long familiarity with bird study and, it may be added, with bird students, from the amateur side, while this knowledge is overlaid and finally infiltrated by an equally competent technical familiarity with the more scientific aspects of ornithology and with an appreciation of the systematized natural history now known as ecology. He is thus able to combine practical advice to the beginner with suggestions for the advanced student, and with interest for the professional biologist.

A Guide to Bird Watching is recommended to everyone interested in bird study, and to naturalists whose special interests lie in other groups of animals as well.—K.P.S.

Technical Publications Issued

The following technical publications recently have been issued by the Chicago Natural History Museum Press:

Botanical Series, Vol. 23, No. 2. Studies of Central American Plants—IV. By Paul C. Standley and Julian A. Steyermark. February 14, 1944. 82 pages. $0.50.

Zoological Series, Vol. 29, No. 5. Amphibians and Reptiles of the Big Bend Region of Texas. By Karl P. Schmidt and Tarleton F. Smith. February 23, 1944. 22 pages. $0.15.

Zoological Series, Vol. 29, No. 6. Amphibians and Reptiles of Northern Coahuila, Mexico. By Karl P. Schmidt and David W. Owens. February 23, 1944. 20 pages. $0.15.

Zoological Series, Vol. 29, No. 7. New Mordellid Beetles from the Western Hemisphere. By Eugene Ray. February 29, 1944. 18 pages. $0.15.

Zoological Series, Vol. 29, No. 8. Snakes of the Hoogstraal Expeditions to Northern Mexico. By Hobart M. Smith. February 29, 1944. 18 pages, 2 text figures. $0.15.

Zoological Series, Vol. 29, No. 9. New Frogs from Misiones and Uruguay. By Karl P. Schmidt. March 15, 1944. 8 pages, 3 text figures. $0.15.

Zoological Series, Vol. 28, No. 3. A New Subfamily of Beetles Parasitic on Mammals. By Charles H. Seevers. March 17, 1944. 20 pages, 3 plates with captions opposite. $0.20.

Botanical Series, Vol. 23, No. 3. Studies of Central American Plants—V. By Paul C. Standley and Julian A. Steyermark. March 24, 1944. 40 pages. $0.30.

Zoological Series, Vol. 29, No. 10. Mastlcatory Apparatus of the Sloths. By Harry Sicher. March 28, 1944. 8 pages, 3 text figures. $0.10.

WEEKDAY LECTURE TOURS DURING MAY AND JUNE

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given, covering all departments. Special subjects are offered on Wednesdays and Fridays; a schedule of these follows:

May

Wed., May 3—Spring Maneuvers (Loraine Lloyd).

Fri., May 5—Embalming the Past (Bert Grove).

Wed., May 10—Trees in Bloom (Miriam Wood).

Fri., May 12—Mothers of the Animal Kingdom (Loraine Lloyd).

Wed., May 17—Faces and Races the World Around (Mrs. Roberta Cramer).

Fri., May 19—Wonders of the World (Bert Grove).

Wed., May 24—Polar Frontiers (Emma Neve).

Fri., May 26—Primitive Fighters (Mrs. Roberta Cramer).

Wed., May 31—Flowers as Symbols (Miriam Wood).

June

Fri., June 2—Out of the Sky (Bert Grove).

Wed., June 7—Tropical Trail Blazers (Emma Neve).

Fri., June 9—The World's Gardens (Miriam Wood).

Wed., June 14—Signs of the Times (Mrs. Roberta Cramer).

Fri., June 16—Equipment for Combat (Loraine Lloyd).

Wed., June 21—Primitive Humor (Emma Neve).

Fri., June 23—Vacation Fun Exploring Nature (Loraine Lloyd).

Wed., June 28—The World at Play (Mrs. Roberta Cramer).

Fri., June 30—Yesterday Lives Again (Bert Grove).

Persons wishing to participate should apply at North Entrance. Tours are free. By pre-arrangement at least a week in advance, special tours are available to groups of ten or more persons.

There will be no tour on Tuesday, May 30, on account of the Memorial Day holiday, but the Museum will be open to visitors as usual.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the last two months:

Department of Anthropology:

From Dr. Henry Field, Washington, D. C.—10 ethnological specimens from Macusi Indians, British Guiana.

Department of Botany:

From Dr. R. M. Harper, University, Ala.—70 herbarium specimens, Alabama, and 46 photographs; from Hermann C. Benke, Chicago—116 herbarium specimens, Illinois, Indiana, Wisconsin, Kansas, and Idaho; from John E. Wilde and J. T. Baldwin, Rio Branco, Brazil—120 herbarium specimens, Brazil; from C. W. Bazuin, Grand Rapids, Mich.—105 herbarium specimens, Michigan; from Cpl. W. L. Tolstead, Camp Barkeley, Texas—33 specimens of algae, Texas; from Dr. Fred A. Barkley, Austin, Tex.—21 specimens of algae, Texas and Mexico; from Dr. Walter Kiener, Lincoln, Neb.—41 specimens of algae, Nebraska; from Museo Nacional, San José, Costa Rica—265 herbarium specimens, Costa Rica.

Department of Geology:

From Lieut. Alvin R. Cahn, U.S.N.R—a molar of mammoth, *Mammonteus primigenius*, Alaska; from Dr. Henry Field, Washington, D. C.—a specimen of sand, British West Indies; from William Redman, Chicago—a specimen of weathered sandstone, Wisconsin; from L. B. Roberts, Monticello, Ark.—a specimen of wood replaced with iron oxide, Louisiana.

Department of Zoology:

From Boardman Conover, Chicago—an ibis and a goshawk, Paraguay and Illinois; from William J. Beecher, U. S. Army—a cuscus skin and an Australian coot skull, Solomon Islands; from Dr. C. Clayton Hoff, Quincy, Ill.—13 water mites (slides of types and paratypes) and 11 microscopic slides of paratypes of 6 species of ostracods, United States; from Dr. Henry Field, Washington, D. C.—a jaguar skull and 2 turtles, British Guiana; from Chicago Zoological Society, Brookfield, Ill.—skull of a reticulated python; from Lincoln Park Zoo, Chicago—a Japanese macaque and skull of a Chaoma baboon; from Minnesota Museum of Natural History, Minneapolis, Minn.—37 snakes and 45 lizards, mostly Philippine Islands; from Mrs. Henry A. Wallis, Oak Park, Ill.—60 specimens comprising 24 kinds of sea shells, Florida; from H. Rasool, Georgetown, British Guiana—2 rodents, British Guiana; from Brother Niceforo Maria, Bogotá, Colombia—5 bats, Colombia; from Walter F. Webb, Rochester, N. Y.—2 specimens of sea shell, Panama; from D. Dwight Davis, U. S. Army—10 specimens of crustacea, Arkansas and California; from Bryan Patterson, U. S. Army—35 specimens of shells and crustacea, Texas; from Billy Milstead, Houston, Tex.—39 snakes, Texas; from Dr. P. W. Fattig, Emory University, Ga.—439 beetles, 288 bees and wasps, 4 lacewings, and 2 fruitflies, Georgia; from Charles D. Nelson, Grand Rapids, Mich.—267 specimens comprising 88 lots of fresh water mussels, Michigan and Japan; from Keith Evans, Chicago—a marine fish, Mexico.

Library:

Valuable books from: American Museum of Natural History, Bakelite Corporation, and Harold N. Moldenke, New York; from Pan American Union and Leon Kelso, Washington, D. C.; from Educational Research Bureau for By-Product Ammonia, and H. H. Tucker, Columbus, O.; from Dr. P. W. Fattig, Emory University, Ga.; from Afranio do Amaral, Instituto de Butantan, São Paulo, Brazil; from William J. Phelps, Caracas, Venezuela; from Noemi V. Cattoi, Universidad de Buenos Aires, Argentina; from Canadian Conservation Association, London, Ontario; from Donald E. Savage, Norman, Okla.; from Maine Geological Survey, Augusta; from Illinois State Archaeological Society, Urbana; from Captain Rupert L. Wenzel, Camp Ellis, Ill.; from Stanley A. Cain, Knoxville, Tenn.; and from Henry F. Ditzel, F. H. Heyser, Mrs. Charles W. Dempster, Dr. D. Ricardo Calatroni, and *The Chicago Tribune*, all of Chicago.

NEW MEMBERS

The following persons became Members of the Museum during the period from February 14 to April 15:

Associate Members

John P. Bent, Mrs. Joseph H. Biggs, Willard F. Clark, Leopold E. Cole, Mrs. William R. Folsom, Albert J. Foute, J. E. Fuller, Joseph B. Garnett, Mrs. James E. Howie, Samuel A. Larsen, Dr. B. J. Mix, Miss Susan Naumann, Sidney Neuman, Mrs. Vaughn G. Nishkian, Mrs. Ernest J. Norcott, Wrisley B. Oleson, Mrs. Cornelius Osgood, Charles H. Porter, Edward C. Porter, August Rassweiler, Mrs. Bartlett Richards, Hugh Robertson, D. G. Schneider, Dr. J. E. Smuk, Ernest G. Sundin.

Annual Members

Mrs. John Jay Abbott, J. F. Ambrose, Ralph Ambrose, Albert T. Bard, Miss Florence E. Bigelow, Mrs. Albert V. Bori, Mrs. George W. Brown, Mrs. Eugene E. Bruckner, William H. Card, Paul Caspers, Rev. W. M. Cassetty, Jr., Mrs. Peter S. Clark, Henry P. Conkey, Mrs. Irving Crown, John G. Curtis, Raymond J. Darby, Mrs. H. F. Duncan, Harry Edward Eaton, Dr. Franz S. Erlach, W. J. Fitzpatrick, Herman H. Fleer, Joseph Fletcher, Mrs. Carl A. Giesbert, Harry M. Goodman, Miss Bernice M. Goodrich, Mrs. Marie J. Graves, Mrs. Charles J. Haines, Mrs. Robert J. Harvey, Eli Herman, Edward Hershenson, Arthur H. Herts, Reynolds Conrad Hieber, Bernard E. Hopper, Ralph Horween, Dr. Harvey C. Johnson, Miss Fannie S. Johnston, J. G. Kennedy, James L. Lyon, Dr. Paul D. V. Manning, Hays MacFarland, K. E. Morgaridge, Mrs. Wilbur C. Munnecke, James L. Palmer, J. W. Pearce, Edward P. Renier, J. R. Shuman, Joseph C. Sibley, Jr., Dr. Danely Philip Slaughter, Earl T. Staffelbach, Felix B. Stahl, Lyman A. Stanton, Mrs. Robert E. Straus, Carroll H. Sudler, Jr., Mrs. Edwin H. Swenson, Mrs. Robert Tarrant, Mrs. Samuel G. Taylor, S. B. Teeters, Reuben Thorson, O. M. Thorsson, Herman L. Wahl, Mrs. Carroll T. Walsh, Eugene H. Weak, Dr. Olin West, Frederick H. Wezeman, Graybiel Graham White, R. R. Wible, Mrs. Charles H. Willard, John G. Wilson, Percy Wilson, Louis Zahn.

Museum Hours Extended

Summer visiting hours, 9 A.M. to 6 P.M. daily, including Sundays and holidays, will go into effect at the Museum on May 1, and continue until September 4 (Labor Day).

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

Chicago Natural History Museum
BULLETIN
Formerly Field Museum News

Vol. 15 JULY-AUGUST, 1944 Nos. 7–8

GIANT FOREST HOG—ONCE A 'MYSTERY CREATURE'—SHOWN IN NEW GROUP

By WILFRED H. OSGOOD
CURATOR EMERITUS, DEPARTMENT OF ZOOLOGY

Until the beginning of the present century there was still considerable justification for calling Africa the "Dark Continent." The source of the Nile was no longer debatable, but the great Congo forest of the west central part of the continent had yielded only part of its secrets. Rumors and frequently exaggerated reports from native sources told of mysterious animals not yet seen by white men and, although these were subject to discount based on experience elsewhere, some of them were followed up with very surprising results.

Most widely heralded was the discovery of the large, strangely colored, giraffe-like okapi. This animal was first brought to notice in 1900 by Sir Harry Johnston who secured from natives some strips of skin and information which led in the following year to the acquisition of an entire skin demonstrating beyond doubt the wholly novel character of the animal. Later specimens, including skulls, showed it to be more nearly related to extinct forms than to modern giraffes and it was added to the list of interesting animals known as living fossils, survivors of a past that is gone.

While this was going on, reports were circulating to the effect that the same forest (the Semliki or Ituri) which harbored and had so long concealed the okapi was also the home of a huge wild hog, unlike any other, and rather extravagantly described by some as equal in size to a small rhinoceros and of a ferocity unequaled for its kind. In fact, some of these highly colored stories dated back to the famous explorer, Henry M. Stanley, twenty years earlier.

It was not until 1904 that these reports were confirmed by Captain R. Meinertzhagen of the British East African Rifles, who secured an imperfect skin from the forest on the southeastern side of Mount Kenya, and a perfect skull with a piece of body skin from the region northeast of the Victoria Nyanza. These were consigned to the British Museum where the peculiarities of the animal were at once recognized and described under the name *Hylochoerus meinertzhageni*, both the genus and the species being new.

FOREST HOGS IN AN AFRICAN RAIN FOREST
A new habitat group recently installed in Carl E. Akeley Memorial Hall (Hall 22).
Taxidermy and accessories by Julius Friesser, assisted by Frank C. Wonder.

Since then, as suspected, the animal has been found in various parts of the Congo forest and some of its eastern extensions, having much the same range as the richly colored forest antelope known as the bongo. No less than four varieties have been distinguished, one from the Ituri forest, one from Liberia and the Ivory Coast, one from the Cameroons, and one from the mountains of eastern Tanganyika.

Although not so enormous in size as reported, it is a very large heavy animal, larger than any other African wild pig, and has many peculiarities. It is jet black in color and its enormous head is characterized by a very broad snout and a pair of crescentic warty facial swellings several times larger than those of the wart hog. Its protruding tusks are curved as in the wart hog, but somewhat shorter and much heavier. Altogether its facial makeup is rather nightmarish and distinctly unlovely.

Like the okapi, the forest hog is probably a survivor of former times. It forms a sort of link between the bush-pigs and the wart-hogs, the former being nearer to the typical pigs represented by the wild boar. Most of the specimens now in museums have come through local hunters and native sources and few white hunters have ever encountered the animal. In the depths of its forest habitat it may be heard at times, but to get a sight of it is largely a matter of chance.

It was through correspondence with a local hunter that our Museum obtained two adult specimens and several newly born young a few years ago. Although not in perfect condition, these have been skilfully prepared by Staff Taxidermist Julius Friesser, and combined with accessories fashioned by himself and Preparator Frank C. Wonder to make a habitat group which has recently been installed in Carl E. Akeley Memorial Hall (Hall 22).

The animals are shown in a reproduction of their natural rain forest environment, framed against the buttresses of a gigantic rainbow-colored liana-hung tree.

So far as known, the only other museum group of this kind in the United States is in the American Museum of Natural History.

WILD CABBAGE—A PLANT OF THE FRENCH INVASION COAST

By B. E. DAHLGREN
CHIEF CURATOR, DEPARTMENT OF BOTANY

As the reputed ancestor of the many forms of cultivated kale and cabbage, this is undoubtedly the most famous plant of that part of the western edge of Europe that we have come to think of as the invasion coast. It grows on the rocks and cliffs near the seashores of England and Wales, the Channel islands and the mainland from the Channel coast to the Mediterranean.

KALE FROM CLIFFS OF DOVER

This plant of the south and west coast of Europe is probably ancestral to all European kinds of cultivated cabbage. Original of this exhibit in Hall 29 was grown in the Museum from seed obtained a number of years ago in the south of England.

The accompanying photograph shows a reproduction of the plant in its flowering stage. It was produced in the Museum, using a plant grown from seed obtained in the neighborhood of Dover by a member of the Museum staff on a visit to England a few years ago. It now forms an inconspicuous part of the botanical exhibits in Martin A. and Carrie Ryerson Hall (Hall 29—Plant Life), where it will be supplemented eventually by other notable examples of the mustard family.

This family, of some 3,000 species of the temperate and frigid zones, includes ornamentals like the wall-flower, sweet alyssum and stock—garden plants like cress, watercress and radishes, all the wild and cultivated mustards and their congeners, turnips and rapes, as well as many forms and races of cultivated kales and cabbages. Distinctly Chinese forms of the latter are supposedly of independent, east Asiatic origin, but all the European cultivated races of kale and collard as well as the various European types of cabbage, leaf-cabbage of different sorts, broccoli, cauliflower and Brussels sprouts—are commonly held to be descendants of the wild cabbage of western Europe. Whether this is literally true, or where, when and how the very considerable differentiation took place is entirely unknown.

It is common practice, even among people who work with plants and write about them and thus might be expected to be more critical, to be satisfied with attributing all the distinctive qualities of cultivated plants to cultivation. In the absence of all definite information on how, exactly where and when, it is probably reasonable to suspect that there may be something wrong or lacking in such an obvious explanation of the origin of different kinds of kale and cabbage, and their cultivated relatives as well as of many other cultivated plants. The great variability of some kinds of fruit and fruit trees still existing in their wild state suggests that the distinctive differences might have been well developed before it had ever occurred to anyone to bring these plants into cultivation for food purposes.

There are innumerable such questions which in the absence of direct evidence may have to wait a long time for an answer, if indeed an answer is possible until after we have learned a great many other things that we do not know at present. In the meantime wild cabbage plants will probably survive on the western edge of Europe.

HARVEST NEAR CALAIS

A peaceful landscape near what is today's invasion coast in France, as photographed by Joseph Breitenbach, A.R.P.S., a few weeks before war was declared in 1939.

WAR TRAGEDIES RELATED BY FRENCH SCIENTIST

Shortly before Allied forces smashed their way into France, a first-hand picture of the sort of tragedies that befell scientists and other intellectuals there under the German occupation was furnished in a letter received by Mr. Henry W. Nichols, Chief Curator of Geology at this Museum. The letter is from André Cailleux, a noted French geologist, who has been a lieutenant of artillery in the French army since the war began, and is now with the fighting Free French. Prof. Cailleux is a world authority on glacial sands and climatology of the glacial periods, and he collaborated with Mr. Nichols on research projects before the war. The letter here published is the first communication from him since the end of 1939 when he sent a letter published in the January, 1940 (p. 2) issue of THE BULLETIN (then *Field Museum News*):

Casablanca Militaire

Dear Sir:- Since three years, it is the first opportunity I find to write you. I made the campaign in France, in June 1940, from Paris to Augoulème. I had the luck not to be a prisoner. As I had absolutely no faith in the policy of the Vichy government, I asked to be liberated. I wanted not to be obliged—occasionally—to fight against our Allies. In August, 1940, I went back to Paris, as a professor in the Lyceé de Saint Maur.

Those three years of life under the German occupation have been awful. In my own family, one of my aunts has been sent to a *camp de concentration;* one of my cousins was imprisoned—by the Gestapo for having worked for the English. L.S., another one, mayor of a little village in Bretagne, was condemned to death (he had helped English airmen); but happily his execution did not take place and he was yet in life last August. My brother-in-law, a captain of artillery, was prisoner of war in Germany. In the Lyceé de St. Maur, three of the sixty professors have been sent to prison by the Gestapo, and one shot. In 1942, first, I tried to join Africa; but the American Consul at Lyon, to whom I paid a visit, told me it was better to wait. In August, 1943, I left my wife and children, crossed alone the Pyrenean mountains, and after a few weeks of prison in Spain, joined our army, where I hope to fight as soon as possible against the Germans.

Common tungsten ore fluoresces in ultra-violet light. Prospectors often carry an ultra-violet light outfit while seeking this ore.

MAYAS AND AZTECS WERE ONLY AMERICAN INDIANS TO DEVELOP A SYSTEM OF WRITING

By PAUL S. MARTIN
CHIEF CURATOR, DEPARTMENT OF ANTHROPOLOGY

According to the latest archaeological evidence —evidence recently recovered from beneath the dry lake gravels of a Pleistocene lake in Arizona—the American Indian has been in the New World at least 15,000 years and perhaps as long as 25,000. He undoubtedly came from Asia via Bering Strait.

The earliest date recorded by man in the New World—about A.D. 350—comes from Uaxactun, Guatemala. What man did in the New World during the thousands of years before this date is not known. At some time during this period he began to develop a system of agriculture which finally made it possible for him to domesticate at least thirty different food plants, many of which are in daily use on our tables.

During the millennia that man has been in the New World he has invented only one system of writing, and that was in Central America. This system was used by two peoples—the Mayas and the Aztecs. The Mayas developed and extended it more than did the Aztecs.

Who were (and are) the Mayas and of what did their ancient civilization consist?

HIGHLY DEVELOPED CULTURE

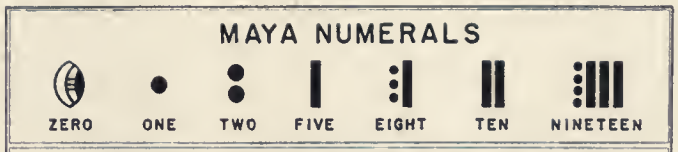
The Maya Indians, a subdivision of the Mongoloid race, live in Central America. At least twenty-five hundred years ago they had become agriculturists, raising beans, squash, peppers, tobacco and maize. They did not posses the plough nor any domesticated beast of burden.

Large towns and then great cities sprang into existence. Each city was provided with at least one civic center and the principal structures were built around it. Many of the temples were placed on the tops of pyramids. Since the true arch was not known to the Mayas, the rooms of the temples and palaces were long and narrow. The buildings were elaborately and beautifully decorated. The achievements of the Mayas stand head and shoulders in every direction above those of all other American Indian peoples.

Politically, the Maya cities may be roughly classed as city-states, each one governed by an hereditary theocracy. For the most part, these city-states, held together by a common culture, lived peacefully, although just prior to the Spanish Conquest there was conflict among them. The earliest city-states, which flourished from A.D. 350 to about 850, were gradually abandoned for various reasons, the chief of which was the wasteful system of using the land. Following this period, a renaissance of Maya culture flowered in Yucatan for six centuries and was then stamped out by the Spaniards in 1541.

The Maya system of writing consists of phonetic and ideographic symbols. We do not know how and where they developed. It is certain that they are indigenous and show no trace of any Old World influence. The earliest inscriptions in the oldest city yet discovered are perfectly set forth. The system of numeration by position, the concept of zero, and all the other highly specialized refinements which I shall briefly describe were at this time already perfected. No changes or improvements in the late inscriptions have been noted by epigraphers.

At the present time about one-third of all Maya glyphs can be read. These deciphered glyphs include signs for the day and the month, for two kinds of numbers from zero to infinity, signs for periods of time, for the four directions and the associated colors, signs for several gods and for the sun, moon, Venus, Mars, and Jupiter. The notes and explanations left by the Spanish padres have given us the key which makes it possible to read what we can; but their notes are not so helpful as one might expect.



COMPARISON OF SYSTEMS OF WRITING NUMBERS

	Number to be Written	3rd position Units of 100	2nd position Units of 10	1st position Units of 1	Result
OUR SYSTEM (DECIMAL)	405	4 4 X 100 +	0 0 X 10 +	5 5 X 1 =	405
	Number to be Written	3rd position Units of 400	2nd position Units of 20	1st position Units of 1	Result
MAYA SYSTEM (VIGESIMAL)	405	● 1 X 400 +	● 0 X 20 +	I 5 X 1 =	405

TABLE SHOWING DIFFERENCES BETWEEN OUR SYSTEM OF WRITING NUMBERS AND THAT OF THE MAYAS

Maya hieroglyphic writing, as already noted, is partly phonetic and partly ideographic. It is possible that Maya writing was similar to rebus writing—i.e., a system where a character has one sound but several meanings. The Aztecs certainly employed the rebus system.

Where do Maya inscriptions occur? They are found on large stone monuments and stone altars set up in front of temples, on wooden and stone lintels, in bas-reliefs of molded stucco, on bone, shell, metal, and pottery, and in three codices inscribed in color on fibre-paper. The Mayas possessed many more books, but the Spanish priests burned thousands of them and therefore only three remain.

OBSESSED BY TIME'S FLIGHT

What do Maya inscriptions say? Since only one-third of all Maya glyphs have been read, it is impossible to know the total content of the inscriptions. We guess that they do not record any deeds of personal glory or great conquests. They are, first, concerned mostly with the counting of time. Interest in the passage of time was almost a fanatical passion of the Mayas, and time was noted with meticulous care.

Second, the inscriptions recorded and predicted astronomical phenomena such as revolutions of the planets, eclipses, and celestial conjunctions. The Maya astronomers possessed lunar and Venus tables. The lunar tables predicted such things as the appearance of the new moon and eclipses of the moon. The Venus tables forecast the movements of the planet Venus and were so accurate that the accumulated error in a thousand years would not have amounted to more than a day.

Third, we know from Spanish chronicles that the codices were used to cast horoscopes and predict forthcoming events. They were also employed by the priests in celebrating ceremonies. Since the glyphs which can be read all deal with numbers, astronomy, and time, I am, perforce, obliged to describe now very briefly some of the mathematical accomplishments of the Maya Indians.

INVENTION OF "ZERO CONCEPT"

Sometime before the beginning of the Christian era (perhaps 200 B.C.), the Mayas devised the principle of notation by position, a system which was adequate for handling their mathematical data. This system plus the invention and use of the mathematical concept of zero was a brilliant achievement. The Maya zero was used for position value, just as we use our zero. Without the zero and positional numeration, it would not be possible to use position to indicate the value of numerical symbols. For example, in our style of notation, the number 405 may be broken down as follows: 5 units of *one*, zero units of *ten*, and 4 units of *one hundred*. The Maya Indians used their symbol for zero exactly as we do. The Egyptians, Greeks, and Romans did not possess this useful concept—it was employed in the Old World (in India) some centuries after it had been in use by the Mayas. The Maya system of numeration had vast advantages of flexibility and speed over any of the contemporaneous methods of numerical notation used in the Old World.

Instead of a decimal system (a count based on units of 10) such as we use, the Mayas used a modified vigesimal system (a count based on units of 20). That is, twenty units in any position are required to equal one unit in the position next higher (1, 20, 400, 8,000 and so on, instead of 1,10, 100, 1,000 and so on). They handled uneven

quantities with surprising accuracy. For example, using the formula 81 moons equals 2,392 days, they computed the length of the lunar period as 29.53086 days.

The Mayas invented two methods of writing their numbers. One used the bar and dot numerals which may be compared to our Roman notation; the other used the head-variant numerals which may be likened to our Arabic notation.

ELABORATE MAYA CALENDARS

The Maya Indians also developed elaborate methods of counting time. These may be briefly described.

First: The earliest and most often used part of their calendar—the sacred year of 260 days. This was an arbitrary period of time, not related to the solar year, but was probably understood by all the common folk. Certainly, it was the period of time in use all over Mexico and Central America.

Second: A 360-day solar year of 18 months of 20 days each, plus a correction of 5 days, making a total of 365 days. However, by the year A.D. 350 (the date of the earliest inscription) the Maya priests knew that the year was actually about six hours longer than 365 days. Since they did not have an elastic month like our February, they could not add a day here and there without throwing off the whole elaborately interlocked system of days, months, and years. However, in all inscriptions, the priests always made the necessary calculations to show how many days the recorded, official year was ahead of the true year. By their formulae* they computed the length of the solar year as 365.2429 days, which was as accurate as our own Gregorian correction (365.2425 days) and was developed at least a *thousand* years earlier. They calculated their solar year so well that in 4,000 years there was an error of only one day! This is an achievement for a people with no precision instruments. One can only guess the myriads of dawns that had to be observed before such accuracy could be obtained.

Third: A period of time called the Calendar Round. This consisted of 18,980 days or 52 years.

Fourth: The long count or the count of days which records the elapsed time since the beginning of the Maya calendar, or 3113 B.C. in our chronology. This zero point for the Maya calendar was a hypothetical date rather than an historical one; but it may have signified the beginning of Cosmos or Time for them. At any rate, no date earlier than 350 A.D. has yet come to light, and this is nearly two thousand eight hundred years after the inauguration of the Maya calendar. Actually, such a long count was not necessary and the Mayas probably realized this. It has been suggested that the Mayas used this cumbersome count to *create a spirit of eternity* and to express the grandeur of time.

How long it took to gather enough astronomical observations for computing these figures is anyone's guess. Which came first—the astronomical observations or the system of writing and notation? Or did they grow up together? It must be clear that several centuries would be required for accomplishing these jobs and that the Maya system of writing must date back at least to the beginning of our era.

AZTEC GLYPHS AND PICTOGRAPHS

Now let us turn briefly to the Aztec system of writing.

Aztec inscriptions consist of hieroglyphs and pictographs. Some pictures were on their way to becoming glyphs. For example, the conquest of a town was shown by the picture of a temple with a spear driven through it and the glyph of the town placed near the speared-temple-glyph. Glyphs for towns were made on the same principle as rebus writing; and some of these glyphs were probably phonetic in character.

The Aztec glyphs which are known, however, are more nearly understood, since the Spaniards left behind more complete explanations and interlinear translations. About seventy-five per cent of Aztec glyphs can be read by students in this field.

The Aztec calendar was vastly inferior to that of the Mayas. The Aztecs used the 260-day sacred year, the 360-day year plus the 5-day addition, and the 52-year period. But they had no method by which they could fix any date except within cycles of 52 years. Therefore, when we read that a man was born on the day 8 Deer in the year 12 Reed, we do not know whether that means 1439 or 1387 or some period before or after one of those years.

But it seems clear that the Mayas and Aztecs both received their writing and their calendar from a common source—or possibly they may even have been developed by the Mayas themselves.

The significance and interest of Maya and Aztec writing will be made clearer by a few brief statements about the three stages of development through which writing passes the world over:

1. Simple picture writing, wherein a picture of the idea to be conveyed is the first stage. Such writing is called "picto-

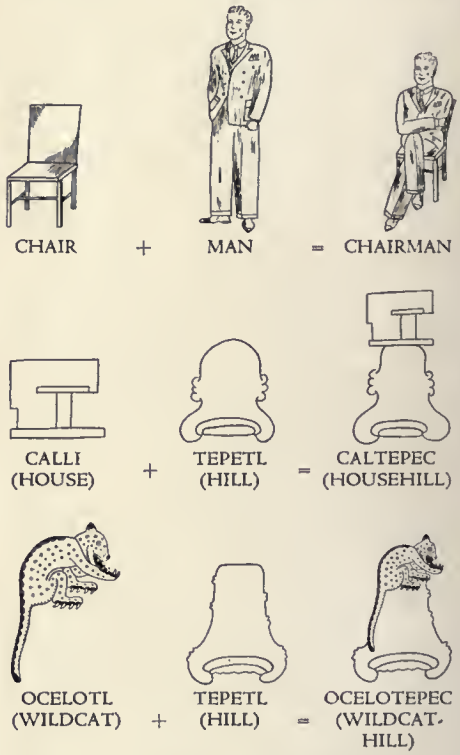
(*Continued on page 7, column 2*)

1,418,400 DAYS

INITIAL SERIES	INITIAL SERIES INTRODUCING GLYPH Grotesque head in center is only variable element. This is the name glyph of the deity who is patron of the month (here Cumhu) in which the initial series terminal date falls.	
INITIAL SERIES	9 Baktuns (9 x 144,000 days = 1,296,000 days)	17 Katuns (17 x 7,200 days = 122,400 days)
INITIAL SERIES	0 Tuns (0 x 360 days = 0 days)	0 Uinals (0 x 20 days = 0 days)
INITIAL SERIES	0 Kins (0 x 1 day = 0 days)	13 Ahau (day)
SUPPLEMENTARY SERIES	Name-glyph of the deity who is patron of the ninth day in the nine day series.	Meaning unknown
SUPPLEMENTARY SERIES	Glyph denoting moon age of initial series terminal date (here "new moon")	Place of current lunar months in lunar half-year period (here 2nd position)
SUPPLEMENTARY SERIES	Meaning unknown	Meaning unknown
SUPPLEMENTARY SERIES	Current lunar month (here 29 days in length)	18 Cumhu (month)

MAYA DATE

January 24, 771 A.D. as expressed in Maya notation—a total of 1,418,400 days which had passed since the Maya year 0 (August 13, 3113 B.C., in our calendar).



AZTEC HIEROGLYPHICS

Made up of pictures similar to our rebuses.

*19 years equals 235 moons, and 149 moons equals 4,400 days.

MUSEUM GEOLOGIST WILL STUDY NEW VOLCANO

Taking advantage of what he describes as only "the seventh opportunity in all human history to make scientific observations on the development of a newly occurred volcano," with the comment that at the time of all other occurrences of such a phenomenon scientists "missed the boat," Dr. Paul O. McGrew of the Museum's geology staff left Chicago for Mexico on June 8.

Dr. McGrew's destination is El Parícutin, new volcano in the state of Michoacan, born February 20, 1943, when it suddenly erupted in the middle of a corn field, much to the amazement of the farmers. Since that time it has grown from a mere smoking hole in the ground to a volcanic cone rising 1,200 feet above the ground surface, belching with explosive violence tremendous quantities of volcanic bombs, cinders and ash, and clouds of gases.

WILL COLLECT EXHIBIT MATERIAL

Only the uniqueness of this phenomenon, presenting an imperative opportunity which if now missed might be lost forever, induced the Museum authorities to make an exception to the policy of "no expeditions for the duration" adopted immediately after Pearl Harbor, it is emphasized by Mr. Orr Goodson, Acting Director. Funds for conduct of the expedition were made available to the Museum by a donor who wishes to remain anonymous.

Dr. McGrew will make comprehensive geological observations, and will collect an extensive representation of the numerous minerals and other products of Volcán Parícutin for study and for museum exhibition. Later, the Museum Press will publish the results of his researches.

"El Parícutin is the first volcano of which science has the opportunity of recording the complete history from the time of its first occurrence," said Dr. McGrew. "It is unfortunate that El Parícutin chose war time to make its costly but magnificent and interesting appearance. In peace time such a geologically important phenomenon would attract geologists from all over the world. Mother Nature, however, will not time her manifestations to accord with human convenience.

COVERS THREE-MILE AREA

"It is important, therefore, that as many geologists as possible visit this fiery monster now, since much data would be lost if we waited until the volcano finally becomes extinct and disintegration of the cone begins. In 1759 a volcano known as El Jurillo grew 50 miles from the site of El Parícutin, but geologists at that time failed to observe its eruption.

"The cone and its lava flows now cover an area of more than three square miles. Heavy falls of volcanic ash and cinders have damaged farm lands as much as 20 miles away, and fine volcanic ash has fallen as far away as Mexico City, more than 200 miles distant."

HOW THE NEW VOLCANO IN MEXICO WAS BORN

By HENRY W. NICHOLS
CHIEF CURATOR, DEPARTMENT OF GEOLOGY

Last year a new volcano burst forth in the midst of a plowed field, two miles from the small village Parícutin in the state of Michoacan, Mexico, and has remained in eruption ever since. This was an event of outstanding geological importance, for it is the first time within the memory of living men that it has been possible to study the birth and early life of a volcano.

The eminent Mexican geologist, Ezekiel Ordoniez, visited the volcano within three days of its appearance and carefully collected all possible information of the phenomena attending its birth. He also arranged to keep the volcano under continued scientific observation. It is from his observations and those of several geologists of the United States that this account is drawn.

The birth of the Parícutin volcano was preceded by fifteen days of earthquake shocks. At first there were from fifteen to thirty every day, increasing to more than 300 daily towards the end. No one at that time suspected that these shocks were a consequence of hot lavas and volcanic gases forcing their way from the depths towards the surface of the earth.

CORNFIELD BELCHES FLAMES

During the afternoon of February 20, 1943, there were numerous shocks accompanied by subterranean rumblings. In the late afternoon Dionisio Pulido, who was plowing the field, saw small columns of smoke rising from a small depression in the field. These rapidly increased and soon were accompanied by flame while dust and fragments of rock were thrown in the air. Naturally the farmer was terrified and ran to the neighboring villages of Parícutin and Parangaricutiro to spread the alarm.

About three hours later visitors from these villages found dense clouds of dark smoke issuing from a hole thirty feet deep. The first explosion came at about 10 o'clock that night, and ever since then the volcano has been in violent eruption. During that night the explosions increased and became so severe that the villagers were terrified by shocks which could be felt in villages several miles away and by great flames which rose above the crater. The explosions were so violent that they ejected great blocks of rock from the crater and projected them two or three thousand feet into the air. By the next morning these rocks as they fell had built a mound nearly a hundred feet high.

This mound of ejected rock contained little but ash and cinders, for lava did not appear until the fourth day. And by that time the cone was 180 feet high, capped by a column of smoke, steam and ash which rose 3,000 feet in the air. Every four seconds a terrific explosion projected great blocks of incandescent lava as high as 2,000 to 3,000 feet. These blocks of hot lava, appropriately called volcanic bombs, fell around the cone so thickly that it was impossible to approach it closer than a mile. They were of all sizes, some of them more than fifty feet in diameter.

NOW TWELVE HUNDRED FEET HIGH

As might be expected, this magnificent and terrible display attracted and continues to attract hosts of visitors including many tourists from the United States. A week later, Parícutin had grown to a diameter of 1,500 feet, a height of 550 feet, and contained nearly four million cubic yards of stone from the earth's interior. By April of this year it reached a height of 1,200 feet and it is still growing.

The terrific violence of the initial eruption lasted about three weeks, after which it moderated for a time, but in March it entered into a new violent phase which endured with increasing severity through September, after which the eruptions again moderated. From that time through April of this year the eruptions were comparatively moderate, so much so that it was possible at times to climb to the rim of the crater. This was merely an intermission, as a late report to the Museum states that the volcano has resumed its more active eruptions.

Falling ash from the eruption compelled the abandonment of neighboring villages and destroyed the vegetation and the fertility of the soil for miles around. This destruction of the fertility of the soil by a covering of volcanic ash, although a great present calamity will be a future benefit, for the ash when it decomposes, will become a soil of unusual fertility.

After the first few weeks there were repeated lava flows. These issued from the base of the cone and its lower slopes. Examples of the lavas from the Parícutin volcano, presented by Mr. Benjamin B. Felix, may now be seen in Clarence Buckingham Hall (Hall 35) of the Museum.

Book on Pacific Fauna

The Pacific World, edited by Fairfield Osborn of the New York Zoological Society, is intended as an introduction to the geography of the Pacific region for servicemen and their relatives. Chief Curator Karl P. Schmidt of the Museum's Department of Zoology, made considerable contributions to this co-operative effort to answer the many questions that have come to the museums since Pearl Harbor.

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Field Drive, Chicago
TELEPHONE: WABASH 9110

THE BULLETIN

EDITOR

WILFRED H. OSGOOD.....*Curator Emeritus, Zoology*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
B. E. DAHLGREN.....*Chief Curator of Botany*
HENRY W. NICHOLS.....*Chief Curator of Geology*
KARL P. SCHMIDT.....*Chief Curator of Zoology*

MANAGING EDITOR

H. B. HARTE.....*Public Relations Counsel*

Members are requested to inform the Museum promptly of changes of address.

ANNUAL REPORT PUBLISHED

Delayed by printing manpower shortage and paper stock difficulties, the Annual Report of the Director to the Board of Trustees, an illustrated book of 121 pages, was published June 14 by the Museum Press. Acting Director Orr Goodson announces that copies will be mailed to all Members shortly.

The Report lists among outstanding contributions of the year the following: from Marshall Field, publisher of the *Chicago Sun*, $100,916.41; from Stanley Field, president of the Museum, $20,075; from Mrs. James Nelson Raymond, $6,000; from Wallace W. Lufkin, $2,500; from Haddon H. MacLean, $1,000; from the estate of Joseph Adams, a bequest of $12,025, and from Lieut. Alvin R. Cahn, U.S.N.R., an anthropological collection valued at more than $1,000. Cash gifts of unspecified amounts were also received from Boardman Conover, a trustee; Peder A. Christensen of Detroit, Michigan; the late Dr. Louis Schapiro, and from the estate of Joan A. Chalmers.

The number of visitors received at the Museum during 1943 declined slightly compared to 1942, 1,021,289 persons coming into the building as against 1,025,002 in the preceding year, the Report discloses. Of this number, all but 77,980 were admitted free, either because they came on the free admission days, or belonged to classifications admitted free on all days—children, teachers, Museum members, and members of the armed forces of the United Nations.

Latin-American Journalists Visit the Museum

A group of distinguished Latin-American newspapermen and publishers touring the United States under the auspices of the National Press Club and the Co-ordinator of Inter-American Affairs, visited the Museum and were guests of Acting Director Orr Goodson at lunch on May 24. Those in the party were: Rodrigo Facio Brenes, Editor and Publisher, *Diario de Costa Rica*, Costa Rica; Ricardo A. Peralta, Director, *El Liberal Progresista*, Guatemala; Juan Ramon Aviles, Editor, *La Noticia*, Managua, Nicaragua; Alberto McGeachey, Editor, *Star-Herald* and *Estrella de Panama*, Panama City, Panama; Julio Velis Lopez, Publisher and Editor, *La Correspondencia*, Cienfuegos, Cuba; Luis Enrique Franco, Editor, *La Informacion*, Santiago, Dominican Republic. The group was conducted by Mr. A. Edward Stuntz of the office of the Co-ordinator of Inter-American Affairs and Mr. Charles E. Bibbo.

Staff Notes

Lieut. Colin C. Sanborn, U.S.N.R., Curator of Mammals, visited the Museum in May en route to his new station in the Pacific.

Mr. Clifford H. Pope, Curator of Amphibians and Reptiles, lectured at Black Mountain College near Asheville, Tennessee, and visited the University of the South at Sewanee, Tennessee. He made collections for the Division of Reptiles in the Appalachian region. Mr. Pope recently was elected a fellow of the New York Zoological Society.

Mr. Llewelyn Williams, Curator of Economic Botany on leave of absence since early in the war to conduct a project for the U.S. government in South America, made a furlough visit to the Museum during June. He is now returning to his war work in Venezuela.

Chief Curator Henry W. Nichols, of the Department of Geology, completed fifty years of service in the Museum this June.

Mr. Milton Mahlburg, Director of the Rockford Natural History Museum, spent a day at the Museum and plans to volunteer his services during the month of August in the N. W. Harris Public School Extension Department.

Miss Joan Sweany will do volunteer work in the Department of Zoology four days a week during the summer months.

The appointment of two well-known Chicago scientists as research associates on the staff of the Museum was announced recently by Acting Director Orr Goodson. Dr. Wilton M. Krogman, Associate Professor of Anatomy and Physical Anthropology at the University of Chicago, has been appointed a Research Associate in Physical Anthropology. Professor Hanford Tiffany, head of the department of botany at Northwestern University, will act as Research Associate in Cryptogamic Botany at the Museum.

THE MUSEUM HONOR ROLL

Now in the Nation's Service

Army

THEODORE ROOSEVELT, Trustee—Brig.Gen.
GEORGE A. RICHARDSON, Trustee—Lt. Col.
CLIFFORD C. GREGG, Director—Colonel, G.S.C.
DR. JOHN RINALDO, Associate, Southwestern Archaeol.—Staff Sgt.
DR. SHARAT K. ROY, Curator, Geol.—Capt.
D. DWIGHT DAVIS, Curator, Anat. and Osteol.—Corp.
BRYAN PATTERSON, Curator, Paleontology—Pvt.
EMMET R. BLAKE, Asst. Curator, Birds—Special Agent, War Dept.
RUPERT L. WENZEL, Asst. Curator, Insects—Capt.
HENRY S. DYBAS, Assistant, Insects—Pvt.
WILLIAM BEECHER, Temp. Asst., Zool.—Pvt.
HENRY HORBACK, Asst., Geol.—Pvt.
JAMES C. MCINTYRE, Guard—2nd Lt.
RAYMOND J. CONNORS, Guard—Pvt.
FRANK J. DUTKOVIC, Janitor—Pvt.

Navy

LESTER ARMOUR, Trustee—Comdr.
SAMUEL INSULL, JR., Trustee—Lieut. Comdr.
JOSEPH NASH FIELD, Trustee—Lieut.
COLIN CAMPBELL SANBORN, Curator, Mammals—Lieut.
DR. ALEXANDER SPOEHR, Asst. Curator, N. Amer. Ethnol.—Lieut. (j.g.)
LOREN P. WOODS, Asst. Curator, Fishes—Ensign
JOHN W. MOYER, Taxidermist—Ch. Specialist (Bur. Aeronautics)
JAMES H. QUINN, Chief Preparator, Paleontol.—Metalsmith 2C
PATRICK T. MCENERY, Guard—Master-at-Arms
JOHN SYCKOWSKI, Guard—Ch. Commissary Stewd.
GEORGE JAHRAND, Guard—Ch. Water Tender
CLYDE JAMES NASH, Guard—Ch. Gunner
NICHOLAS REPAR, Printer—Aviation Machinist's Mate 2C.
MORRIS JOHNSON, Carpenter—Carpenter's Mate 1C.
HERBERT NELSON, Painter—Painter 1C.
ELIZABETH BEST, Guide-Lecturer—Ensign, WAVES
MARIE B. PABST. Guide-Lecturer—WAVES

Marine Corps

MELVIN A. TRAYLOR, JR. Associate, Birds—1st Lt.

Coast Guard

M. C. DARNALL, Jr., Guard—Lieut. (j.g.)
JOHN MCGINNIS, Guard—Ch. Boatswain's Mate

Other Services

RUDYERD BOULTON, Curator, Birds—Staff of Office of Strategic Services
BRYANT MATHER, Asst. Curator, Mineralogy—Civilian Worker, Corps of Engineers, U.S. Army
LLEWELYN WILLIAMS, Curator of Economic Botany—on special service for U.S. Government
DR. JULIAN A. STEYERMARK, Asst. Curator, Herbarium—field work for Board of Economic Warfare
DR. C. MARTIN WILBUR, Curator, Chinese Archaeol. and Ethnol.—Staff of Office of Strategic Services

Served and Honorably Discharged:

BERT E. GROVE, Guide-Lecturer—Medical Aide, American Field Service, Africa.

BACKGROUNDS OF THE WAR
(Summer Programs for Adults)

Throughout July and August on Thursday afternoons at 2:30, the Museum will present a series of illustrated lectures, motion pictures, and tours of exhibits relating Museum material to the war news of the day. Like the "Backgrounds of the War" series given in 1942 and 1943, these programs will give information on the various geographical areas involved in current fighting, and their inhabitants. Admission is free. Following are the dates and subjects of the programs:

July 6—One Day in Soviet Russia (A motion picture filmed in one day by 97 photographers showing Russia's cities and rural areas, people, industries, and programs for education and welfare).

July 13—North Africa (The people and geography of this region as reviewed by a recent participant in military action in Africa. Natural color still pictures). Bert E. Grove.

July 20—European Spots of Current Interest (Motion pictures of pre-war Poland, Czechoslovakia, Italy and Hungary).

July 27—Islands of Japanese Penetration (Philippines, Sumatra, Bali, Java and Singapore. Natural color still pictures). Mrs. Roberta Cramer.

August 3—World of Plenty (A motion picture presenting the story of food with emphasis on uneven distribution and waste in peace time, and necessary control and need for planning in war and post-war times).

August 10—On Top of the World (American Arctic regions including Alaska, northern Canada and Greenland. Story told with still and motion pictures and Museum materials).

August 17—Conquest of the Air (A motion picture story of flight from the prehistoric pterodactyl to transport planes).

August 24—India—Land of Contrasts (A study of the country which houses one-fifth of the world's population. Natural color still pictures). Bert E. Grove.

August 31—How Invasion Troops Were Trained (Tank destroyers, tanks and paratroops, Camp Hood, Texas. Motion pictures).

Children's Vacation Haven at the Museum

With Chicago schools now closed for the summer, Acting Director Orr Goodson, hopes to see all of Chicago's 500,000 school children visit the Museum some time during their vacation. In offering the services of this institution to children, and to their parents, as a safe, cool haven for youngsters to go, be sent to, or be taken to on all those days during the long summer vacation when for one reason or another parents find it inconvenient to have them around home, Mr. Goodson is carrying out a Museum tradition of many years' standing.

CONGO PHOTO EXHIBIT

A special exhibit of documentary photographs illustrating native life in the Belgian Congo, and war contributions there, is on exhibition in Stanley Field Hall until July 25. The pictures were supplied by the Belgian Government Film Mission.

MAYA AND AZTEC WRITING

(Continued from page 5)

graphic" writing. For example, a buffalo hunt is represented by the picture of a buffalo and a man shooting an arrow at it.

BEGINNING OF PHONETICS

2. In the second stage the representation of sounds begins, but is made through pictures or abbreviations of pictures used to express ideas and pictures plus signs which have phonetic values. This is sometimes called the ideographic (meaning "idea" and "writing") or rebus stage of writing. In Chinese writing (which is ideographic) the ideograph or picture of a roof with a woman underneath it meant "peace"; an ideograph of a roof with *two* women under it indicated "trouble"! Rebus writing is familiar to all of us and is used frequently in newspaper contests. For example, the picture of the organ of sight may stand for the organ itself, the eye; or it may stand for the sound, which then means "I." A picture of an eye, followed by pictures representing a tin can, a knotted rope, a honey bee, a chair and a man, would thus be read, "I cannot be the chairman."

3. The third stage is phonetic. In phonetic writing, the characters denote sounds only and have lost all likeness to the objects they originally portrayed. For example, very few people are aware of the fact that our capital letter "A" is derived from the picture of an ox head which in Seirite (an ancient writing used near the Red Sea) was called "Alph." Thus a drawing of an ox head stood, not for ox, but for the sound of the first letter in the word "Alph."

Maya and Aztec writing belongs to the ideographic or rebus stage and partly to the phonetic stage). The Mayas and Aztecs used both ideograms and some phonetic characters.

Thus, the significance of the Maya-Aztec styles of writing becomes more apparent, for they probably represent one of the earliest stages of a formal writing system which has come down to us. This does not mean that the Maya-Aztec systems of writing are the oldest in the world, for this claim would be untrue. But the Maya-Aztec writing does represent an early stage in the development of written language.

OBSERVATION OF TINY DETAIL OPENS GREAT DISCOVERIES

An accidental observation of an apparent triviality may lead to important results. Years ago there was among the fossils in Ernest R. Graham Hall (Hall 38) the head of a giant fossil fish terminated behind by a rough break where it had separated from the body. This break did not appear on casual observation to have any features not to be expected on any roughly broken rock surface. A visitor who was spending the time between trains at the Museum noticed on this rough surface one small lump that seemed strange to him and asked permission to scrape away a little of the matrix to see what it was. As the visitor proved to be Dr. Erik A. son Stensiö from the Royal Museum at Stockholm, recognized as the leading authority on fossil fishes, permission was readily granted.

The specimen was taken to a work room and the necessary tools provided. The first slight cuts proved that the lump was an actual part of the fossil and not an accident of fracture, and exposed features of such interest that the cut was made slightly deeper again and again until it became evident that enough of the anatomy of the head was preserved to justify its complete dissection. Dr. Stensiö, after receiving permission, made this dissection and found the anatomy of the head so well preserved that he told the curator he could hardly have done better dissecting a fresh head. The shape and size of the brain, the nerves, blood vessels and various other details had all been preserved.

This was one of those amazing near impossibilities, almost a miracle, that sometimes happen. Certainly such preservation of details of anatomy could not be expected to persist through the 350 million years that have passed since the death of the fish. So much hitherto unknown to science was learned that Dr. Stensiö, who had intended to spend only a few hours here spent ten days studying the specimen before he returned to Stockholm. There he spent many months more in research working with his notes and photographs.

This study, fully described in a publication of the Museum (*On the Head of the Macropetalichthyids*, Geological Series, Volume IV, No. 4) was a most important part of the research by which Dr. Stensiö completely revolutionized our ideas of the phylogeny and relationships of the more primitive classes of fish. Seldom has so great a result come from the notice of an apparently trivial detail by a competent observer. —H.W.N.

SUMMER MOVIES FOR CHILDREN —RAYMOND FOUNDATION

The James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures offers a series of nine motion picture programs for children on Thursday mornings throughout July and August. These entertainments will be given in the James Simpson Theatre of the Museum, and each program will be given twice, at 10 A.M. and again at 11, in order to accomodate maximum audiences. Children are invited to come alone, accompanied by parents or other adults, or in groups from clubs and various centers. Admission is free. Following are the dates and titles of the various films.

July 6—TULIP TIME IN HOLLAND
Also a cartoon

July 13—THE BISCUIT EATER
The story of a boy and his dog.

July 20—PUSS IN BOOTS
Also a cartoon

July 27—VACATION SPOTS IN OUR OWN COUNTRY
Also a cartoon

August 3—PECK'S BAD BOY WITH THE CIRCUS

August 10—ANIMALS FROM FAR AND NEAR
Also a cartoon.

August 17—ROBINSON CRUSOE
Also, Raggedy Andy cartoon.

August 24—18th CENTURY LIFE IN WILLIAMSBURG, VIRGINIA
Also a cartoon

August 31—AN ALL CARTOON PROGRAM

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the last two months:

Department of Anthropology:

From Gustavo Bellon, Oaxaca, Mexico—a tripod bowl, a tripod jar, and an incense bowl with handle, Mexico.

Department of Botany:

From Rev. Hermano Daniel, Medellin, Colombia—36 herbarium specimens, Colombia; from Rev. Hermano Apolinar Maria, Bogotá, Colombia—45 herbarium specimens, Colombia; from Rev. Hermano Elias, Caracas, Venezuela—120 herbarium specimens, Venezuela; from Frederick O. Thompson, Des Moines, Iowa—specimens of Mexican amber; from Mrs. L. M. Snyder, Berkeley, Calif.—27 herbarium specimens, Saudi Arabia; from Dr. Walter Kiener, Lincoln, Neb.—71 specimens of algae, Nebraska; from Harry K. Phinney, Evanston, Ill.—280 cryptogams, central United States; from Dr. Fred A. Barkley, Austin, Tex.—21 specimens of algae, Texas; from Harold Lauderback, Argo, Ill.—55 specimens of algae, Illinois.

Department of Geology:

From Stuart H. Perry, Adrian, Mich.—four meteorites; from Benjamin B. Felix, Dundee, Ill.—10 specimens of lava, Paricutin volcano, Michoacan, Mexico; from Dr. Henry Field, Washington, D.C.—7 specimens of sands and rocks, British Guiana.

Department of Zoology:

From Dr. P. W. Fattig, Emory University, Ga.—831 beetles and other insects, Georgia; from Lieut. Colin C. Sanborn, U.S.N.R.—19 bats, 2 centipedes, and 62 specimens of various kinds of shells, crustacea, and starfish, Peru; from Chicago Zoological Society, Brookfield, Ill.—5 mammals; from Lincoln Park Zoo, Chicago—a monkey; from Ensign Loren P. Woods, U.S.N.R.—301 fishes, California; from Rev. Floyd H. Sullivan, Flint, Mich.—skulls of a turtle and a honey bear, Siam and Malay Peninsula; from Dr. Lewis H. Weld, East Falls Church, Va.—76 gall insects and 44 insect galls, United States and Mexico; from Emil Liljeblad, Indianapolis, Ind.—112 specimens comprising 44 lots of shells and 2 lots of barnacles; from Mrs. A. M. Andrews, White Cloud, Mich.—89 specimens comprising 21 lots of land shells, Hawaiian Islands; from Pvt. Henry Dybas—86 specimens comprising 3 lots of sow bugs and 13 lots of shells, Texas; from Mrs. Walter C. Lyman, Downers Grove, Ill.—90 specimens comprising 26 lots of shells, Florida; from G. Alan Solem, Oak Park, Ill.—11 sea shells, Midway Island, Pacific Ocean.

Library:

Valuable books from Army Air Forces and Standard Oil Company, New York City; from Miss Alice Eastwood, San Francisco, Calif.; from Dr. G. A. Foster, Santa Fe, Argentina; from Mabel C. and Ross Winthrop Gilbert, Oakland, Calif.; from Reich V. Moran, La Cañada, Calif.; from G. M. Jadhav, Baroda, India; from W. G. Kiihue, Isle of Man, England; from L. M. S. Snyder, Berkeley, Calif.; from Iowa State College, Ames, Iowa; from Mrs. Virgil C. Welch, Hampton, Iowa; from Clinton R. Stauffer, Minneapolis, Minn.; from Clarence H. Kennedy, Columbus, Ohio; from Emil Liljeblad, Indianapolis, Ind.; from Frank D. McKenney, San Diego, Calif.; from Mrs. Walter C. Lyman and A. B. Wolcott, Downers Grove, Ill.; from Dr. Henry Field, Washington, D.C.; and from Henry W. Nichols, Orr Goodson, Karl P. Schmidt, and Bert Grove, all of Chicago.

Technical Publications Issued

The following technical publications have been issued by the Chicago Natural History Museum Press during the last two months:

Zoological Series, Vol. 28, No. 4. Chilopods in the Collections of Field Museum of Natural History. By Ralph V. Chamberlin. April 26, 1944. $ .50.

Zoological Series, Vol. 29, No. 11. The North Pacific Allies of the Purple Sandpiper. By Boardman Conover. May 8, 1944. $ .10.

The ancients believed that quartz crystal was water, congealed by long exposure to cold into an ice more durable than the common kind.

SUMMER GUIDE-LECTURE TOURS MORNINGS AND AFTERNOONS

During July and August conducted tours of the exhibits, under the guidance of staff lecturers, will be given on a special schedule, as follows:

Mondays: 11 A.M., Stories from the Earth —The Earth and Its History; 2 P.M., General Tour of Exhibition Halls.

Tuesdays: 11 A.M., Facts and Fiction About Animals; 2 P.M., General Tour of Exhibition Halls.

Wednesdays: 11 A.M., Faces and Races the World Around; 2 P.M., General Tour of Exhibition Halls.

Thursdays: 11 A.M., and 2 P.M., General Tours of Exhibition Halls.

Fridays: 11 A.M., Plants Useful to Man; 2 P.M., General Tour of Exhibition Halls.

Persons wishing to participate should apply at North Entrance. Tours are free. There are no tours given on Saturdays, Sundays, or on July Fourth.

By pre-arrangement with the Acting Director, special tours are available to parties of ten or more persons.

NEW MEMBERS

The following persons became Members of the Museum during the period from April 17 to June 15.

Contributors

Frederick T. Haskell*, Thomas W. Hinde

Associate Members

William H. Alexander, Ralph E. Bowers, Sidney I. Cole, Mrs. Irwin Paul Daemicke, Samuel Edward Dean, Mrs. Burnham M. Fisk, G. C. Hass, Miss Lily Heffernan, Ens. Susan D. Hoyne, Mrs. Joseph Huska, Clarence B. Kenney, Philip Lochman, R. R. Lusk, Dr. William J. Michel, John J. Muszynski, Mrs. Clara L. Poulson, Mrs. Edward G. Todt, H. F. Wardwell.

Annual Members

Julius Ameismaier, Norman Asher, Mrs. Walter Bartky, Royston H. Bigelow, Louis A. Breskin, George L. Briggs, Mrs. Robert O. Butz, Harry Cohn, A. B. Costello, John R. Covington, Samuel A. Culbertson II, Francis L. Daily, H. S. Darr, W. S. Deeming, Richard J. Donaldson, Paul Fleming, William R. Fleming, Stanley J. Flesch, George M. Gardner, Fred M. Gillies, P. W. Goodell, F. G. Gurley, James D. Harvey, Howard H. Hewes, Carl Hussman, Homer B. Johnson, Dr. Robert W. Keeton, Leo A. Klemperer, Mrs. E. H. Koenig, Louis Kopinski, Thomas E. Kysela, E. A. Lodge, Roland McHenry, Leopold Milner, John Neumayer, John F. O'Keefe, W. M. Olsen, H. Edsall Olson, W. Irving Osborne, Jr., J. H. Ottmann, I. B. Perlman, Vincent P. Reilly, Dr. Paul S. Rhoads, Samuel M. Rinaker, Mrs. Corinne Runyan, K. A. Sheffer, Mrs. Raymond J. Soukup, J. E. Tegarden, Dr. William H. Wethers, Eberhard E. Wettley, Robyn Wilcox.

* Deceased.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

Chicago Natural History Museum
BULLETIN
Formerly Field Museum News

Vol. 15 SEPTEMBER-OCTOBER, 1944 Nos. 9-10

REPORT ON EL PARICUTIN VOLCANO, MEXICO'S NEW EARTH-BORN MONSTER

By PAUL O. McGREW
ASSISTANT CURATOR OF PALEONTOLOGY

Prior to February 20, 1943, the word Parícutin meant nothing except to the relatively few inhabitants of the southwest part of the state of Michoacán, Mexico. Now the word is familiar to nearly everyone in the Americas and its fame has spread throughout the world all because a new volcano was born near the little town bearing that name.

Little consolation can this fame bring the village of Parícutin because, ironically enough, the phenomenon that gave it renown has brought about its complete destruction and burial. Now when one speaks of Parícutin he no longer refers to the village but instead to a thunderous and fiery mountain that rises like a monument to the memory of the once sleepy Indian town.

How a farmer first noticed thin clouds of smoke rising from a depression in his cornfield and how this fissure gave rise to the volcano has been related in many published accounts (including the July-August Museum BULLETIN). It is no wonder that the inhabitants of Parícutin and neighboring villages were terrorized. During a single night materials ejected from this embryonic volcano made a pile nearly a hundred feet high, and at the end of four months it had risen to more than a thousand feet, all from lava blown by terrific explosions from the depths of the earth's interior.

The sight of countless glowing boulders of lava being sent hundreds of feet into the air, with the attending thunderous roar and trembling ground, has made this volcano one of the most spectacular demonstrations of natural forces on earth. To tourists the volcano is a magnificent spectacle, but to geologists it is more.

Many volumes of data have been gathered from active volcanoes in various parts of the world—volcanoes that have existed since long before geology was a science. These studies and observations have brought out the basic facts surrounding volcanic action.

EL PARICUTIN, THE MEXICAN VOLCANO
The volcano photographed from the village of San Juan Parangaricutiro. The white smoke in the left middle foreground is from houses burning in the path of approaching lava.

The great value of El Parícutin is that it furnishes an opportunity for geologists to observe in the greatest detail and step by step the complete growth of a volcano—an opportunity that has never before been available. Thus many conclusions based upon the observation of finished products may at Parícutin be put to the test. When all of the details of Parícutin's development are put together and interpreted the science of vulcanology will rest upon a much firmer basis than has been possible hitherto.

Study of Parícutin is not being neglected. Several distinguished geologists visit the volcano regularly to make observations, and during periods of unusual activity, these men live on the spot under decidedly uncomfortable conditions. Their copious notes on the development of Parícutin will, when published, undoubtedly be an important milestone in the study of vulcanology. It was the best of luck for me that I was able to work with some of these men—Drs. Ezequiel Ordoñez and Jeñaro González of the Instituto de Geología de México, and Dr. W. F. Foshag of the United States National Museum—during my visit to the volcano in June and July, and they contributed much to the success of this Chicago Natural History Museum expedition.

It is not really surprising that the State of Michoacán in Mexico should be the site of a new volcano. This part of Mexico is studded with literally hundreds of volcanic cones which, although extinct, are known to have originated within the last few thousand years. One of these, about fifty miles from El Parícutin, was born less than two hundred years ago. Its name is El Jorullo.

Michoacán is in a cycle of volcanic activity. Under the surface of this region, perhaps tens of miles under the surface, is a vast reservoir of molten rock or magna. Under extreme pressure from miles of overlying rock, this molten matter, for a number of complex reasons grasps every opportunity to rush to the surface. Thus any fracture or fault in the crust that reaches this reservoir may result in a volcano. The presence of the magma plus the fact that

Michoacán is in a heavily faulted region, readily accounts for great numbers of geologically recent volcanoes. In all probability the next two hundred years will witness the growth of more.

The village nearest the volcano that can be reached by car is known by the imposing name of San Juan Parangaricutiro de las

MUSEUM GEOLOGIST AT PARICUTIN

Dr. Paul O. McGrew with large volcanic bomb that fell while he was exploring the area close to the new volcano to obtain specimens for the Museum.

Colchas—sensibly it is usually called San Juan. An excellent, even if distant, view of the volcano is seen from this town, some three miles from the cone itself.

FLOWS SEVEN MILES

When I first arrived at San Juan a stream of lava was making its way down a narrow but deep gully that ran past the outskirts of the town. This lava was coming from the far side of the volcanic cone and by its crooked route had run an estimated distance of seven miles. This was by far the greatest distance lava had traveled from El Parícutin.

At the lava front in the canyon the mass was moving glacier-like at the rate of seven meters an hour. In the daytime the flow of lava looked like a black craggy pile of rocks. One is aware only that it is moving by the fact that from its front large hardened chunks are constantly falling off and rolling down the slope. As these chunks break off and fall, a glowing mass of viscous lava is exposed that drips like thick molasses. This soon hardens and the performance is repeated. At night the red glow from the lava may be seen for miles. The great stream not only fills the canyon, but is piled above the rim some twelve to fifteen feet. In some places this overflows the rim of the canyon and spreads out well over the wide adjacent flats.

TOWN FLOODED BY HOT LAVA

The town of San Juan is on such a flat and at the time I was there its outskirts were being flooded by this terrifying wall of red hot lava. Thus I watched a large number of houses being swallowed. Usually the houses would burst into flame from the intense heat of the approaching lava; then while they were still burning the molten rock would gradually engulf them. Most of the houses had been emptied of useful articles, but some appeared as they would if the owner had just walked out to go to the "corner drug store." Many of the houses had been partially demolished by the evacuating Indians so that particularly good bits of lumber might be saved and used for the construction of new ones.

IRRESISTIBLE FLOW

Lava wall pushing into an ash-covered street in the village of San Juan Parangaricutiro. Here the lava is flowing at a little more than a yard an hour.

One poor old Indian woman, working against insufferable odds, was trying to get her belongings and part of her house moved to a safe area before the lava reached it. With the help of our group she succeeded but hardly before the one end of her house was a roaring fire. When I left, the lava was still creeping toward the center of town. Since then the flood has continued across the town and completely demolished it.

On my first day in the area I obtained horses and an Indian guide to take me by way of the buried village of Parícutin to the observation cabin built for geologists by the Mexican government. Previously the volcanic cone had been spewing out dense clouds of "smoke" and making little noise aside from deep rumblings and an occasional crack from lightning flashing in the clouds. As we approached the cone, conditions changed—less gas and ash were being ejected—and for short intervals there were no clouds of ash over the crater at all. Such periods of quiet were merely calms before the storm, however, as after each period of quiet there would occur such explosions that the ground would tremble like so much jelly, masses of bombs would be thrown from the crater to a height that could not have been much less than a mile, then would come amazingly prolonged periods of popping as the bombs hit the ash covered area surrounding the cone.

Several times during this period of violent

(*Continued on page 4*)

EL PARICUTIN IS DESTRUCTIVE

Houses in San Juan Parangaricutiro are swallowed by a wall of molten lava.

MUSEUM PAYS TRIBUTE TO GENERAL ROOSEVELT, TRUSTEE, WHO MET DEATH IN FRANCE

News of the death of Brigadier General Theodore Roosevelt on the battlefield in Normandy was received with deep regret at the Chicago Natural History Museum. He was a familiar figure to his fellow members of the Museum's Board of Trustees, and to the Museum's staff, particularly in the Department of Zoology.

Photo courtesy of Acme and the Chicago Sun

RECENT PHOTOGRAPH OF GENERAL THEODORE ROOSEVELT IN FRANCE

Following his death, July 12, the flags on the two tall flagstaffs in front of the Chicago Natural History Museum were flown at half-mast for three days.

The first gold star has been sewn onto the Museum's service flag, in tribute to General Roosevelt. He was one of five members of the institution's 21-man directing board to be commissioned in Army and Navy. He was elected a Trustee on May 23, 1938.

MUSEUM EXHIBITS ARE MEMORIAL

"At the Museum, Chicago will have a permanent memorial to General Roosevelt and his brother, Major Kermit Roosevelt who also died in the nation's service, in Alaska," said Mr. Orr Goodson, Acting Director. "This memorial consists of a number of habitat groups of rare animals collected in Asia jointly by General and Major Roosevelt on the expeditions they led for this institution.

"General Roosevelt's interest in and association with the Museum dated back to 1925 when, with Major Kermit Roosevelt, he led the James Simpson-Roosevelts Asiatic Expedition of Field Museum. This expedition obtained magnificent collections of mammals, of which many are now exhibited in habitat groups or as single mounts. Outstanding are the groups of Marco Polo's sheep (*Ovis poli*), and Asiatic ibex, obtained in the Thian Shan Mountains of Turkestan and on the Pamir plateau. In 1928 General Roosevelt and his brother again collected for the Museum, as joint leaders of the William V. Kelley-Roosevelts Expedition to Eastern Asia. This expedition, working in three divisions in remote parts of French Indo-China and southern China, brought back more than 15,000 zoological specimens. The most noteworthy single result was the collecting of the giant panda specimens now exhibited in a habitat group.

TRIBUTE FROM NOTED WRITER

No better tribute to General Roosevelt's service in the present war could be paid than that in the account of H. R. Knickerbocker, Chief of the *Chicago Sun* Foreign Service, of which part is quoted as follows:

"With American Forces in France, July 13.—Brig. Gen. Theodore Roosevelt, Jr., son of President Theodore Roosevelt, died last night of a heart attack in his tent at headquarters of the 4th Division. . . . .

"His name was synonymous among American officers and soldiers for reckless daring. His thousands of friends were sadly convinced he must be eventually killed at the front. He was.

"His death, though from heart failure, was death in action as truly as though he had been blown to bits by a German shell. He died of overwork for his country. . . . .

"General Roosevelt was the most popular senior officer in the United States Army. This opinion, I believe, will be shared by scores of correspondents who, as I did, went with him and watched him fight through three campaigns—North Africa, Sicily and Normandy.

"He was the best loved man of all because he not only laughed at danger, he loved danger and sought it to show it to his men and make them see how easy it was to handle. He took battle the way G.I.s like to see it taken.

"As the hazard increased, as the risk grew, as peril became almost certainly lethal, General Roosevelt became increasingly gay. He was one of the few men in the United States Army or any army in the world who was fearless, not just brave or courageous, but fearless. . . . .

"I can testify from personal observation that General Roosevelt's ability to inspire courage was sheer magic. One very senior officer not long ago told me General Roosevelt was to be permanently employed as a battle leader of new divisions.

"What made General Roosevelt's fearlessness so exceptional was that it was not the fearlessness of an insensitive man, but of an extraordinarily perceptive as well as learned man. He loved all life, but most of all he loved his fellow men and of all the fellow men he loved the common man most.

GENERAL ROOSEVELT IN 1925 ON EXPEDITION TO EASTERN ASIA

LOVED BY HIS MEN

"He slapped enlisted men and non-coms on the shoulders and they loved it. He knew thousands of G.I.s by their first names, and used to call out to them every few yards as he walked along past a regiment. . . . . .

"He was a man who could save lost causes. When men wavered, the mere sight of General Roosevelt whirling up in a cloud of dust in his jeep would restore morale."

GENERAL ROOSEVELT AT THE MUSEUM IN 1928 INSPECTING EXHIBIT OF WATER BUFFALO HE COLLECTED

THE EARTH MONSTER OF

The photograph extending across the top of these two pag
ment. Dominating the center is the cone of El Paricutin risi
are cooling lavas with their abundant fumeroles. In the di
state of Michoacan. This panorama and other photographs oo

EL PARICUTIN, MEXICO'S VOLCANIC MONSTER

(Continued from page 2)

activity I saw a bright arc of light expand upward and outward from the crater. It proved to be the rather rare "flashing arc" so named after its observation at Vesuvius in 1906. It is a phenomenon that may accompany any violent explosion and has been observed frequently during intensive bombardments in war time.

This tremendous display was beyond all description. Even after reading and hearing eye-witness accounts, and supposedly knowing what to expect, I was uncomfortably aware of my shaking knees. I am completely sympathetic with the young lady tourist who, after watching El Parícutin for a few moments during violent activity, broke into tears and hysteria.

2,700 TONS A MINUTE

Nearly all of the houses of the village of Parícutin are completely buried under ten to fifteen feet of ash. The top of the church and the roofs of a few stores and houses are barely exposed. The town is literally dead and buried. The amount of dark ash thrown from the crater of the volcano and scattered over the countryside is beyond belief. Dr. Foshag has estimated that, on an average, 2,700 tons of solids are ejected every minute. When one sees the depth to which Parícutin has been buried in a year and a half the estimate does not sound high.

From Parícutin we rode in front of a cooling lava flow and up the side of an extinct volcanic cone to reach the observation cabin built by the Instituto de Geología.

From this high spot, about half a mile from the cone itself, there is a magnificent view. What had been a fertile valley now is a great field of rough, cooling lava, and out of its center rises the cone.

Lava streams have broken out at various places around the base of the cone. Usually these have flowed for a few days or perhaps weeks, then hardened into a rough craggy mass. The craggy effect is caused by the hardening of the surface of the lava while underneath the rock is still molten and flowing. These rock crusts break up and are displaced in a jumbled mass of sharp lava boulders. This type of lava flow is rather common and bears the name "aa," given to similar lava surfaces on the Hawaiian Islands. The Pahoehoe lava surface, which is smoother and has a ropy surface, is not well developed in the Parícutin flows, although it is approached on a small scale on some of the individual blocks.

CRYSTALS FORM

As lava cools—a process which may take many years—large quantities of steam and gas escape through holes in the hard lava. These outlets are known as fumeroles. In all of the cooling lavas of Parícutin, fumeroles are abundant. At most of these openings crystals of various minerals, most commonly sal ammoniac, are being formed. Some are of bright colors and offer welcome relief from the drab monotony of the dull lava and ash that dominate the scene.

In one restricted area are found vents from which have been ejected extremely hot gases and bits of fluid lava. The lava thus thrown out has formed miniature cones called "hornitos." When I visited this spot, lava was no longer being ejected, but the escaping gases sounded like an engine letting off steam. The atmosphere was so heavily laden with hydrochloric acid fumes that breathing was extremely painful. By wrapping handkerchiefs around our faces it was barely endurable.

"GLANCE INTO HADES"

Here Drs. Foshag and Gonzalez, in whose company I visited the "hornitos," attempted to obtain samples of the gas for analysis. This was done with extreme difficulty, however, as the heat was so intense that the glass vacuum tubes in which the gas was to be collected melted when placed within the vent. At some places in this area were seemingly bottomless holes three or four feet in diameter, the walls of which were glowing brilliantly red from the heat. This surely seemed like a glance into Hades.

The area of "hornitos" is rather close to the southwest base of the volcanic cone. While we were working there, El Parícutin became uncomfortably violent and with terrific explosions started throwing bombs all around us. The ground was shaking continuously and with each explosion cracks in the surface under our feet belched forth quantities of steam.

HOT COLLECTING JOB

I was very frankly more interested in choosing a clear path of escape through the rough lava field than anything else. I must confess, however, that my companions appeared, like seasoned infantrymen, to take this barrage in their stride. Bombs would hit the ground with a dull "plop" and bury themselves in the hard ash. I dug out some of the freshly-fallen bombs for our collection and found them so hot that they could not be carried until they had cooled in the air for some time.

As we left the area of bombardment, tremendous quantities of ash and cinders were falling. The rain consisted chiefly of tiny black particles from one to three millimeters in diameter, but along with this were many very porous cinders up to four or five inches across, so light in weight that a direct hit would probably cause no injury. To collect pure samples of this material we spread rain-coats upon the ground. In a very few minutes we had far more than was required for our purposes.

INDIAN EXPLANATIONS

I heard several stories the Indians had offered to explain the eruption of El Parícutin. One of the most interesting is as follows:

The Tarascan Indians who inhabit the region are exceedingly pious and it is the custom of each village to place a large cross on the highest near-by hill. It seems that both Parícutin and San Juan claimed the same hill for the erection of their respective

IS MOMENTARILY QUIET

e from the observation house built by the Mexican govern-
ht of more than 1,200 feet. Surrounding it, and to the left,
be seen several of the extinct volcanic cones that cover the
f 2 are the camera work of Dr. Paul O. McGrew.

crosses. This led to argument and finally the people of one of the towns tore down the cross erected by the other. It was not long thereafter that El Parícutin came into being and spread destruction first to Parícutin and later to San Juan. For the most part the people seem to feel that the feud constituted an unfriendly act towards God and that they deserve therefore all of the punishment they are getting.

After nearly two weeks at the volcano all objectives of my visit were fulfilled. I had collected specimens of the incrustations and crystals of the various minerals formed at the fumeroles and obtained choice specimens of bombs, ash, lapilli, basalt, etc. On leaving this monster I felt as though I were leaving a world series baseball game in the sixth inning, with the score tied. What turn El Parícutin will take in the months and years to follow nobody knows. But whatever it is, it will certainly be well worth watching.

HUGE JADE BOULDER RECEIVED AS MUSEUM GIFT

An unusually large and fine nephrite jade boulder weighing 2,490 pounds has been received by the Museum as a gift from Mr. James L. Kraft of Chicago. The rounded boulder is oblong-oval in shape with one flattened side, and is approximately 4 feet by 2½ feet by 2½ feet in its principal dimensions. It is probably the second largest piece yet discovered in the United States, and was found in an area about fifty miles southwest of Lander, Wyoming. Quoting from a letter received from Mr. Kraft, the boulder " . . . . formed the peak of an eroded mountain with an elevation of about 7,000 feet.

"Some years ago jade was discovered in the area surrounding Lander, Wyoming," Mr. Kraft's letter continues. "Practically all the jade discovered was on the surface, and the entire area within approximately a fifty-mile radius had been explored and and searched many times, yet constant and persistent effort continued to bring to light additional pieces of beautiful jade covering a rather wide color range.

"One of the most industrious and persistent jade hunters in this area was Allan Branham, and to him must be given the credit for the original discovery of this large boulder. However, while on a gem prospecting trip with me some time subsequent to its original discovery it was again located. Because of the size of the boulder, its compact texture and excellent quality as jade, I felt the rightful place for such a find was in the Chicago Natural History Museum."

Mr. Kraft arranged for the difficult task of bringing the boulder down the mountain and shipping it to Chicago.

NOW ON EXHIBITION

The boulder has been placed on exhibition in the Hall of Minerals (Hall 34) on the second floor of the Museum. A small section, about one-half square foot in area, has been cut from one end and polished to reveal the rich dark green color and variegated markings of the specimen.

Jade is a common name applied to two different but related minerals; *nephrite*, a calcium magnesium silicate, and *jadeite*, a sodium aluminum silicate. Both minerals vary considerably in color, due to the presence of other minerals, and together they range from black through brown and green to bluish gray and white. The minerals are fairly hard, remarkably tough and resistant to crushing, and capable of taking a high polish. Suitably cut pieces emit a clear musical tone when struck.

Jade is usually associated with the Orient, especially China, in the minds of most people. The Chinese have a high regard for the mineral as a precious stone, and certainly it is they who have become most expert in carving the material through experience extending over a period of more than 3,000 years.

Less well known is the fact that articles made of jade were not uncommon among the Indians of the Americas, particularly those of the Northwest Coast and Alaska, and Central and northern South America, before the coming of Europeans. Some of the native sources of the mineral are known, but no important supply had been located in the United States until recent years.

In 1935, two prospectors located a vein of jade in the southeast corner of Fremont County, Wyoming, and later, as mentioned by Mr. Kraft, a second area was discovered in the southwest corner of the same county. In the latter site, the mineral occurs as fragments and boulders scattered over an area of many square miles. Both sites are in the valley of the Sweetwater River but, singularly enough, the loose boulders are found above the vein jade.

Occurrences of jade have been located and are continuing to be found in other parts of the continent. The value of the finds depends on the quality of the jade judged according to standards set by the lapidary and popular esteem. Thus far nothing equal to the semi-transparent, deep green of "imperial jade" has been found on this continent.

EGG OF EXTINCT GIANT OSTRICH ACQUIRED BY MUSEUM

The Museum has recently acquired by purchase a fossil egg of the extinct giant ostrich *Struthiolithus*. The specimen is almost perfectly preserved and is one of the largest of such eggs known.

Struthiolithus lived during the Pleistocene period, from 25,000 to 1,000,000 years ago. Fragments of eggs have been found in ancient Chinese archaeological sites indicating that: (1) the giant bird was a contemporary of early man in China; or (2) that primitive man had found the fossil eggs and shown enough paleontological interest to bring the egg to his dwellings.

Most of the discoveries of *Struthiolithus* eggs have been made by Chinese farmers who, for the most part, consider them "dragon's eggs." The specimen obtained by the Museum was found in a loess cliff by such a farmer and was brought to the United States by Dr. R. A. Torrey, Jr.

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Field Drive, Chicago
TELEPHONE: WABASH 9410

THE BULLETIN

EDITOR

WILFRED H. OSGOOD.....*Curator Emeritus, Zoology*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
B. E. DAHLGREN.....*Chief Curator of Botany*
HENRY W. NICHOLS.....*Chief Curator of Geology*
KARL P. SCHMIDT.....*Chief Curator of Zoology*

MANAGING EDITOR

H. B. HARTE.....*Public Relations Counsel*

Members are requested to inform the Museum promptly of changes of address.

NATURALISTS AT WAR

In this war, as in all others, it is frequently not the fighting but the waiting and the suspense of inaction that try men's souls. "Soldiering" in peace times has become a term of opprobrium, but its origin carries no derogation, for in war, killing time, often for long periods, is unavoidable.

It is a fortunate soldier who has a passion for natural history, whether his interest be specialized and professional or merely amateur and curious. For him there are no dull times and even within the confines of his own tent he has a watchful eye for what goes on in the subhuman world. When duty takes him there or when he is permitted to wander "in the pathless woods" or on "the lonely shore," he nearly always finds his time all too short.

One boy writes that while struggling through barbed wire on hands and knees he encountered certain rare insects and land shells which he hastily stuffed in his pockets for later examination. Another learned of some interesting caves in the Solomons, but regretfully reports that he was forbidden to visit them because they were in Jap territory and the trail to them mined. He now has them marked for a visit as soon as the Orientals are dislodged.

In the first World War many American soldiers had great satisfaction in hearing the famous songs of the skylark and the nightingale and in becoming personally acquainted with other birds of story and song; but in comparison with those of the present war their opportunities were limited. The deserts of North Africa, the Arctic tundras of Iceland and Greenland, the fog-drenched mountains of the Aleutians, and above all the jungles of Burma and the East Indies are teeming with interest for the naturalist. However humdrum and monotonous to others, they are to him better than books to read, better than movie shows, and only second to letters from home.

Ever since the war began, this museum and others like it have been besieged by our soldiers and sailors for information about the peoples, the animals, and the plants of the countries in which they found themselves. Such information in many cases has been all too scanty. Technical reports and scattered articles in scientific journals are not obtainable by ordinary means, and good general accounts, suitable for use by non-professionals, simply do not exist.

To supply at least a part of the need, various museums, including our own, have recently co-operated to produce the book called *The Pacific World*, which is being welcomed by many a service man. Of necessity, however, this could not cover special subjects very thoroughly and, to those who prepared it, there is much left to be desired. To a considerable extent, natural science is like commerce in following the flag. With the development of our Pacific relations and our generally wider outlook after the war it can be foreseen that many of the present blind spots will be filled in.

Returning service men are now coming to the museums, almost daily, to ask for information, to consult the libraries and collections, and in general to check on their experiences. Many have been stimulated to interests which will follow them through life. They furnish evidence for all of us that in every walk of life in any part of the world, nature study, if only a hobby, is an asset and a resource making for greater enjoyment of life. —W. H. O.

Phillip Fox

Members of the scientific staff of the Chicago Natural History Museum share with scientists of many other institutions a sense of loss in the death on July 21 of Colonel Phillip Fox, former director of the Adler Planetarium and of the Museum of Science and Industry.

"The fighting star gazer" was a term of esteem bestowed upon Colonel Fox, who served with distinction in three wars and whose scientific attainments as an astronomer won international recognition.

In 1941 he was called into active service as a colonel of the Reserve Corps. During the first World War, Colonel Fox served in France as assistant chief of staff of the Seventh Division.

Colonel Fox first made his mark as an astronomer while a member of the staff of Yerkes Observatory. Later he was professor of astronomy at Northwestern University and director of the Dearborn Observatory. He resigned the latter post in 1939 to accept the directorship of the Adler Planetarium.

THE MUSEUM HONOR ROLL

Now in the Nation's Service

Army

GEORGE A. RICHARDSON, Trustee—Lt. Col.
CLIFFORD C. GREGG, Director—Colonel, G.S.C.
DR. JOHN RINALDO, Associate, Southwestern Archaeol.—Staff Sgt.
DR. SHARAT K. ROY, Curator, Geol.—Capt.
D. DWIGHT DAVIS, Curator, Anat. and Osteol.—Corp.
BRYAN PATTERSON, Curator, Paleontology—Pvt.
EMMET R. BLAKE, Asst. Curator, Birds—Special Agent, War Dept.
RUPERT L. WENZEL, Asst. Curator, Insects—Capt.
HENRY S. DYBAS, Assistant, Insects—Pvt.
WILLIAM BEECHER, Temp. Asst., Zool.—Pvt.
HENRY HORBACK, Asst., Geol.—S. Sgt.
JAMES C. MCINTYRE, Guard—2nd Lt.
RAYMOND J. CONNORS, Guard—Pvt.
FRANK J. DUTKOVIC, Janitor—Pvt.

Navy

LESTER ARMOUR, Trustee—Comdr.
SAMUEL INSULL, JR., Trustee—Lieut. Comdr.
JOSEPH NASH FIELD, Trustee—Lieut.
COLIN CAMPBELL SANBORN, Curator, Mammals—Lieut.
DR. ALEXANDER SPOEHR, Asst. Curator, N. Amer. Ethnol.—Lieut. (j.g.)
LOREN P. WOODS, Asst. Curator, Fishes—Ensign
JOHN W. MOYER, Taxidermist—Ch. Specialist (Bur. Aeronautics)
JAMES H. QUINN, Chief Preparator, Paleontol.—Metalsmith 2C
PATRICK T. MCENERY, Guard—Master-at-Arms
JOHN SYCKOWSKI, Guard—Ch. Commissary Stewd.
GEORGE JAHRAND, Guard—Ch. Water Tender
CLYDE JAMES NASH, Guard—Ch. Gunner
NICHOLAS REPAR, Printer—Aviation Machinist's Mate 2C.
MORRIS JOHNSON, Carpenter—Carpenter's Mate 1C.
HERBERT NELSON, Painter—Painter 1C.
ELIZABETH BEST, Guide-Lecturer—Ensign, WAVES
MARIE B. PABST, Guide-Lecturer—Lieut. (j.g.), WAVES

Marine Corps

MELVIN A. TRAYLOR, JR. Associate, Birds—1st Lt.

Coast Guard

M. C. DARNALL, Jr., Guard—Lieut. (j.g.)
JOHN MCGINNIS, Guard—Ch. Boatswain's Mate

Other Services

RUDYERD BOULTON, Curator, Birds—Staff of Office of Strategic Services
BRYANT MATHER, Asst. Curator, Mineralogy—Civilian Worker, Corps of Engineers, U.S. Army
LLEWELYN WILLIAMS, Curator of Economic Botany—on special service for U.S. Government
DR. JULIAN A. STEYERMARK, Asst. Curator, Herbarium—field work for Board of Economic Warfare
DR. C. MARTIN WILBUR, Curator, Chinese Archaeol. and Ethnol.—Staff of Office of Strategic Services

Served and Honorably Discharged:

BERT E. GROVE, Guide-Lecturer—Medical Aide, American Field Service, Africa; and Military Intelligence, U.S. Army.

Died in Service:

THEODORE ROOSEVELT, Trustee—Brig. Gen., U.S.A.

WIDE VARIETY IN AUTUMN SATURDAY LECTURE COURSE FOR ADULTS, OPENING OCT. 7

Eight Saturday afternoon lectures will be given at the Museum in the annual Autumn Course presented in the James Simpson Theatre during October and November. All the lectures begin at 2:30 P.M., and all but one are illustrated with color motion pictures. The exception will, instead, feature personal interpretations of Indian songs and dances by the lecturers, Reginald and Gladys Laubin, on November 18.

October 7—PEOPLE OF THE PAINTED DESERT

John V. Hansen.

Mr. Hansen, born in Denmark, and retired from the engineering profession, has been devoting himself in recent years to developments of new techniques in the making of color motion pictures and to the study of the life of the Indians of the Southwest. He will show, and relate, intimate details of Indian life. His films include the famous Corn Dance and other ceremonials, the intertribal gathering at Gallup, New Mexico, and other features of the colorful Southwest.

October 14—WILD WINGS.

Murl Deusing.

Here is the beautiful yet simple story of wild birds through the season as captured in motion picture films by Mr. Deusing, who is a member of the staff of the Milwaukee Public Museum. Geese fly over in a thrilling wedge; flocks of whistling swan appear. The complete story of a heron rookery is photographed. We visit a desert island in Lake Michigan where herring gulls battle and duel for nesting territory.

October 21—SEETHING INDIA.

Joe Fisher ("Singapore Joe").

What is behind Ghandi's mind?

Why cannot Great Britain accede to his request?

What of the untouchables? The Hindus? The Moslems? Sikhs? and Parsees?

Can India survive?

Mr. Fisher not only tells his answers to these questions, but shows in natural color films the reasons for his opinions on subjects which have become vitally important to Americans.

October 28—WILDLIFE OF MARSH AND MOUNTAIN.

Cleveland P. Grant.

Mr. Grant, formerly a member of the staff of this Museum as extension lecturer in the Raymond Foundation and Acting Curator of the N. W. Harris Public School Extension, is well known for his success with the color motion picture camera in America's wildernesses. In his new films he will show his latest pictures of the Canadian Rockies with deer, moose, and caribou.

November 4—BORA, BORA, FISHERMAN'S PARADISE.

Henry M. Hedges.

Mr. Hedges, formerly Senior Civil Engineer P-5, attached to the First Construction Battalion of the Seabees, U. S. Navy, recently came back from the Island of Bora Bora in the Southwest Pacific, where he and his wife were the only white people until the American sailors came. Once called "The Sentinel Island" because of the large, towering peak which guards over the harbor, Bora Bora, now an American outpost, is truly living up to its name. Mr. Hedges relates the reaction to the arrival of the American troops.

November 11—UPPER AMAZON AND HIGH ANDES ADVENTURE.

Lewis N. Cotlow.

The fabled lands of the Golden Incas, the impenetrable fastnesses of the Amazonian jungles, and the stupendous heights of the great Andes have from the days of the Spanish Conquistadores been a lure to traveler and explorer alike. Mr. Cotlow ranges not only through these ancient places of mystery but through beautiful cities and the fertile lands supporting them. Traveling at times literally thousands of miles in a plane especially provided by the Peruvian government, again astride plodding mules, careening in a modern motor car over boulder-strewn trails hitherto unused for such travel, he obtained notable films.

November 18—THE FIRST AMERICAN.

Reginald and Gladys Laubin.

Known as the foremost exponents of American Indian dances, Mr. and Mrs. Laubin will present these in native costume; and also Indian lore and songs. Of them, John Martin, dance critic of the *New York Times*, has said: "It is no wonder that the Indians themselves are warm in their praise, for certainly no one of their own people has come before the white man with so eloquent and winning a presentation. Their singing, their drumming, their costuming are all quite as admirable as their dancing."

November 25—OUR MEXICAN NEIGHBORS.

Dr. A. B. Keeler.

Dr. Keeler's home is in Mexico City where for five years he was associated with the American School Foundation. His time is now divided between Mexico and the United States in the interest of international friendship. His films show the Mexican people at work and play, and include colorful fiestas at Cholula, the making of leather furniture at Guadalajara, marketing at Tasco, the potter and his wheel at Tlaquepaque, yachting and water skiing at Acapulco, and physical training exhibitions in Mexico City. As a special feature he will show also views of the new volcano, El Parícutin, to which this Museum recently sent an expedition, the results of which are told in the featured article on page 1 of this issue of the BULLETIN.

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WABash 9410) or in writing, and seats will be held in the Member's name until 2:30 o'clock.

RAYMOND FOUNDATION FALL PROGRAMS FOR CHILDREN

The James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures will present its annual autumn series of free motion picture programs for children during October and November. Eight programs are scheduled, one for each Saturday morning, during the two months. These programs, to which children from all parts of Chicago and suburbs are invited, will be presented twice each Saturday, at 10 A.M. and at 11, in the James Simpson Theatre of the Museum.

Two programs will include the appearance of persons concerned in the films presented. On the October 28 program, "On the Bottom of the Sea," Robert Zimmerman, the noted deep-sea diver will tell in person his adventures on the ocean floor. On the November 18 program, "Living India," Ramkrishna and Manorama Modak will portray the life of a typical Indian couple.

Following is the schedule:

October 7—FRANCE.
Color film showing people, traditions, customs and industries of France.
And a cartoon.

October 14—FALL OF THE YEAR.
And a cartoon.

October 21—CANADA FROM COAST TO COAST.
And a cartoon.

October 28—ON THE BOTTOM OF THE SEA.
Personal appearance by Robert Zimmerman.

November 4—WHEN WINTER COMES.
And a cartoon.

November 11—STORY OF THE POLAR REGIONS.
And a cartoon.

November 18—LIVING INDIA.
Personal appearance by Ramkrishna and Manorama Modak.

November 25—ALL CARTOON PROGRAM.

LECTURE TOURS ON WEEKDAYS, SEPTEMBER AND OCTOBER

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given, covering all departments. Special subjects are offered on Wednesdays and Fridays; a schedule of these follows:

September

Fri., Sept. 1—Primitive Hunters (Roberta Cramer).
Wed., Sept. 6—Unconquerable China (Emma Neve).
Fri., Sept. 8—All Is Not Gold That Glitters (Bert Grove).
Wed., Sept. 13—Plant Storehouses (Miriam Wood).
Fri., Sept. 15—Strategic Rivers (Emma Neve).
Wed., Sept. 20—Fall Mysteries (Loraine Lloyd).
Fri., Sept. 22—Nature's Warfare (Bert Grove).
Wed., Sept. 27—Indian Leaders (Roberta Cramer).
Fri., Sept. 29—Autumn Animal Antics (Loraine Lloyd).

October

Wed., Oct. 4—Immigrants from Asia (Emma Neve).
Fri., Oct. 6—What to Wear (Roberta Cramer).
Wed., Oct. 11—New Woods for Old Uses (Miriam Wood).
Fri., Oct. 13—Indian Summer Adventure (Loraine Lloyd).
Wed., Oct. 18—Fire Works (Emma Neve).
Fri., Oct. 20—Phantom Caravans (Bert Grove).
Wed., Oct. 25—Ghost Stories (Roberta Cramer).
Fri., Oct. 27—Bones, Bats, and Cats (Hallowe'en) (Loraine Lloyd).

Persons wishing to participate should apply at North Entrance. Tours are free. By pre-arrangement at least a week in advance, special tours are available to groups of ten or more persons.

Layman Lectures

Sunday afternoon lectures by Paul G. Dallwig, the Layman Lecturer, begin November 5. Reservations begin October 1.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the last two months:

Department of Botany

From: Dr. M. A. Brannon, Gainesville, Fla.—37 specimens of algae, Florida; Robert Runyon, Brownsville, Tex.—132 specimens of algae, Texas; Dr. Walter Kiener, Lincoln, Neb.—84 specimens of algae, Nebraska; Miss Priscilla Hannaford, Winnetka, Ill.—16 specimens of algae, Illinois; William A. Daily, Indianapolis, Ind.—126 specimens of algae, Indiana; Harold B. Louderback, Argo, Ill.—147 specimens of algae, Illinois.

Department of Geology:

From: James L. Kraft, Chicago—a nephrite jade boulder, Wyoming; Stuart Perry, Adrian, Mich.—a polished slice of the Linwood, Nebraska, meteorite.

Department of Zoology:

From: Chicago Zoological Society, Brookfield, Ill.—a tapir, a green pit viper, a monitor lizard, a raccoon, 39 birds; Pvt. William J. Beecher, U. S. Army—5 birds, 12 phalangers, 30 beetles and allies, Solomons, New Georgia, Munda; Lt. Richard Snyder, U. S. Army—a chicken snake and a coach whip snake, Alabama; O. H. Meeker, Havana, Cuba, and Port-au-Prince, Haiti—a hermit crab, 3 specimens of barnacles, Cuba; Mrs. L. M. Snyder, Berkeley, Calif.—a horned viper, 2 lizards, 2 frogs, Saudi Arabia; L. M. Snyder and T. C. Barger, Berkeley, Calif.—29 insects and allies, Saudi Arabia; Col. Clifford C. Gregg, Washington, D.C.—65 insects, 2 spiders, Texas; Leslie Hubricht, St. Louis, Mo.—771 fresh water clams, 143 shells, Missouri and other localities; Miss Margaret Storey, Stanford University, Calif. 16 mullets, Florida; Lincoln Park Zoo, Chicago—10 birds; the late Arthur W. Herz—12,944 European and North American butterflies and moths; J. E. Johnson, Waco, Tex.—208 snakes, frogs, lizards, turtles, Texas; E. Ross Allen, Ocala, Fla.—3 turtle skulls, Florida; Irving D. Townsend, Hot Springs, Ark.—a salamander, Arkansas; Dr. Wesley R. Coe, La Jolla, Calif.—25 mussels, California; Lt. Alvin R. Cahn, U.S.N.R.—a wolverine skull, Alaska; Pvt. E. F. Bromund, U.S. Army—a snake, 2 lizards, Georgia; Pvt. Henry Dybas, U.S. Army—28 snakes, lizards, frogs, Texas and Florida; Delzie Demaree, Monticello, Ark.—150 shells in 28 lots, Arkansas; G. Alan Solem, Oak Park, Ill.—26 shells, Midway Island; Dr. Vasco M. Tanner, Provo, Utah—2 gila monsters, 2 snakes, Utah; Dr. Charles T. Vorhies, Tucson, Ariz.—2 coral snakes; Lt. Harry Hoodstraal, Ft. McPherson, Ga.—3 snakes, 4 lizards; Georgia; Earl Wright, Spider Island, Wis.—2 garter snakes, Wisconsin; Pvt. S. B. Lummis, U.S. Army—65 specimens of marine invertebrates comprising 12 species. Aleutian Islands and Alaska; Pvt. J. K. Cordell, Savannah, Ga.—10 tree frogs, Georgia; J. E. Johnson and John Sparks, Waco, Tex.—8 cottonmouth moccasins, Texas.

Library:

Valuable books from: the Celanese Celluloid Corporation, New York; the Co-ordinator of Inter-American Affairs, Dr. Henry Field, and the War Department, Washington, D.C.; W. J. Givler, Greensboro, N. C.; Melville G. Hatch, Seattle, Wash.; Lake Carriers' Association, Cleveland, Ohio; Lt. Colin C. Sanborn, U.S.N.R.; E. P. Phillips, Pretoria, South Africa; Bailey Willis, Stanford University, Calif; A. B. Wolcott, Downers Grove, Ill.; E. P. Wiltshire, Bombay, India; Paul Roder, Summit, N. J.; William J. Gerhard, Boardman Conover, International Harvester Company, and Westinghouse Electric Supply Company, Chicago.

Change in Visiting Hours

The Museum visiting hours, which have been 9 A.M. to 6 P.M. daily during the summer months, will change to the autumn schedule—9 A.M. to 5 P.M.—on Tuesday, September 5, the day after Labor Day. These hours will continue until October 31.

Staff Notes

Dr. Francis Drouet, Curator of Cryptogamic Botany, has been in Washington engaged in research at the National Museum.

Mr. Leon L. Pray, Staff Taxidermist, has completed a workshop exhibit illustrating the steps in the making of a museum fish model. It is available for consultation.

Dr. Paul S. Martin, Chief Curator of Anthropology, is at Camp Highlands, Wisconsin, lecturing to groups of boys.

Miss Marie Pabst, Raymond Foundation lecturer on leave, has been promoted to Lieutenant (j. g.) in the WAVES.

NEW MEMBERS

The following persons became Members of the Museum during the period from June 16 to August 4.

Associate Members

Harry M. Brostoff, Jay Gould, William M. Hales, L. W. Hraback, William J. Kelly, Dr. Mary G. Schroeder.

Sustaining Members

J. W. Lynch

Annual Members

Mrs. Howard C. Abbott, J. H. Briggs, C. Roy Campbell, Carl Clare, W. N. Clasen, Dr. Willie Mae Clifton, Mrs. Michael J. Corrigan, Wells E. Crockett, David Davis, Mrs. A. M. Fishburn, John Flesch, Frank Furedy, Elmer H. Gamrath, Harold E. Groble, Mrs. Leon Grotowski, Walter Haines, Mrs. Norman R. Hanson, Eric Heilo, Maxwell R. Herman, Charles Iker, Dr. Carl Ireneus, Jr., Mrs. Rose M. Kiefer, George J. Loderbauer, Charles J. McCann, Donald P. Mossman, Leon Neumark, Dr. Victor T. Nylander, Harry Palm, Mrs. Henry Scarborough, Dr. William J. Schnute, B. L. Smalley, David A. Smart, Geary V. Stibgen, Robert F. Trumbull, Dr. A. E. Winner, Herbert H. Winsberg, Herman Wise, James E. Wise, Herman A. Zischke.

SPECIAL NOTICE

All Members of the Museum who have changed their residence, or are planning to do so, are earnestly urged to notify the Museum at once of their new addresses, so that copies of The BULLETIN and all other communications may reach them promptly.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

Chicago Natural History Museum
BULLETIN
Formerly Field Museum News

Vol. 15 NOVEMBER-DECEMBER, 1944 Nos. 11-12

THE WEB OF LIFE IN A FRESH WATER LAKE, AS SEEN WITH A DIVER'S HELMET

By MARION GREY
ASSOCIATE, DIVISION OF FISHES

For the preparation of a museum habitat group, the scientist needs a thorough knowledge of the type of environment he plans to exhibit, the taxidermist must see in their natural setting the animals that are to be his models, the preparator must know as much as possible about the rocks and plants he is to use as accessories, and the artist needs a close acquaintance with the background that he is to paint.

These conditions of co-operative knowledge cannot always be met; but when the Chicago Natural History Museum undertook the project of creating a habitat group of fresh water fishes of the Middle West, it was possible for members of the Museum staff to make repeated trips to Lake La Grange, Cass County, Michigan, with diving equipment, preparatory to the construction of an underwater scene typical of this region.

WEB OF LIFE UNDER WATER

New group, prepared by use of unique technical developments, to give Museum visitors illusion of descending to the bottom of a fresh water lake and viewing its denizens in typical natural surroundings.

What is seen when looking into water from above is an illusion, lively as it sometimes is. Viewing a lake through the window of a diving helmet not only discloses underwater objects in their true shapes, but also reveals an unsuspected range of color. Plump graceful columns of milfoil (*Myriophyllum*) and hornwort (*Ceratophyllum*) stretch above to the lake's surface and, along with crisp-leaved pondweeds (*Potamogeton*), masses of *Elodea*, and other water plants, assume the appearance of a thick jungle of foliage with here and there an open room carpeted with soft black mud.

Wisps of gray or brown algae droop from stems and leaves; there are unexpected red tips on some of the milfoil fronds where there is new growth. Sometimes the algae on the plants form a delicate golden tracery over all, and even the old logs and stumps scattered over the lake bed are encrusted with golden brown algae in this way taking on a beauty entirely of their own.

Lake La Grange is little more than a pond —few places are too deep for rooted water plants to grow, and there is but little wave action. The damming of a stream formed the lake about one hundred years ago and it is now being slowly choked up with wild rice and other water plants. Eventually such a lake, like most natural lakes, becomes a bog, and the bog in turn will finally become dry land.

Life in a small lake follows a more or less set pattern, just as swift-flowing streams or large deep lakes have their own types of living communities. Perhaps the most important factor in the economy of Lake La Grange is the abundance of vegetation, though this in turn is determined by the physical and chemical properties of the water and the soil of the lake bed.

The plants not only offer homes and shelter for thousands of animals, large and small, from the single-celled protozoa to fishes and birds, but they also produce the abundant supply of oxygen necessary to the maintenance of animal life; and they are used, too, as food by many of the animals. Thus a rich plant life makes possible a correspondingly rich animal life.

Bacteria are of major importance in the pond community. Besides performing their essential duty as agents of decay, releasing the elements of dead organic matter to make them again available to the green plants, these tiny organisms serve as nourishment for some of the smallest plankton animals and also for the mud-living inhabitants of the lake such as tube-worms and gnat-larvae. These latter creatures, along with some bottom-feeding fishes, serve their purpose as the scavengers of the lake. The plankton population of the water, the microscopic floating plants and animals, are devoured by almost all the legion of small and middle-sized water creatures and even by some of the larger fishes.

Young fishes, snails, and insects are eaten by adult fishes, frogs, turtles, or birds. As animals die, they fall to the bottom where their bodies decay through bacterial action or are eaten by detritus feeders.

Thus the cycle continues until some unusual circumstance occurs to upset the natural balance of the lake. The various animals and plants of the lake commun-

EXPEDITION "SHIP"

Boat, with diving helmet, on Lake LaGrange where studies for new group were made. Assistant Curator (now Ensign, U.S.N.R.) Loren Woods in bathing suit at right.

ity are *interrelated* to form a web of life.

Mass destruction may befall the entire water-living population of a pond or bog-lake, probably due in most cases to depletion of oxygen in the water. Certain conditions of temperature and chemical changes sometimes produce the phenomenon of "waterbloom," an excessive growth of microscopic plants that die and decay too rapidly to return to the water as much oxygen as they extract from it.

Depletion of oxygen may also be brought about by other circumstances, but the result is always the death of all fishes and nearly all other animals bound by their habits to life beneath the surface. These phenomena are fortunately rare. Normally the balance of life is maintained, and a lake that is turning into a bog does so gradually, losing its animal inhabitants a few at a time and over a long period of years.

FISH BREED AMONG PLANTS

The luxuriant plant growth of Lake La Grange makes possible the existence of great numbers of fishes, and the habitat group is planned to feature them. Besides the above-mentioned benefits of shelter and food, some fishes, among them the northern pike and pickerel (*Esox*) and the red-bellied dace (*Chrosomus*), use the weed-beds as breeding grounds.

The pike leads a solitary life, lying in wait for its prey among the plants, except at spawning time when a pair swims rapidly through the plants, slapping their tails vigorously as the eggs and milt are extruded, scattering them widely. The fertilized eggs adhere to the stems and leaves until development is complete and the fry emerge.

Red-bellied dace also spawn in the weeds, but as the eggs are not adhesive, the female darts into a mass of filamentous algae, with one or several males following close behind, and there leaves her eggs to be caught and held in the tangle.

Not all the fishes of the lake scatter their eggs in this fashion. Bullheads, bass, and many of the minnows construct simple nests of stones and gravel in the shaded shallow water near shore. The eggs in these nests are usually well guarded by one or both parents until they hatch.

The large-mouth black bass (*Huro*) and the bullheads (*Ameiurus*) carry their protection even further, keeping watch over the young and driving away hungry predators for some days after hatching. When their parents finally desert them, these young fishes can resort to the vegetation for both food and protection, and a larger percentage is able to survive than in open water where their many enemies can find and devour them more readily.

The most familiar of freshwater ponds is thus an appropriate subject for the Museum's Hall of Fishes (Hall O) in which the very different oceanic conditions may be seen in beautiful representations of the rocky seacoast of Maine, the sandy coast of the Gulf of Mexico, and a West Indian coral reef, among previously installed exhibits.

WHAT A DIVER SEES

This diver's-eye view of the life in a fresh water lake is typical of lakes found in northern Illinois, Wisconsin, and Indiana as well as Michigan. Entirely new conceptions and techniques of exhibition were used in the preparation.

Surface scenes on the lakes in this region are familiar to hundreds of thousands of fishermen and other sportsmen. But it is doubtful if more than a handful have ever been privileged to go down in a diving helmet and remain for a protracted length of time to observe the typical life of the lake waters and bottom. This group provides the opportunity to Museum visitors of seeing everything a helmeted diver can see on the floor of such lakes.

The Museum sent members of its staff, and volunteer assistants, on diving expeditions to various lakes to make the necessary studies for this group. Among those visited besides Lake La Grange were Fox Lake, Illinois, and Magician Lake, near Dowagiac, Michigan. The scene finally reproduced is based principally upon Lake La Grange, because conditions there were most favorable for the studies made by the icthyologists, artists, and technicians whose joint efforts were necessary in the production of this most unusual exhibit.

MANY JOIN EFFORTS

The group was originally conceived by Loren P. Woods, Assistant Curator of Fishes, now on duty as an ensign in the Navy, who headed the Museum's underwater expeditions in 1941 and 1942. Preparation of the group is the work of Staff Taxidermist Leon L. Pray, who is responsible for the reproductions of the various types of fish represented; and Staff Artist Arthur G. Rueckert, who devised completely new methods, using special glass, concealed lighting, and other museum-art techniques to produce completely realistic natural effects simulating those which actually confront the eyes of a diver in such a lake. This involved combination of the blurred underwater effect in the distance with clear representation of the fresh water life in the foreground of the group.

Others who assisted in the expeditionary observations and in the preliminary preparations for the group include Taxidermist W. E. Eigsti; Frank H. Letl, former Museum preparator; Ronald Lambert, diver of Zion, Illinois; Mr. and Mrs. Gordon Cole, of Dowagiac, and the writer.

The fishes include: large mouthed black bass, pickerel, grass pike, black crappie, white crappies, warmouth bass, and yellow perch; the sun fishes—green sunfish, pumpkinseed and bluegill; bullhead, and redhorse. Also shown are the minnows—common shiner, golden shiner, red bellied dace, and mud minnows.

OTHER ANIMAL LIFE

The accessory animals shown as part of the natural lake assemblage include a dead snapping turtle, being cleaned up by crayfishes; a bullfrog, diving into the group; a green frog; a swimming coot; and air-breathing and water breathing snails.

The group features a pebble nest, cleaned of all silt, guarded by the male black bass as is characteristic of its "family life."

The setting is the early summer development of under-water vegetation typical of our local lakes.

Model Victory Garden

In co-operation with the Victory Garden movement, the Museum has accepted on loan and placed on exhibition in the Hall of Food Plants (Hall 25) the miniature diorama shown in the illustration above. The diorama was made and lent to the Museum by Miss Halina Przydatek, a teacher in the Chicago Public Schools.

MUSEUM ASSISTING TWO SERIES OF SCHOOL RADIO PROGRAMS

The Museum is co-operating in the presentation of two series of radio programs for children in their school classrooms.

One series, under the joint sponsorship of the Radio Council of Chicago's Board of Education and the Museum, is presented on Wednesdays under the title "Places and Peoples of the Far East." This series began September 20, and will continue through December 13, with additional programs on January 3 and 10. Each program is presented twice, at 11:15 A.M. over FM station WBEZ, and again at 1:30 P.M. on the same days over WIND, with frequency modulation repeat-performance on the Board of Education's station, WBEZ.

The second series of programs is being given on station WLS at 1:15 P.M. on one Tuesday each month for eight months, the first presentation having been made October 24. These programs are part of the WLS feature known as "School Time Broadcasts."

The October 24 program may be described as a model of these broadcasts: On that occasion Miss Martha Gowdy, WLS commentator, brought a group of some fifteen grade school boys and girls to the Museum for a tour of the Hall of Egypt with Curator Richard A. Martin. The program was picked up directly from the Museum hall through a traveling microphone moving about the exhibits with the group. During the program, the children asked questions about the various exhibits they were inspecting, and Mr. Martin gave them the answers.

Similar programs will be conducted in other halls of the Museum on one Tuesday during each of the next seven months; on the alternate weeks, the broadcasts of this type will be made from the Brookfield Zoo, Lincoln Park Zoo, and Trailside Museum. Thousands of school classrooms in Chicago and throughout the states of Illinois, Wisconsin, Indiana and Michigan are tuned in regularly on these programs.

The weekly programs on Wednesdays in conjunction with the public school broadcasting council are also 15-minute programs intended for reception on radio sets in classrooms and assembly halls of the schools. The programs correlate with social studies which are a part of the regular school curriculum in upper elementary and high school grades.

The broadcasts given on the first two Wednesdays were devoted to the Philippine Islands; the next two to the Malay Archipelago and Malay states; Thailand and French Indo China, followed by Burma, were the subjects of the following two programs. Four Wednesdays are now to be devoted to the peoples, customs and problems of India, and the final four to similar studies of China.

At the Museum itself, a special program was given on October 26, and another is scheduled for December 14 at 2 P.M., as a tie-in with the radio series. The first of these consisted of a lecture and tour of the Melanesian exhibits, and the second will provide the same treatment for India and China. Each school selects pupils to be sent to these special programs, and report back on them to their classmates.

A handbook on the radio series has been prepared and distributed to all Chicago teachers who might be concerned with the programs. Preparation of the programs is in the hands of Isabel Callvert, for the Board of Education, and Miss Miriam Wood, chief of the James Nelson and Anna Louise Raymond Foundation at the Museum.

AMATEUR COLLECTORS

By WILLIAM J. GERHARD
CURATOR OF INSECTS

Large and valuable collections of natural history specimens are often made by persons who are interested in the subject mainly as a hobby or a pastime. Such amateur collectors unquestionably derive much pleasure from their hobby. Frequently they are able to add to the knowledge of the subject in which they are interested, and often their collections are acquired eventually by museums and thereby made available for study or examination for many generations to come.

Because insects are generally abundant, and comparatively easy to collect and preserve, they are favored by amateur collectors. Thus a surprisingly large part of what is known about insects is due to such collectors.

A notable example of the results of an amateur's hobby is the collection of butterflies and moths that the Museum received as a gift this year from the late Arthur Wolf Herz, of Chicago. This collection consisted of nearly 13,000 well-spread and named specimens, most of which have the essential data, namely, a pin-label indicating when and where the specimen was collected.

More than a third of the specimens in this collection consisted of European species, many of which previously were not well represented in the Museum. A large number of both the European and North American specimens were raised from either the egg or the larval stage and hence they are in perfect condition. To attain such results much time and patience were required, as well as a knowledge of the usual food-plants of the species to be bred.

For fifty years Mr. Herz devoted the greater part of his leisure time after business hours to the increase and improvement of his collection, maintaining a keen interest in it to the end of his life. For a much longer period the results of his hobby will be easily accessible and useful to future students of butterflies and moths.

JAMES L. KRAFT ELECTED A MUSEUM CONTRIBUTOR

In recognition of his gift of an exceptional specimen of nephrite jade boulder weighing 2,490 pounds (illustrated in this issue of THE BULLETIN, and described in an article on page 5 of the September-October number), Mr. James L. Kraft of Chicago has been elected to the membership class designated as Contributors (a classification including all those whose contributions in money or materials reach a value between $1,000 and $100,000).

Mr. Kraft has been an Associate Member of the Museum since 1926.

A. W. HERZ POSTHUMOUSLY ELECTED

The late Arthur Wolf Herz, of Chicago, has been posthumously elected a contributor in recognition of his gift to the Museum of a collection of 12,944 North American and European butterflies and moths.

2,490-POUND JADE BOULDER

Edwin, Marjory and Emily Gin Toy, 2219 Wentworth Avenue, Chicago, inspect the huge Wyoming specimen of the rock so highly prized in the Orient, presented to the Museum recently by Mr. James L. Kraft, of Chicago. The boulder is now in the Hall of Minerals (Hall 34).

Discovery of Agate in Uruguay

This is the story of the discovery of agate in Uruguay as it was told to a member of a Museum expedition by Julius Schuch, owner of the largest agate quarry in that county.

A young man of Oberstein, Germany, where agate cutting had been practised for hundreds of years, fought in the Brazilian army during one of the revolutions. After the fighting was over, foreigners were thrown out of the army without formality. This young man, finding himself without employment or resources, crossed into Uruguay and during his wanderings there found in the stream beds many pebbles which he saw were the same as the agates he knew in Oberstein. He sent some to his uncle in Germany who became interested and soon established the agate quarrying industry of Uruguay. Examples of these agates, rough and polished, are in Hall 34. —H.W.N.

WAR POINTS TO NEED FOR RESTORING SOUTH AMERICA AS PRODUCER OF QUININE AS WELL AS RUBBER

By B. E. DAHLGREN
CHIEF CURATOR, DEPARTMENT OF BOTANY

Quinine is obtained from the bark of various trees of the genus *Cinchona*. Thirty to forty species are known from the mountains of northwestern South America from Bolivia through Peru, Ecuador and Colombia to Venezuela, where they grow scattered in the forests above 2,000 or 2,500 feet to altitudes approaching 10,000 feet near the equator. One species extends northward to Costa Rica. Some of them are handsome trees with thick and shiny, oblong, opposite leaves, reddish when immature, or when ready to fall, and laden with clusters of yellowish-white, rose-tipped flowers.

FLOWERS OF QUININE

Detail of a branch of the quinine tree, recently reproduced from nature and added to the botanical exhibits in Martin A. and Carrie Ryerson Hall (Plant Life, Hall 29). The species represented is Cinchona Ledgeriana which is grown in the Dutch cinchona plantations and has now been introduced into Central America.

Whether the anti-malarial properties of the bark were first discovered by the Indians, or by the early missionaries, or by whom, has never been determined. The long-current legend attributing to the Countess Chinchon the introduction of the so-called Peruvian bark into Europe in 1640 is said to be thoroughly exploded, but it is commemorated in the botanical genus name *Cinchona*.

The remarkable bark gained such great repute that a century later several European governments sent expeditions or botanical explorers to investigate particulars of its occurrence. The most famous of these were the Frenchman Condamine, who returned to report on his findings in 1738, and the Spaniards Ruiz and Pavon who left Spain in 1777. During ten years spent in Peru they became acquainted with seven species of quinine trees and their product, and described these at length in their *Quinologia* which was published in Madrid in 1792.

An English translation of the long-lost journal of the travels of Ruiz was published by this Museum in 1940 (publication 467). In an epilogue the Spanish editor gives an account of the notable report on quinine. The almost equally famous Spanish botanist Mutis studied the quinine trees of Colombia about the same time.

Ruiz in his journal describes vividly the poor earnings and the hard life of the Indian quinine gatherers, and also tells of the destruction of the trees that are felled in order to peel the bark from stems and roots. In places that once furnished large quantities of bark the supply, even then, had diminished until locally almost non-existent.

As long as the natural supply was reasonably abundant, no one thought of planting quinine trees either in Peru or elsewhere, but about 1850 the scarcity of the bark became increasingly apparent. Both the Dutch and British governments then took steps to obtain plants or seed for introduction in their eastern possessions.

The Dutch established a large plantation in Java in the years immediately following 1854, and the English in the Nilgiri Hills in southern India in 1859. Neither at first obtained the most valuable species, now known as *Cinchona Ledgeriana*. This was found about ten years later by an English business man named Ledger, resident in Peru who through a London agent was able to sell some of his seeds to the Dutch government, the English having declined to buy.

In this manner and after many experiments in propagation and breeding, none too well understood at the time, the Dutch quinine plantations became the most important source of the world's increasingly necessary supply of the drug. South America thus lost its early natural monopoly and primacy in what should have remained one of its most valuable exports.

The story of the parallel loss of its rubber trade some years later follows the same pattern, which serves to emphasize the economic advantage of scientifically guided plantation production over the exploitation of the corresponding wild forest-grown products of scattered distribution.

POST-WAR LESSON

That an enemy seizure of the East Indies should have practically deprived the rest of the world of two such essential commodities as rubber and quinine is a remarkable fact with implications demanding the serious attention of post-war planners. That the American continent should be placed in a critical position by a drastic curtailment by enemy hands of its normal supply of two such essentially American forest products as these should be as disconcerting to ourselves as it must be to the South American countries concerned.

In view of the inadequacy of the scattered plantings existing outside of Japanese occupied areas, recourse has been had during the past few years to enforcement of strict economy in the use of existing stocks, as well as to intensified gathering and search for additions to the insufficient natural supply. It is fortunate that recent developments in chemical science and industry have made it possible to provide more or less satisfactory substitutes for eking out the available modicum of the natural products.

It is to be hoped that this eleventh hour rescue may not be too discouraging to future production on the American continent of these important natural commodities for which the Western Hemisphere should well be able to rely on itself, at least in much larger measure than before.

A SPECIAL NEW SERVICE TO AID HIGH SCHOOL SCIENCE GROUPS

By JOHN R. MILLAR
CURATOR, N. W. HARRIS PUBLIC SCHOOL EXTENSION

A new development in the method of circulating the exhibits of the N. W. Harris Public School Extension was inaugurated this fall. The sixty-four high schools now reached by the Extension have been grouped in a separate category and will receive a special selection of exhibits believed to be most useful for science teaching at the high school level. These exhibits will move in a sequence co-ordinated with the course of study in biology in use in public high schools at present.

This is a simple, rather obvious change in the system of circulating exhibits in schools, a system which has prevailed almost from the time the Extension first began to operate. Under it, exhibits have been moved in pairs in an endless chain through all schools participating in this Museum service, regardless of their type.

A diversification of the procedure was made possible, even imperative, by the character of some recent additions to the collection of portable exhibits. These exhibits are less objective than most of those in circulation heretofore, and present instead more mature ideas that help toward an understanding of so-called "biological principles."

ADAPTATIONS DEMONSTRATED

An example is a recently completed exhibit on the subject of the adaptations of of some bottom-dwelling fishes. In this exhibit the similar adaptive forms of the otherwise dissimilar flounder and skate are illustrated by means of life-sized models and diagrammatic drawings. The curious migration of the flounder eye during the metamorphosis of the young is a classic example of the adaptive change in an animal's form, and is a part of the exhibit.

Simple as it is, this exhibit deals with forms and ideas beyond the experience and grasp of elementary school pupils. However, it is eminently suitable to high school biology where some of the generalizations of science are first taught, and are, in fact, the core of the entire course of study.

Another reason for separate treatment of high schools is the essentially different method of handling the cases within the schools. In high schools, it is customary to use the portable exhibits in the science rooms only. Students see the cases at only one period of their high school experience. It follows then, that if the exhibits are of value as teaching aids one year, it would be a distinct advantage to the teacher to have the same kind of material at about the same time the following year, when he has a new group of students. The new schedule for high schools will achieve this end.

The situation in elementary schools is quite different. Here cases usually are carried into all classrooms, and endless variety seems to be desirable. The fact that a particular exhibit does not reappear at an elementary school oftener than once in four years, and usually not at all in the eight-year period that the average pupil attends, is considered advantageous rather than otherwise.

Although school authorities were consulted on the matter, many aspects of the plan must be regarded as theory to be proven by experience. However, the basic scheme is believed to be a sound development of the Museum's service to the schools of Chicago, and efforts toward further expansion will be continued.

METEORITIC IRON STUDY VOLUMES RECEIVED

Mr. Stuart H. Perry, newspaper publisher of Adrian, Michigan, has presented to the Museum a five-volume collection of photomicrographs of more than 100 meteorites. The photomicrographs were made during the course of Mr. Perry's important and extensive studies of the metallography of meteoritic iron.

The microscopic patterns of the specimens were brought out by polishing a section to a very high degree and then etching it very lightly with dilute acid. This method brings out the pattern which may be studied in perfect detail under high magnifications. Many of the photographs are magnifications of 600 times.

The Smithsonian Institution has recently published a 115-page account of studies made by Mr. Perry of the microstructure of iron meteorites.

The five volumes contain more than 1,400 photographs accompanied by Mr. Perry's valuable interpretation of the structure revealed.

Only three such sets have been made and these have been distributed to the United States National Museum, the University of Michigan (where Mr. Perry conducted his studies), and to this Museum.

—P. O. M.

Technical Publications Issued

The following technical publications have been issued by the Chicago Natural History Museum Press since appearance of the last list printed in THE BULLETIN.

Zoological Series, Vol. 29, No. 12. *Ornithological Notes from Point Barrow, Alaska.* By Louis B. Bishop. July 12, 1944. $ .15.

Zoological Series, Vol. 29, No. 13. *Nine New South American Rodents.* By Wilfred H. Osgood. July 12, 1944. $ .15.

Geological Series, Vol. 8, No. 12. *An Osteoborus from Honduras.* By Paul O. McGrew. August 14, 1944. $ .10.

Geological Series, Vol. 8, No. 13. *The Aelurodon Saevus Group.* By Paul O. McGrew. August 14, 1944. $ .10.

MUSEUM OFFERS ASSISTANCE TO CHRISTMAS SHOPPERS

How would you like to avoid the rush and confusion of Christmas shopping?

The Museum makes it possible for you to buy and send your gifts while sitting cozily at your desk in your own home or office.

You can avoid wrapping packages, and standing in line at the post office to have them weighed, stamped, and insured.

The Museum offers its service in two forms. All you need is a pen—we furnish even the postage.

Here are the plans:

1. *Christmas Gift Memberships in the Museum.* With this issue of THE BULLETIN there are enclosed Christmas Membership application forms, and postage-prepaid envelopes for returning them. All you need to do is designate the name of the person you wish elected to membership, and send the form in with your check.

The Museum will handle all details, sending the recipients attractive Christmas cards notifying them that they have been elected Members of this institution through your courtesy. With the card will be sent information about their privileges as Members, as well as the regular Membership cards (and Certificates in the case of Life and Associate Members).

2. *Services of the Book Shop of the Museum.* The Book Shop is prepared to furnish books, endorsed for scientific authenticity by members of the Museum staff, for both adults and children.

You are invited to browse in the Book Shop during part of your next visit to the Museum.

Where desired, the Book Shop will handle mail and telephone (WABash 9410) orders, and will undertake all details in connection with wrapping, and the dispatching of gift purchases to the designated recipients, together with such forms of greeting as the purchaser may specify.

Latin American Newspaperwomen Brought to Museum

On October 21, the Museum was host to a group of newspaperwomen from Latin American countries, visiting the United States under the auspices of the Co-ordinator of Inter-American Affairs. They were entertained by Acting Director Orr Goodson. Those in the party were: Señorita Lenka Frañulic, writer, *Revista Ercilla;* Señorita Piedad Levi Castillo, writer, *El Telegrafo;* Señora Aurora Estrada y Ayala de Ramírez Pérez, magazine and radio writer; Señora Elsa de Barrios, Director, *Proa;* Señorita Gloria Menédez Miña, Director, *Azul;* Señora Raquel Delgado de Castro, Director, *Vida y Salud;* and Señorita Laura de Arce, Director, *Mujeres de América.*

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Field Drive, Chicago

TELEPHONE: WABASH 9410

THE BULLETIN

EDITOR

WILFRED H. OSGOOD.....*Curator Emeritus, Zoology*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
B. E. DAHLGREN.....*Chief Curator of Botany*
HENRY W. NICHOLS.....*Chief Curator of Geology*
KARL P. SCHMIDT.....*Chief Curator of Zoology*

MANAGING EDITOR

H. B. HARTE.....*Public Relations Counsel*

Members are requested to inform the Museum promptly of changes of address.

POSTHUMOUS HONORS GIVEN GENERAL ROOSEVELT

In tribute to Brigadier-General Theodore Roosevelt, Trustee of the Museum, whose death in France was reported in the last issue of THE BULLETIN, the Board of Trustees adopted a memorial resolution at a meeting held September 15.

On September 21, Secretary of War Stimson presented to General Roosevelt's widow the Medal of Honor, an award which had been recommended prior to the general's death in Normandy on July 12.

MUSEUM RESOLUTION

Following is the text of the Museum Trustees' resolution:

"The death of General Theodore Roosevelt, Jr., deprives American science and culture of a staunch supporter and an active participant in the advancement of knowledge. Distinguished son of a distinguished father, he led a life of intense devotion to public service during which his interest in and appreciation of natural history were never submerged by the exigencies of administrative affairs.

"His direct connection with the Chicago Natural History Museum began in 1925 when with his brother Kermit he conducted with great success the James Simpson-Roosevelts Asiatic Expedition. Again in 1928, also with his brother, he continued with a similar and equally successful undertaking, the William V. Kelley-Roosevelts Expedition to Eastern Asia. These expeditions were planned and carried out on a large scale. They traversed difficult and little-known regions and they brought to the Museum some of the largest and most important zoological collections acquired within its history. It is significant that, although both these expeditions engaged in the exciting chase of rare game animals and secured material for some of the finest exhibits in the Museum, there was also provision for the careful study of the little-known and unspectacular elements of the fauna of the regions explored. In both cases trained zoologists were associated with the parties and their notes and collections have formed the basis of technical publications detailing large additions to knowledge.

"General Roosevelt's interest in and service to the Museum were by no means confined to expeditionary activities. While Governor of the Philippines he was instrumental in securing important collections for the Museum, and elsewhere he was ever alert for its interest. After his election as a Trustee in 1938, he kept in touch loyally with Museum affairs although unable to be in regular attendance at meetings.

"His brilliant record as a soldier in two wars, especially in the present one, is remarkable, bringing to his memory the acclaim and gratitude of the entire nation.

"Therefore, be it resolved that this expression of our high regard for him be spread upon the permanent records of the Board and that our deep sympathy be conveyed to his family. The loss of his stimulating personality, his valued counsel, and his warm companionship will long be felt."

ARMY TRIBUTE

The War Department citation said:

"For gallantry and intrepidity at the risk of his life above and beyond the call of duty on June 6, 1944, in France. After two verbal requests to accompany the leading assault elements in the Normandy invasion had been denied, Brigadier-General Roosevelt's request for this mission was approved and he landed with the first wave of the forces assaulting the enemy-held beaches.

"He repeatedly led groups from the beach, over the seawall and established them inland. His valor, and courage and presence in the very front of the attack and his complete unconcern at being under heavy fire inspired the troops to heights of enthusiasm and self-sacrifice.

"Although the enemy had the beach under constant direct fire, Brigadier-General Roosevelt moved from one locality to another, rallying men around him, directed and personally led them against the enemy. Under his seasoned, precise, calm and unfaltering leadership, assault troops reduced beach strong points and rapidly moved inland with minimum casualties. He thus contributed substantially to the successful establishment of the beachhead in France."

General Roosevelt previously had been awarded the Distinguished Service Cross, Distinguished Service Medal, Silver Star, Purple Heart with Oak Leaf Cluster, and several foreign decorations for his service in World War I. He was awarded the Oak Leaf Cluster to the Silver Star in 1943 for gallantry in action in this war.

THE MUSEUM HONOR ROLL

Now in the Nation's Service

Army

GEORGE A. RICHARDSON, Trustee—Lt. Col.
CLIFFORD C. GREGG, Director—Colonel, G.S.C.
DR. JOHN RINALDO, Associate, Southwestern Archaeol.—Staff Sgt.
DR. SHARAT K. ROY, Curator, Geol.—Capt.
D. DWIGHT DAVIS, Curator, Anat. and Osteol.—Corp.
BRYAN PATTERSON, Curator, Paleontology—Pfc.
EMMET R. BLAKE, Asst. Curator, Birds—Special Agent, War Dept.
RUPERT L. WENZEL, Asst. Curator, Insects—Capt.
HENRY S. DYBAS, Assistant, Insects—Pvt.
WILLIAM BEECHER, Temp. Asst., Zool.—Pfc.
HENRY HORBACK, Asst., Geol.—S. Sgt.
JAMES C. MCINTYRE, Guard—2nd Lt.
RAYMOND J. CONNORS, Guard—Pvt.
FRANK J. DUTKOVIC, Janitor—Pvt.

Navy

LESTER ARMOUR, Trustee—Comdr.
SAMUEL INSULL, JR., Trustee—Lieut. Comdr.
JOSEPH NASH FIELD, Trustee—Lieut.
COLIN CAMPBELL SANBORN, Curator, Mammals—Lieut.
DR. ALEXANDER SPOEHR, Asst. Curator, N. Amer. Ethnol.—Lieut. (j.g.)
LOREN P. WOODS, Asst. Curator, Fishes—Ensign
JOHN W. MOYER, Taxidermist—Ch. Specialist (Bur. Aeronautics)
JAMES H. QUINN, Chief Preparator, Paleontol.—Metalsmith 2C
PATRICK T. MCENERY, Guard—Master-at-Arms
JOHN SYCKOWSKI, Guard—Ch. Commissary Stewd.
GEORGE JAHRAND, Guard—Ch. Water Tender
CLYDE JAMES NASH, Guard—Ch. Gunner
NICHOLAS REPAR, Printer—Aviation Machinist's Mate 2C.
MORRIS JOHNSON, Carpenter—Carpenter's Mate 1C.
HERBERT NELSON, Painter—Painter 1C.
ELIZABETH BEST, Guide-Lecturer—Ensign, WAVES
MARIE B. PABST, Guide-Lecturer—Lieut. (j.g.), WAVES

Marine Corps

MELVIN A. TRAYLOR, JR. Associate, Birds—1st Lt.

Coast Guard

M. C. DARNALL, Jr., Guard—Lieut. (j.g.)
JOHN MCGINNIS, Guard—Ch. Boatswain's Mate

Other Services

RUDYERD BOULTON, Curator, Birds—Staff of Office of Strategic Services
BRYANT MATHER, Asst. Curator, Mineralogy—Civilian Worker, Corps of Engineers, U.S. Army
LLEWELYN WILLIAMS, Curator of Economic Botany—on special service for U.S. Government
DR. JULIAN A. STEYERMARK, Asst. Curator, Herbarium—field work for Board of Economic Warfare
DR. C. MARTIN WILBUR, Curator, Chinese Archaeol. and Ethnol.—Staff of Office of Strategic Services

Died in Service:

THEODORE ROOSEVELT, Trustee—Brig. Gen., U.S.A.

SUNDAY LAYMAN LECTURES BEGIN IN NOVEMBER

With two new titles added to his repertoire, Mr. Paul G. Dallwig, the Museum's Layman Lecturer, will open his 1944–45 season of Sunday afternoon lectures the first week in November.

With a different subject each month, Mr. Dallwig will lecture every Sunday during November, December and January, and again (after a month's absence while on a Pacific coast lecture tour) in March, April and May.

Lectures this season will begin an hour later, at 3 P.M., instead of at 2 as has been the practice in the preceding six seasons during which Mr. Dallwig has carried on this activity.

IGOROT, PHILIPPINES TODA, INDIA

Illustrations show sculptures by Malvina Hoffman in Hall 3, and are copyrighted by the Museum.

During November, Mr. Dallwig will present one of his new subjects, under the title "Those Interesting Asiatics and Pacific Islanders." The relationship of this lecture to the Pacific war is obvious, and consequently exceptionally heavy reservations are expected on the four Sundays in November.

In December Mr. Dallwig's subject will be "Mysterious 'Night-Riders' of the Sky"; in January, "Digging Up the Caveman's Past"; in March "Who's Who in the Jungle Zoo"; in April, "Romance of Diamonds From Mine to Man," and in May, the final month, the second subject not hitherto presented will be given, viz., "The Romance of Wood."

Some of these lectures will be given entirely in the lecture hall, followed by a "social half-hour" in the exhibition halls; of some, the first half will be given in the lecture hall, and the remainder will be continued among the exhibits in related halls of display. With the starting time changed, the lectures are scheduled to end at 4:50 P.M.

The heavy demand by the public for Mr. Dallwig's lectures, and the necessity of limiting each audience to 100 *adults* (children cannot be accommodated), make it necessary to require advance reservations. *Persons desiring to attend are advised to apply several weeks in advance.* Reservations will be accepted by mail or telephone (WABash 9410).

Visiting Hours Change

The Museum visiting hours, which have been 9 A.M. to 5 P.M. daily during the autumn months, will change to the winter schedule —9 A.M. to 4 P.M.—on November 1. These hours will continue until February 28.

Staff Notes

Mr. Bryan Patterson, Curator of Paleontology, on leave from the Museum for service in the U. S. Army, when last heard from was engaged with a contingent assigned to rehabilitating a bombed-out community in Normandy.

Mr. Harry Changnon, Assistant in the Department of Geology, recently spent several weeks on a geological field trip, studying Cambrian and Huronian formations in the Devil's Lake region of Wisconsin with a group from the University of Chicago.

Mr. John W. Moyer, Staff Taxidermist, now a Chief Specialist in the U. S. Navy engaged in making motion pictures of naval medical and surgical work, visited the Museum recently during a furlough. Since going into the service he has been on assignments in South America, North Africa, Italy, France, Great Britain, and elsewhere.

Miss Velma Whipple has rejoined the Raymond Foundation staff of lecturers. Formerly on the lecture staff, she left in 1938 to teach in the Chicago Public Schools, and to complete her studies for a master of science degree which has since been conferred upon her by the University of New Mexico. She replaces Mr. Bert E. Grove who has resigned to teach at Lake Forest.

Dr. Wilfred H. Osgood, Curator Emeritus of Zoology, recently spent a week at the American Museum of Natural History, in New York, for the purpose of studying specimens there in connection with research on the mammals of North America.

THE MUSEUM WILL CLOSE CHRISTMAS AND NEW YEAR'S DAY in order to permit as many employees as possible to spend the holidays with their families.

FOUR SATURDAY AFTERNOON LECTURES IN NOVEMBER

Four more Saturday afternoon lectures remain to be given at the Museum in the annual Autumn Course presented in the James Simpson Theatre for adults. The lectures all begin at 2:30 P.M., and all but one are illustrated with colored motion pictures. The exception, on November 18, consists of a stage presentation of Indian dances and songs to be given by Reginald and Gladys Laubin, well-known interpreters of this art.

Following are the titles, dates and lecturers for the remainder of the season:

November 4—BORA BORA, FISHERMAN'S PARADISE.
Henry M. Hedges.

November 11—UPPER AMAZON AND HIGH ANDES ADVENTURE.
Lewis N. Cotlow.

November 18—THE FIRST AMERICAN.
Reginald and Gladys Laubin.

November 25—OUR MEXICAN NEIGHBORS.
Dr. A. B. Keeler.

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WABash 9410) or in writing, and seats will be held in the Member's name until 2:30 o'clock.

PROGRAMS FOR CHILDREN CONTINUE IN NOVEMBER

The James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures will present during November the last four programs of free motion pictures for children in its annual autumn series. These programs, to which children from all parts of Chicago and suburbs are invited, are presented twice each Saturday, at 10 A.M. and again at 11, in the James Simpson Theatre of the Museum.

A special feature of the November 18 program will be a stage presentation consisting of the personal appearance of Ramkrishna and Manorama Modak who will portray in their program, "Living India," the life of a typical Indian couple.

Following is the schedule for the month:

November 4—WHEN WINTER COMES.
And a cartoon.

November 11—STORY OF THE POLAR REGIONS.
And a cartoon.

November 18—LIVING INDIA.
Personal appearance by Ramkrishna and Manorama Modak.

November 25—ALL CARTOON PROGRAM.

LECTURE TOURS ON WEEKDAYS, NOVEMBER AND DECEMBER

Conducted tours of exhibits, under the guidance of staff lecturers, are made every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given, covering all departments. Special subjects are offered on Wednesdays and Fridays; a schedule of these follows:

November

Wed., Nov. 1—The Elephant, Donkey, and Other Significant Animals (Loraine Lloyd).

Fri., Nov. 3—Rocks and Rationing—Coal and Oil (Velma Whipple).

Wed., Nov. 8—Sugars, Spices, and Oils (Miriam Wood).

Fri., Nov. 10—Peace Making in the Primitive Manner (Mrs. Roberta Cramer).

Wed., Nov. 15—The People of Africa (Emma Neve).

Fri., Nov. 17—The Magic of Jade (Velma Whipple).

Wed., Nov. 22—Animals Have Feasts Too (Loraine Lloyd).

Fri., Nov. 24—Offerings Among Ancient and Primitive Peoples (Mrs. Roberta Cramer).

Wed., Nov. 29—Beginnings of Big Business—Primitive Ways of Making A Living (Emma Neve).

December

Fri., Dec. 1—Pin-ups from the Past—Famous Fossils (Velma Whipple).

Wed., Dec. 6—Pacific Paradoxes—Hawaii and Other Polynesian Islands (Mrs. Roberta Cramer).

Fri., Dec. 8—The Influence of a Star—The Sun's Effect on Plants and Animals (Loraine Lloyd).

Wed., Dec. 13—Traveling Salesmen—World Trade (Emma Neve).

Fri., Dec. 15—Religious Rituals (Mrs. Roberta Cramer).

Wed., Dec. 20—Christmas Gifts from Animal Products (Loraine Lloyd).

Fri., Dec. 22—Christmas Greens (Miriam Wood).

Wed., Dec. 27—Belated Greetings—The Story of Communication (Emma Neve).

Fri., Dec. 29—Cliffs and Caves (Velma Whipple).

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the last two months:

Department of Anthropology:

From: The late William F. E. Gurley—jewelry, pottery, stone and copper tools, sculpture, seals, bronze and stone vessels, and other ethnological specimens, various localities; Cecil Drake, Tulsa, Okla.—a tripod plate (Huastecan), Mexico; Mrs. Alice Hall Gregory, Chicago—Indian painting, hunting and war scenes, on muslin, Montana.

Department of Botany:

From: Dr. Marion Ownbey, Pullman, Wash.—90 herbarium specimens, Ecuador; Dr. W. H. Camp, Quito, Ecuador—45 herbarium specimens, Ecuador; Pvt. Standley B. Lummis, U. S. Army—12 herbarium specimens, Aleutian Islands; Lawrence J. King, Wooster, Ohio—500 specimens of cryptogams, Ohio; Dr. Fred A. Barkley, Austin, Tex.—35 specimens of algae, Texas; Dr. Delzie Demaree, Monticello, Ark.—53 specimens of algae, Arkansas; Robert Runyon, Brownsville, Tex.—145 specimens of algae, Texas; Harold B. Louderback, Argo, Ill.—248 specimens of cryptogams, Illinois and Wisconsin; Dr. Walter Kiener, Lincoln, Neb.—154 specimens of algae, Nebraska; Dr. M. A. Brannon, Gainesville, Fla.—31 specimens of algae, Florida; Charles A. Heath, Chicago—a water color painting of *Welwitschia;* George L. Fisher, Houston, Tex.—63 herbarium specimens, Mexico; Cranbrook Institute of Science, Bloomfield Hills, Mich.—68 herbarium specimens, Mexico.

Department of Geology:

From: Lieut. Colin C. Sanborn, U.S.N.R.—2 gastropods, Peru; Alex Fitzner, Chicago—10 specimens of columbite, Colorado; Mrs. Richard T. Crane, Jr., Chicago—7 chalcedony intaglios from Carthage, a green jade ring, and a citrine cane head; Lt. V. A. Lang, Chicago—specimen of brachiopods on slab (*Camarotoechia*), Pennsylvania; Carl Almen, Chicago—an iron pyrite concretion showing glacial striae, Illinois; Miss Anna Vasek, Honey Creek, Wis.—a copper boulder, Wisconsin; Thomas J. Dee, Evanston, Ill.—7 specimens of crystallized gold and a gold nugget, Colorado.

Department of Zoology:

From: Prof. A. M. Adamson, Trinidad, B. W. I.—2 caimans, 4 snakes, and 3 frogs, British West Indies; Lincoln Park Zoo, Chicago—2 turtles and a snake, Mexico; Lieut. Murray L. Johnson, (M.C.) U.S.N.R.—11 frogs and 24 lizards, Brazil, Trinidad, and St. Thomas; Pvt. Henry S. Dybas, U.S. Army—2 frogs, Louisiana; Mrs. Emil Veto, Chicago—10 specimens of marine shells, Dutch New Guinea; Sgt. Thane Riney, Savanna, Ill.—6 frogs, 2 salamanders, and a turtle, Illinois; Pfc. William J. Beecher, U.S. Army—16 snakes, 44 lizards, 37 frogs, and 5 bird skins, Solomon Islands and New Guinea; Miss Priscilla Hannaford, Winnetka, Ill.—10 specimens of shells and 2 salamander larvae, Illinois; Oden H. Meeker, Port-au-Price, Haiti, and Evanston, Ill.—a giant tree frog, a camel cricket, 3 snakes, and a lizard, Haiti and Dominican Republic; Lieut. Colin C. Sanborn, U.S.N.R.—an owl, a hawk, a sea shell, and 2 ticks, Peru; Pfc. Bryan Patterson, U.S. Army—57 insects and allies, Texas; Dr. and Mrs. C. J. Goodnight, Urbana, Ill.—4 harvestmen, Africa and China; Maj. Henry J. Bennett, U.S. Army—14 shrimps and 32 insects and allies, Solomon Islands; Maj. Henry J. Bennett and L. A. Psekany, U.S. Army—39 crabs and fresh water shells, Solomons.

Library:

Valuable books from: United States Army Map Service, United States Chamber of Commerce, Coordinator of Inter-American Affairs, and Dr. Henry Field, Washington, D.C.; the late Arthur W. Herz; B. A. Krukoff and Dr. Albert E. Parr, New York; Lieut. Colin C. Sanborn, U.S.N.R.; Dr. Angelo Costa Lima, Rio de Janeiro, Brazil; Pedro Villa Cordova, Lima, Peru; Mrs. Edith Comas, Baltimore, Md.; Curtio W. Sabrosky, Manning, S. C.; Donald E. Savage, Norman, Okla.; John D. Dwyer, Albany, N. Y.; S. W. Geiser, Dallas, Tex.; Miss Leota Hallock, Brooklyn, N. Y.; James Lee Love, Burlington, N. C.; Royal Air Force Headquarters, Colombo, Ceylon; Ivan T. Sanderson, London; Dr. Narcisco Souza, Merida, Yucatan, Mexico; Mrs. Hermon Dunlap Smith and Bert E. Grove, Lake Forest, Ill.; Stuart H. Perry, Adrian, Mich.; Boardman Conover, W. J. Gerhard, and Miss Miriam Wood, all of Chicago.

NEW MEMBERS

The following persons became Members of the Museum during the period from August 7 to October 14:

Contributors

Arthur Wolf Herz,* James L. Kraft

Non-Resident Life Members

Gilbert S. Maxwell

Associate Members

Victor A. Beckman, S. A. Bennett, B. N. Hunding, Ferris E. Hurd, Miss Katherine Marjorie Kelly, C. A. Lambert, John Franklin Lax, Casper William Ooms, John McC. Price, Dr. George E. Wakerlin.

Annual Members

Mrs. L. E. Aldrich, George Barr, Oliver R. Barrett, William J. Beckwith, Ben Berk, Dr. J. Ernest Breed, John A. Breen, Peter Edwin Butterfield, Chester M. Carson, Herbert J. Clonick, A. L. Creange, Pierre A. DeMets, Mrs. Arthur W. Dickinson, Mrs. Janet Dixon, J. E. Ellington, William H. Everds, Mrs. Herman Fietsch, Jr., R. F. Fletcher, J. George Forster, Herbert G. Franz, W. C. Frohning, Samuel H. Gensburg, Martin S. Gerber, Mrs. Allan W. Gonnerman, Harry L. Goodbar, Mrs. William D. Goodman, J. Frank Grimes, Mrs. George H. Gruendel, Leo Hanson, Rev. Olof B. Hanson, Mrs. Flora Rassweiler Harders, Mrs. Malcolm Hart, Voyle C. Johnson, Pierce W. Jones, Daniel Francis Kane, Morris I. Kaplan, Richard Kay, Ralph Keller, J. D. Kloppenstein, Florian E. Laramore, Mrs. Blair S. Latshaw, Dr. Eva J. Line, W. W. Loomis, Dr. William J. Loos, Frank E. Manning, Frederick L. Marriott, Dr. Eugene T. McEnery, Milton M. Myers, A. O. Novander, George S. Oberne, Mrs. Peter P. O'Connor, Mrs. Oscar V. Palmquist, Mrs. Harris Perlstein, Nelson D. Phelps, Mrs. Howard C. Phillips, Mrs. Agnes O. Pohl, Sidney T. Pope, Robert Press, Mrs. Richard W. Raftis, Mrs. Herbert S. Ray, Mrs. Ray M. Ring, Magnus I. Ronning, Ben L. Rosenberg, William F. Rubert, William H. Ruskamp, Dr. L. A. Schipfer, Mrs. Siegfried G. Schmidt, Clarence H. Seeley, Mrs. Elvie Shaw, F. A. Strodel, Dr. R. M. Strong, Mrs. Arthur F. Tylee, Mrs. Louis VonPerbandt, Milton Arnold Wadler, George B. Wadlow, Mrs. Charles A. Walter, Edward J. Warren, Fred G. Wendhack, Roy O. Westman, Mrs. Lynne L. White, Leo Winsberg, Samuel Winsberg, Mrs. R. G. Wright.

*Deceased.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS