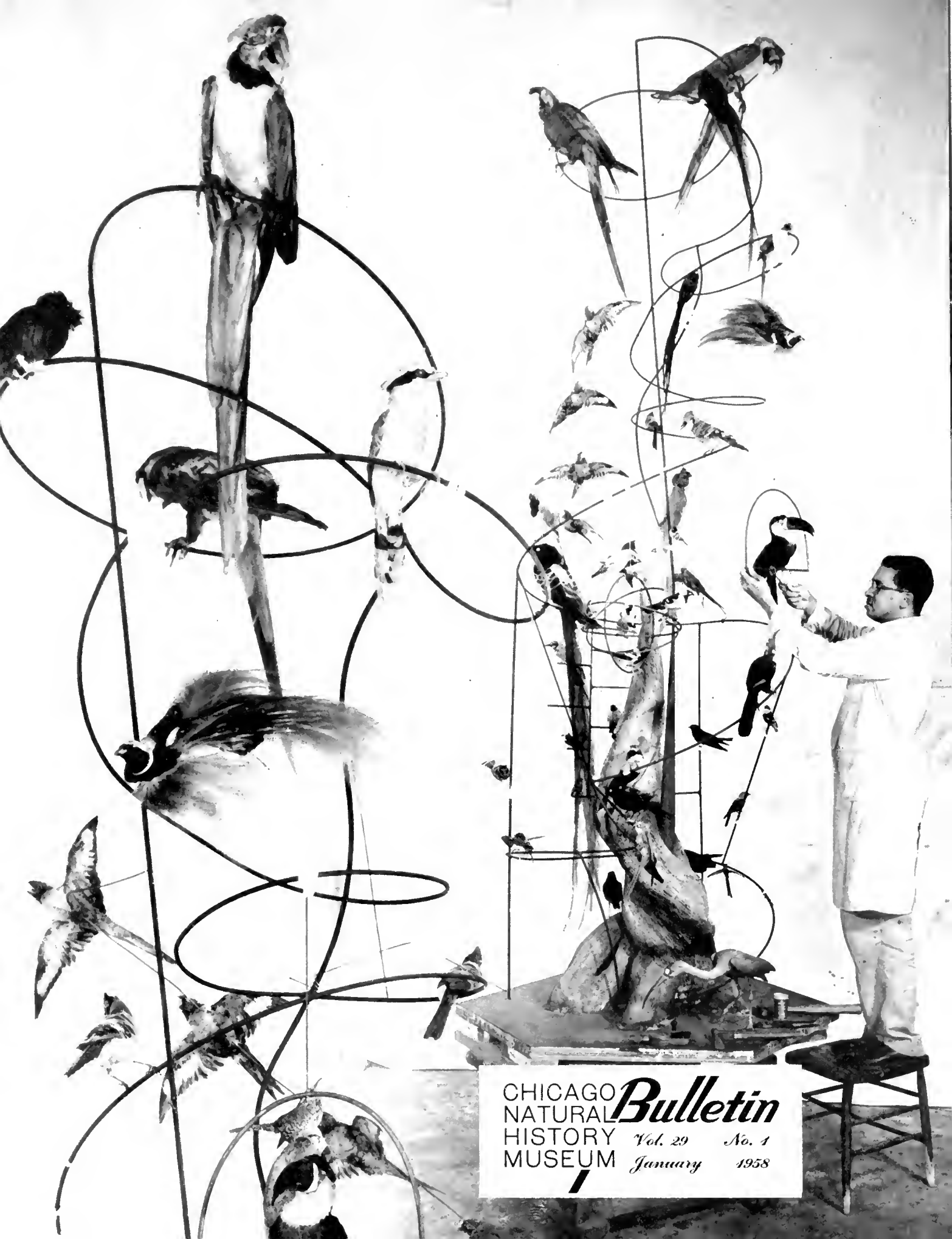

CHICAGO NATURAL HISTORY MUSEUM

Bulletin

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Chicago Natural History Museum

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

LIFEBLOOD OF SCIENCE: PUBLICATIONS

The lifeblood of a science is the stream of published papers, large and small, that comprise the "current literature" each year.

To write scientific papers and send them out into the world sometimes seems a little like dropping stones into a deep, deep well. Having done your part, you await the splash that may be long in coming. It may be years before your contribution is heard from again. But that doesn't mean that no one has read it. Scattered over the globe are fellow naturalists who make card files of the things they read and index them under such headings as: Kergulenland, the birds of; rafts, transportation of animals by; migration, effect of colonization by; barriers, water gaps as. Such people read and index your paper.

This is only the first step in the use of a scientific paper that has been printed in a small edition of a thousand or so copies, the step that keeps our colleagues throughout the scientific world informed of our activities and scientific progress. But these scientific papers have still to reach a wider public. Finally, and it may be years later, even the smallest worthwhile paper may be incorporated into more comprehensive writings and summaries.

I found this well illustrated in a new work that just came to the Museum. It is Darlington's *Zoogeography: The Geographical Distribution of Animals*, a book that was twenty years in the writing. It is a milestone in its field—the study of the kinds of vertebrate animals there are and the where, why, and how of their distribution. It is a summary of one phase of our museum zoologists' work, and it is the only modern critical summary. It will be a standard reference and text for many years.

The author himself indicates in his references the precise source of his reliance on the past and on the writings of others. Listed here are the scientific papers that provided raw material, the data that the author has studied, evaluated, digested, and incorporated into his thinking. The result is an amalgamation of old and new ideas on the subject into a fresh modern treatment of zoogeography. In other words, the ideas and data contained in individual papers published from time to time by many workers have finally entered a standard reference book.

The more studious of the widespread and expanding group of natural-history enthusiasts will want this book on their shelves alongside their other books on animals. College teachers will use it as a textbook. Indeed, the material has been presented in a course at Harvard, where the author teaches. Students who will become teachers will pass on the information, and writers will refer to the book and incorporate its ideas into their own output. The ideas and data will be used long after the source has been forgotten.

Chicago Natural History Museum has played its part in making this book, I was pleased to see. Some thirty papers written by members of the Museum's Department of Zoology are cited as having been used in the preparation of the volume, and there are about seventy-five references to our Museum authors in the index.

The individual contributions from our Museum vary from a two-page paper to a catalogue whose various volumes occupy two feet of my book shelf. They deal with mammals, birds, amphibians, reptiles, and fishes. Their subject-matter comes from all continents, as one would expect from a world-wide museum and from many out-of-the-way islands such as the Ryukyus and Tristan da Cunha. Their approach is diverse: nomenclature, descriptions of new kinds of animals, check-lists, faunal reports, faunal analysis, relationships and taxonomy, climate and evolution, and anatomy.

Thus in Darlington's book we have an example of how our scientific papers on even the most abstruse subjects—such as the proper name for a snake, the presence of Bidder's organ in a toad, the relationship and the systematic position of a genus of bird—are synthesized in a textbook and are well on the way to entering the public domain.

—A.L.R.

THIS MONTH'S COVER

Our cover this month is a photomontage of two views of the colorful bird exhibit recently installed in Hall 21 (Birds in Systematic Arrangement). In the background, Carl W. Cotton, Museum Taxidermist, adjusts a toucan's perch. In the foreground, an enlarged view of the exhibit affords a closer look at the spiraling birds. Towering 16 feet, the exhibit is truly a spectacular one, for it is designed to show solely the beauty, grace, and color of birds in various attitudes on the circling wire sculpture. More detailed information about the exhibit can be found on page 5.

STAFF NOTES

Emmet R. Blake, Curator of Birds, was a contributor to the recent book, *Warblers of North America* (Devon-Adair Co., New York.). Among the several sections by him are chapters on the warblers of Mexico and South America, areas in which he specializes .... **Philip Hershkovitz,** Curator of Mammals, recently spent a week at the U.S. National Museum in Washington and the American Museum of Natural History in New York studying South American deer .... **Rupert L. Wenzel,** Curator of Insects, participated in a symposium on "The Future of Taxonomy in Entomology" at the annual meetings in Memphis last month of the Entomological Society of America. He was appointed to a committee that will consider the possibility of establishing a national institute of entomology .... **Loren P. Woods,** Curator of Fishes, recently returned from a four-week exploratory fishing cruise in the offshore waters of the coast of the Guianas and Brazil .... **Dr. Theodor Just,** Chief Curator of Botany, participated in a symposium last month at the 124th meeting of the American Association for the Advancement of Science held in Indianapolis. His paper was entitled "Post-Glacial History of the Vegetation of the North Central States" .... **Dr. Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, also attended the meeting, where he presented a symposium paper on "Postulates Employed in a Pennsylvania Paleoecological Study".... **Forest Highland,** Assistant Recorder in the Division of Publications, resigned last month after five years at the Museum.

PRIMITIVE ART EXHIBITS ARE INSTALLED IN AFRICAN HALLS

By PHILLIP H. LEWIS
ASSISTANT CURATOR OF PRIMITIVE ART

NEW EXHIBITS of African art have been installed in Halls D and E. Together with the Cameroons King's House (completed a year ago), these comprise a series of primitive art exhibits that are related because the peoples represented occupy an almost continuous area across Nigeria and into the Cameroons. These exhibits are the Cameroons King's House, the series of wall cases showing the art of Benin, and the presentation of West African masks from

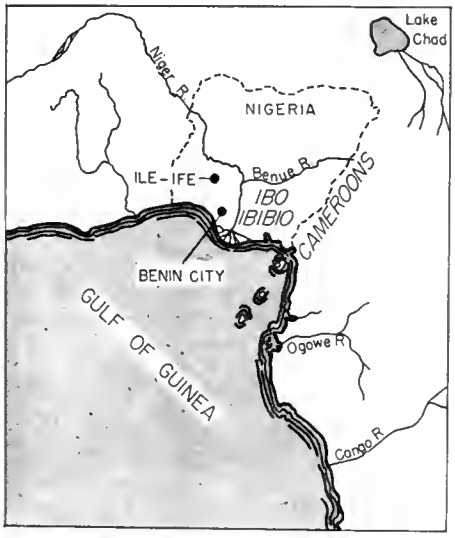
IBIBIO MASK

Twelve inches high and painted black, this carved wooden mask comes from the Ibibio people.

the private collection of Dr. William R. Bascom.

The Cameroons King's House (Hall E) is an exhibit of both ethnological and artistic significance. Objects of art from the Museum's extensive Cameroons Grasslands collection are exhibited in the appropriate setting of a Cameroons king's residence, his ancestor shrine, and his drum hut. The objects, mainly wood sculpture, are architectural ornaments, ceremonial masks, socially important state regalia (such as carved stools), and sacred ancestral images. The King's House exhibit illustrates a significant point about primitive art, namely that art in such societies has very important religious and social functions, and in places like West Africa it is closely linked to royal activities.

Another presentation of African art is the series of newly installed wall-case exhibits devoted to the art of Benin (Hall E).



Benin City, in southwestern Nigeria, is the capital of the Bini people, who have lived in that area for many centuries. According to Dr. Philip Dark, in his article "Benin, A West African Kingdom" (*Discovery*, May, 1957), when the Portuguese first arrived in Benin in 1485, they found the fifteenth *Oba* (king) ruling there. The present *Oba*, Akenzua II, the thirty-seventh ruler of the Bini since the first known king in the 13th century, today rules some 300,000 people. His capital is Benin City, which has a population of about 54,000.

FIRST APPEARANCE IN EUROPE

The first Benin art objects appeared in Europe after the unfortunate and bloody incidents of 1897, during which the British sacked Benin City in retaliation for the massacre of members of a trade mission. The realism and craftsmanship of the bronze castings startled Europeans because their appreciation of African wood-carving had not yet developed and the realistic Benin bronzes contrasted sharply with the art of other African peoples. Europeans would not believe that the native peoples of West Africa, who seemed capable of producing only grotesque and bizarre wood-carvings, could have done the Benin bronzes. At first it was thought that the Bini learned bronze casting from the Portuguese, but later it was found that Bini knowledge of bronze-casting technique antedated the arrival of the Portuguese. The Bini say that bronze casting was learned from the Yoruba people from the city of Ile-Ife, some hundred miles northwest of Benin City. The art of Ife, in the form of bronze, terra-cotta, and stone heads and figures, has come to light as a result of excavations in recent years. Ife art is also realistic and, if anything, more skillfully done than Benin art. Dr. Dark mentions the possibility that the technique of lost-wax metal casting might have come from Egypt some time between the 5th and 7th centuries A.D., wnich theory is supported, he says, by Yoruba traditions of a migration from the East occurring about A.D. 600.

In Hall D is the exhibition of West African masks of the Ibo and Ibibio peoples of southern Nigeria from the collection of Dr. Bascom, formerly head of the Department of Anthropology at Northwestern University and presently Director of the Museum of Anthropology of the University of California. He collected these masks while on various anthropological expeditions to Africa and has generously loaned them to the Museum for exhibition.

FOUR MILLION IBOS

The Ibo people are considered to be related to each other mainly because of their common language. There are approximately 4,000,000 Ibo people. Unlike the Bini people, there is no Ibo central government nor comparable political institution. Whereas the Benin art objects on exhibition are royal paraphernalia, the Ibo and Ibibio masks are made and used by ordinary men, usually in rites of secret societies.

The Ibibio also speak a number of related dialects and number about 1,000,000 persons. They live just to the south and southeast of the Ibo and in a few places are found

IBO MASK

Now on exhibition in Hall D is this carved wooden mask, twelve and three-eighths inches high.

living together with Ibo people. The few Ibibio masks in the exhibit were collected from Ibo villages. The Ibibio also have excellent wood carvers and produce a variety of carved objects, drums, bowls, dolls, and masks, of which only a few masks are shown in the exhibit.

The relationship to other African art of

the highly sophisticated Benin and Ife art-forms (such as Ibo, Ibibio, and Cameroons) poses complex questions. We have mentioned the possibilities of diffusion of bronze casting from Egypt, but another question looms larger. In the midst of the great African wood-carving area wherein some of the world's most complex, abstract, and stylized sculpture occurs, the Benin-Ife art styles stand out as two strikingly naturalistic styles, indeed so well done that certain Ife objects are the equal even of classical Greek sculpture.

Some of the questions to be asked are not easily answered. Are the Benin-Ife art styles native to West Africa or, if not,

NOW ON EXHIBITION

Made by the Ibo people from Bende village, Nigeria, this mask is nine and three-quarters inches high.

where did they originate? If they are native to the area, even greater problems arise. Who were the people who produced this striking style? How did they live? What has happened to them? (Much of Benin culture, including manufacture of art objects, still goes on.) What was the relationship of the Benin-Ife people to present-day inhabitants of the area and to the other peoples adjoining the area?

Art and archaeological research is beginning to be pursued seriously in Africa, and undoubtedly many answers will be forthcoming. Perhaps it is part of the nature of art that while we wait for such answers we can enjoy looking at the art objects.

Examples of more than a hundred families of mollusks are exhibited in Hall M.

MUSEUM ACQUIRES ZETEK SHELL COLLECTION

By ALAN SOLEM

ASSISTANT CURATOR, LOWER INVERTEBRATES

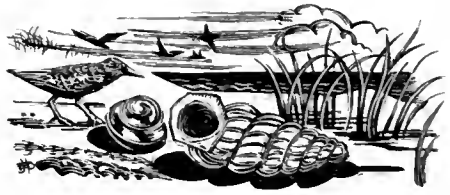
In November, Chicago Natural History Museum received 40,000 non-marine shells from the collection of James Zetek, formerly of Chicago and for many years a resident of Panama. About 4,000 different species are represented in this accession, which is the second largest ever acquired by the Division of Lower Invertebrates.

Shell collectors trade their duplicates with conchologists in other parts of the world, and the labels with the Zetek collection read like a United Nations' roster. Australia, Hungary, New Zealand, Germany, Hawaii, France, Japan, Cuba, South Africa, Great Britain, and of course many United States localities attest to the extent of Zetek's exchanges. Eighty thousand different species of mollusks are known (perhaps 28,000 of them are non-marine), and no private collector can obtain more than a fraction of all the species. Dr. Zetek's 4,000 species represent a notable collection but still account for only about 5 per cent of the species.

Exchange material can be very important if it contains specimens on which a species was based or if it comes from important collections that later were destroyed. In the 1920's, Dr. Zetek made a very large exchange with the Hungarian National Museum in Budapest. The mollusk collection there was completely destroyed in the revolution of October, 1956, and Chicago Natural History Museum is now the custodian of historically important specimens, many of them paratypes of species whose holotypes no longer exist.

Almost as important is the fact that duplicates from other countries enable us to determine exactly to which of several closely related species Australian, Japanese, or South African malacologists consider a specific name to refer. If someone asks us to identify an Australian shell, it is much easier if we have specimens in our collection that an Australian malacologist has identified. It is vital to our work to obtain collections of identified material as well as unstudied specimens. This Museum probably has slightly less than one-fifth of the known species of mollusks, so that additions such as the Zetek collection contribute greatly to both the size and usefulness of our collections.

Behind the new collection lies a fine example of institutional co-operation. Stanford University, which specializes in the marine mollusks of the eastern Pacific Ocean, has limited facilities for housing collections and no scientist whose interest is non-marine shells. As an inland institution, Chicago Natural History Museum can easily specialize in non-marine mollusks. Thus Dr. Zetek's eastern Pacific marine shells are at Stanford and his non-marine shells are in this Museum. Both institutions benefit by sharing his fine collection, and the specimens are now located where they can be used most advantageously in research projects.



NEW MEMBERS

The following new Members were elected from November 18 to December 13:

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Rudyerd Boulton

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Mrs. Bruce Borland, William Roy Carney, Alfred T. Carton, Alfred Cowles, Dexter Cummings, Gaylord Donnelley, Percy B. Eckhart, James B. Forgan, Mrs. Stanley Keith, Joseph H. King, Fowler McCormick, James Simpson, Jr., John M. Simpson

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Captain John B. Gregg

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Magical Weapons

A collection of supposedly magical ornamental daggers, hatchets, war clubs, tridents, and other weapons symbolic of war, which were used by lama priests of Tibet in exercising and exterminating demons and enemies of Buddhism, is on exhibition in Hall 32.

SEARCH FOR FOSSIL FISH UNDERTAKEN IN EAST

By ROBERT H. DENISON
CURATOR OF FOSSIL FISHES

IN THE SUMMER of 1951 while on a reconnaissance of the Silurian and Devonian rocks in the eastern states I visited, among other places, Erie County, New York. Lying as it does along Lake Erie south of Buffalo, this region has been visited from time to time by amateur and professional fossil-collectors from the nearby city. Over a period of years they have found a number of Devonian fishes in the different formations that are exposed in creeks and in cliffs along the lake shore. Most of the finds have been fragmentary, although, rarely a nearly complete fish has been obtained.

In my short visit in 1951 I concentrated on the black shales that make up a good part of the Late Devonian deposits, and I found them to be barren almost everywhere. Fortunately that year a large excavation had been made in the black shales for the foundations of a seminary, and in the rocks removed from the excavation I found three well-preserved fishes, two of them belonging to the arthrodires, an extinct group of armored fishes in which I am particularly interested.

This find encouraged me to think that a more thorough investigation might be profitable, and so I returned last year accompanied by Bruce Erickson, Preparator, and for a short while by Dr. Rainer Zangerl, Curator of Fossil Reptiles, whose experience with black shales has been extensive, both in Europe and in this country. We hoped to find some layer or locality where fossil fishes occurred in sufficient abundance so that quarrying for them would be profitable. We did not expect to find anything as rich as the quarry at Mecca, Indiana, but if we could unearth one or two good specimens a week, that would be enough. In this hope we were disappointed, for we were unable to find even this small concentration.

Black shales are often excellent places to hunt for fossils because the foul waters in which they were formed may lead to excellent preservation. But the waters may be so foul that little or no life can exist in them, and this seems to be the situation in Erie County, New York. The commonest fossils in these black shales are pieces of plant stems and tree trunks that were drifted into the sea from land, perhaps a hundred miles away. In places there are invertebrates, such as cephalopods, that may have floated into this sea either before or after death. The occasional fishes are probably strays that blundered into this unfavorable habitat and died, or perhaps drifted in after death.

However, we did not leave this region empty-handed. Almost every day we returned to camp with a few specimens of fossil fish, perhaps with only an isolated jaw or plate, or perhaps on a lucky day with several plates of a spectacularly large arthrodire. During three weeks we had accumulated quite a varied collection of early fishes, which will make, I hope, an important addition to the fish fauna of this region.

When it became apparent that we were not going to find a place where we could quarry profitably, we moved our operations into the central part of Pennsylvania. Perry County, northwest of Harrisburg, the region where Silurian vertebrates were first found in North America, is one of the few places in the world where they occur in abundance. The problem here was not to find them but to obtain them in a good state of preservation. They occur in the Landisburg Sandstone, which forms low, rounded ridges in the valleys but which is soft enough so that it has few or no natural outcrops.

It is possible to go into a cornfield on a Landisburg Sandstone ridge and pick up pieces of rock containing these early vertebrates, but they are always weathered so badly that they do not reveal the characters necessary for identification. To obtain better material we made two excavations, both in places where the preservation on the surface was better than usual. When this material is prepared we will have for the first time a collection permitting a satisfactory description and classification of these primitive vertebrates. This is of particular importance because Perry County is a classic locality, yet one from which the original material, first described in 1884, is lost.

COLORFUL BIRD STABILE MAKES DEBUT AT MUSEUM

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

A thirteen-foot wire sculpture bedecked with birds is the latest addition to the Museum's bird exhibits. The openness, the airiness, and the liveliness of the twisting and turning strands of metal as they swirl upward make the wire sculpture a particularly appropriate place for birds to perch and accentuate the beauty and grace of these creatures of the air. As the elephants in Stanley Field Hall have become a sort of symbol or trademark of the Museum, so it may be that this arrangement of gay birds will become a trademark of our bird halls.

The concept of this exhibit, which towers 16 feet in its entirety, is modern, as new as abstract design, free form, mobiles, and stabiles. But we expect the exhibit to last a long time, and, as with many enduring things, it has a familiar quality. It has a hint of a cage full of birds in an aviary or a zoo and of a tree loaded with bright-colored fowl. Our artists strove for these effects, realizing that any overemphasis of decoration this way or that could have cluttered the clear basic design of the exhibit, making it as dated as the artificial flowers in a Victorian parlor.

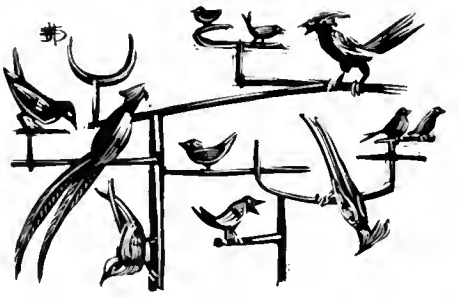
The message of this exhibit is that birds are beautiful, gay creatures of air and light. In Hall 21 (Birds in Systematic Arrangement), which is otherwise devoted to the enlightenment and edification of the Museum visitor interested in birds, we present this exhibit for its beauty and its aesthetic appeal. One doesn't have to know the name of a single bird to appreciate it.

Beauty need not be labeled to be appreciated, but knowing the names of things and something about them adds to and deepens our interest in them. So we did provide a label, a guide to the names of the birds and where they live. Many of the birds can be found in adjacent exhibits along with their relatives and a general account of the group to which they belong.

In their central position in Hall 21 these colorful birds can be seen from far off in the Museum. We hope that people seeing this bird stabile will be attracted into the bird hall; that art students will sketch the twirling wires with their vivid birds; that visitors, attracted by the new exhibit, will stay to browse among the related exhibits and discover new things for themselves.

Just what bird merits the title of most beautiful in the world is debatable. Certainly we have many contenders here. There is a scarlet ibis, sometimes called a flame bird, at the bottom of the exhibit. At the top are two giant macaws, blue and red, and a long-tailed quetzal with emerald green back. Between are yellow birds, red birds, blue birds, green birds, and, for accents, here and there, dull-colored ones, like the black rifle bird and a tiny brown wren. In all there are 56 birds in the exhibit.

The exhibit was designed and executed by E. John Pfiffner, Staff Artist, and Carl W. Cotton, Taxidermist, along with the Division of Birds.



Etruscan archaeological exhibits in Edward E. and Emma B. Ayer Hall (Hall 2) range from the 8th to the 2nd centuries B.C.

WYOMING DIG YIELDS FOSSIL MAMMALS OF EOCENE

By WILLIAM D. TURNBULL
ASSISTANT CURATOR OF FOSSIL MAMMALS

LAST AUGUST the 1957 Paleontological Expedition to Wyoming departed for two months of collecting in the Washakie Basin (BULLETIN, August, 1957). Roughly, this is the area bounded by Rawlins, Rock Springs, and the Wyoming-Colorado line. Orville L. Gilpin, Chief Preparator, and I returned to this area of southwestern Wyoming to continue a program of study and collecting begun in 1956. A previous trip into this arid and isolated region (BULLETIN, August, 1947) had convinced Dr. Rainer Zangerl, Curator of Fossil Reptiles and Amphibians, that good collections of Eocene mammals could be made there (he was then seeking fossil turtles). My 1956 trip showed this to be true (BULLETIN, December, 1956).

The Washakie formation covers a nearly circular area of almost 400 square miles in the center of the basin. A variety of sedimentary types occurs within the formation. These include lake-bed clays and silts containing much volcanic ash, as well as floodplain and stream deposits of ash, silt, and sand and even pebbles, gravels, and cobbles. Paved or tarred roads are totally lacking. Even graded dirt roads are few. Stream beds, ridges, and sheepherder's trails are the highways of the region. Often it becomes necessary to abandon even these luxuries and to travel a number of miles cross-country to reach a particular outcrop area. This combination of circumstances —the vast distances involved and the isolation and remoteness of the area when considered together with the presumed scarcity of fossils—accounts for the past neglect of the Washakie formation. This year's collections add materially to our knowledge of the mammalian fauna.

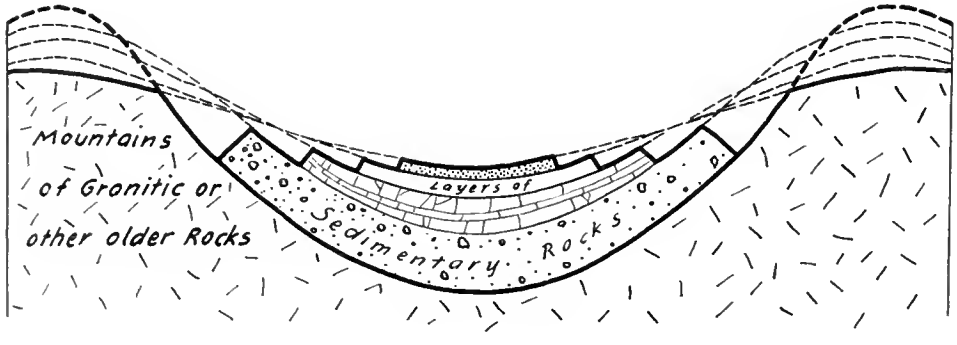
Associated skeletal remains are virtually never encountered in the abundant coarse-grained sediments of the formation, and only very rarely in the finer sandstones and clays. This season the latter beds yielded several partial skeletons of two carnivores, a titanothere and a uintathere. Perhaps the most significant discovery was the microfauna that came from several layers of fine sandstone. This microfauna predominantly consists of rodent jaws and teeth, though insectivore, carnivore, and small artiodactyl remains also are present.

In addition to the microfauna, 65 specimens were brought back to the Museum. Two of the finest of these are complete titanothere skulls. The titanotheres are by far the most abundant mammals in the fauna. Other perissodactyls, "cousins" to the titanotheres, the horses, and the rhinoceroses, also were found. Rodents, uintatheres, carnivores, and artiodactyls occur in lesser abundance. The forms most rarely represented in our collections are the marsupials, insectivores, condylarths, and pantodonts. Thus far I've not detected a single primate, edentate, taeniodont, or tillodont although these are to be expected in deposits of this age.

Last year's collection from the Washakie formation, as those from previous Museum expeditions, came mostly from its upper part. A brief explanation of the geology of the basin will help to clarify the position of the Washakie formation within the sedimentary sequence. The stratigraphy of the basin is quite simple. Sediments derived from the adjacent mountains throughout Late Cretaceous, Paleocene, and Eocene times (100 to 50 million years ago) have built up some very considerable rock sequences. These are now being dissected by the active agencies of erosion. The combined result of the earlier episode of deposition and the subsequent erosion, is a landscape that is typical of a semi-arid desert. Vegetation is sparse and low sand dunes abound. Rims or ridges of resistant rock, in this case concentric ones, add topographic relief.

The system of sedimentary rocks of most intermontaine basins, of which the Washakie is one of several in North America, can be likened to a stack of dishes. At the bottom of the pile is the first plate to be set down. Likewise the first rock layer to be deposited after the nearby mountains are formed lies at the base of the stack of sediments. Successively smaller plates build up the stack of dishes until the smallest saucer rests on the top. Similarly, successively newer rock formations of diminishing extent are found one upon the other. Actually the reduced extent of the upper formations has resulted from erosion since their deposition. In this way the concentric ridges mentioned above are formed. This same period of erosion has also reduced the mountains. The stippled layer in the diagram, below, shows the stratigraphic position of the fossil-mammal bearing Washakie formation within the basin.

Developing an understanding of the geologic setting of such an area and of the unpredictable nature of the fossil finds themselves are two aspects of paleontology that are extremely stimulating and satisfying.



ROCKS ARRANGED IN PATTERN

Cross-section diagram of intermontaine basin shows sequence of sedimentary rocks arranged like stack of dishes. Dash lines indicate conditions at various stages of deposition.

Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Zoology, Vol. 38. *Days with Birds, Studies of Habits of Some East African Species.* By V. G. L. van Someren. 523 pages, 126 illustrations. $8.

Fieldiana: Zoology, Vol. 39, No. 1. *Two New Birds from Nepal.* By Austin L. Rand and Robert L. Fleming. 3 pages. 10c.

Fieldiana: Zoology, Vol. 39, No. 2. *A New Lacertid Lizard from Angola.* By Hymen Marx. 5 pages, 1 illustration. 15c.

Fieldiana: Zoology, Vol. 35, No. 4. *Placentation of the Pigmy Treeshrew Tupaia minor.* By Waldemar Meister and D. Dwight Davis. 25 pages, 18 illustrations. 60c.

Fieldiana: Zoology, Vol. 39, No. 3. *A New Plethodontid Salamander from Nuevo Leon, Mexico.* By George B. Rabb. 10 pages, 1 illustration. 20c.

Fieldiana: Zoology, Vol. 34, No. 41. *Geographic Variation in the Chicken Turtle Dierochelys reticularia Latoeille.* By Albert Schwartze. 43 pages, 6 illustrations, 1 map. 85c.

Fieldiana: Botany, Vol. 29, No. 3. *Tropical American Myrtaceae, Notes on Generic Concepts and Descriptions of Previously Unrecognized Species.* By Rogers McVaugh. 86 pages, 6 illustrations. $1.50.

Fieldiana: Zoology, Vol. 39, No. 4. *The Herpetology of Sinai.* By Karl P. Schmidt and Hymen Marx. 20 pages, 3 illustrations, 1 map. 40c.

Field Museum of Natural History: Botanical Series, Vol. XIII, Part IIIA, No. 2. *Flora of Peru.* By J. Francis Macbride. 458 pages. $5.50.

Fieldiana: Geology, Vol. 13, No. 1. *Early Cretaceous Mammals and the Evolution of Mammalian Molar Teeth.* By Bryan Patterson. 107 pages, 17 illustrations. $2.25.

NEW EVIDENCE LINKS CHIPPEWA TO PREHISTORIC CULTURE

By GEORGE I. QUIMBY
CURATOR OF NORTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

THE FIRST definite evidence linking the historic Chippewa tribe to a prehistoric culture known only from archaeological remains was one of the most exciting discoveries of the 1957 joint archaeological expedition of Chicago Natural History Museum and the Museum of Anthropology of the University of Michigan.

The expedition, led jointly by Professor James B. Griffin, Director of the Museum of Anthropology, and the writer, found this evidence while looking for Paleo-Indian sites along fossil beaches on the northern shore of Lake Superior, near the Pic River in Ontario, Canada.

It had long been suspected but never proved that the Chippewa Indians had what archaeologists call a Woodland-type culture. This culture, at least 3,000 years old and perhaps 4,000, is characterized by cord-marked pottery, stemmed and notched projectile points of chipped flint, grooved and ungrooved axes of ground stone, bone awls, and other simple tools, utensils, weapons, and ornaments. It was a relatively simple culture and widespread in eastern North America. This prehistoric Woodland culture was particularly common to the Upper Great Lakes region.

LINK WAS MISSING

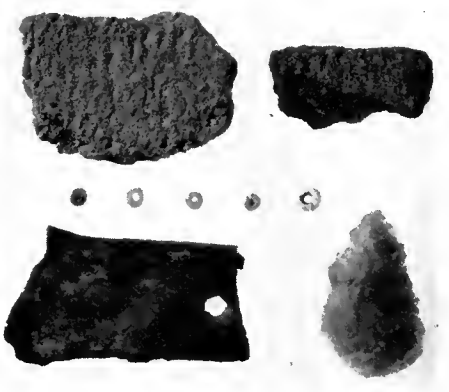
Under such conditions it seems obvious that many Indian tribes at the time of discovery and first exploration must have been local representatives of this ancient culture, but with few exceptions it has been impossible to demonstrate the historic connection between the prehistoric Woodland culture and any given tribe.

About twenty years ago the writer made an attempt to analyze historic-site collections in an attempt to bridge the gap between the historic period and prehistoric times. The attempt was not successful for the following reasons:

First of all, after devising a method of dating historic sites by means of known dates of manufacture of European trade goods, it was discovered that the historic sites in question were too late. By 1750 the nonperishable items of Indian material culture were gone—brass kettles had been substituted for pottery, flintlock guns for bows and arrows, and iron tools for flint tools, although the social culture was probably little changed. For instance, they still placed the substituted items of material culture in graves lined with birchbark. Thus it was impossible to make a positive connection between tribes dating at 1750 and later with the Woodland culture known archaeologically, because the material culture of the tribes had changed through their contact with white traders and explorers.

Next an attempt was made to find documented sites earlier than 1750 in areas where there had been fairly brief occupancy. This too failed, either from lack of documented sites or because the site had been occupied also in prehistoric times and the resultant mixture of early and late materials in the earth could not be satisfactorily separated.

Third, attempts to use ethnohistorical



CONCLUSIVE CLUES

Aboriginal cord-marked pottery, chipped flint scraper, trade beads of glass and shell, and fragment of copper pot found together in campsite offer first definite evidence in an archaeological puzzle.

sources—descriptions of the Indians by early explorers and missionaries at time of first contact—were unsatisfactory because they did not provide enough detail to enable comparison of tribal culture with prehistoric culture known only from archaeological research.

It was thus with amazement and considerable satisfaction that we comprehended the meaning of our find this summer on the desolate northern shore of Lake Superior.

The site was found by Professor Griffin and the writer in the course of a ten-mile traverse of ancient beach-line in the vicinity of the Pic River. Starting with the highest beaches at more than 500 feet above Lake Superior we crossed successively lower beaches down to the level of Lake Superior, where we found the site about a hundred feet west of the mouth of the Pic River.

The site itself consisted of a dark cultural layer about four inches thick exposed in a wind-blown cut through a low sand-dune. The black sand in this cultural layer was greasy to the touch and filled with grains and small pieces of charcoal, fire-cracked rocks, organic refuse, and cultural materials.

The dark occupation zone was not a soil horizon. It was a midden, or refuse layer, deposited by Indians in the course of daily-living activities while camped at this spot. Beneath the dark layer was clean white sand deposited by wind and wave action. Above the cultural layer lay about ten feet of clean white sand in a fore dune ridge, which had subsequently covered the site that lies about eight feet above the present level of Lake Superior.

The nature of the occupation layer, its thickness, and its position on a beach and under a sand dune proves that it represents a single occupancy over a relatively short period, perhaps one to ten years of summer camping. Moreover, under the conditions described it would be impossible for earlier-period materials to become mixed with later-period materials at this site. Everything found in the cultural layer of the site was once in the possession of the Indians who camped there.

Without attempting to remove the overburden of dune sand, we excavated the exposed area of the site, a strip about ten feet long and twelve inches wide on the west side of the cut through the fore dune ridge. Using trowels and scraping gently through the cultural layer we found the following objects: many small fragments of charcoal; fish scales; bones of sturgeon and other fishes; one beach pea (*Lathyrus japonicus*); bones of deer, porcupine, and beaver; bird bones; fire-cracked rocks; flint chips; a small trianguloid scraper of chipped flint; two sherds of rather thin, grit-tempered pottery with exterior imprints of a cord-wrapped paddle; one small tubular bead of shell; four very small spheroidal beads of blue glass (seed beads); one melted blue-glass bead; a cut fragment of the rim of a brass or copper kettle or pot; a rolled pewter or tin pointed object like the metal part of a fish-stringer; and one fragmentary gun-flint or fire-making flint.

SIGNIFICANCE EXPLAINED

The archaeological remains recovered by our test excavations are not impressive but are nevertheless most significant because the food refuse and aboriginal artifacts were in direct association with trade materials from European sources. For instance, two blue-glass beads, the tubular shell bead, several flint chips, and one piece of cord-marked pottery were found with charcoal, fire-cracked rock, and food refuse in a shallow fire-pit in the occupation zone. This association proves that the Indians camping at this site still had cord-marked pottery and flint implements at some point within the historic period when white men's trade goods were reaching them.

The nature of the trade goods plus the presence of aboriginal artifacts proves that the period is earlier than 1750. The evidence derived from the trade objects alone suggests a time around 1700.

The only tribe living at this period on the north shore of Lake Superior was the Chippewa, also called Ojibwa and Saulteaux. Two divisions of the Chippewa, the

Outchibous and Marameg, are known to have lived on the north side of Lake Superior in 1670. And there are even today Chippewa living in the area.

Thus the site near the mouth of the Pic River, on the north shore of Lake Superior, is a Chippewa campsite dating from about 1700, and the archaeological evidence from this site shows that the Chippewa were a part of the ancient Woodland culture of prehistoric times.

New Exhibit On Display in Jade Room

The imposing imperial Chinese jade jar presented to the Museum by R. Bensabott in May, 1955, and described in the July, 1955 BULLETIN, has been placed on permanent exhibit in the Jade Room (Hall 30). The jar was a special exhibit in Stanley Field Hall during the late summer of 1955, but preparations for its permanent exhibition only recently have been completed.

AN EARLY CHINESE RUBBING IS SCRUTINIZED

Discussing an early Chinese rubbing from the Han period (207 B.C.—A.D. 220) are (seated) Dr. Hoshien Tchen, Technical Adviser for the Museum Library's Oriental Collection; Ta-tseng Ling, Consul General of the Republic of China for Chicago; and Stanley Field, President of the Museum. Standing are C. F. Chu, Chinese Consul of the Republic of China for Chicago, and Dr. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology. The men attended a tea at the Museum last month in honor of a special exhibit of Chinese rubbings recently given to the Museum by Dr. David C. Graham of Englewood, Colorado. The exhibit will continue in the Museum's Stanley Field Hall through January 19.

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: Miss Fanny P. Brown, Harwichport, Mass.—seven-stringed Chinese table lute (*ch'in*), China

Department of Geology

From: Illinois Minerals Co., Cairo, Ill.—earthy mass; Dr. Erik N. Kjellesvig-Waering, Jamaica, B.W.I.—specimen of *Fenestella* Permian bryozoan

Department of Zoology

From: Academy of Natural Sciences of Philadelphia—284 land snails, Europe; Rudyerd Boulton, Washington, D.C.—175 birdskins, Angola, Southwest Africa; Dr. N. L. H. Krauss, Honolulu—5 lizards, Wake Island; Dr. Marshall Laird, Quebec—7 lots of tadpoles, Singapore; Simon Siegel, Porter, Ind.—short-eared owl; University of Texas, Austin—11 fishes, Mexico; U. S. Fish and Wildlife Service, Pascagoula, Miss.—collection of invertebrates, Gulf of Mexico; Dr. Lewis H. Weld, Arlington, Va.—67 gall wasps; John E. Werler, Houston—lizard, Mexico

Daily Guide-Lectures

"Highlights of the Exhibits," free guide-lecture tours that give a general idea of the entire Museum and its scope of activities, are available Monday through Friday at 2 P.M. and Saturday at 2:30 P.M. No tours are offered on Sundays.

AUDUBON SCREEN-TOUR: PUERTO RICO, U.S.A.

The "land of perpetual spring" will be the pleasant topic of the Illinois Audubon Society's first screen-tour lecture of the New Year, when Fran William Hall, noted lecturer for the National Audubon Society, presents "Puerto Rico, U.S.A.," on Sunday afternoon, January 12, at 2:30 o'clock in the James Simpson Theatre of the Museum. Mr. Hall's film and lecture will show Puerto Rico as a land of extremes, contrasting the modern atmosphere of San Juan with a countryside little changed from the days of Christopher Columbus and the Spanish conquistadors. The audience will see striking shots of wildlife—barracuda, sea urchins, iguanas, and enormous hermit crabs.

PHOTO CONTEST ENTRIES DUE ON JANUARY 11

The last call has been issued for entries in the Thirteenth Chicago International Exhibition of Nature Photography to be held in February at the Museum. All photographs and color slides should be received at the Museum not later than January 11.

Entries in the contest's two divisions—prints and color slides—must qualify under one of three classifications: (1) Animal Life, (2) Plant Life, or (3) General (scenery, clouds, etc.). Medals and ribbons will be awarded by the Nature Camera Club of Chicago and special prizes will be given by the Photographic Society of America. Contestants are permitted to submit no more than four entries in each division.

The geological history of the Chicago region is illustrated by exhibits in Hall 34.

ARTIST PAINTS MURAL

Marion Pahl, Staff Illustrator, paints smile on frolicking Eskimo child, one of series of murals created by Miss Pahl for Museum lunchroom.

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CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Vol. 29 No. 2
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NATURE PHOTO SHOW

February 1–23

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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

PRESIDENT FIELD IN 50th TERM

Stanley Field was re-elected at the annual meeting of the Trustees on January 20 to begin his 50th consecutive year as President of the Museum. Mr. Field was elected a Trustee in 1906 and at the same time became Second Vice-President. He was elected President for the first time in 1909. Under his guidance the Museum has experienced the years of its greatest expansion of collections and greatest activity in world-wide expeditions. Mr. Field was instrumental in obtaining the Grant Park site the Museum occupies and in pushing forward the construction of the present building, which was opened to the public in 1921. Founded late (1893) as compared with such institutions as the British Museum in London, the American Museum of Natural History in New York, and the U. S. National Museum in Washington, the Chicago museum rapidly progressed, largely through the enthusiasm and interest of President Field, to its present rank as one of the four leading museums of the world in the natural sciences.

STANLEY FIELD

All other officers of the Museum were re-elected at the Trustees' meeting. They are: Hughston M. McBain, First Vice-President; Walther Buchen, Second Vice-President; Joseph N. Field, Third Vice-President; Solomon A. Smith, Treasurer; Dr. Clifford C. Gregg, Director and Secretary; and John R. Millar, Deputy Director and Assistant Secretary.

MUSEUM VISITORS IN 1957 AGAIN TOPPED MILLION

Attendance at the Museum in 1957 exceeded a million, as it has for each of the thirty-one preceding years. The total number of visitors was 1,097,561, an almost negligible decline from the 1,101,512 who came in 1956.

While the number of persons who were admitted free constituted an overwhelming majority, as always, there was a small increase in the number of visitors paying the 25-cent admission fee—139,834 as compared to 129,483 in 1956. The free attendance is composed not only of visitors on the free days—Thursdays, Saturdays, and Sundays—but also includes children, teachers, and Museum Members, all of whom are admitted free every day.

It should be emphasized that attendance is an incomplete measure of the public reached by the Museum's influence. Extramural activities such as the circulation of traveling exhibits by the N. W. Harris Public School Extension, bring Museum service to many hundreds of thousands besides those who come to the Museum.

BOOK REVIEW

VERTEBRATES OF THE UNITED STATES. By W. Frank Blair, Albert P. Blair, Pierce Brodkorb, Fred R. Cagle, and George A. Moore. 819 pages, many text-figures. McGraw-Hill Book Co., Inc., New York, Toronto, and London. $12.

This volume will be an indispensable reference book for anyone with a small library studying the natural history of the United States. Only here, in about 800 pages, can one find diagnoses of the major groups as well as genera and species, and keys for identification of all the vertebrates (except marine fishes and turtles). The book is technical and, as such, replaces the out-of-print Pratt's manual of similar title as a college textbook. The treatment is at species level, and the list of names will provide a useful standard for ecology treatises and general writings.

The choice of the species, not the subspecies, as the smallest unit is a happy one, and ranges are given for each. Naturally the names and the generic limits will not always agree with those in other standard texts. This is inevitable in different interpretations of biological data. Some of the changes are to be commended. For example, all the grizzly bears have been replaced into one species; the black bear is back in the same genus (*Ursus*) as the grizzly, and the yellow-shafted and red-shafted flickers are considered conspecific. The data on life histories are scant, as they must be in the small space available, and are often summarized under group headings.

In the flood of popular natural-history books and hobby-type texts, this work stands out as taking the serious student back to some of the fundamental details on which classification is based.

AUSTIN L. RAND
Chief Curator of Zoology

THIS MONTH'S COVER

The portrait of a garden snail on our cover won the first-prize silver medal in the Animal-Life Section, Division of Prints, in the Thirteenth Chicago International Exhibition of Nature Photography. The exhibition, which is sponsored by the Nature Camera Club of Chicago and the Museum, is being held from February 1 through February 23 in Stanley Field Hall of the Museum. The snail photograph is the work of H. S. Barsam, of Fresno, California. To satisfy a whim for "composition," Photographer Barsam reversed the negative, for Museum staff members point out that the shell's spiral, which is taxonomically important, curves in the wrong direction in the picture.

Staff Notes

Ronald J. Lambert has been transfered from his position as Taxidermist in the Department of Zoology to the Division of Paleontology, where he will serve as a Preparator . . . . . **Michael Anderson,** formerly of Ocean Springs, Mississippi, has been appointed Assistant Taxidermist . . . . **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, was speaker before the Conservation Council of Chicago and participated in a meeting in St. Louis of the board of governors of the Missouri chapter of Nature Conservancy . . . . **Dr. John W. Thieret,** Curator of Economic Botany, has been appointed to the staff of advisory editors of the journal *Economic Botany.*

A series of exhibits in Boardman Conover Hall (Hall 21) illustrates various aspects of the biology of birds.

'BEST IN NATURE PHOTOS' TO BE EXHIBITED FEB. 1—23

RARE VIEWS of nature at its best—animal life, plant life, landscapes and seascapes, cloud formations, and other phenomena—will be seen at the Museum from February 1 through February 23 when, under the auspices of the Nature Camera Club of Chicago, the Thirteenth Chicago International Exhibition of Nature Photography is presented in Stanley Field Hall.

ROCK-BOUND COAST

By William Siegel, of Riverdale, Illinois. Awarded first-prize silver medal in General Section of the 13th Chicago International Exhibition of Nature Photography to be held at the Museum February 1 through 23.

HUNDREDS OF PHOTOGRAPHERS

Several of the prize-winning photographs are reproduced on the cover and inside pages of this issue of the BULLETIN. The contest drew entries from many far parts of the world. The photographs exhibited were selected from the work of several hundred photographers, both amateur and professional, and are believed to include some of the best camera studies made in the past year or two. Since the inception of the annual Chicago contests they have been the world's largest competitions devoted exclusively to nature photography, and the resulting exhibitions rank among the largest photographic shows in any category.

As in the twelve preceding nature-photography exhibits, there are two divisions, one devoted to prints, both black-and-white and color, and one to color transparencies. The prints exhibited number about two hundred, selected after careful deliberation by the judges.

The accepted color-slides will be exhibited by projection on the screen of the Museum's James Simpson Theatre on two Sundays, February 9 and February 16, at 2:30 P.M. Admission to these showings is free, and all who are interested are invited to attend.

The committee of judges included the following: Lorena R. Medbery, photographer, A.P.S.A.; Edward Kloubec, Jr., photographer; Phillip H. Lewis, Assistant Curator of Primitive Art at the Museum; Loren P. Woods, the Museum's Curator of Fishes; and Ramon Swisher, of the biology department of Wilson Junior College. A silver medal was awarded as the first prize in each section (animals, plants, and general) of each division. Many other entries were awarded ribbons denoting honorable mention. Two special silver medals were awarded by the Photographic Society of America for slides best illustrating color-harmony in nature.

WINNERS' NAMES ON PLAQUE

Names of winners of medals will be inscribed on a bronze plaque contributed by Mrs. Myrtle R. Walgreen, who is a leader in the activities of the Nature Camera Club. As soon as possible, the club will publish an illustrated catalog of accepted photographs.

Following is a list of prize-winners in the various categories:

MEDAL WINNERS

Prints:

ANIMAL-LIFE SECTION: H. S. Barsam, Fresno, Calif.—*Garden Snail*

PLANT-LIFE SECTION: Ted Farrington, Chicago—*Japanese Creeper*

GENERAL SECTION: William Siegel, Riverdale, Ill.—*Rock-bound Coast*

Color Slides:

ANIMAL-LIFE SECTION: Richard Prasil, Mineral, Calif.—*U'mm, Good!*

PLANT-LIFE SECTION: Bernice S. Foster, Worcester, Mass.—*Pixie Cup and Friend*

GENERAL SECTION: Russel Kriete, Chicago—*Panorama*

HONORABLE MENTIONS

CHICAGO AREA

Prints:

ANIMAL-LIFE SECTION: Martin J. Schmidt

GENERAL SECTION: John S. Bajgert, Louis W. Braun, William Siegel

Color Slides:

ANIMAL-LIFE SECTION: Augusta Dahlberg, Charles L. Meiser

PLANT-LIFE SECTION: G. P. Hoffman, Grace H. Lanctot, Barbara F. Palser, R. Stahl

GENERAL SECTION: Charles Albee Howe, William C. Kraus, Russel Kriete, Paul Lobik

OUTSIDE CHICAGO AREA

Prints:

ANIMAL-LIFE SECTION: Leslie A. Campbell, Belchertown, Mass.; Edgar L. Crooks, Colton, Calif.; Grant M. Haist, Rochester, N.Y.; Bob Leatherman, San Bernardino, Calif.; Rae McIntyre, Edmonton, Canada; T. Middleton, Glossop, Derbys, England; Eliot Porter, Santa Fe; Gordon S. Smith, Buffalo; Mme. Van den Bussche, Antwerp, Belgium; G. H. Wagner, Omaha

PLANT-LIFE SECTION: Edward H. Bourne, Penfield, N.Y.; George Brewster, Arlington, Va.; Cy Coleman, Detroit; H. J. Ensenberger, Bloomington, Ill.; Grant M. Haist, Rochester, N.Y.; Howard Oberlin, Canton, Ohio; Eliot Porter, Santa Fe; Dr. Joz. Prove, Antwerp, Belgium; G. H. Wagner, Omaha; Mrs. Gretchen Wippert, El Monte, Calif.

GENERAL SECTION: Harry Harpster, Salt Lake City; Clarence H. Heagy, Freano, Calif.; Inocencio E. Padua, Los Angeles; Gertrude L. Pool, Palo Alto, Calif.; Henry W. Ryffer, San Diego, Calif.; George Stringfellow, Pomona, Calif.; Gretchen Wippert, El Monte, Calif.

Color Slides:

ANIMAL-LIFE SECTION: H. S. Barsam, Fresno, Calif.; Mrs. Dorothy Beatty, Chambersburg, Pa.; H. E. Berry, Wellesley, Mass.; S. G. Blakesley, Merced, Calif.; Leslie A. Campbell, Belchertown, Mass.; Roger H. Camping, Rochester, N.Y.; Charles A. Carlson, Berkeley, Calif.; John A. Collis, Belchertown, Mass.; Ralph E. Cowan, Bakersfield, Calif.; John R. Dowalo, Donoro, Pa.; J. A. Falkenstein, Reading, Pa.; C. B. Harris, Merced, Calif.; Arthur C. Hollatz, Blooming-

(*Continued on page 8, column 1*)

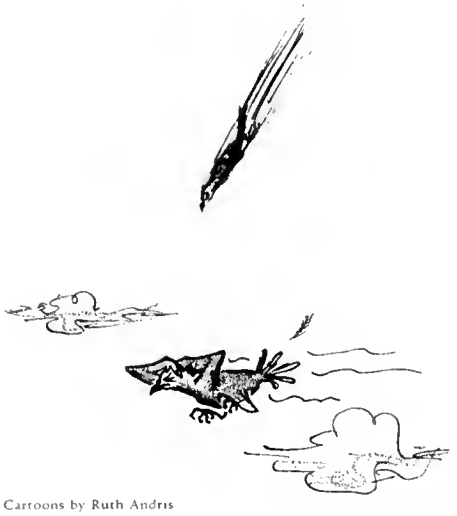
JAPANESE CREEPER

By Ted Farrington, of Chicago. Awarded first-prize silver medal in Plant Life Section of Nature Photography Exhibition under the auspices of the Nature Camera Club of Chicago and the Museum.

SPEED OF BIRDS

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

A FLEA travels at the rate of 4.5 miles per hour in 8-inch jumps. This I discovered in a recent account of speed of animal locomotion. Though I had no immediate use for this datum, it did set me thinking about animals and speed. How fast a bird flies or an animal travels is a question we commonly are confronted with at the Museum. We usually look up the appropriate table in the most recent textbook and read out the answer. But I've



Cartoons by Ruth Andris

long had the feeling that these weren't very good answers. So I welcomed the stimulus given by the flea information, and that about mosquitoes flying at one mile per hour, and a Masai warrior, one of the celebrated lion spearers, with shield and spear running at 18.4 miles per hour when pursued by a rhino, and a rhino trotting at 27.2 miles per hour when pursuing a Masai warrior but galloping at 32–35 when charging a motor car.

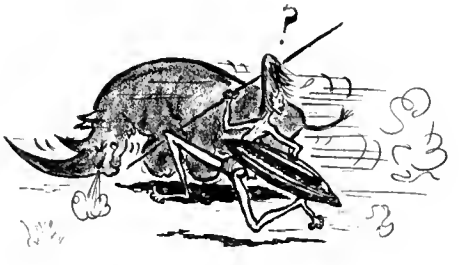
I browsed through the surveys of Meinertzhagen and Roberts of England, and of Cooke and Lane of the United States. They contained records from the United States, Europe, Africa, Asia, and Australia, gathered at various times by various persons. The standards of precision may have been different and the methods of calculating were often very different. Some were made by pacing the animals with automobiles or airplanes; some by using range finders; some by timing over measured courses; some were made with "instruments"; and some were merely estimates. Only occasionally were the conditions given: tail wind, frightened, etc.

There were records of mayflies at one mile per hour; butterflies and houseflies at 5 miles per hour; horsefly types at 40, and dragonflies at 60. A 20-pound salmon, freshly hooked, took out line at 10 miles per hour while salmon are credited with 14–17 when ascending waterfalls. A varanus lizard in Egypt did 14 miles per hour on a dash to a hole, but the dreaded, deadly black mamba snake could not exceed 7.2 miles per hour over short grass in Kenya, and a hungry giant tortoise in Mauritius moved at 1/6 mile per hour toward food. A cheetah chasing an electric hare on a race course at 44 miles per hour was the fastest mammal.

HUMAN SPEED

Then I came to man: a man may walk from two to four miles per hour; on a mile race he may run at the rate of 12 miles per hour; in a 100-yard dash he may approximate a rate of 20 miles per hour. But to say that man's top speed is 20 miles per hour, implying that 15 minutes would be enough to get from his home to the office five miles away, is not a sound piece of information. Nor can I imagine a flea setting out to travel a mile in 8-inch jumps when he could hop on a dog and travel at the rate of 40 miles per hour (top greyhound speed).

But it was the speed of birds that interested me most. Notable was the fact that the recorded speeds are very variable. Horned lark records, for instance, ranged from 17 to 54 miles per hour. But variability must be taken into account and may depend on a variety of factors. For instance, ground speed is not the same thing as air speed. With a good wind behind it a herring gull might double its ordinary speed, from 30 to 60 miles per hour. An eider duck has a maximum speed of 50 miles per hour, but Meinertzhagen saw one flying into a heavy gale that actually had a minus ground speed, approaching him backwards as it tried to fly away.



The question as to whether or not a bird is doing its best makes a difference, too. A crow in India that cruised at 25 miles per hour in the shelter of trees speeded up by an additional 10 miles per hour when it was crossing open fields where attack was likely. Kingbirds are recorded as making only 11 and 15 miles per hour, but I have seen one overtake and strike a fleeing crow that was certainly doing more than the 26 miles per hour credited to it.

570-M.P.H. DIVE

Pigeons may fly in the neighborhood of 40 miles per hour, but racing pigeons have exceeded 90. A duck hawk, sometimes thought of as one of our fastest birds, is said to be unable to catch pigeons in level flight but by diving on them from a height can gain enough impetus to do so. However, I once saw a duck hawk easily overtake a teal, one of our fastest ducks, in level flight. A golden eagle, that probably does not reach 60 miles per hour in much of its flying, has been credited with an estimated speed of 570 miles an hour on a mile-long dive. Migration flights of birds are said to be much faster than the ordinary flight. Starlings often move about at 20–30 miles per hour, but when they get up to travel approach 50.

The length of time a speed can be maintained is a point on which we have no data. Presumably birds can speed up greatly for short spurts.

Then there are speed records we wonder at: Indian spine-tailed swifts that were measured over a course at about 200 miles per hour, and frigate birds traveling at 261. A museum man has much of his raw material housed for permanent reference. His specimens can be remeasured and checked against standards. Time and again a controversy has been settled in this manner. But these scattered data on speed permit no check. A project set up to accumulate new data by having trained birds fly a measured course would be very expensive and time-consuming for such data as would be secured, and the limited use that could be made of it.

But the speed of birds is a legitimate subject of interest and we will have to make do with the scattered data gathered incidentally as opportunity offers. However, until we can separate out the various types of flight: those aided by wind or given impetus by a dive, leisurely cruising or a hurried dash to safety, or long range traveling, we must be satisfied with very general answers.

GENERAL ESTIMATES ON BIRDS

The following are some general estimates of the speed of birds in calm air in level flight:

- 10–20 m.p.h.: Many small perching birds —sparrows, wrens, catbirds, flycatchers
- 20–30 m.p.h.: Many medium-sized birds often move in this range—as robins, grackles, meadowlarks, and some larger, broad-winged birds like herons, pelicans and gulls
- 20–40 m.p.h.: Many small and medium-sized birds move in this range—starlings, chimney swifts, flickers, mourning doves
- 40–60 m.p.h.: The faster flying birds—like falcons, ducks, geese, and rock doves—often travel in these ranges

Perhaps the most productive approach in further study will be to make comparative studies to determine which birds can overtake other birds.

As to the extreme records, comparable to man-made records in airplane, car, boat, or

on foot, the record is doubtful. Their biological interest is in one bird's being able to overtake another, or the amount of energy expended. Their more general interest is that of any record—what is the biggest, the most costly, the strongest of its kind? When we think how carefully checked are human world records for the mile, for instance, we realize how poorly documented are fastest-bird records. But such as they are, the following often rejected records have been seriously put forward:

Indian spine-tail swift	200 m.p.h. (level flight)
Frigate bird	261 m.p.h. (level flight)
Duck hawk	360 m.p.h. (dive)
Golden eagle	570 m.p.h. (dive)

The fastest records of level flight in calm air that were accepted by Meinertzhagen in 1955 are: homing pigeon, 94.3 miles per hour; golden plover, 62; hummingbird, 60; mallard, 60; swift, 57.

FRUSTRATION IN FISH

In a valley in Mexico, in the state of San Luis Potosi, there are several caves with pools containing blind and half-blind fish well known to aquarists as *cave tetras*. These are closely related to and, indeed, may be crossed with normal-eyed river fish but this presents some difficulties as has been reported by Dr. C. M. Breder, Jr., Curator of Fishes and Aquatic Biology at the American Museum of Natural History, New York.

The normal-eyed fish are gregarious and usually rest in compact schools kept together by visual perception. The blind fish do not form schools but wander continually at random. When a blind and an eyed fish are placed together in a tank for experimental purposes the eyed fish attempts to follow the blind one in its aimless wandering. This is very often disastrous for one or the other. The eyed fish may become emaciated and die, Dr. Breder says, since blind fish normally eat much more than eyed fish and apparently are adjusted to the continual exercise. The eyed fish may become erratic in behavior. One actually took to spinning on its snout at one end of the tank but recovered after removal to another tank. Most likely the eyed fish will attack the blind one and destroy it.

Dual-purpose Skirts

Batak women of the Philippine Islands wear bark skirts wide enough to wrap twice around their bodies so that their skirts can serve as blankets at night if necessary.

How mosquitoes carry malaria is illustrated by an exhibit in Albert W. Harris Hall (Hall 18).

SCIENCE BAFFLER: HOW MANY ANIMALS ARE THERE?

By G. ALAN SOLEM
ASSISTANT CURATOR, LOWER INVERTEBRATES

MANY TIMES I have been asked the seemingly simple question, "How many animals are there?" This has always embarrassed me since no quick answer is possible. What are "animals"? Does "how many" mean individuals or kinds? If kinds, does this mean kinds known to scientists, kinds actually living today, or should the many extinct animals be included? Viewed in this light, the question becomes very complex.

WHAT IS AN ANIMAL?

If one considers only the higher plants and animals, it is relatively easy to propose definitions which will separate the two categories. When the single-celled and subcellular organisms are examined, it becomes obvious that there is no dividing line between "animal" and "plant," but that there is *one world* of living things. The question of how to define animals and where to place the things which are neither animal nor plant is a separate subject and will not be discussed at this time. The term "animal" does include far more than mammals and other vertebrates. Biologists use it to cover the vast and heterogeneous assemblage called invertebrates as well as the more familiar vertebrates. A sponge is as much an animal to a biologist as is a mammal, although in the popular literature this definition might not be utilized.

A coral and a clam are two kinds of animals, but by "kind" one usually means "species." Biologists know what a species is, more or less certainly, just as they know what an "animal" or a "plant" is, but definitions are very difficult to make. A good working definition might read: "A species is a kind of animal, composed of all populations of individuals, which, under natural conditions, is actually or potentially capable of interbreeding and producing fully fertile offspring." Species are then grouped into higher categories on the basis of supposed relationship. No general agreement on the number and composition of the many higher categories exists and even on the question of the phyla, the largest divisions formally rec-

ARTHROPODA—IN NUMBERS, THE DOMINANT GROUP OF ANIMALS

About 864,000 species of insects and their relatives are known, making this phylum by far the largest of any animal group. Photograph shows section of "Animal Kingdom" exhibit devoted to these creatures.

ognized, there is wide disagreement.

A few biologists would recognize only fourteen phyla; most would recognize many more groups as being full phyla and some authorities recognize up to thirty-five phyla. The differences of opinion are caused by our limited knowledge of the relationships of several groups of animals which contain only a few living species. Some stretch the definitions of the major phyla to include the "minor groups," but most zoologists retain them as distinct phyla.

SPECIES IN CHICAGOLAND

Scientists have reported 46 species of native mammals, 134 of nesting birds, 52 of reptiles and amphibians, 130 of fishes, 147 of snails and clams, and between 8,000 and 12,000 species of insects from the Chicagoland region. Of course, not all these animals can be seen at one time or in one place, but even in a limited area or in one day a surprising number of different animals can be observed. During spring migration last year, a Chicago ornithologist saw 163 species of birds in one day. While no insect census of a suburban garden has been taken in Chicago, a New York entomologist found more than 1,400 species of insects in his own back yard over a period of a few years.

EXISTING SPECIES IN THE WORLD

No catalogue of animals for the entire world exists, nor is one likely to be prepared. In 1758 the great Swedish biologist, Carolus Linnaeus, published a catalogue of all the animals known to him, a total of 4,236 species. Since then, several thousand system-

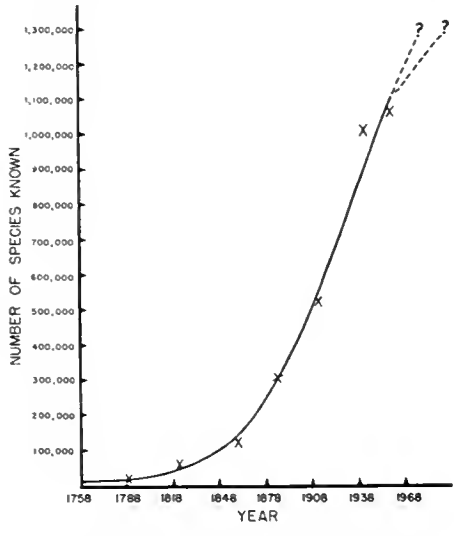


Figure A—Number of species known to scientists. Systematics, like all other activities, is affected by world conditions. The upheavals of World War II and the Korean War show in the slight increase between 1939 and 1957. In the past few years the line has continued its sharp upward growth.

atists have worked at collecting, naming, and classifying the living world. *Figure A* herewith is a graph showing the estimated number of species known to scientists for various years from 1758 to the present day. The increase is not in number of *existing* species, but only in the number *found* by scientists. New species are being described at the rate of more than 10,000 per year and the actual number of *existing* species may be between 2,000,000 and 5,000,000. At the same time, many forms previously thought to be species are found to be only varieties of other species. Thus the rate of increase in what scientists consider to be "good species" is less than 10,000 per year, but this still is quite a substantial figure.

Some phyla have been more thoroughly studied than others. The vertebrates have been particularly well studied and probably only a comparatively few species remain to be discovered. Much more work remains to be done on the invertebrates, most of which are very small and must be studied with the aid of special equipment.

At this writing I am studying snails 1/25 of an inch in size. The last whorl of the shell has 120 "large" ribs. The important characters in classification are found in the microsculpture between the "large" ribs. Obviously a high-powered microscope is needed to study these shells. Minute size and the need for special equipment have greatly slowed the study of the smaller animals. For most of the invertebrates we have barely begun the process of describing the existing species, much less studying their variation, distribution, and biology.

Table 1 gives a list of the larger phyla with estimates of the number of species known to scientists today and the guesses of various specialists as to what percentage of *existing* species these figures represent. Estimates of the number of described species of mollusks range from 40,000 to 150,000; insects from 650,000 to 1,000,000; and fish from 20,000 to 40,000. The great differences in estimated numbers reflect the vastness of these groups and the impossibility for a systematist to master more than a small fraction of the species comprising one of these larger phyla. Estimates as to the percentage of existing species these figures represent may be more accurate than the figures of number described. In collections of invertebrates from various parts of the world, there will be a very high percentage of undescribed species. From this we can estimate the approximate percentage of existing forms that are known at the present time.

Table 1
THE 12 LARGEST PHYLA

PHYLUM	NUMBER OF KNOWN SPECIES	ESTIMATED % OF EXISTING SPECIES KNOWN
Protozoa	20,000 (±5,000)	? ? ?
Porifera (sponges)	5,000	75%
Coelenterata	10,000	? ? ?
Platyhelminthes (flat-worms)	10,000	25%
Nemathelminthes (round-worms)	10,000	10%
Rotifera (wheel-animals)	1,500	? ? ?
Ectoprocta (moss-animals)	3,000	? ? ?
Annelida (segmented-worms)	6,200	? ? ?
Mollusca	80,000 (±25,000)	65%
Arthropoda (joint-legged)	864,000 (±100,000)	45%
Echinodermata	5,600	? ? ?
Chordata	47,528	
(Cephalochordates)	28	? ? ?
(Tunicates)	1,500	80%
(Fishes)	25,000 (±5,000)	85%
(Amphibians)	2,500	95%
(Reptiles)	6,000	95%
(Birds)	9,000	99%
(Mammals)	3,500	98%
Minor phyla (Table 2)	2,696	
Total	1,065,524 (±135,000)	

Table 1—Estimated number of species belonging to the major phyla. In phyla such as the arthropods and nematodes, only a small proportion of the existing species have been classified. Individuals are small but fantastically numerous. Many are of direct interest to man because of damage they do to growing crops.

EXTINCT SPECIES

Mention was made above that the relationships of the "minor" phyla (those with only a few living species) are uncertain. Because of the small number of living species, some zoologists call these animals "aberrant" and lump them with the larger phyla. Although only 225 living species of brachiopods are known, more than 30,000 fossil ones have been described. Fossilization is a rare accident and ordinarily only organisms with hard parts will be preserved as fossils. Most species belonging to the "minor" phyla have no hard parts and we cannot determine whether they have always been insignificant in number, or whether they were once as important as some of the larger phyla of today. Nineteen of the "minor" phyla are listed in *Table 2*.

Table 2
THE 19 SMALLEST PHYLA

PHYLUM	NUMBER OF KNOWN SPECIES
Mesozoa	50
Ctenophora	90 (±10)
Nemertinea	650 (±100)
Acanthocephala	300
Gastrotricha	180 (±20)
Kinoryncha	100
Priapulida	3
Nematomorpha	75 (±25)
Entoprocta	60
Sipunculoidea	250
Echiuroidea	60
Phoronidea	15
Pogonophora	18
Brachiopoda	245 (±25)
Onychophora	80 (±10)
Tardigrada	340
Linguatula	70
Hemichordata	80
Chaetognatha	30
Total	2,696 species

Table 2—Number of species known to belong to the minor phyla. Most, if not all, of these names are unfamiliar. Yet each name represents a type of animal construction that is just as distinctive as is that of a coral, snail, or fish. Most of these animals are small and live in the ocean. Although one may not recognize these names, such a list serves as a reminder of the diversity of animal life.

The fossil record, although very incomplete, does tell of faunal changes in the past. The trilobites, dinosaurs, and graptolites

are now extinct, yet once they were very large and important groups of organisms. The horseshoe crab, *Nautilus*, and the lizard-like *Sphenodon* are the only living members of formerly important groups. Only a minute portion of the species of the past have been *both* preserved as fossils and discovered by paleontologists. It is thus impossible to guess how many species have become extinct.

It can only be said, "We don't know how many animals there are." Zoologists have named more than 1,000,000 species, but perhaps another 1,000,000 have not yet been described. In the 200 years since 1758, zoologists have increased the total number of known species at least 250 times, yet the end is nowhere in sight. Perhaps in another 200 years the task of just naming the living species of animals may be 90 per cent completed, but the much greater job of classifying variation, structure, physiology, embryology, and genetics will hardly have begun.

INFLATION NOTE

Talk about inflation . . .

The Ashanti tribe in West Africa had it, too.

In the old days the king of the Ashanti gained revenue for his royal needs by a device that gave him extra profit whether he was buying *or* selling. It's illustrated in an exhibit in Case 4 of Hall E, one of the Museum's two halls of African ethnology.

When the king was selling gold dust, the buyer took a loss because of the king's special privilege of using a set of weights of less than the tribe's standard mass. But when the king bought gold flakes, he used another set of weights that insured him of full value, or more. Thus he always won.

A set of the brass weights of the type used is in the Museum exhibit of Ashanti craftsmanship. The weights, highly ornamental, were sculptured in the forms of men and women, animals, and familiar objects used in daily living. Because of their occupation, the goldsmiths, while easy marks for the king under the system, were nevertheless regarded as a high social caste.

A Bit of Charm Works Even on Fish

After hours of not-so-patient waiting for stubborn fishes to bite, do you often wish you could charm the fishes right out of the water? Well, that's exactly what the Maoris of Polynesia attempt to do. Maori fishing expeditions aren't complete unless a priest accompanies the fishermen to invoke his magical powers. The first fish caught is charmed by the priest and then thrown back into the water in the hope that action will induce other fish to bite. More information about the Polynesian people is given in the exhibits in Hall F (Peoples of Polynesia and Micronesia).

PERU PROJECT HEADS 1958 EXPEDITION LIST

Several expeditions—a smaller number than in most years—will carry on the Museum program of collecting and field research during 1958. The curtailment is necessitated by a reduction in the funds available for the purpose.

The outstanding new field project of the year will be the Conover Peru Expedition conducted by Emmet R. Blake, Curator of Birds. Blake will fly in May to Cuzco to prepare for exploration of areas virtually unpenetrated by zoologists. With a principal assistant who has a museum-collecting background he will set out from Cuzco for the lowlands east of Madre de Dios where the only means of travel are foot-trail and canoe. A party of native boatmen, hunters, and porters will be organized before proceeding into the Amazon drainage region east of the Andes and into practically uninhabited rain forests along the Rio de Madre de Dios. A large general collection of the fauna, principally birds, will be sought. Preliminary reconnaissance has indicated that the area should be rich in bird life and that the chances are favorable for discovering some species hitherto unknown to science. The expedition will be financed by the Conover Game-bird Fund, established by the late Boardman Conover who was both a Museum Trustee and Research Associate in the Division of Birds.

The largest expedition of the year in point of personnel and size of operations will resume excavations of prehistoric Indian sites in Arizona. This work, by the Southwest Archaeological Expedition, which goes into its twenty-fourth season, will, as in past years, be under the direction of Dr. Paul S. Martin, Chief Curator of Anthropology. The expedition has been unearthing evidence for tracing the culture and history of peoples who inhabited the area 4,500 years ago. Dr. John B. Rinaldo, Assistant Curator of Archaeology, will again be Dr. Martin's principal associate. They will be joined by a staff of other archaeologists, while crews of local men will be enlisted for the digging.

The comprehensive survey in both the United States and Canada of the archaeology of the Upper Great Lakes region, which has been under way for several years, will be continued by George I. Quimby, Curator of North American Archaeology and Ethnology. The period under study goes all the way back to 10,000 B.C.

Collecting of Middle and Late Eocene specimens will be continued in the remote Washakie Basin of Wyoming by William D. Turnbull, Assistant Curator of Fossil Mammals, and Orville L. Gilpin, Chief Preparator of Fossils.

Dr. Rainer Zangerl, Curator of Fossil Reptiles, and Dr. Eugene S. Richardson, Jr., Curator of Fossil Invertebrates, will continue to collect and study the fossil content of a Coal Age shale occurring near Mecca, Indiana. This work is financed by a fund contributed by Dr. Maurice L. Richardson, of Lansing, Michigan.

Dr. John W. Thieret, Curator of Economic Botany, is scheduled to make a field trip to the Great Plains areas in Minnesota, North and South Dakota, Iowa, Nebraska, Montana, and Wyoming to collect and study grasses.

AUDUBON FILM SHOWS COLORADO ROCKIES

Wildlife and plants found on the eastern slopes of the Rocky Mountains will be colorfully portrayed when the Illinois Audubon Society presents "High Horizons," its fourth screen-tour lecture of the 1957–58 season. The color-film program will be given at 2:30 P.M. Sunday, February 23, in the James Simpson Theatre of the Museum.

William Ferguson of Omaha, Nebraska, who will lecture with his film, is the originator of "This Curious World," an educational cartoon syndicated to hundreds of newspapers in the United States and Canada, as well as a cartoonist for a group of farm newspapers. Mr. Ferguson's lecture and film will present an exciting journey from the melting snows above timberline down to alpine meadows and finally to fertile prairies. During the exciting descent through the Colorado wilderness, the audience will see vivid portraits of animals and plants living in the various zones.

The last program in the current series of Illinois Audubon Society screen-tours will be "Forgotten Country," on Sunday, March 16.

Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Botany, Vol. 28, No. 4. *Contributions to The Flora of Venezuela.* By Julian A. Steyermark and Collaborators. 514 pages, 7 illustrations. $7.50.

Fieldiana: Zoology, Vol. 39, No. 5. *Two New Species of Birds from Angola.* By Austin L. Rand. 5 pages. 15c.

Fieldiana: Geology, Vol. 10, No. 28. *The Present Status of the Volcanoes of Central America.* By Sharat Kumar Roy. 5 pages, 1 map. 15c.

Fieldiana: Anthropology, Vol. 47, No. 1. *The Sawmill Site, A Reserve Phase Village, Pine Lawn Valley, Western New Mexico.* By Elaine A. Bluhm. 88 pages, 29 illustrations, 3 maps. $2.25.

Saturdays in Spring . . .

LECTURES ON TRAVEL START MARCH 1

On Saturday afternoons in March and April the Museum will present its spring series of free illustrated travel lectures for adults. Provided by the Edward E. Ayer Lecture Foundation Fund, the new series will be the 109th offered by the Museum.

The programs for March are:

March 1—A Nova Scotia Visit
Roy E. Coy

March 8—Indo-China
William G. Campbell

March 15—Eastern South America
Phil Walker

March 22—Ethiopia
Willis Butler

March 29—Afghanistan
Julien Bryan

A complete schedule of the lectures will appear in the March BULLETIN. All of the programs will be given in the James Simpson Theatre of the Museum at 2:30 P.M. and all will be illustrated with color motion-pictures. A section of the Theatre is reserved for Members of the Museum, and each Member is entitled to two reserved seats for each program. Requests should be made in advance by telephone (WAbash 2-9410) or by mail. Seats will be held in the Member's name until 2:25 P.M. on the day of the program.

PHOTO CONTEST WINNERS—

(Continued from page 3)

ton, Ill.; Ted Johnson, Rochester, Minn.; B. J. Kaston, New Britain, Conn.; Robert Leatherman, San Bernardino, Calif.; O. H. Logan, Camden, Ohio; Joseph J. Malek, Reading, Pa.; R. O. Malcomson, Mount Pleasant, Mich.; Edgar K. Nauth, Kenmore, N.Y.; Wendell W. Nicholson, Kalamazoo, Mich.; John B. Pearson, Mount Vernon, Ohio; Mildred Porter, Studio City, Calif.; Robert W. L. Potts, San Francisco; Elsie Pyle, Van Nuys, Calif.; Alfred Renfro, Santa Barbara, Calif.; Marian M. Rich, Melrose, Mass.; Alvin Richard, Pomona, Calif.; Marion Roberts, Los Angeles; Le Roi Russel, Prescott, Ariz.; R. E. Sams, Mentone, Calif.; Lt. Col. Ralph Sims, Amarillo, Tex.; Ernest Smith, Santa Barbara, Calif.; David C. Stager, Bloomfield, New Jersey; S. Stern, New York; Edmund Stoddard, Auburn, Calif.; Mrs. Anstiss Wagner, Arlington, Mass.; John E. Walsh, Beverly, Mass.; Mrs. John E. Walsh, Beverly, Mass.; D. E. Williams, Porterville, Calif.; W. A. Wren, Newport, Ohio; W. M. Wright, San Diego, Calif.; Louis B. Ziegler, San Jacinto, Calif.

PLANT-LIFE SECTION: W. G. Chaney, Browns Mills, N.J.; Len Chatwin, Rosemere, Canada; Mrs. W. L. Davis, Dumas, Tex.; B. Durha, Yonkers, N.Y.; Howard L. Garrett, Midland, Mich.; Mrs. J. E. Goodwin, Toronto; Henry M. Harris, Pacific Palisades, Calif.; G. Gulberson, Olympia, Wash.; Anne M. Hatcher, Port Chester, N.Y.; S. G. Johnson, Hemet, Calif.; Peggy Jordan, Brighton, Mass.; John W. Kell, Fremontia, Calif.; Mrs. V. King, West Hill, Canada; Emil Muench, Santa Barbara, Calif.; Mary M. Mulford, Washington, D.C.; L. W. Peterson, La Verne, Calif.; Leona Piety, Ontario, Calif.; Dr. R. B. Pomeroy, Scarsdale, N.Y.; Glenn O. Porter, Studio City, Calif.; R. G. Prasil, Mineral, Calif.; Donald T. Ries, Normal, Ill.; William D. Popejoy, Normal, Ill.; Winnifred Recht, Boulder, Colo.; Mattie C. Sanford, Salt Lake City; Nettie Schoppe, Yakima, Wash.; Benjamin M. Shaub, Northampton, Mass.; Mrs. Mary Shaub, Northampton, Mass.; L. L. Steimley, Urbana, Ill.; Oscar F. Stewart, Detroit; Howard Swigart, Seattle; Carl Van Steenbergen, Long Beach, Calif.; Lee Walp, Marietta, Ohio; Elvin Warrick, Urbana, Ill.; Claire E. Webster, Berkeley, Calif.; Wesley Wilcox, Normal, Ill.; Virginia Williamson, Lyndhurst, N.J.; Edmund A. Woodle, Natick, Mass.

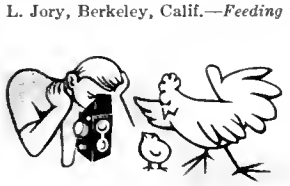
GENERAL SECTION: John Benzel, Covina, Calif.; W. C. Brasie, Midland, Mich.; Norma Chatwin, Rosemere, Canada; Wayne C. Foster, Phoenix, Ariz.; Hank Greenhood, Los Angeles; Katherine H. Jensen, Pittsford, N.Y.; M. McGregor, Toronto; Paul L. Miller, Seattle; Dr. A. M. Nielsen, Salt Lake City; Jack E. O'Brien, Webster Grove, Mo.; Anton F. O'Neil, Seattle; Clark Sager, South Gate, Calif.; Lewis S. Stadler, Kalamazoo, Mich.; Mrs. Anstiss Wagner, Arlington, Mass.; Ing. J. L. Zakany, Mexico City

SPECIAL MEDALS FOR COLOR SLIDES

(Awarded by the Photographic Society of America)

Wendell W. Nicholson, Kalamazoo, Mich.—*Luna Moth Larva*

Stafford L. Jory, Berkeley, Calif.—*Feeding Time*



A Killer's 'Badge of Honor' For Young Bachelors

Young men of the Ilongot tribe of the Philippines impress the tribe's young maidens by wearing the red beak of the hornbill over their foreheads to indicate that they have killed an enemy. A lesser honor in the maiden's eyes is the bachelor's headdress of rooster tail-feathers, which signifies that he has cut the body of an enemy. Other information about the people of the Philippines may be found in Hall A (Peoples of Melanesia and the Philippines).

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: Miss C. F. Bieber, Santa Fe—ethnological material, Borneo; Walker B. Davis, Chicago—Barong fighting-knife and sheath, 2 woven mats, Philippine Islands; G. Edward Quimby, Chicago—breech clout of tapa cloth, New Guinea

Department of Botany

From: Dr. John Dwyer, St. Louis—33 grasses, Missouri and Arkansas; Ernest J. Palmer, Webb City, Mo.—5 plant specimens

Department of Geology

From: Mrs. Walter Douglas, Phoenix, Ariz.—petrified palm-trunk, Florida

Department of Zoology

From: California State Fisheries Laboratory, Terminal Island, Calif.—fish specimen; Robert J. Drake, Tucson, Ariz.—3 land snails, Veracruz; Rodolfo Escalante, Montevideo, Uruguay—birdskin; Dr. Henry Field, Coconut Grove, Fla.—landshells, France; Raymond Grow, Gary, Ind.—2 birdskins; Miss Trudie Jerkins, Tarpon Springs, Fla.—a frog, Colombia; B. Malkin, Minneapolis, Minn.—fresh-water clams, Brazil; Tarpon Zoo, Tarpon Springs, Fla.—a snake, Colombia; U. S. Fish and Wildlife Service, Pascagoula, Miss.—marine invertebrates, Atlantic, Gulf of Mexico, and Caribbean

Children's Programs . . .

YOUNG PEOPLE'S GROUPS WILL BE HONORED

Children's free movie-programs at the Museum will honor various young people's organizations on Saturday mornings in March and April. Films and suggested tours will carry out the themes of projects under study by the particular groups. Although special recognition is being given the organizations, unaffiliated boys and girls also are invited to attend all the programs. The first program, on March 1, while honoring no specific organization, will be dedicated to the most important of all—the typical American family.

March 1—Family Day
"Animal Families"

March 8—Cub Scout Day
"Exploring Alaska"

March 15—Girl Scout Day
"Hands Around The World"

March 22—Campfire Girls' Day
"Meet the People"

March 29—Chicago Boys' Clubs Day
"Wildlife"

The programs are provided by the James Nelson and Anna Louise Raymond Foundation. No tickets are needed for the shows, which will be given in the James Simpson Theatre at 10:30 A.M. Children are invited to come alone, accompanied by parents or other adults, or in groups.

NEW MEMBERS

(December 14 to January 15)

Contributors

Walter J. Cummings, Joseph H. King

Associate Members

Edison Dick, W. Paul McBride

Sustaining Members

Joseph W. Dennis, K. Schlanger, John B. Van Duzer

Annual Members

Frederick B. Andrews, Mrs. William Bellano, Herbert E. Brehm, Jr., Albert H. Brunell, James H. Burtch, Mrs. Anthony E. Cascino, Arthur D. Chilgren, Joseph S. D'Amico, Dr. Lloyd De Vore, Earl T. Franzen, Robert A. Gardner, Jr., Alfred Gawthrop, Miss Elsie L. Haug, LeRoy Hirsch, A. C. Hoffman, Carl Jacoby, George A. Laadt, James McMahon, Arthur H. Morstadt, Mark K. Newell, J. A. Papa, Arnold W. Pascus, Lester W. Reinecke, Dr. Clifton C. Rhead, Richard F. Robinson, Miss Evelyn Rose, Arnold N. Schorn, Whitt N. Schultz, Noel M. Seeburg, Jr., R. Wells Simmons, Edward A. Sippel, Miss Marie Smith, Fred A. Stavenhagen, Arthur I. Stephens, Russell T. Stern, Edward Winkler

An entire hall of the Museum (Hall N-1) is devoted to whales.

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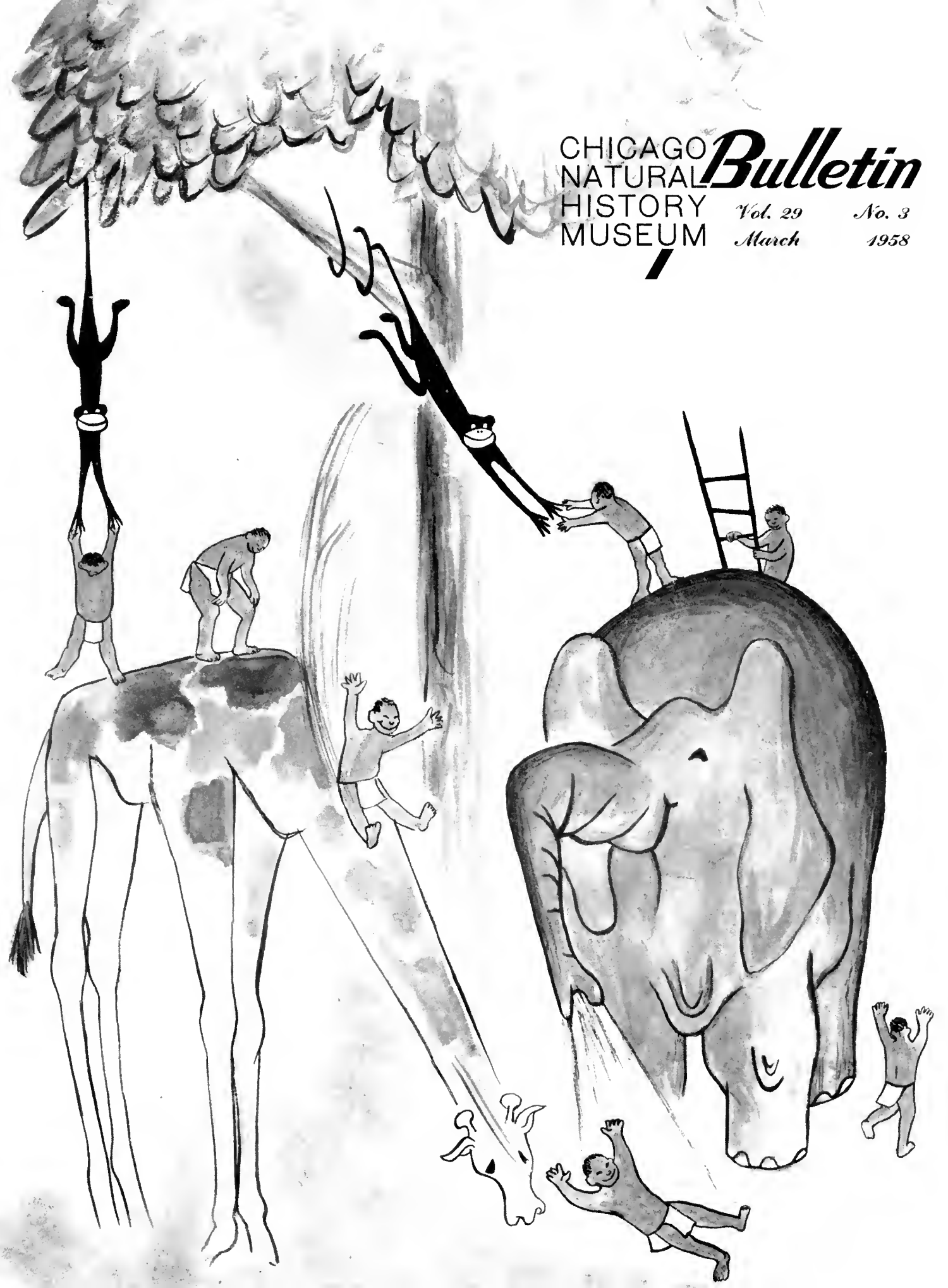

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Members are requested to inform the Museum promptly of changes of address.

50 SPLENDID YEARS AT MUSEUM HELM

Members of the Museum staff have noted with deep gratification the many tributes to Stanley Field, President of the Museum for the past half-century, published in the metropolitan papers and other newspapers in the Chicago region, recognizing his outstanding contributions to the cultural life of Chicago. Temptation is strong to sit back complacently and say "*We* knew it all the time."

The fact that the success of this institution is largely due to the personality of Mr. Field and his constant encouragement of the staff is basic in the history of this Museum. We are happy, also, in the knowledge that his recognition of the talents of other members of the Board of Trustees does not imply that he plans to leave his work in the near future.

C.C.G.

Errata

The report on New Members of the Museum published in the February BULLETIN erroneously listed Edison Dick and W. Paul McBride as Associate Members. It is regretted that this error occurred. Actually, the gentlemen named are Life Members. Mr. McBride had been an Annual Member since 1941 and Mr. Dick had been an Associate Member since 1935. Both converted to Life Memberships in order to add to the Museum's endowment funds.

Record Homing Flight

A record homing flight has been made by the Laysan Island albatross, according to an article in a recent issue of the journal *Condor*. Two American scientists sent nesting albatross from Laysan Island near the Hawaiian group to the Philippine Islands by air in 1957, and in 31 days one of them was back, a distance of 4,120 airline miles. Part of the ocean flown over was outside the range of the species. Two birds sent to Washington state returned, an airline distance of 3,200 miles in 10 and 12 days each. The most spectacular sea-bird homing flight recorded before these was a Manx shearwater, transported 3,200 miles from Wales to Boston, which returned in 12½ days.

STAFF NOTES

John R. Millar, Deputy Director, who on February 3 completed his 40th year of service on the Museum staff, was guest of honor at a staff reception in recognition of the occasion. Mr. Millar joined the staff in 1917 as a preparator in the Department of Botany and participated in several expeditions to South America and elsewhere. In 1938 he was appointed Curator of the Department of the N. W. Harris Public School Extension and in 1946 became Deputy Director. . . . **Raymond A. N. Gomes** has been appointed Assistant Recorder in the Division of Publications. Formerly employed by the Evanston Hospital Association, he replaces **Forest Highland** who has resigned. . . . **Miss Louise Jones** is now secretary in the Museum Book Shop. . . . **Dr. Donald Collier,** Curator of South American Archaeology and Ethnology, lectured on "Ancient Peruvian Art" at the Kalamazoo (Michigan) Art Center on February 12. . . . Vocational counsel on "Archaeology as a Career" was given at La Grange (Illinois) High School on February 26 by **Dr. John B. Rinaldo,** Assistant Curator of Archaeology. . . . **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, has resigned. . . . **D. Dwight Davis,** Curator of Vertebrate Anatomy, has been appointed to the Scientific Advisory Committee of the Chicago Zoological Society. He recently lectured on "Concepts of Taxonomy" before a class at the University of Chicago. . . . "Definition of Genera" was the subject of a recent lecture by **Dr. Robert F. Inger,** Curator of Amphibians and Reptiles, before the Zoology Club at the University of Chicago. . . . **Loren P. Woods,** Curator of Fishes, recently was speaker for the Conservation Council in Chicago and the Izaak Walton League of Winnetka.

—THIS MONTH'S COVER—

One who looks at the cover of this Bulletin and at the drawing on another page of a caveman moppet serving a bottled cola drink to a dinosaur should not infer that the Museum has veered away from its strict scientific concepts or that its direction has been taken over by Walt Disney. For entertainment and for decoration there is room for fantasy everywhere, and even so eminent and serious a biologist as the late Dr. Karl P. Schmidt, of the Museum staff, in moments of relaxation wrote and published grotesque stories about the animal world under the title "Unnatural History." This same title might be applied to the series of amusing murals, of which the cover and dinosaur pictures are examples, recently painted on the walls of the children's lunchroom in the Museum. These whimsies are the creation of Marion Pahl, Staff Illustrator. She evokes chuckles by combining naturalistic forms of animals with impossible situations.

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: Dr. William R. Bascom, Berkeley, Calif.—two masks and two wooden figures, Nigeria, West Africa; Dr. David C. Graham, Englewood, Colo.—42 Chinese rubbings, China

Department of Botany

From: Los Angeles County Museum, California—58 plant specimens, Brazil; U. S. Dept. of Agriculture, Beltsville, Md.—a specimen of *Araeococcus pectinatus*, 2 plant specimens, Honduras and Costa Rica

Department of Geology

From: University of Chicago—fossil reptiles, Texas; Mrs. Ethel Doerr, Tinley Park, Ill.—limestone specimens; University of Pennsylvania, Philadelphia—three casts of *Gigantopithecus*

Department of Zoology

From: Harry Hoogstraal, Cairo, Egypt—2 fleas, 2 lice; Tim Hopkins, Redwood City, Calif.—a tiger beetle; Dr. David Kistner, Rochester, N.Y.—25 beetles, Africa; Chin Phui Kong, North Borneo—3 fishes; Borys Malkin, Minneapolis—a land shell, Brazil; Dr. Jeanne S. Schwengel, Scarsdale, N.Y.—shells and books; Stephen Weinstein, Chicago—a snake, Colombia

FILMS FROM BEHIND IRON CURTAIN IN SPRING LECTURES

THE MUSEUM offers a varied fare for this spring's stay-at-home travelers. Subjects of color motion-pictures and accompanying talks by world wanderers range from Nova Scotia in the North to the jungles of Africa, and include a view behind the "iron curtain" to see how life is lived and what people are really like in Soviet Russia today.

There will be nine illustrated lectures in the 109th series to be presented in the James Simpson Theatre of the Museum on Saturday afternoons at 2:30 o'clock in March and April. The programs, to which admission is free, are offered under the provisions of the Edward E. Ayer Lecture Foundation Fund. Each Member of the Museum is entitled, on request, to two reserved seats. Early reservations are urged for all the following dates and program subjects:

March 1—A Nova Scotia Visit

Roy E. Coy

In his travelogue, Roy Coy, director of the St. Joseph (Missouri) Museum, will take his audience to "the most different" of Canada's provinces. Starting in the quaint old city of Halifax with its flower gardens and ancient fortress, the lecturer plunges into natural history at the outset with a visit to a most unusual wildlife park. Then his film follows the fishing fleet out into the Bay of Fundy for scallop and cod and into Oyster Bay for lobster and mackerel. Highlights include a trip to an island thronged with black-backed gulls, to Cape Breton Isle whose people are noted for their remarkable handcrafts, and to Ciboux Island with its vast colonies of Atlantic puffins.

March 8—Indochina

William G. Campbell

All three states of Indochina—Vietnam, Cambodia, and Laos—yield their stories to Dr. Campbell's cameras. His films focus on the life of Saigon ("weary Paris of the Orient"), the court of the king of Cambodia, the royal dancers of Laos, the mysteries of Buddhist temples, the remote tribal peoples, and the magnificent ruins of Angkor Wat and Angkor Thom, seats of the once-great Khmer civilizations. Opium dens as well as opium control-measures are the subject of study. Elephants, festivals, golden pagodas, virgin mountain-forests, the historic Mekong River, the beautiful coast of Annam—and everywhere all kinds of people—contribute to the interest of Campbell's superb color-films and equally colorful narrative.

March 15—Eastern South America

Phil Walker

Special emphasis is placed on Buenos Aires and other parts of Argentina in Phil Walker's film and lecture, because of changes since the overthrow of Dictator Peron, but a comprehensive travelogue is given of Brazil and Uruguay from Rio de Janeiro to Montevideo. Among the highlights are Bariloche in Argentina, called the "Switzerland" of South America because of its snowcapped peaks and jewel-like lakes, and Santos, São Paulo, and Bahia. The Caribbean islands of Curaçao and St. Thomas and life aboard a cruiseship are other features.

March 22—Ethiopia Today

Willis Butler

In an exciting and beautiful film-story, Willis Butler takes you through 4,000 miles of rugged Ethiopia by airplane, jeep, mule, and boat. He covers thoroughly the country's geography, history, religion, family life, and scenic attractions. Visits are made to the coffee plantations (the world's first coffee came from Ethiopia) and to the workshops of native arts and handcrafts. A feature is a sojourn at the imperial palace in which the audience becomes well acquainted with Emperor Haile Selassie.

March 29—Afghanistan

Julien Bryan

Few tourists or other outsiders get into Afghanistan. Julien Bryan has made the first full-length color motion-picture of this country's life ever obtained by an American lecturer. He traces the major movements in Afghanistan: early Buddhism (500–400 B.C.), the entry of Alexander the Great (about 320 B.C.), the arrival of the followers of Mohammed (9th century A.D.), and the invasion of Ghengis Khan (13th century A.D.). His film shows what is being done by the final invader, modern machinery, in building new schools and hospitals, roads and dams, and airports. The life of nomadic tribes and of the cities with their mosques, markets, veiled women, and theatrical presentations are given equal attention.

April 5—Germany

Alfred Wolff

Two phases of Germany—the "once-upon-a-time" land of fable and fairy tale and the post-Hitler modern industrial country of today—are presented in Alfred Wolff's film-lecture. He will show his audience the medieval pageantry of Rothenburg and the fairylandlike castle of Neuschwanstein and even Red Riding-hood's House at Oberammergau, as well as the Passion Play Theatre. Scenic features include a journey up Germany's highest mountain, the Zügspitze; the Bavarian Alps and villages; the Black Forest and the Rhineland. Cities visited include Berlin, Nuremberg, Stuttgart, and Munich.

April 12—Marvels of Africa

John Nicholls Booth

Dr. Booth presents one of the most comprehensive picture-stories of Africa ever attempted. This color-film opens with a voyage up the mighty Congo River through dense jungle, with stops among the fascinating Ngomba and Monga tribes, to French Equatorial Africa, where a visit is paid to Dr. Albert Schweitzer at his famed hospital. A northward trek to Morocco, which is traversed from sites of ancient Roman invaders and Barbary pirate lairs to modern Casablanca, a jump of 4,000 miles to the equator and into Kenya, which is in the grip of the Mau Mau terror, and the ascent of Africa's tallest mountain, Kilimanjaro, are followed by exploration of Nigeria and once-forbidden Timbuktu. The film ends with a survey of northwest Uganda, near the Mountains of the Moon, where thrilling pictures are made of the biggest wild game on earth.

April 19—Wildlife Across Canada

Cleveland P. Grant

Early in his film, Cleveland Grant, a former member of the staff of this Museum, takes his audience around the Gaspé Peninsula and the great sea-bird cliffs of Bonaventure. Then he proceeds to Canada's far west for pictures of the big-game animals in Alberta, British Columbia, and Yukon Territory. There are adventures with grizzly bears, and hazards are met while recording on film the life of the mammoth bull-moose.

April 26—Russia

Neil Douglas

In his film and lecture Neil Douglas brings you the latest available information on the people behind the iron curtain. He visited

RESERVED SEATS FOR MEMBERS

No tickets are necessary for admission to these lectures. A section of the Theatre is allocated to 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 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

Russia just before the Hungarian clash, which marked the end of opportunity for traveling photographers. A vast area is explored, including Leningrad, Moscow, the port of Odessa, Yalta and the Crimea, the Caucasus, and Georgia, whence came the late Stalin. A vast array of the different peoples within the USSR is pictured—Kazakhs, Taziks, Turkmen, Siberian Yakuts, Ziss, Ukrainians, and Georgians whose "people's folk dances" are a colorful feature. Those who see Douglas' color motion-pictures and hear his story should gain an impression of what life is really like in the sprawling land of the Soviets.

CHILDREN'S MOVIES BEGIN MARCH 1

Young people's organizations will be honored at the Museum in the spring series of children's free movie-programs to be presented on Saturday mornings during March and April by the James Nelson and Anna Louise Raymond Foundation.

Except for the opening program on March 1, "Family Day"—which will offer a series of movies showing how animal families live together—all of the shows will give special recognition to organized groups. All programs, however, are open to unaffiliated boys and girls as well as members of groups. No tickets are needed for the shows, which will begin at 10:30 A.M. in the James Simpson Theatre. Children may attend alone, in groups, or with parents or other adults. Below is a schedule of the Saturday-morning programs for March and April:

March 1—Family Day

"Animal Families"—a program of films illustrating how both wild and domesticated animals live together in family groups

March 8—Cub Scout Day

"Exploring Alaska"—movie program and exhibits in the Museum will provide a visit to Alaska's Eskimos and animals

March 15—Girl Scout Day

"Hands Around the World"—a skit and movie program will carry out the Girl Scout project-theme "International Friendship." Following the program an open house will be held, at which Senior Girl Scouts will act as guides and hostesses

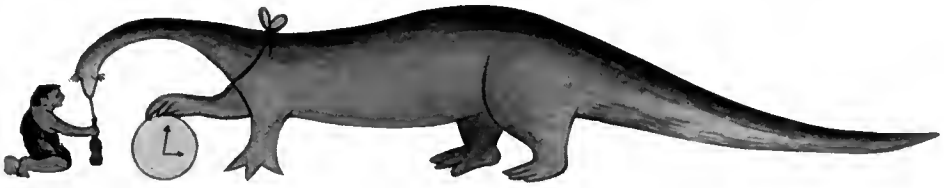
March 22—Camp Fire Girl Day

"Playtimes"—movies and a special tour, "Toys Around the World," will show children at play in various parts of the world. Horizon Girls will serve as hostesses and guides after the program

March 29—Chicago Boys' Clubs Day

"Wild Wild World!"—several short films will show wild life from the backyards of Chicago to the wilds of Africa

FANTASY FOR CHILDREN IN MUSEUM LUNCHROOM



One of a new series of murals, described as "unnatural history," painted for the amusement of young visitors by Marion Pahl, Illustrator. These lighthearted paintings depict a world of things that couldn't be.

April 5—*No program because of Easter holiday*

April 12—Boy Scout Day

"Exploring Our Earth"—film program will show volcanoes, mountain climbers, rock-and-mineral collecting, and the assembly of two of the Museum's dinosaur exhibits

April 19—YMCA Day

"Boys, Braves, and Dancers"—American Indians will be visited by way of movies and Museum exhibits

April 26—Brownie Scout Day

"Three Little Pigs"—a puppet show by the Apple Tree Workshop of Chicago Heights will give a present-day interpretation of the classic fairy-tale, "Three Little Pigs." Senior Girl Scouts will be guides and hostesses after the program

A cartoon is included in each program except for the last one, on April 26.

'ANIMALS OF THE BIBLE' TOPIC FOR JOURNEY

Animals in the stories of both the Old and New Testaments are seen on the thirteenth Museum Journey for children, "Animals of the Bible." Mammals, birds, reptiles, and fishes exhibited on the first and ground floors of the Museum will be visited by any boy or girl who takes the spring Journey, which is offered from 9 A.M. to 5 P.M. on any day in March and April. Journey instructions with a questionnaire about the animals are provided at the north and south doors of the Museum. When a child has filled out the questionnaire he can deposit it in a barrel at either the north or south door of the Museum. After successfully completing four Journeys, the child is eligible for a Museum Traveler award. Eight successful Journeys entitle him to be a Museum Adventurer and twelve Journeys a Museum Explorer. The spring Journey begins a series in which an entirely new award will be presented to the boys and girls participating. The nature of the award will be announced in a future issue of the BULLETIN.

LURE OF WILDERNESS IN AUDUBON FILM

The wonders of the real wilderness that may be found in the Far West by heeding the invitation of little-used back roads and rivers will be shown on the screen in "Forgotten Country," next film-lecture of the Illinois Audubon Society. The program will be presented by Bert Harwell in the James Simpson Theatre of the Museum on Sunday, March 16, at 2:30 P.M.

The "forgotten" land where Harwell has found adventure is a vast area between the Rockies and the Pacific Coast extending from Canada to Mexico. From the lofty crags, the deep canyons, and the thick forests of this region of beauty, contrast, and mystery, Harwell brings a colorful life pageant of many strange animals and plants.

This is the final program in the current Audubon series of screen-tours. Admission is free. Seats in the reserved section of the Theatre are available to Members of the Audubon Society and the Museum on presentation of their membership cards.

Whooping Cranes Achieve New Lease on Life

The whooping-crane population is the highest in seven years, according to an article in the New York Zoological Society's *Animal Kingdom*. There is now a total of 31 living whooping cranes: one adult in the San Antonio Zoo, two adults and two young in the Audubon Park Zoo in New Orleans, and 22 adults and four young wild on the Aransas Refuge in Texas.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

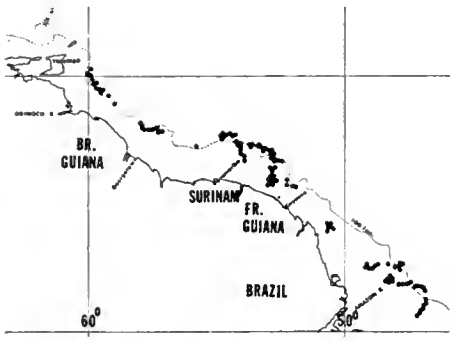
Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

FISH COLLECTING ON COASTS OF GUIANAS AND BRAZIL

By LOREN P. WOODS
CURATOR OF FISHES

RECENTLY the author participated for the fifth time in an exploratory fishing cruise of the motor vessel *Oregon* of the United States Fish and Wildlife Service. Three of the previous cruises were in the Gulf of Mexico and one in the western Carribean. Each resulted in large collections of fishes from offshore deep waters. Many of the species collected were not previously represented in our collection and have provided valuable research materials for our staff and for several ichthyologists in other institutions as well as for graduate students training to become ichthyologists.

On the fifth voyage, in November, 1957, the *Oregon* explored the South American



FISHING GROUNDS

Each spot on the map represents a trawling station on the recent cruise to the Guianas and Brazil of the motor vessel "Oregon."

continental shelf along the coasts of the Guianas and Brazil from off the mouth of the Orinoco River to the mouth of the Amazon. Over this vast distance an otter trawl with an opening 40 feet wide and 6 feet high was dragged at 5-fathom depth-intervals *(see map)* in depths ranging from 10 to 400 fathoms and from 20 miles off shore to the edge of the continental shelf, 50 to 75 miles from shore.

The fauna of the shelf of this section of South America had never been explored beyond a depth of 20 fathoms, and we made many noteworthy discoveries. In fact, only about one-third of the fish species collected were recorded as living along the coasts of the Guianas or Brazil while the remaining two-thirds were either extensions of range from the West Indian–Caribbean area or are undescribed species.

CURRENTS AND WINDS

The main equatorial current moves westward across the Atlantic just south of the equator and divides on approaching Cabo de São Roque, the easternmost projection of South America. One branch turns south to form the Brazil current and the other stronger branch, the Guiana current, flows northwest along the coasts of Brazil and the Guianas where it combines with the north equatorial current and enters the Caribbean through deep channels between the islands of the Lesser Antilles. The Guiana current, moving past Brazil and the Guianas at a rate of more than 50 miles in 24 hours, is one of the strongest ocean currents around South America. Its waters and the life it contains are more affected by the outpourings of great rivers than those of any other ocean current in the world.

This region also lies in the path of the trade winds that blow strongly from the east and northeast and result in long even swells moving in a southwesterly direction. The mingling of trade-wind swells with waves accompanying the equatorial current results in very choppy seas that make difficult working conditions and at times uncomfortable sailing conditions. We did not get beyond the trade-wind belt into the region of equatorial calms, although usually the trade winds do not blow south of French Guiana. These fresh northeast winds tempered the sun's heat so that, although we were near the equator, the temperature was seldom above 90 degrees and dropped to 80 degrees at night.

The surface waters appeared to be relatively sterile if compared with waters over the shelf in the Caribbean or Central American coasts of the Pacific. Only one small school of small tunalike fishes was observed. There were very few flying fishes, Portuguese man-o'-war, porpoises, or birds. Only an occasional tern, jaeger, or petrel was seen. Boobies and tropic birds frequently seen in the Caribbean do not live on these coasts. Dr. Robert Cushman Murphy, Research Associate in Oceanic Birds at the American Museum of Natural History in New York, who has written about the sea birds of South America, has stressed the importance of vast areas of the sea made turbid by the tremendous discharge of the numerous rivers of this section of coast as a limiting factor in the distribution of such birds as the pelican. He gives as explanation that "in this turbid water there are either no schooling fish in numbers sufficient to support a population of pelicans, or else the water itself is so opaque that the pelicans are unable to see their prey."

QUEER SPECIMEN

A deep-water angler-fish named Chaunax. It is pink. It fills its gill pouches with water and blows itself up. The contrasting fleshy "bait" between its eyes is used to lure other fishes on which it preys.

FRESH WATER ON SEA SURFACE

Most authors in describing conditions in this area have mentioned the low-lying muddy coasts, the extensive patches of silty and stained fresh water, the mangrove swamps, the estuarine and inshore fauna. Our work was carried on far enough offshore so these turbid-water conditions were encountered on only two occasions. November is at the end of the low-water stage of the rivers or at the beginning of the rising waters so their volume apparently was not sufficient to overcome the waters of the Guiana current.

GOOD CATCH

A pelagic (open seas) lancet fish is displayed by Harvey R. Bullis, Jr., Chief of Gulf Fisheries Exploration and Gear Research aboard the "Oregon."

In describing their approach to one of the mouths of the Amazon, usually the Para River, many travelers have mentioned the discolored (brown or greenish-brown) water and the fact that the open sea is quite fresh a long distance from the shore. On the *Oregon* we encountered some discolored water about 40 miles offshore of French Guiana. This water tasted slightly brackish. However, the water near the bottom in 25 to 40 fathoms was certainly undiluted sea-water because the fresh water, being lighter, floats on top of the salt. The fishes trawled on the bottom here were all typical sea-fishes with one exception. This exception was a small banjo-catfish, *Aspredo*, that is widely distributed in the rivers of the Guianas and northern Brazil, including the

Amazon. Although *Aspredo* is known to live in river mouths, it apparently has never been collected in offshore waters before.

ABUNDANCE OF FISHES

Fishes were abundant everywhere but in the deeper waters, 200 to 400 fathoms, and in the shallower waters about 10 to 20 fathoms they were more abundant than in the intermediate depths. One of the constant difficulties in trawling in a new region is to find a bottom sufficiently free from ridges and valleys or from rocky or coral reefs that the trawl may be dragged several miles without being torn.

There are no coral reefs near the shore where conditions of silt and fresh waters combine to make conditions unfavorable for coral, but offshore where the shelf waters are still relatively shallow yet beyond the range of these two limiting factors there are patches of coral reef and patches of gorgonians and sponges flourishing in the clear, warm, saline Guiana current. Fishes trawled here were typical coral-reef fishes such as wrasses, tangs, demoiselles, parrotfishes, and butterfly fishes. There were also many invertebrates of kinds usually associated with corals.

In the middle depths, by far the most extensive type of bottom was fine sand. Here were snappers, grunts, goatfish, several kinds of small sea-basses, lizard fish, sea robins, scorpion fishes, eels, and many more kinds. In these areas beds of shrimp were discovered, often in quantity sufficient for commercial fishing.

As might be expected in the shallowest areas (10 to 25 fathoms) nearer shore the bottom was often of mud although even here some rock outcrops were encountered off French Guiana. Even here as offshore the bottom was predominately sandy. In these relatively shallow waters we caught five or six kinds of sea catfishes as well as the *Aspredo* mentioned above, and as many kinds of drum fishes and grunts. Sea cats and drum fish are abundant much nearer shore, and a large part of the local commercial catch is made up of these species.

WEIRD SOUNDS

Often when a netful of fish was dumped in a heap on the deck a variety of clicks, staccato popping, rasping, grunting, and groaning would be heard emanating from the catfish and drums in the pile. Some of the catfish produce sounds by rasping their pectoral fins. The drum fish make noise both by grinding broad crushing toothplates located in their throats and by vibrating their swim bladders giving a rapid, sharp, penetrating purr.

In deep waters near the edge of the shelf (200 to 300 fathoms) the fish fauna was practically identical with the fauna of similar depths in the Caribbean Sea and Gulf of Mexico. Here are several kinds of grenadiers, hake, whiting, armored sea-robins, pelican flounders, other flatfish, and beds of deep-water red shrimp. Some kinds of these red shrimp were almost twice the size of the pink or brown commercial shrimp, and shrimp gumbo or shrimp salad was often on the menu next day.

In the deep waters on the slope of the shelf (400 fathoms) typical bathypelagic and benthal fishes were caught. Several kinds of these—scorpion fishes, boar fish, dorys—are red with very large eyes or merely pink without the large eyes as is the angler fish, *Chaunax* (*see illustration*). Most of the abyssal fishes are very dark brown or black with an endless variety of luminous organs arranged in patterns over their heads and bodies. Also caught in these deep waters were viper fish 12 inches long with teeth an inch long curving over the tops of their heads, lantern fishes, hatchet fish, and a great many kinds with large mouths and weak fins—kinds that have no common names. Many of these were small, about 6 inches long, but some such as the deep-water chimaera were nearly 30 inches long. The black, velvety, blue-eyed deep-water sharks were also quite small, seldom over a foot long. Because of their small, weak teeth they feed on soft and sluggish invertebrates found on the bottom rather than actively pursue other fishes, as do the larger pelagic and inshore sharks.

The packed collection, which was left aboard the *Oregon* to be shipped upon arrival at its home port of Pascagoula, Mississippi, did not arrive at the Museum until after the beginning of the new year. It has taken two people nearly two weeks to unpack and sort the collection into jars so that the specimens may be studied. When these studies are finally completed the fishes will become part of the Museum's steadily growing reference collection of fishes. One more unknown region of the oceans has been at least superficially explored and something of its potentiality as a food source is known.

Books

THE SEVEN CAVES. By Carleton S. Coon. Alfred A. Knopf, Inc., New York. 338 pages, photographs, line drawings, maps. $5.75.

THE TESTIMONY OF THE SPADE. By Geoffrey Bibby. Alfred A. Knopf, Inc., New York. 414 pages, plates, line drawings, maps. $6.75.

The increasing number of excellent popular books on archaeology is most heartening to those of us who are asked to recommend books on this subject. The two recent publications reviewed here are first-class references, well-written documents, and dramatic and exciting reading.

The Seven Caves, by Carleton S. Coon, is an account of the author's search for the origins of the Old Stone Age cultures in caves in northern Africa, the Middle East, and Afghanistan. The lay-reader is fortunate in having this account because it was written before the long scientific reports have been issued and it is therefore relatively fresh. The photographs are excellent, but the maps, for one not well acquainted with the area, are difficult to interpret.

Dr. Coon's first caves were dug in 1939 and the last one in 1955. The war years naturally interrupted his labors, which otherwise would have terminated some five or six years earlier. The reader will find his interest aroused from the outset, for Dr. Coon, in facile and witty style, presents his story in narrative form. His explanations as to why people dig in caves are convincingly personal and lack any psychoanalytical motivations.

The excavations were sometimes exciting and rewarding but more frequently were monotonous, tiring, dangerous, and disappointing. The significance of the many finds (over 150,000 pieces) is carefully presented albeit in a technical manner. Therefore, many sections have to be read with care. But the reader will be rewarded because all the parts of this gigantic jigsaw puzzle are related to the Stone Age cultures of the Far East, the Middle East, and Europe. In short, one finds that the earliest horizons in Europe are merely the later developments of cultures that originated many thousands of years earlier in the Middle East or perhaps the Far East. One of the radiocarbon dates—43,000 years ago—is the oldest date found at a site occupied by human beings.

Dr. Coon and his associates were searching for the place of origin of a man fully evolved and equipped with a complete Upper Paleolithic toolkit that would enable him to live in the cold, moist, cloudy climate of Ice Age Europe. The story of the success he achieved and of his theories about the origins of Neanderthal man, climate changes, and migration routes of our prehistoric ancestors will answer many questions for Dr. Coon's readers and will point out many that cannot yet be answered.

The Testimony of the Spade is utterly different and yet equally rewarding and illuminating. Dr. Bibby, an English archaeologist, has made full use of his knowledge of many languages in creating the saga of the life and the inhabitants of Europe from 15,000 B.C. to about A.D. 800. The sweep of events, the breadth of scope, the enormous mass of detail that make up this story remind one of a great tapestry depicting

(*Continued on page 8, column 1*)

ABOUT ST. PATRICK AND THE SNAKES

By ROBERT F. INGER
CURATOR OF AMPHIBIANS AND REPTILES

THERE ARE TWO recurring questions about Ireland and snakes. (1) Is it true that there are no snakes in Ireland? (2) Did St. Patrick really drive them out?

My qualifications for answering these questions are two: I am Curator of Reptiles, and my mother was born on St. Patrick's Day.

This story, like most good ones, goes back a long time—in fact, about 60,000 years, to the period immediately before the last Ice Age. At that time snakes probably lived in

Cartoon by E. John Pfiffner

Ireland as they almost certainly did in England. But as the glaciers began to advance and cover Ireland (and England), the snakes and other warmth-loving animals were pushed farther and farther south. Finally the ice covered all of Ireland, exterminating the entire fauna, including the snakes. Actually, the reptiles must have died out before all of the land was under ice because the climate was undoubtedly too cold.

By the time the glaciers began to melt and retreat, so much water was bound up in the ice that sea level was lowered, forming a land connection between the British Isles and the continent of Europe. As the ice sheet continued to melt, animals of many kinds began to reinvade Great Britain from the continent. The climate was still very harsh and the hardiest animals returned first. Reptiles, being very sensitive to cold, probably were not among the first invaders. But eventually they, too, crossed the land between modern Europe and England. Just about the time snakes began to reach Great Britain but before they could reach Ireland, it was cut off from England and Scotland by an arm of the sea, for as the ice sheet melted the level of the oceans rose.

This geographic separation of Ireland took place some time before 5000 B.C. Since St. Patrick did not reach Ireland until about A.D. 400, the sequence of events eliminates him from the zoological problem.

Therefore the answers to our two questions are: yes and no. Yes, Ireland has no snakes. No, St. Patrick did not drive them out.

ANIMAL LIFE HAD ITS ORIGINS IN THE OCEANS

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

THE PREPONDERANCE of seascape paintings in our new exhibit, "The Animal Kingdom," came as a surprise to me when I stood back and looked at the plans. But the importance of the sea and its inhabitants in any survey of animal life is great. Inclusion of many seascapes was necessary.

In area the seas are much more extensive than the land, covering about two-thirds of the surface of the globe. The oceans have their depths too—the Mindanao Deep off the Philippines descends to 32,000 feet, exceeding by more than a half-mile the height of Mount Everest. But it is the shallow water and the surface layers of the open oceans that contain most of the living things.

While in the vast expanses of the sea less than one-quarter of the million or so existing species of animals live, they include more basic types than do the other three-quarters of the animal species, which live on the land.

CRADLE OF ANIMAL LIFE

The sea was the cradle of animal life. Already in that far-distant geological period, the Cambrian, or shortly afterward, there lived in the sea representatives of all the major types of animals that we know today.

ECHINODERM PANEL IN 'ANIMAL KINGDOM' EXHIBIT

The animals shown form the only group that developed in the sea and still all live there, none having colonized on land or in fresh water.

Perhaps the most amazing aspect in a review of the animal kingdom, living and extinct, is that only these few basic types have flourished. Many smaller groups have disappeared, of course. Dinosaurs became extinct but other reptiles have survived. Trilobites disappeared more than 200 million years ago but other arthropods survive in abundance. A few obscure groups, such as graptolites (of which no one but specialists have ever heard and even they find the fossils difficult to interpret), did become extinct, and probably some soft-bodied groups disappeared without leaving an un-

(*Continued on page 8, column 3*)

BOOKS—

(*Continued from page 6*)

events that are so remote, so thrilling, so commonplace that they quite outclass the story of St. George and the dragon.

This book really contains two stories: the growth of culture in northern Europe and short biographies of the more important and colorful archaeologists whose labors have made possible this excellent volume. Both stories are skillfully intertwined and yet each stands out clearly. The most satisfactory feature of the book, besides its clever title, is its simplicity and directness of style. The absence of technical anthropological terms and the expression of the technical aspects of this work in everyday language are remarkable.

To whet the reader's appetite, let me cite several of the subjects covered. The first part of the book deals with the antiquity of man in Europe and the discovery of the world-famous and incredible cave paintings that date back some 15,000 years. The second part covers events before and during the retreat of the great ice sheets. In this section is the best account I have ever encountered of the methods of dating the past. Herein one finds an explanation of typology (types), of geochronology (the dating technique worked out by Baron de Geer wherein the laminated, annual glacial deposits of sediments are counted), of dating by means of pollen analysis, and, finally, of the more recent dating by means of radiocarbon. I recommend this section most heartily to all laymen who wish to find out how the archaeologist interprets and dates his materials. The remainder of the book is concerned with such absorbing subjects as the Swiss Lake Dwellers, the first farmers, the coming of the plough, Stonehenge, Viking ships that have been totally recovered, and the bodies in the peat bogs.

Mr. Bibby concludes his masterful book by stating the reasons for digging up the past. "He [the archaeologist] digs in pity and humility that the dead may live again, that what is past may not be forever lost, that something may be salvaged from the wrack of the ages, that the past may color the present and give heart to the future."

I have given high praise to both of these books because they deserve it. I can unequivocally recommend both of them to the layman and to the archaeologist alike.

PAUL S. MARTIN
Chief Curator of Anthropology

In addition to actual fossil skeletons of prehistoric animals, exhibits in Ernest R. Graham Hall (Vertebrate Paleontology, Hall 38) show how bones hundreds of millions of years old happen to be buried and how paleontologists find them.

Spring Visiting Hours Begin at Museum

Beginning March 1, spring visiting hours will go into effect at the Museum. The building will be open from 9 A.M. to 5 P.M. every day, an extension of one hour over the winter hours. On May 1 there will be another extension, when summer hours, 9 to 6, go into effect.

ENDOWMENT FUND SET UP AS SCHMIDT MEMORIAL

An endowment fund to assist naturalists in pursuing their fields of study has been established by the friends and colleagues of the late Dr. Karl P. Schmidt, Curator Emeritus of Zoology, as a memorial to the eminent scientist who died September 26, 1957. The training of young scientists was among the activities closest to the heart of Dr. Schmidt.

Under the provisions of the fund, income will be disbursed as grants-in-aid to help naturalists in the museum phase of their studies, that part that is often most difficult to finance. Grants will be limited to visiting naturalists desiring to use the research facilities of this Museum and will apply to work in any area of natural history except for financing of field work.

A self-perpetuating seven-man committee drawn from the staff of the Museum and the several universities in the Chicago area will administer the grants. The Museum will handle investment of the capital but will not be concerned with the administration of the fund. All contributions to the fund should be sent to The Karl P. Schmidt Fund, care of Chicago Natural History Museum. Checks should be made payable to The Karl P. Schmidt Fund.

NEW MEMBERS

(January 16 to February 12)

Life Members

John P. Bent, Edison Dick, Russell P. Kelley III, W. Paul McBride, Donald R. McLennan, Mrs. Clive Runnells

Associate Member

Robert J. Greenebaum

Sustaining Members

Kent W. Duncan, Donald Erickson

Annual Members

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SEA LIFE—

(*Continued from page 7*)

derstandable record. But eight "major" basic types of animal organization that are shown in this exhibit have an ancient lineage. They got their start in the sea, and all of them still flourish there.

All of the echinoderms (sea stars, sea urchins, etc.) live only in the sea, and two other groups, the sponges and the coelenterates (jellyfish, corals, etc.) are mostly in the sea, with only a few colonists in fresh water. The protozoans and the various worms are shared by sea and land, but those that have colonized the land usually stick to damp places. The mollusks, too, are most abundant in the sea and are much less important as a land group.

Two groups only have colonized the land and become conspicuous there: some chordates (birds, mammals, reptiles) and some arthropods (notably insects). But both of those have left large subgroups in the sea too, notably fishes and crustaceans.

PLANTS IN FOOD CHAIN

Both on land and in the water the basis of the animal food-chain is the same: plants. All animals eat plants as part of a food-chain or eat other animals that eat plants. On land the grass, herbs, and leaves are the start of the food-chains. In the sea, plant-life is less varied. Especially in shallow water there are large, many-celled algae, some of which may grow in strands 200 feet long. But out in the open ocean it is minute one-celled plants such as diatoms that form the plant part of the drifting sea-life called plankton and the first link in the food-chain.

Though the plants of the plankton are very small, they are extremely abundant. The many animals of the plankton that feed on them are also very small, and the tiny crustaceans bulk large among them. Some mollusks, like clams, also filter out tiny bits of food from the water. Then there come animals a size larger that eat the smaller, then larger crustaceans that eat smaller ones, and fishes that are predators—jellyfish that eat fish, starfish that open oysters, squids that pursue and catch fish, and sperm whales that eat squids. Parasitic worms pass through a complicated life-cycle in which an individual lives in a fish, a snail, and a bird as alternative hosts before it becomes adult. The web of life in the sea is different, but it is at least as complicated as on the land.

While the plant-life may be less varied in the sea, the manner of feeding on it and the food-chains that lead from that are more varied than on land, and this is what one must expect with the greater variety of animal life in the sea.

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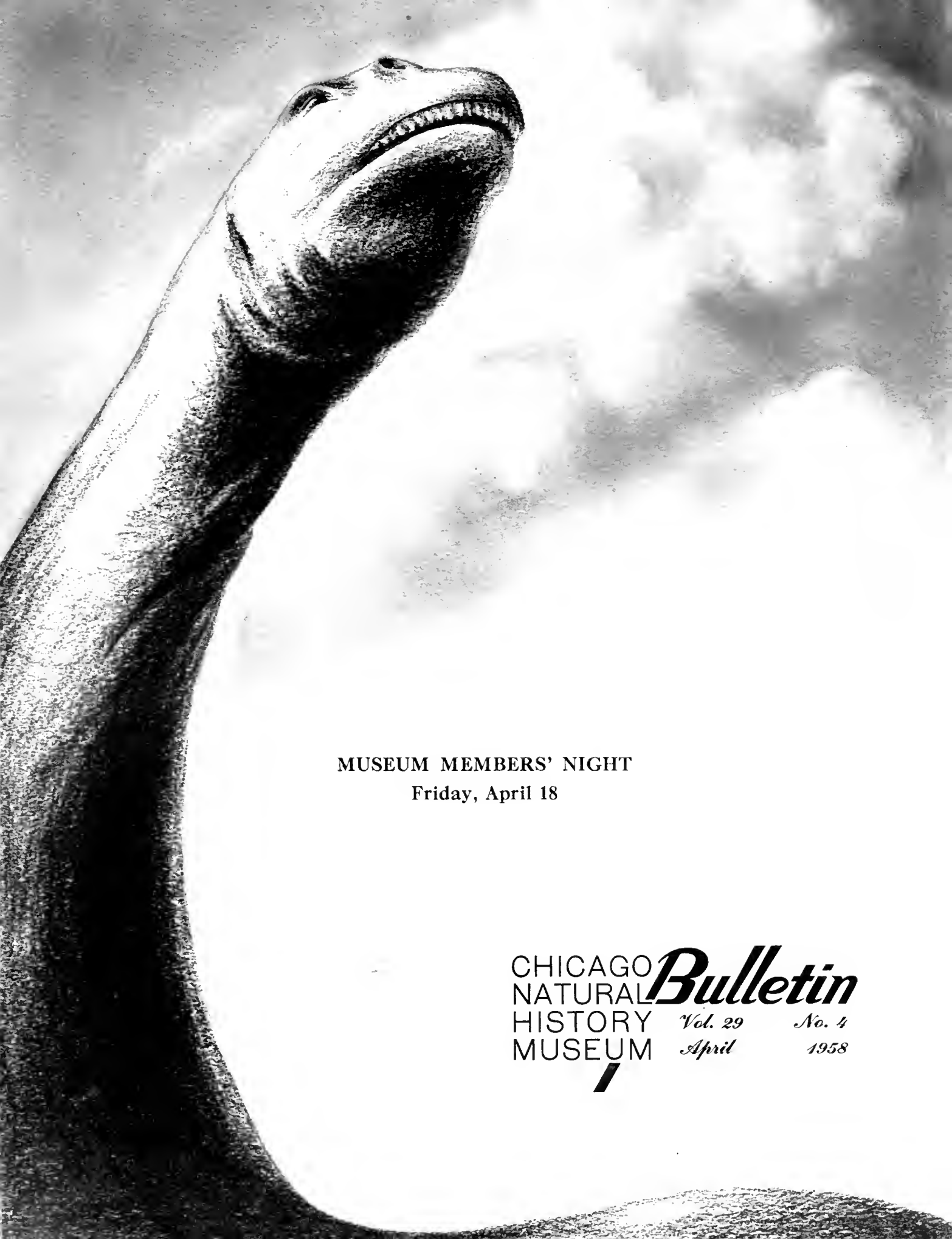

MUSEUM MEMBERS' NIGHT
Friday, April 18

CHICAGO NATURAL HISTORY MUSEUM
Bulletin
Vol. 29 *No. 4*
April *1958*

Chicago Natural History Museum
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Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

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

PEARLE BILINSKE

1889–1958

The Museum has suffered the loss of a faithful and valued employee in the death, on February 20, of Pearle Bilinske, head of the Division of Memberships. Miss Bilinske's many years of service began in 1923 when she joined the Museum staff as a stenographer and membership canvasser. In 1928 she was placed in charge of the Division of Memberships, and in the years that followed she efficiently conducted the affairs of that office, and attained great success in expanding the rolls of members to the highest point in the Museum's history. Miss Bilinske was 68 years of age at the time of her death. She was born in Chicago on March 27, 1889. She became eligible for retirement on pension in 1949, but chose to continue actively at her desk, and this arrangement was welcomed by the Museum administration not only because of the high caliber of her work but also because of her extreme loyalty to the Museum.

PEARLE BILINSKE

THIS MONTH'S COVER

Top-billed of the attractions for Members' Night, Friday, April 18, is the completed skeleton of Brontosaurus, 30-ton 72-foot dinosaur in Ernest R. Graham Hall (Hall 38). For our cover, the giant's head and neck as they must have appeared in life, have been restored by Maidi Wiebe, Artist of the Department of Geology. The skull, the long neck, shoulder girdle, fore limbs, and the long tail are important new parts just added to complete the huge fossil specimen—the central or torso section of the skeleton had been on exhibition since 1911.

Ashley Hine Dies

News of the death of Ashley Hine, once a member of the Museum staff, was received with deep regret. Mr. Hine came to the Museum in September, 1922, and held the position of Chief Bird Taxidermist from that time until his resignation in 1935 when he moved to the west coast. He also participated in field work and was a member of the Rawson-MacMillan Expedition to the Arctic in 1926. For many years, Mr. Hine had been living in San Diego, California, where he died on January 4, at the age of 81 years.

Artist John G. Wilkins Dead

Word has been received of the death, on February 17, of John G. Wilkins, 65, an artist. A former member of the faculty of the School of the Art Institute of Chicago, Mr. Wilkins was in charge of that institution's art classes at this Museum in the 1920's. He was the author of a book for students, *Research Design in Nature*, published in two volumes by the Museum press.

MUSEUM REPRESENTED IN ART PROJECT

Some 60 outstanding objects of American Indian art in the ethnological collections of Chicago Natural History Museum were photographed in color last month for use in the Carnegie Study of the Arts of the United States. Sponsored by the Carnegie Corporation of New York, the project is aimed at providing teaching materials in the visual arts of this country for wide distribution to educational institutions both in the United States and abroad. The project is being administered by the University of Georgia under a Carnegie grant, and will provide thousands of color slides covering architecture, city design, landscape architecture, costume design, decorative and applied arts, graphic arts, painting, photography, sculpture, stage design, and visual communications, as well as primitive art.

The work at this Museum, as well as at the Art Institute and other Chicago sources, was conducted by Photographer John Waggaman, and Mrs. Waggaman, of New York, who were assigned to it by Color Illustration, New York. That organization, under the direction of Victor Sandak, has developed a new technique for duplicating color slides by the thousands without the work and expense formerly required.

MEMBERS' NIGHT

PROGRAM

Friday, April 18

7 p.m. to 10:30 p.m.
(Museum doors open at 6 p.m.)

FOR YOUR CONVENIENCE—

Special Motor-Bus Service has been arranged for Museum Members and guests who do not wish to drive their own cars. A bus marked to indicate that it is for Museum shuttle-service will leave Jackson Boulevard and State Street at 15-minute intervals beginning at **6:30 p.m.** The last bus will leave the Museum at **10:45 p.m.** In both directions intermediate stops will be made at 7th Street and Michigan and at Jackson and Michigan.

Ample Free Parking Space is available to the north of the Museum building for those who drive.

You May Dine at the Museum in the Cafeteria (ground floor). **Open 6 to 8 p.m.** (regular service and prices).

FOR YOUR ENTERTAINMENT—

New Exhibits: *Brontosaurus*, fossil skeleton of a 30-ton 72-foot dinosaur, in Ernest R. Graham Hall (Hall 38, 2nd floor). Mineralogical exhibits, Clarence Buckingham Hall (Hall 35, 2nd floor). Ethnological and primitive art exhibits from Africa and Oceania in Halls D, E, A, F, and G (all these halls on ground floor). Cultures of ancient Mexico and Central America in Hall 8 (main floor). "Birds Are Beautiful" stabile in Hall 21 (main floor).

Open House: "Behind the Scenes," 7 to 9 p.m. Visitors are invited to take the elevator to third and fourth floors where the scientific staff and other Museum workers will welcome them in laboratories, studios, offices, and the Library and explain various phases of a museum's operation. Some laboratories also will be found on the Ground Floor.

Refreshments at 9:30 p.m. in Stanley Field Hall (main floor).

MEMBERS' NIGHT AT MUSEUM SET FOR FRIDAY, APRIL 18

MUSEUM MEMBERS' NIGHT this year will be, for the first time, a spring event. It will be held on **Friday evening, April 18.** There has been an unusually long interval since the last such gathering (October 12, 1956), and many new exhibits installed since then await the visitors. New Members who have enrolled within the last year and a half are especially urged to take this opportunity to become better acquainted with the institution they are helping to support. Members' Night is the one occasion when they may go "behind the scenes" and observe the activities that keep a museum moving and growing, as well as seeing the fruits of these activities in the displays in the exhibition halls.

Central feature of this year's Members' Night will be the recently completed giant fossil skeleton of *Brantosaurus*—a 30-ton 72-foot long dinosaur. The completion of this exhibit is an event that has been awaited some 47 years. Since 1911 the Museum has exhibited the torso-framework and legs of this huge creature that lived about 160 million years ago, but the skull, the long neck, and most of the long tail were missing. In 1942 the Museum finally acquired the missing parts of the skeleton which were badly fractured requiring patient assembly like a jigsaw puzzle of stupendous size and baffling intricacy. The final result is a fine specimen of the giant creature which was one of the

largest animals ever to walk the earth. Elsewhere in this BULLETIN will be found an account by Dr. Rainer Zangerl, Curator of Fossil Reptiles, of the history and life cycle of *Brontosaurus*, its place in the story of evolution, the gigantic task of collecting its component parts by expeditions to the burial places in Colorado where the huge bone piles lay hidden for millions upon millions of years, and finally the herculean task of reassembling the skeleton in the Museum laboratories and its erection in the exhibition hall (Ernest R. Graham Hall of Historical Geology—Hall 38).

Many Other Features

Other features on the program for this year's Members' Night are:

A preview of reinstalled and new exhibits in the completed half of Clarence Buckingham Hall (Hall 35), devoted to minerals, meteorites, and the moon.

Spectacular new exhibits illustrating phases of tribal life in Africa, recently added to the collections in the two halls of African ethnology (Halls D and E).

Recent additions to the exhibits illustrating the amazing cultures of the Mayas, Aztecs, Toltecs, and Zapotecs of ancient Mexico and Central America (Hall 8).

Exhibits of examples of primitive art created by peoples of Africa and of many islands of the Pacific, especially selected by the new Division of Primitive Art recently established in the Department of Anthropology.

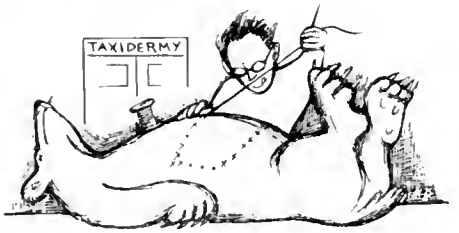
"Birds Are Beautiful," the new and colorful display of birds arranged in "stabile" art-form to emphasize their appeal to the aesthetic sense (Hall 21).

A vast array of new exhibits of many kinds scattered through all departments of the Museum—Anthropology, Botany, Geology and Zoology. Visitors will be furnished with leaflet-guides to all new exhibits added since the 1956 Members' Night.

All exhibits, old as well as new, will be lighted and available for inspection.

Behind the Scenes

"Open House" will prevail, and will be one of the main attractions of the evening. Visitors are invited to take the elevator to the third, fourth, and ground floors of the



Museum, where they will find the various work areas. There they will meet the staff—chief curators, divisional curators, taxidermists, preparators, artists, technicians, librarians, editors, and others. In laboratories, studios, workshops, and offices of the staff the guests will have opportunity to observe the workings of many branches of Museum activity, and learn something about the methods, the techniques, and the painstaking and long drawn-out toil that go into the preparation of exhibits.

The open house hours will be from 7 to 10:30 P.M., but the doors will open at 6 for the convenience of visitors who wish to dine at the Museum. The Cafeteria will serve dinner from 6 to 8 P.M., offering its regular service at its usual prices.

Reception and Refreshments

The official, but thoroughly informal reception will begin at 9:30 P.M. in Stanley

Field Hall, where guests will be welcomed by President Stanley Field, Director Clifford C. Gregg, and other Museum officials. Light refreshments will be served at this time.

For Members and their guests who arrive by private car, ample free parking space is available at the north entrance. Special motor-bus service has been arranged to accommodate those who do not wish to drive their own cars. A free shuttle-bus, marked to indicate that its destination is the Museum, will leave Jackson Boulevard and State Street at 15-minute intervals, beginning at 6:30 P.M. Intermediate stops will be made at Jackson and Michigan Avenue and at Seventh Street and Michigan. The last bus, city-bound, will leave the Museum at 10:45 P.M.

PLEASE NOTIFY MUSEUM IF YOU'RE MOVING

Members of the Museum who change residence are urged to notify the Museum so that the BULLETIN and other communications may reach them promptly.

Members going away for extended periods may have Museum matter sent to their temporary addresses.

Museum Exhibit at U. of C.

Some of this Museum's notable collection of Chinese rubbings, books and archaeological materials were on loan for a special exhibit last month in the galleries of the Renaissance Society on the campus of the University of Chicago.

NEW EXHIBITS OF MIDDLE AMERICAN CULTURE

By DONALD COLLIER
CURATOR OF SOUTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

NEW INSTALLATIONS in Hall 8, (Ancient and Modern Indians of Mexico and Central America), will be available to visitors on Members' Night. The most recently completed of these exhibits deal with the ancient Mayas and the prehistoric Indians of Mexico.

MODEL OF EARLIEST KNOWN MAYA TEMPLE

The Maya exhibits include displays of pottery vessels, precious jewelry, stone sculpture, and a diorama depicting a colorful religious ceremony. Also displayed is a model of the earliest known Maya temple, dating from about 100 B.C. This is the temple known cryptically as E VII sub, which was excavated by the Carnegie Institution of Washington in the Guatemalan jungle at Uaxactun (pronounced Wah-shock-toon).

This small, stepped pyramid was discovered inside a later and larger pyramid. The temple that surmounted the earlier structure had been destroyed when the later pyramid was built over it, but postholes from the supporting beams of the temple were preserved. From the evidence of these postholes and our knowledge of later Maya buildings, Dioramist Alfred Lee Rowell was able to reconstruct the thatch-roofed temple that stood on this little pyramid 2,000 years ago.

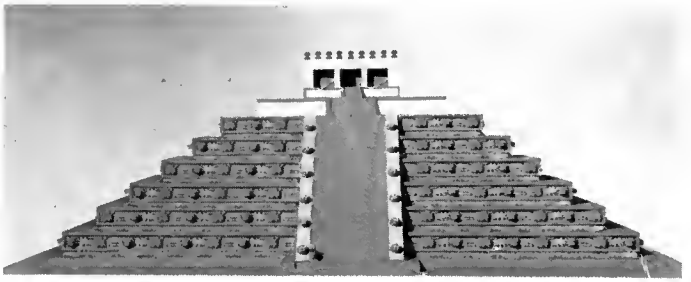
The four stairways of the pyramid are flanked by great masks 8 feet wide and 6 feet high sculptured in stucco. They are conventionalized and anthropomorphized renderings of the jaguar, and probably represent rain gods.

This beautiful pyramid is especially important because it is the only well-preserved prototype of the Classic Maya architecture that evolved several centuries later. And the style of the jaguar masks is a link between Maya art and the early Olmec style of southern Veracruz.

Another new exhibit of special interest is the model of the Temple of Quetzalcoatl at Teotihuacan, in the Valley of Mexico. This stepped pyramid, which is situated a half-mile south of the Pyramid of the Sun, dates from the early Classic period, about A.D. 200. It was excavated by the Mexican government in 1921.

Like pyramid E VII sub at Uaxactun, the Temple of Quetzalcoatl was buried under a later pyramid, the construction of which resulted in the destruction of the upper terrace and the crowning temple of the earlier structure. We shall never learn the precise character of the former temple. But in the model Mr. Rowell has replaced the missing parts with a reconstruction based on what is known of the architecture of the period. He has thus recreated the architectural spirit of the original structure, even though some of the details may be inaccurate.

The terrace faces and the balustrades of the central stairway were ornamented with heads and reliefs sculptured in stone and stucco. The principal features were great masks of Tlaloc, the rain god, and the heads and undulating bodies of feathered serpents representing Quetzalcoatl. Quetzalcoatl ("quetzal snake") was the god of wind, clouds, and fertility, and lord of the planet Venus. These and other ornaments were painted in red, green, blue, and white. Their colors are now largely destroyed but they have been restored to their full brilliance in the reconstructed model.



MODEL OF TEMPLE OF QUETZALCOATL

MUSEUM MEMBERS' NIGHT
Friday, April 18

TEN-YEAR-OLD SCIENTIST HAS DAY AT MUSEUM

A "one-man" science show extending some 15 miles from the North School in Franklin Park, Illinois, to Stanley Field Hall in Chicago Natural History Museum was staged by Junior Scientist Lee Carson, age 10, 3412 Ruby Street, Franklin Park, on March 18. Lee is a fifth-grade pupil at North School, and his exhibit was part of that school's Science Fair. "General Consultant" was Mrs. Gordon Carson, Lee's mother.

Lee's exhibit was intended to illustrate in comprehensible terms of space, the distances between astronomical bodies. To accomplish this, he prepared a representation of the sun's 864,100-mile diameter on a scale of 1 inch to equal 25,000,000 miles, reducing the sun thus to less than 1/25 of 1 inch in diameter. This part of the exhibit was displayed at the school in Franklin Park. The nearest star neighbor, which explanatory labels written by Lee stated would be one of the Alpha Centauri system, was represented by another placard containing a dot 1/25 of 1 inch in diameter, representing the star's diameter of approximately 1,000,000 miles. This was displayed in Stanley Field Hall. With the two astral bodies on this tiny scale, the distance of some 26 trillion miles between them was therefore represented in ratio by the distance of about 15 miles between the Franklin Park School and the Museum, it was explained by Lee's labels. To show the sun and the other star on a scale "big enough to see, they had to be this far apart," Lee's legend said.

At the school, Lee's exhibit also covered our galaxy and its nearest neighbor on a scale of one quintillion miles to the inch; our supergalaxy on a scale of 20 quintillion miles to an inch; and the universe on a scale of 5 sextillion miles to the inch, which he said was based on Einstein's figures. Coming down to more modest figures, he showed the earth and its moon on a scale of 40,000 miles to the inch, and the sun at 500,000 miles per inch. He also had an exhibit on atoms and electrons in which the nucleus of an atom was shown in the school exhibit on a scale that required the orbit of its electrons to pass through another school several blocks away, and the nearest neighboring atom to be located in New York.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

BRONTOSAURUS—A BULKY LUMP OF ANCIENT PROTOPLASM

Copyright Chicago Natural History Museum

RESTORATION OF BRONTOSAURUS—A MURAL, BY CHARLES R. KNIGHT, IN HALL 38

By RAINER ZANGERL
CURATOR OF FOSSIL REPTILES

ANY RECENT VISITOR to the Hall of Fossil Vertebrates (Ernest R. Graham Hall—Hall 38) must have noticed the commotion behind screens and blinds in the middle of the hall. Looking through the peepholes which had been provided, he could witness one of the more formidable construction jobs that the staff of the Museum has to undertake from time to time. Ever since our present building was opened in 1921 there has stood, at the present location, the skeletal torso of a giant dinosaur, *Brontosaurus* (which was exhibited also for a number of years in the first building in Jackson Park). Although the skeleton lacked everything in front of the chest and a good part of the tail, it did convey a fair notion of the fantastic size of the creature. It did not, however, give an adequate idea of what the animal looked like. Therefore, it was decided to complete the exhibit by using a second specimen to supply the missing parts. These were assembled properly with the original skeleton, and remaining minor gaps were filled out with restorations in plaster of Paris.

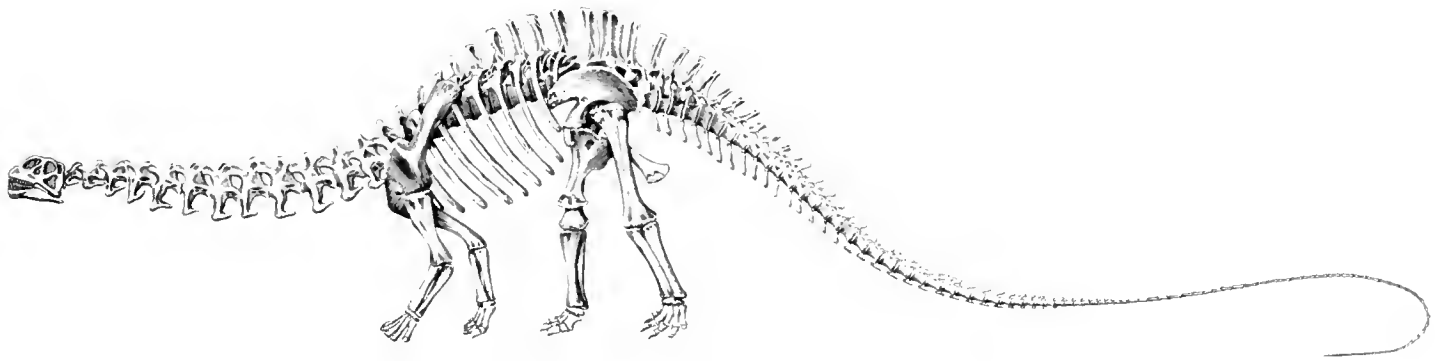
Brontosaurus has become a familiar animal, partly because it is a spectacular giant and as such has received a good measure of publicity, and partly because it is used as a trade mark by one of the big oil companies. It belongs to a group of dinosaurs, the sauropods, including such other illustrious names as *Diplodocus*, *Camarasaurus* and the spectacular *Brachiosaurus*. Remains of sauropod dinosaurs have been discovered in every part of the world, except in Antarctica, but fairly complete skeletons are rare so that the group as a whole remains rather poorly known.

MUSEUM MEMBERS' NIGHT
Friday, April 18

The sauropod dinosaurs walked on all four feet, but their ancestors did not; all dinosaurs originated from animals that walked on their hind feet holding the body in semi-erect posture. In late Triassic time (some 180 million years ago) there lived a group of dinosaurs showing, among other similarities to the sauropods, a marked tendency toward walking on all fours. This change in the mode of locomotion seems clearly to go along with the rapid increase in body size, resulting in a better distribution of the enormous weight in the large sauropods.

REASONS FOR HUGE BULK

What brought about this prodigious bulkiness of the body in the sauropods? We have no definitive answers to this question. But there are some ideas that might have a bearing on the problem. For one thing, the study of paleontology has revealed gradual increase in size in the course of evolution of very many animals, such as the horses and the elephants, to mention two familiar examples. Suggested underlying mechanisms that might have been responsible for such phyletic increase in body size involve, among others, selective advantages enjoyed by the larger individuals of a breeding population in terms of opportunity for reproduction, competition for food, balance of power in relation to enemies. In the sauropod dino-

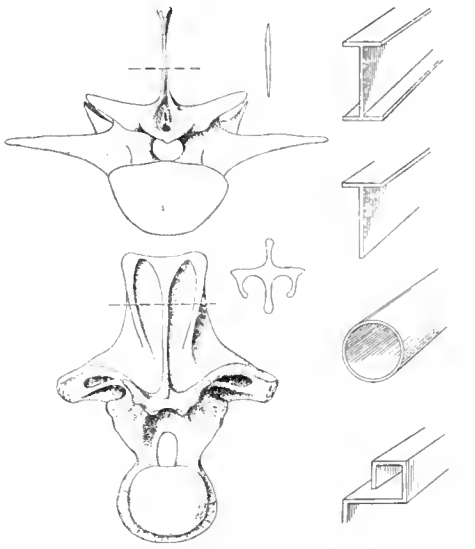


DRAWING OF BRONTOSAURUS SKELETON APPROXIMATELY AS RECONSTRUCTED IN HALL 38

saurs, increase in body size was accompanied by a very notable enlargement of a ductless gland at the base of the brain, the anterior lobe of the pituitary, whose size can be determined in a fossil skull by the dimensions of a pit in the floor of the bony braincase that contained the organ in the living animal. One of the functions of this ductless gland is to produce a growth hormone; overproduction of this hormone in man, for example, results in abnormal growth of such individuals beyond the normal size range of the human species. They may become so overgrown that they are labeled giants.

NATURE'S ENGINEERING

Vast bulkiness in an animal creates many structural problems. The skeleton provides the supporting framework for the muscles and the large digestive and reproductive organs within the belly cavity. As the body



'SUPER' STRUCTURAL ENGINEERING

Backbone of a crocodile (above, left), and below it, the corresponding vertebra of Brontosaurus. Cross-sections through spines are shown in both examples. Note the structural shape in the backbone of the dinosaur. For comparison, structural shapes used in typical metal building supports are illustrated in the four drawings at right.

size increases, the muscle mass becomes bulkier and, especially in plant-eaters, the digestive organs must provide for the reception and processing of ever increasing food demands. This in turn requires a heavier and stronger skeleton, which in turn increases the overall weight, requiring yet bigger and more powerful muscles, and so on. Clearly, mere increase in size without structural adjustments would lead to a vicious circle in which a functional equilibrium among the parts of the body could never be realized. The sauropod dinosaurs illustrate more clearly than any other animals the structural adjustments that must accompany increase in body size.

The backbones of *Brontosaurus* and his relatives conform to one of the basic principles

MUSEUM MEMBERS' NIGHT
Friday, April 18

of structural engineering: design for maximum strength with minimum use of material and thus overall reduction in weight. Instead of using solid metal bars and rods, our engineers have designed what they call "structural shapes"—angles, I-beams, T-beams, tubes, etc.—for the construction of building supports. The sauropod backbones, too, make use of the advantages of structural shapes. The arches of the vertebrae are not solid masses of bone as they are, for example, in a crocodile; instead, they consist of relatively thin sheets of bone, re-enforced by struts and braces (*see figure*). This design of the backbones had additional advantages in providing large areas of attachment for the muscles and the ligaments that had to support the head at the end of a very long neck.

There is still another aspect to the great size and weight (it has been estimated at 30 tons) of *Brontosaurus*. Heavy animals often show mechanisms that permit them to rest in standing position in such a way that their weight is not supported by the action of muscles, but rather by locking devices between leg bones (as in the elbow joints of the elephants) or by complicated arrangements of ligaments in the foot region, as in the horses. In *Brontosaurus* there are no indications of such resting devices. The joints between the limb bones are very poorly developed, and thick cartilage pads must have covered the ends of the bones. These considerations and the fact that the nasal openings were located high up on the face, led to the conclusion that the big sauropod dinosaurs must have spent most of their lives in the water where the great weight would have been much less of a problem and where they could have rested in perfect safety with only their nostrils above water. That they were capable of walking on land, however, is certain, since trackways of large sauropods, impressed into the plastic mud along the shores of an ancient pond or lake have been discovered, for example, in Texas.

The sauropod dinosaurs have rather peculiar teeth: more or less blunt, thick spatulae, that are neither designed for cutting or tearing flesh, as are those of the predacious dinosaurs, nor for grinding hard plant material as are the dental batteries of the duckbilled and horned dinosaurs. Accordingly it is thought that the sauropods fed essentially on soft, leafy water plants of which they must have consumed immense quantities.

THRIVED OVER LONG PERIOD

It would be very misleading, however, to conclude from the preceding discussion that the sauropod dinosaurs could hardly have been successful animals. The fact is that they were around for a very long time, namely from the Jurassic period (about 160 million years ago) to almost the end of the Cretaceous, spanning an interval of some 70 million years.

The old skeleton was collected near Fruita, Colorado, by the Museum's palaeontological expedition of 1901 with former Curator Elmer S. Riggs in charge. The new partial skeleton, now merged with the old one, was obtained by a Museum expedition in 1942 near Floy Junction, Utah, by James H. Quinn, former Chief Preparator and Orville L. Gilpin, present Chief Preparator of Paleontology. Both specimens were found in late Jurassic beds of the Morrison Formation. The fact that these specimens are of very nearly the same size made it possible to combine them into one skeleton.

The amount of work and skill that goes into an exhibit of a sauropod dinosaur is almost unbelievable. Two full years were required to prepare the second specimen alone, and its addition to the old mount posed much the same problems that face a householder trying to enlarge his living quarters which were built with no such eventualities in mind. Mr. Gilpin must be congratulated for his skill in solving all these difficulties, so that the finished skeleton looks as if it had been mounted all at one time.

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: Chicago Academy of Sciences—12 pigeon whistles, China

Department of Botany

From: Holly Reed Bennett, Chicago—1,917 plant specimens; Dr. Lawrence Kaplan, Chicago—26 seed samples, South Africa

Department of Geology

From: Dr. Henry Field, Coconut Grove, Fla.—dinosaur egg fragments, southern France

Department of Zoology

From: Harry Hoogstraal, Cairo, Egypt—26 mammals; Dr. Carl L. Hubbs, La Jolla, Calif.—31 birdskins, Guadalupe; Dr. P. Wagenaar Hummelinck, Utrecht, Netherlands—collection of Subulinidae (land snails), Lesser Antilles; N. L. H. Krauss, Honolulu—4 frogs, 7 lizards and a snake, Guam, Gilbert Islands and India; Mrs. Margaret C. Teskey, Marinette, Wis.—collection of sea shells, worldwide; Douglas Tibbitts, West Dundee, Ill.—a mammal skull, Illinois

Repopulation Advances

The Laysan Island teal, once hovering on the verge of extinction, now has a population of about 600 birds. In addition to the birds on Laysan Island, eight were brought to the Honolulu Zoo in 1957.

(*Auk*, 1958, p. 82)

MINERALOGICAL EXHIBITS FOR MEMBERS' NIGHT

Guests of the Museum on Members' Night are to be given a preview of 25 modern and attractive exhibits now completed in the Hall of Minerals and Meteorites (Clarence Buckingham Hall—Hall 35).

For two years the Department of Geology has been actively engaged in the gigantic task of verifying the identification and the reclassification of more than 20,000 mineral specimens in the Museum's collection. The classification used represents a new scientific approach to mineralogy and is based on a better understanding of the chemical composition and atomic structure of minerals.

The new system of classification has facilitated the exhibition not only of common and beautiful specimens but also of rare and unusual minerals from many parts of the world.

Included among the new introductory exhibits is the outstanding Chalmers Crystal Collection displaying exceptional examples of natural crystals. Exhibits are also devoted to the crystal structure and physical properties of minerals and their use in mineral identification. When completed the hall will contain 50 exhibits devoted to minerals and meteorites.

The world's largest scale model of the visible half of the moon remains as an outstanding feature of the hall. But now, as a full moon should, it reflects a flood of bright light.

HARRY E. CHANGNON
Curator of Exhibits, Geology

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including postage are promptly filled.)*

Extinct and Vanishing Birds of the World. By James C. Greenway, Jr. 518 pages, including 86 line-cuts. American Committte for International Wild Life Protection, New York—Special Publication No. 13.

Of the 9,000 or so species of recent birds, about 56 are extinct, and another 50 subspecies have shared the same fate. About 75 more are poised on the verge of extinction. There are about 18 species known only from their bones and 27 "species" known only from early travelers' tales too uncertain to accept but perhaps representing species exterminated quickly upon contact with man. What these last were we'll never know.

There are no extinct birds known from Africa, South America, or Europe. From Asia there is one, (a duck); Australia and New Zealand, three each; North American mainland, six. The rest come from islands among which the Hawaiian group leads with 26 kinds.

This is the material that James C. Greenway's book covers in a comprehensive manner. There is an intriguing section of 100 pages on "Geography of Extinction" followed by a species-by-species account. Each writeup includes a brief description of the bird, former range, status, and a summary of what we know of its history and the factors that led to its extinction.

Those who would seek an easy, universal answer to the question, "What causes birds to disappear?" will be disappointed. Beyond man's all-embracing activities in general, the picture is very complex. Introduction of goats, rats, cats, rabbits, mongooses, monkeys, disease; clearing of forest, draining swamps, shooting, trapping, together or separately may be factors. While one set of factors may exterminate a bird on one island, a similar bird on another island may thrive under what appear to be similar conditions. Then volcanic action, cyclonic storms, and changes in the climate since the Pleistocene have been factors in some places.

Greenway has set forth his data in a calm and balanced manner and has provided what will be a standard reference in a field where none existed. The black and white sketches of many of the species are an added attraction of the volume.

AUSTIN L. RAND
Chief Curator of Zoology

MUSEUM MEMBERS' NIGHT
Friday, April 18

STAFF NOTES

George I. Quimby, Curator of North American Archaeology and Ethnology, made the presentation speech for the Viking Fund Archaeology Medalist at a dinner given in New York by the Wenner-Gren Foundation for Anthropological Research. Quimby is president of the Society for American Archaeology. . . . **Dr. Kenneth Starr,** Curator of Asiatic Archaeology and Ethnology, was a recent speaker before the Renaissance Society of the University of Chicago. His subject was "Chinese History and Culture as Seen in Chinese Rubbings." . . . **Miss Marilyn Jaskiewicz** has resigned as secretary of the Department of Botany. **Mrs. Dorothy Gibson** has been appointed to the position. . . . **Dr. Robert F. Inger,** Curator of Amphibians and Reptiles, has been appointed to the Committee on Paleozoology at the University of Chicago. . . . **Rupert L. Wenzel,** Curator of Insects, spoke on anatomy and evolution in histerid beetles before a seminar of the Department of Anatomy of the University of Illinois Medical School. . . . **Henry S. Dybas,** Associate Curator of Insects, attended the annual meeting of the American Mosquito Control Association in Washington, D.C. While in the capital, he made some studies of specimens in the U.S. National Museum.

FOUR YOUNG 'EXPLORERS' HONORED BY DIRECTOR

For successfully completing 12 Museum Journeys for Children, the happy quartet shown in photograph above were recently presented with awards as Museum Explorers by Dr. Clifford C. Gregg, Director. They are: Cub Scout Boyce Brunson, 9, and his sister, Carol, 11; Janet Mangold, 9, and Konrad Banasak, 13. Awards were made also to boys and girls qualifying as Museum Travelers (4 Journeys) and Adventurers (8 Journeys). Journeys may be made any day, any hour, by any child. They are furnished with combination questionnaires and guidesheets, on request, at the Museum entrances. They fill these out during their Journeys, and deposit them in barrels at the Museum doors when they leave the building.

Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Anthropology, Vol. 47, No. 2. *The Bayou Goula Site, Iberville Parish, Louisiana.* By George I. Quimby. 84 pages, 16 illustrations, 2 maps. $1.75

Fieldiana: Zoology, Vol. 40. *A Monograph on the Termitophilous Staphylinidae* (Coleoptera). By Charles H. Seevers. 334 pages, 42 illustrations. $6.50

Fieldiana: Geology, Vol. 10, No. 29. *The Nature of Shield Abnormalities in the Turtle Shell.* By Rainer Zangerl. 22 pages, 5 illustrations. 60c.

Fieldiana: Zoology, Vol. 34, No. 42. *Notes on Amphibians and Reptiles from El Salvador.* By A. Stanley Rand. 30 pages. 50c.

3 MOVIES FOR CHILDREN OFFERED THIS MONTH

On the last three Saturday mornings in April, the Raymond Foundation will present the concluding film and puppet shows of its spring series for children in the James Simpson Theatre of the Museum. Because of the Easter holiday, there will be no program on April 5. No tickets are needed for the shows, which begin at 10:30 A.M. Although each program has a tie-in with certain children's organizations, all children unaffiliated with these groups are equally welcome to attend. They may come alone, or with parents or other adults. Following is the schedule:

April 12—Boy Scout Day

"Exploring Our Earth"—film program will show volcanoes, mountain climbers, rock-and-mineral collecting, and the assembly of two of the Museum's dinosaur exhibits

April 19—YMCA Day

"Boys, Braves, and Dancers"—American Indians will be visited by way of movies and Museum exhibits

April 26—Brownie Scout Day

"Three Little Pigs"—a puppet show by the Apple Tree Workshop of Chicago Heights will give a present-day interpretation of the classic fairy-tale, "Three Little Pigs." Senior Girl Scouts will be guides and hostesses after the program

A cartoon is included in each program except the last one, on April 26.

MEMBERS' NIGHT SHOW OF AFRICAN ART

A series of new exhibits in Halls D and E (Africa and Madagascar) will greet Musuem visitors on Members' Night, April 18. The new exhibits emphasize art and represent the first work of the new Division of Primitive Art. In Hall E are to be found five new exhibits showing the Museum's world-famous Benin bronzes, ivories, iron and brass art objects. Another recently installed wall case shows brass weights used in West Africa for weighing gold dust. These exhibits augment the previously completed Cameroons King's House exhibit, which shows primitive art in the context of its usual surroundings.

At the west end of Hall D is to be seen a special exhibit of West African masks, from the collection of Dr. William R. Bascom, Director of the Museum of Anthropology, University of California. These masks are from the *Ibo* and *Ibibio* peoples of Nigeria. In addition, in the same exhibit there are some very fine African textiles from the *Ashanti* and *Yoruba* peoples of West Africa.

The African and Madagascar general ethnological exhibits in Halls D and E have been reinstalled. Cases have been painted

BRONZE PLAQUE FROM BENIN

The figure represents a warrior-noble of the Bini people of Nigeria. He wears a helmet, carries a sword in his right hand, and a staff in his left.

and rearranged in the halls and new lighting has been installed. The completion of these halls, together with the Oceanic halls, means that most of the Ground Floor Anthropology exhibits have been improved for the benefit of Museum visitors.

PHILLIP H. LEWIS
Assistant Curator of Primitive Art

Chicken Thieves Thwarted In Easter Islands

Natives of the Easter Islands do their best to discourage would-be chicken thieves. First, the natives build stone houses for their chickens in which tunnels serve as bedrooms. A thief with "fowl" thoughts must create a terrible racket in order to tear down the stones, one by one, before he can even think of entering the tunnels where the chickens slumber. Incidentally, many Easter Islanders place skulls of certain clans in their chicken houses in the belief that the magical effect of the skulls will stimulate egg production. For other facts about these island people visit Hall F (Peoples of Polynesia and Micronesia).

Among the world's strangest mammals are the pouched marsupials and the egg-laying monotremes. The principal facts about them are graphically illustrated in a special case in Hall 15.

MUSEUM MEMBERS' NIGHT
Friday, April 18

4 LECTURES FOR ADULTS SCHEDULED IN APRIL

The four final lectures in the spring series on science and travel for adults, provided by the Edward E. Ayer Lecture Foundation Fund, will be given on Saturdays at 2:30 P.M. in April. Following are dates, titles, and subjects:

April 5—Germany
Alfred Wolff

April 12—Marvels of Africa
John Nicholls Booth

April 19—Wildlife Across Canada
Cleveland P. Grant

April 26—Russia
Neil Douglas

Attendance is limited to adults, but free programs of motion pictures for children are presented on the mornings of the same Saturdays (except April 5).

No tickets are required for admission. A section of the James Simpson Theatre is allocated to Members of the Museum, each of whom is entitled to two reserved seats. Requests for reservation of seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

NEW MEMBERS

(February 13 to March 14)

Life Members

Paul Bechtner, Harry H. Blum, William D. Cox, Robert Crown, David Degen, William R. Dickinson, Jr., Querin P. Dorschel, Fletcher M. Durbin, Dr. Lester E. Frankenthal, Martin H. Kennelly, Eric L. Kohler, Bowman C. Lingle, Francis E. Manierre, Mrs. C. Phillip Miller

Associate Members

Charles M. Hines, Theodore Tieken, John T. Vernon, W. W. Watkins, H. M. Wies

Annual Members

John L. Antognoli, F. H. Bopp, Howard J. Davis, James F. Duffy, E. Melvin Ellingsen, C. G. Gehringer, Wadsworth Serre Giller, Lawrence W. Gougler, Dr. Henry I. Graham, Joseph Halouska, Samuel Hassen, A. J. Hoefer, Col. Duncan Hodges, M. F. Hutcheson, Ralph C. Kieffer, Maurice M. Kraft, Robert C. Liebenow, Marshall Long, Eugene W. Masters, Frank J. Misek, Richard B. Nolte, William A. Reider, Richard S. Reichman, Oliver T. Sands, Ray J. Schoonhoven, Fletcher Seymour, Miss Martha Utz, Benjamin Weintroub, Louis J. Weiss, George B. Wendt, Munroe A. Winter

An entire hall (Hall N) is devoted to marine mammals, among which are some of the most interesting of living creatures.

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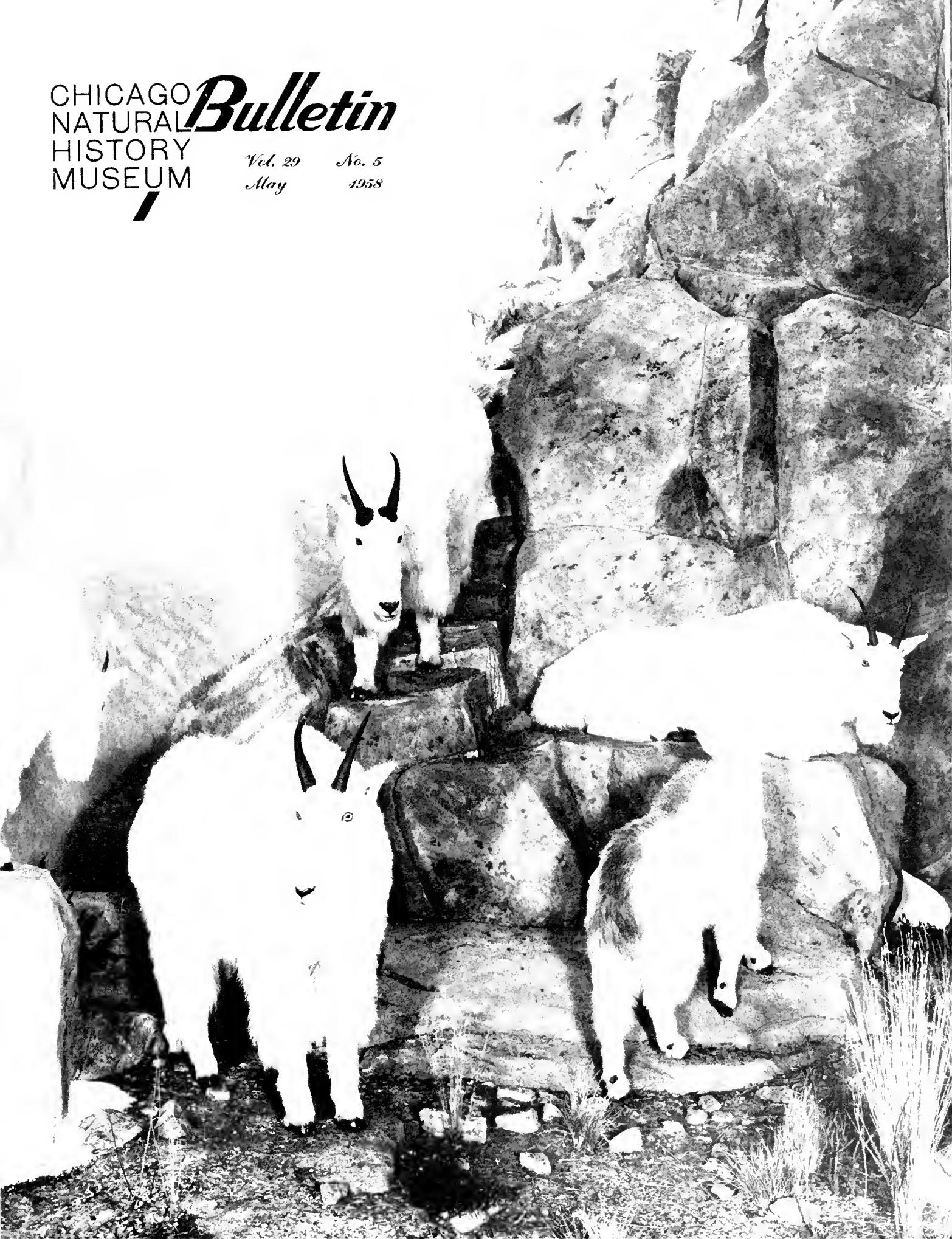

Chicago Natural History Museum

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

GEORGE A. RICHARDSON

1887–1958

With profound regret, we announce the death on April 15 of George A. Richardson, formerly a Trustee of the Museum, whose retirement was announced in our October, 1957 BULLETIN. Mr. Richardson died at his home at Rancho Santa Fe, California. He had been in apparently splendid health up to the time of his death.

George A. Richardson

In addition to his service as a Trustee of the Museum for a period of 28 years, he had also been active in other civic enterprises, serving as an alderman of Lake Forest, and as president of the Chicago Council of Foreign Relations. He served as a Major of Field Artillery in World War I and as a Lieutenant-Colonel in the Army Air Force in World War II.

Although he had retired from the Museum Board of Trustees, his loss as a friend will be keenly felt.

C.C.G.

JULIUS FRIESSER

1873–1958

With sorrow, members of the Museum staff received news of the death on April 9 of their former associate, Julius Friesser. Mr. Friesser had reached the age of 84. He served the Museum as a Staff Taxidermist for nearly 44 years, from 1905 until his retirement on pension in 1948.

Julius Friesser

Born October 6, 1873, in Marburg, Austria (a section now a part of Yugoslavia), Mr. Friesser first devoted himself to collecting birds and small mammals in his homeland as a schoolboy. He took up taxidermy, which was to become his life work, while still in his teens. In 1892, at the age of 19, he came to the United States and soon settled in Chicago where he obtained employment as a commercial taxidermist. When the Museum needed a man qualified in his craft for a collecting trip to Mexico in 1902, he applied and received the commission. His success on this expedition led to his joining the Museum staff.

During his career at the Museum, he was one of the most productive and skillful taxidermists in the country. Exhibits prepared by him at the Museum, including both elaborate habitat groups and individual mounts of large mammals, total more than 200. In many cases the animals upon which he practiced his art were specimens he had collected himself. Between 1910 and 1933 he was sent on expeditions to Alaska, Mexico, the Olympic Mountains, British Columbia, and Guadalupe island off the coast of Mexico. Among the most spectacular groups he produced are those of American bison, Alaska moose, giant elk, Rocky Mountain goats, polar bears, and sea elephants.

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: E. J. Grumbecker, Chicago—5 Philippine knives; Mrs. C. A. Reed, Portland, Ore.—a Chinese gown; the Rev. Miss Ellen Studley, Chicago—a Chinese rubbing

Department of Geology

From: Florida Geological Survey, Tallahassee, Fla.—casts of Miocene mustelids, Florida and Nebraska; Mr. and Mrs. Samuel Kirkby, Riverside, Calif.—Permian brachiopod, Devonian corals, Miocene crayfish, and scaphopods, from Arizona, Texas, Oregon, California

Department of Zoology

From: Miss Dorothy E. Beetle, Laramie, Wyo.—a collection of inland mollusks; P. K. Chin, Jesselton, North Borneo — 2 fishes; Borys Malkin, Minneapolis—2 microscope slides with 7 aphids, U. S. and Mexico; Museum and Art Gallery, Durban, Natal, South Africa—3 birdskins, Africa and South America; Lt. Col. S. S. Nicolay, FPO, San Francisco—24 salamanders, 55 frogs, 4 lizards, Riu Kiu Islands; Tarpon Zoo, Tarpon Springs, Fla.—2 snakes, a turtle, Colombia; U. S. Fish and Wildlife Service, Pascagoula, Miss.—31 lots of fishes

THIS MONTH'S COVER

The Museum's habitat group of Rocky Mountain goats pictured on our cover might well be labeled "Monument to a Taxidermist." It is one of 26 such groups representing the work of a truly great taxidermist, Julius Friesser, whose death is reported elsewhere in this issue of the Bulletin. The scene is typical of the Kootenay District in British Columbia where these agile animals abound. Though less widely known than the famous Carl E. Akeley, Friesser's huge volume of work of superlative quality in the Museum entitles him to a place beside the great master of taxidermic art.

NEW MEMBERS

(March 15 to April 15)

Life Members

Mrs. Vernon Armour, Mrs. Laird Bell, Carl P. Clare, Dr. Vernon C. David, Mrs. Herbert A. Friedlich, William M. Hales, John Woodworth Leslie, James G. McMillan, William R. Odell, Dr. Eric Oldberg, J. Sanford Otis, Shepherd M. Roberts, Mrs. Moses E. Shire, Edward Byron Smith, Solomon B. Smith, James P. Soper, Jr., David B. Stern, Jr., Frank L. Sulzberger, John R. Thompson, Jr., Mrs. Patrick A. Valentine, Paul G. Warren, Robert E. Wilson, Hampton Winston

Associate Members

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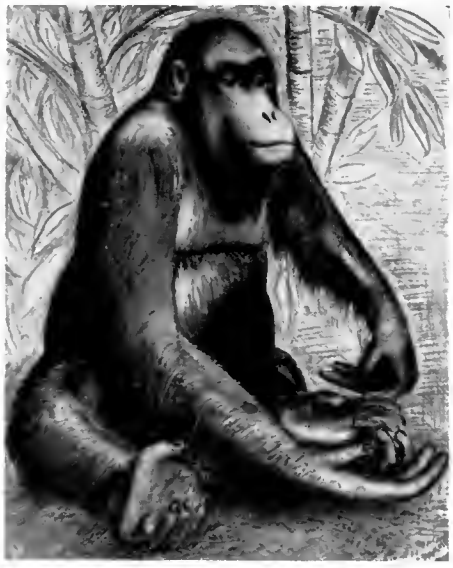
ART STUDENTS TO DISPLAY CREATIONS BASED ON NATURE

Stanley Field Hall and the North Corridor on the Ground Floor of the Museum will be splashed with color this month when close to 100 paintings, drawings, and prints by students of the School of the Art Institute of Chicago are hung in a special exhibit.



PENSIVE GORILLA

Skillfully drawn ape by Charles Barreto of Chicago, a student in the basic painting and drawing course of the Art Institute. Paintings, drawings, and prints inspired by exhibits studied in classes at this Museum, will be displayed this month.

The show will encompass work by students who have attended the junior and basic adult day classes at the Museum conducted by the art school during the past year. Students whose work is represented range in age from seven years through the adult level. Their work, executed in nearly all possible media, will reveal both representational and highly imaginative interpretations of the Museum and its exhibits.

Judges for this year's competition were Marion Pahl, Staff Illustrator, and Mrs. Marjorie Furr, Botany Illustrator, who selected the work to be displayed from material previously chosen by teachers at the school. Instructors in the adult day school whose students will be represented in the show are Ethel Spears and Richard Keane. Junior school instructors whose students will be represented in the exhibit are Barbara Aubin, Harry Breen, Mrs. Berta Caul, Herb Forman, Jasper San Fratello, Angela Gregory, Mrs. Adelaide Hirsh, Mrs. Martha Larson, Marion Lukens, Dolores Nelson, Mrs. Donald Novotny, Eugene Szuba, and Joseph S. Young. The annual show owes much of its success to Edithe Jane Cassady, head of the Art Institute's Junior School.

CRANE IN PASTELS

The graceful bird above is the work of Peter Klauke of Winnetka, Illinois, a student in the basic painting and drawing class in the School of the Art Institute. Klauke's pastel drawing is one of about 100 exhibited at the Museum in May.

SCIENCE FAIR COMING TO MUSEUM MAY 17

Junior scientists of the Chicago region will hold their annual Chicago Area Science Fair in Stanley Field Hall of the Museum on Saturday, May 17. The exhibits will encompass accomplishments of children all the way from sixth grade in the elementary schools through senior year of high school. Experience from the fairs held here in past years leads to the expectation that some very elaborate demonstrations of the application of scientific principles may be expected from the youngsters participating.

Sponsored by the Chicago Teachers Science Association, the show will be open from 9 A.M. to 5 P.M. The event is distinct from the Chicago Public Schools Student Science Fair, which was held in April but was limited to public schools within the city limits of Chicago. The show staged in this Museum is participated in by pupils of private and parochial as well as public schools, and members of youth organizations located in suburbs within a radius of 35 miles around the city are eligible to compete. Each grade-level from 6 through 9 will receive prizes and awards; in the grades from 10 through 12 other awards will be made on a subject-area basis rather than being restricted within these three individual grades.

Theodore Wallschlaeger, principal of the Palmer School and promoter of the Science Fair, has made arrangements for several working scientists from the professions and industry to confer with contestants immediately after the judging. They will offer suggestions on ways to improve the exhibits and to develop the students' interests in science.

Visiting Hours Extended for Summer Season

Effective May 1 and continuing through September 1 (Labor Day) visiting hours at the Museum are extended by one hour. The Museum will be open daily, including Sundays and holidays, from 9 A.M. to 6 P.M. At the end of this period, hours will revert to 9 A.M.–5 P.M.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

You are invited to browse in the Museum Book Shop.

MUSEUM IS HOST TO ART GROUP

One hundred and seventeen members and guests of the Society for Contemporary American Art enjoyed a special evening program at the Museum on April 8. After dinner in the Museum dining room, Phillip H. Lewis, Assistant Curator of Primitive Art, addressed the group on "What Is Primitive Art?" The group was then conducted on tours through the exhibition halls containing displays of African, Melanesian, and American Indian art. Acting as guides were Dr. Donald Collier, Curator of South American Archaeology and Ethnology; George Quimby, Curator of North American Archaeology and Ethnology; Dr. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology, and Mr. Lewis.

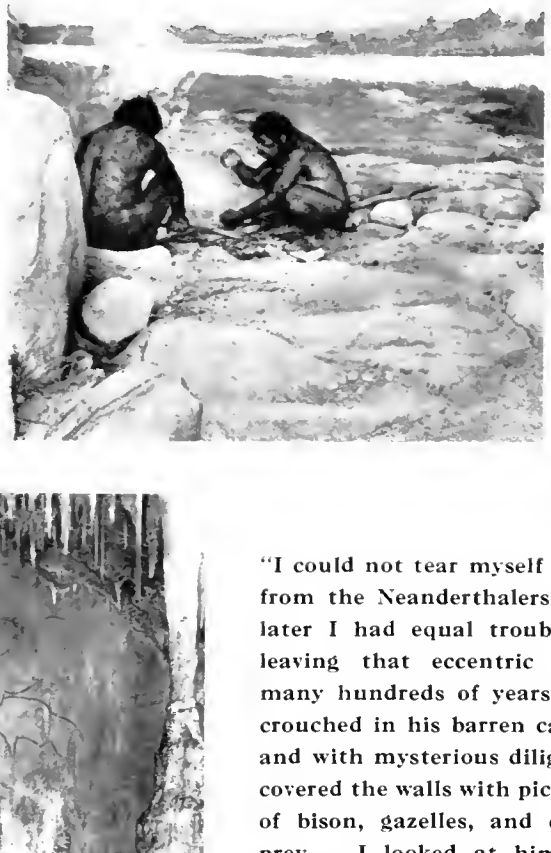
In his talk, Mr. Lewis asserted that "it is not the art which is primitive—primitive art is the art made and used by members of primitive societies. Only after classifying art as coming from primitive societies is it possible to compare art forms in a meaningful way."

As part of the conducted tours, the groups were taken through the Pacific Research Laboratory, where they were shown the facilities for study and care of the specimens.

The program was developed by Winston Elting, president of the society, and Robert B. Johnson, chairman of the program committee.

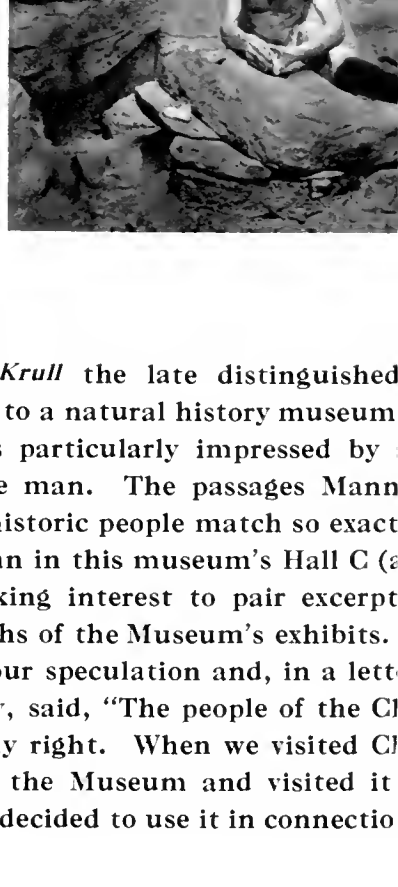
MUSEUM'S STONE AGE MEN IN W

Confessions of Felix Krull, Confidence Man
By Thomas Mann
Copyright, 1955, Alfred Knopf, Inc.



"Good God, what were those small, shaggy creatures squatting together in timid groups as though conferring in some cooing and hissing pre-language about the means of surviving and prospering on an earth already possessed by better-equipped and more strongly armed creatures? Had the spontaneous generation of which I had been told, the separation from the animal, already taken place or had it not? . . ."

"I could not tear myself away from the Neanderthalers, but later I had equal trouble in leaving that eccentric who, many hundreds of years ago, crouched in his barren cavern and with mysterious diligence covered the walls with pictures of bison, gazelles, and other prey . . . I looked at him for a long time and yet, after we had passed on, I wanted to return once more to that diligent eccentric."

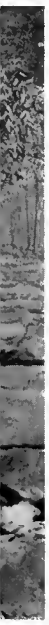


"Then came a handsome seascape in which fishermen were carrying on their advanced and bloodless occupation by the shore, hauling in a good catch with their flaxen net."

IN *Confessions of Felix Krull* the late distinguished
Mann, describes a visit to a natural history museum
character, Felix Krull, is particularly impressed by
restorations of Stone Age man. The passages Mann
observations of these prehistoric people match so exact
dioramas of Stone Age man in this museum's Hall C (a
that it would be of striking interest to pair excerpt
scriptions with photographs of the Museum's exhibits.
of the writer, confirmed our speculation and, in a lett
Alfred A. Knopf Company, said, "The people of the C
tory Museum are perfectly right. When we visited C
was deeply impressed by the Museum and visited it
obviously already then he decided to use it in connectio

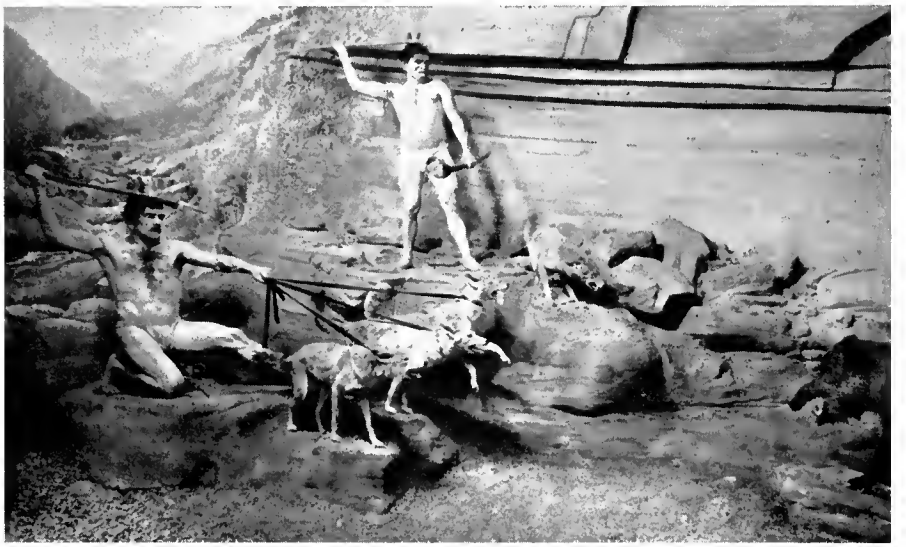
RD-PICTURES BY FAMED NOVELIST

"A roomy cave housed a group of Neanderthal people tending a fire—bull-necked, thick-set individuals, to be sure—but imagine anyone else, even the lordliest king of the forest, coming along and making a fire and tending it! That required more than a regal demeanour; for that, something had to be added. The head of the clan had an especially thick bull-neck; he was a short man with a moustache and rounded back, his arms too long for his stature; his knee had been bloodily gashed open, one hand grasped the antlers of a deer he had killed and was just dragging into the cave. Short-necked, long-armed and stooped were they all, these people around the fire . . . the woman emerging from the back of the cave with a child at her breast . . ."



"Here we have someone . . . who is scratching his imaginings in stone as best he can . . ."

"Daring and valiant, however, was the replica of a man attacking a maddened and embattled wild boar with dogs and spear—the boar was daring and valiant, too, but at a subordinate level on Nature's scale. Two dogs . . . they were of a strange breed, now vanished, which the professor called bog hounds and which had been domesticated in the lake-dwellers' time . . . their master was taking aim with his spear. Since there could be no doubt about the outcome, we passed on, leaving the wild pig to its subordinate fate."



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Hall 38), we felt
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go my husband
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th Felix Krull."

"Next to them, however, something was going on quite different from anything else . . . Stone pillars had been raised . . . forming a hall . . . with only the heavens as ceiling, and on the plain beyond the sun was just rising, flaming red, over the edge of the world . . . a powerful-looking man stood with upraised arms presenting a bouquet of flowers to the rising sun! . . . He was in the prime of life. And it was just the fact of his vigour and strength that lent his action its peculiar delicacy . . . Just let any other creature in Nature come along and hit on the idea of making a formal gift of flowers to the rising sun!"

1,268 GATHER AT MUSEUM ON MEMBERS' NIGHT

The 1,268 guests who toured the Museum on Members' Night, April 18, certainly did not lack an interest in science. Exploring on their own, members viewed new exhibits and discovered what goes on behind the scenes. The main feature of the evening was the learned of the scientific research, preparation of exhibits, and other tasks done by scientists, technicians, librarians, artists, editors, and other members of the staff.

The reinstalled and new exhibits in Clarence Buckingham Hall of mineralogy, recent

MEMBERS' NIGHT SCENE IN STANLEY FIELD HALL

At refreshment time hundreds of guests gathered in the main hall after seeing behind-the-scenes activities in laboratories, offices, and workrooms usually closed to the public. More than 1,200 persons attended the affair.

recently completed fossil skeleton of *Brontosaurus*. Members thronging around the dinosaur asked questions of Museum personnel ranging from the engineering feats of erecting the exhibit itself to the particular type of food consumed by the animal.

On the third and fourth floors, there was much activity as Members visited the offices, workshops, laboratories, and studios normally closed to the public. Here young and old alike showed great interest as they additions to collections in the two halls of African ethnology, exhibits of African primitive art, the synoptic "Animal Kingdom" series of exhibits, and the new "Birds Are Beautiful" display were also among the highlights of Members' Night.

After a welcoming address by Dr. Clifford C. Gregg, Director, he and President Stanley Field greeted the guests at an informal reception in Stanley Field Hall and refreshments were served.

Books

ANCIENT VOYAGERS IN THE PACIFIC. By Andrew Sharp. 240 pages with 12 photographic plates of island scenes and three maps. Penguin Books, London, 1957. $.85.

Some years ago the late Sir Peter Buck, part-Maori anthropologist and then Director of the Bishop Museum in Honolulu, wrote a book about the island peoples of the Pacific. He called his book *Vikings of the Sunrise* because the people he wrote about had to sail across wide expanses of ocean wastes to get to their island homes, much as the famed Norsemen of old sailed across the Atlantic in quest of new lands.

The word *sunrise* in the title refers to the fact that the ancient sailors of the Pacific sailed to the east in search of new lands—toward the sunrise. Of course this is a simplification, since many voyages were made in other directions. However, because it has been conclusively shown by students of the Pacific that the primary direction of migration into the Pacific was from Southeast Asia (*Kon Tiki* to the contrary), *sunrise* is an apt way of indicating this direction in general.

The author of *Ancient Voyagers in the Pacific* is not so sure that *Vikings* was an entirely appropriate term for the early voyagers. He would amend Buck's title to read "Vikings of the Sunrise—By Accident." The problem of how the vast region of the Pacific was peopled has long challenged anthropologists. Shrouded in the mists of antiquity and dimly perceived through the shadowy vistas of prehistory, the facts have remained elusive and obscure. Linguistic, racial, and cultural affinities, orally transmitted genealogies and elements of folklore, and a limited amount of archaeological evidence have served as signposts.

Over the years, traditions were developed that saw early man in the Pacific as a dauntless and intrepid explorer of the watery desert we call Oceania. From these traditions one received the impression that great flotillas of elegant and ruggedly seaworthy high-prowed double-canoes, manned by hosts of stalwart mariners, complete with their families, livestock, and an inventory of plants for new island-homes, set out at relatively frequent intervals through the centuries on deliberate voyages of long-range exploration.

The main purpose of these ancients, according to the traditions, was to sail steadfastly through the treacherous waters for thousands of miles, plotting their courses by the heavens until they reached suitable island-homes not yet peopled, where they terminated their voyages and began life anew. It is further conjectured that not only were deliberate voyages of exploration to far-distant and unknown shores undertaken but also that, having discovered a new island-home, some navigators even returned across thousands of miles of uncharted seas to their points of origin to tell others of their conquests and to return with new flotillas.

The ancient mariners of the Pacific were supposed to have been ardent students of the heavens and astutely competent in combating the severely fickle weather conditions that have long prevailed in Oceania. Motivation for deliberate long-distance exploration and settlement has been explained as resulting from population pressures, political conflict and warfare, exile, and sheer curiosity and adventure-seeking.

In his book Andrew Sharp brings a meticulous logic, an enviable command of Pacific geography, ethnological and archaeological as well as botanical data, and a remarkable awareness of the accounts of early voyages by Europeans in the Pacific to bear on the problem of settlement. His purpose is to burst the bubble of traditional explanations and he provides an extremely convincing case for an antithetical point of view.

Sharp propounds the thesis that *accidental* rather than deliberate offshore voyages were chiefly responsible for the dispersal of man

in the Pacific. Evidence presented runs the gamut of folklore accounts of native voyages; responses elicited from islanders by early European explorers and missionaries with respect to navigational lore, island geography, and historic contacts; linguistic, cultural, and racial affinities and noncongruences; and the immutable vagaries of Pacific meteorology and currents. Evidence is cited from other parts of the world to support the claim that without modern methods of navigation and cartography, mariners of any part of the world were largely subject to the whims of weather and ocean currents. Sharp admits the validity of relatively short-range deliberate settlement while denying it for long-range settlement.

The basic limitations on primitive navigation seem obvious after reading Sharp's comments. He points out that the heavens are often overcast for days at a time and that even in relatively clear weather stars do not shine during daylight hours, which are more numerous than those when stars can be perceived. Furthermore, he says, the sun is a very poor navigational guide.

One is compelled to agree with Sharp that in the face of storms, variable and highly unpredictable winds, calms, capricious shifting currents, and relatively flimsy craft dependent upon winds for propulsion, it is untenable to support the traditional view that the "locations of distant objectives could have been established in the first place or rediscovered when they had."

Andrew Sharp has in this small book asked enough probing questions and suggested a sufficient number of logical alternative ideas to more than adequately challenge the so-called traditional theories of Pacific navigation and settlement. He has carefully arranged his evidence so as to provide a landmark in an extremely troubled sea of theory and historic (as well as prehistoric) reconstruction—a sea in which the currents of thought perhaps may have been as misleading as those oceanic currents of the vast Pacific which loom so large in his arguments, and comparable to them in strength.

If we must require more of the author than he offered, we can only suggest that a few more outline maps of specific island groups and schematic drawings of the migration routes that are outlined in the text would have helped the average reader whose knowledge of the geography of the Pacific is extremely limited.

ROLAND W. FORCE
Curator of Oceanic Archaeology and Ethnology

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including postage are promptly filled.)*

Undersea views such as are seldom seen except by professional divers are available to everyone in the Hall of Fishes (Hall 0).

EXPEDITION TO BEGIN NEW DIG IN SOUTHWEST

ONE of the primary things anthropologists are interested in is human behavior and how it got that way. It is clear that valuable contributions to the understanding of man and his behavior remain to be derived from ancient camp sites and old beaches, in pit-houses, in the storied pueblos, and in buried cities.

In May, the Museum's Southwest Archaeological Expedition returns to eastern Arizona to continue its excavations and researches.

As in the expedition's previous 24 seasons of excavations in the Southwest, Dr. Paul S. Martin, Chief Curator of the Department of Anthropology, will be the leader. He will be assisted by Assistant Curator John B. Rinaldo and other archaeologists and diggers.

The sites to be worked lie in a triangular area that is bounded by Springerville, St. Johns and Show Low—about 40 miles south of the famed Petrified Forest National Monument and about 350 miles southeast of Flagstaff. The country is an attractive plateau at an altitude of about 7,000 feet, close to the White Mountains. Much of the terrain is rough with old volcanic flows protruding here and there. From the expedition's camp location at Vernon, Arizona, many ancient volcanic caves can be seen. There are hundreds of ancient sites in the area, a few of which will be excavated this summer.

CULTURAL LINK SOUGHT

This area was chosen for intensive researches because it was believed that a link between the archaeological sequences of culture established at Reserve, New Mexico, the sequences of culture in and around Vernon, Arizona, and one of the contemporary pueblo groups—such as the Hopi or Zuni—might be established. In other words, the work now in progress, in and near Vernon might provide a clue as to what became of the Mogollon Indians; as to what adjustments they made when uniting with other people; and as to whether the culture of modern Hopi or Zuni represents in part a blending of Mogollon and Hopi-Zuni elements.

To obtain this information, it is necessary to work out a succession of cultures on the history of the Vernon area as completely as possible. It will be especially valuable if we can find out whether or not the great burst of cultural activity in the 15th and 16th centuries among the Hopi and Zuni Indians was due to Mogollon influences and migrations. New insights on ancient rites and customs would be gained.

At present, no one knows enough about the local history of the Vernon area to be very specific; but it is probable that there are several periods that would date from perhaps 1500–2000 B.C. to A.D. 1300 or 1400.

The earliest period has been named the Concho Period, which may date from 1500 B.C. to the time of Christ. The Concho Period is just one small part of a larger culture called the Desert Culture which extended from Oregon to Mexico City and from the Pacific Coast to the Rocky Mountains. The "Concho People" lived in skin or brush shelters that were placed near the shores of now extinct lakes. Food was not abundant and consisted of wild plants such as seeds, nuts, berries and roots; and rabbits, deer and other small game which were hunted with spears rather than bows and arrows. The few tools of stone left behind are rather crude. Pottery and agriculture were unknown. It is assumed that sandals and baskets were woven, and it is believed that cookery was done in the baskets.

The next later development would probably date from about A.D. 600–800. We have no information yet as to what was happening in the Vernon area from about 1500 B.C. to about A.D. 600–800. In other words, there is a gap of about 2,000 years of which we know nothing. It is possible, though not probable, that the area was abandoned for 2,000 years and then reoccupied at about A.D. 600. A more intensive survey will help settle this question and this will be undertaken in the next season or so.

ADVANCES BECOME EVIDENT

At any rate, the next evidences of civilization in the area reveal the fact that the Indians now knew how to construct better houses (pit-houses), and how to make pottery and to plant crops. The information concerning the pit-house period (about A.D. 600–800) is meager and will be augmented this summer by further excavations.

From A.D. 800 on, greater progress is assumed (judging by the appearance and size of the ruins and by the surface debris) although the Museum's expedition has yet to verify this by digging.

Several sites will be opened up in 1958. Probably another pit-house village will be dug as well as one larger, later site. An intensive search will be instituted for a dry cave in the hopes that one may be found that will yield a variety of well-preserved objects as well as evidence of a 2,000 to 3,000-year-long occupation. This would indeed be a find, but the chances of discovering such a cave are very slim.

Educational circles in recent months have been alerted to the need for more attention to science in our schools. In the field of natural sciences, the Museum has two foundations constantly co-operating with the schools—the N.W. Harris Public School Extension, and the James Nelson and Anna Louise Raymond Foundation.

STUDENTS LEARN HOW PREHISTORIC MAN LIVED

"Workshop" gatherings of school children at the Museum to make studies of selected specific subjects are a recent innovation added to the activities of the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures. In the above photograph, Edith Fleming, Raymond Foundation lecturer, is seen demonstrating the similarities of ancient and present-day tools to a workshop on prehistoric man for young students. At the lecture the children were given the opportunity to handle and examine closely actual tools of early man. They also saw a filmed story of man's prehistoric development, and made a supervised study of the Museum's Hall of the Stone Age of the Old World (Hall C) where they saw the eight life-size dioramas of early peoples, and many supplementary exhibits illustrating details of their way of life. The boys and girls in this group are in sixth-grade at Oriole Park School.

STAFF NOTES

Several members of the Museum staff have recently been interviewed on radio programs. **Emmet R. Blake,** Curator of Birds, told of his experiences on Museum expeditions in three talks on the Art Mercier Show over WBBM-CBS. In successive weeks, on the Phil Bowman show over WMAQ-NBC, talks on Museum subjects were given by **John R. Millar,** Deputy Director; **Dr. Theodor Just,** Chief Curator of Botany; **Phillip H. Lewis,** Assistant Curator of Primitive Art; **Dr. Eugene S. Richardson, Jr.,** Curator of Invertebrate Fossils, and **Loren P. Woods,** Curator of Fishes. . . . **Henry S. Dybas,** Associate Curator of Insects, attended the annual meeting of the North Central Branch of the Entomological Society of America in St. Louis. . . . **Dr. Paul S. Martin,** Chief Curator of Anthropology, attended a conference on "The Place of Museums in Higher Education" held recently at Indiana University. . . . **George I. Quimby,** Curator of North American Archaeology and Ethnology, **Dr. John B. Rinaldo,** Assistant Curator of Archaeology, and **Allen S. Liss,** Assistant in Anthropology, attended a recent meeting of the Illinois Archaeological Survey, and a symposium on Woodland Pottery held in this Museum. . . . **Dr. Theodor Just,** Chief Curator of Botany, and **Miss Lillian A. Ross,** Associate Editor of Scientific Publications, will represent the Museum at the Second Conference of Biological Editors to be held in Washington, D.C., on May 3 and 4. Dr. Just is chairman of the committee for formulation of editorial policy. . . . **Mrs. Meta P. Howell,** Librarian, **Mrs. M. Eileen Rocourt,** Associate Librarian, and **Miss Marjorie West,** Assistant to the Librarian, attended the recent meeting of the Chicago Chapter of the Special Libraries Association. . . . **Miss Jane Rockwell,** Associate Public Relations Counsel, who joined the Museum staff late in 1954, resigned as of April 30 to move to New York.

SCULPTOR AND CREATION

Malvina Hoffman of New York, noted sculptor, on a recent visit to Chicago came to the Museum for conferences with members of the staff. Our photographer induced her to pose with the bronze figure of a Navaho man, one of the 101 life-size figures, busts and heads she made to represent types of the Races of Mankind. Her sculptures of modern peoples of the world, both primitive tribesmen and highly cultured racial types, form a series unique among anthropological displays, and fill Chauncey Keep Memorial Hall (Hall 3).

Tomb . . . or Treasure

On the front of the Palais de Chaillot, one of the art museums of Paris, there is an inscription which applies equally to all museums of the world, whether their field be art, science or other subjects. By the French writer Paul Valéry, it reads, translated: "It depends on him who passes here whether I remain tomb or treasure . . . Friend, enter not unwillingly."

Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Zoology, Vol. 39, No. 6. *The Subspecies of the Bush Shrike Laniarius fulleborni (Including L. poensis).* By Austin L. Rand. 4 pages. 10c.

Fieldiana: Zoology, Vol. 41, No. 1. *Philippine Zoological Expedition 1946–1947, Philippine Snails of the Family Endodontidae.* By Alan Solem. 12 pages, 4 illustrations. 40c.

The range of plant life from lowly bacteria to shining orchids is traced by the exhibits in Martin A. and Carrie Ryerson Hall (Hall 29—Plant Life).

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Bulletin

Vol. 29 No. 6
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Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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

Museum Members to Receive Director's Annual Report

The steady progress that the Museum has made in expansion of exhibits, despite the unrelieved difficulties caused by the inflation of recent years, is emphasized in the Annual Report for 1957 of the Director to the Board of Trustees. Copies of the Report, a volume of 164 pages with 25 illustrations, will be sent to all Members of the Museum within a few weeks.

The Report stresses also the progress of the Museum's educational activities for school children, pointing out that no other museum makes available to its community a lending service of traveling exhibits comparable to that of the N. W. Harris Public School Extension, whose 1,032 portable exhibits are circulated regularly among 516 schools. Attention is called also to the notable new record in educational work achieved by the James Nelson and Anna Louise Raymond Foundation, which, among many other activities, served 4,158 organized groups aggregating 178,810 students visiting the Museum during the year.

Detailed accounts are also given of the collecting done by 16 expeditions and field trips in 1957, of research in many fields by all departments, gifts (of both funds and specimens for the collections) received during the year, maintenance of the building, the work of the Library, and the accomplishments of all divisions of the institution.

'Nature Around Us' is Journey Topic

The summer Museum Journey for Children offered by Raymond Foundation, "Nature Around Us," is open to all boys and girls visiting the Museum on any day during June, July, or August. Youngsters who wish to take the Journey will receive instructions and questionnaires at either the north or south entrance of the Museum. These instructions will tell them where to find exhibits in the Museum of animals, plants, rocks, and fossils that they can look for in their own backyards or in parks and other nearby places. The advantage of this preliminary survey in the Museum, the Raymond Foundation staff points out, is that here "the animals always stand still, the birds never fly away, the plants are always green and blooming, and you don't have to dig for the rocks and fossils."

Children who fill in correctly the questionnaires for this Journey and three other Journeys are eligible for awards as Museum Travelers. After eight Journeys they may become Museum Adventurers and after twelve Journeys Museum Explorers.

New Assistant Appointed in Public Relations

Patricia McAfee, a recent graduate of Northwestern University, has been appointed Assistant in the Museum's Division of Public Relations. She replaces Jane Rockwell, Associate Public Relations Counsel, who resigned to begin a career in New York. Miss McAfee will work in association with H. B. Harte, Public Relations Counsel since 1927. The position involves press, television, and radio relations and assistance in preparation of the monthly BULLETIN for the membership of the Museum.

Patricia McAfee

Miss McAfee, a native of Washington, D.C., has lived in that city and its suburb, Falls Church, Virginia, most of her life. For a period she was employed in public contact work and other duties in the offices of the United States Department of Agriculture. She received her B.A. degree earlier this year at Northwestern, where she was enrolled both in the Medill School of Journalism and the College of Liberal Arts.

THIS MONTH'S COVER

For years the School of the Art Institute of Chicago has joined hands with Chicago Natural History Museum to encourage art based on nature subjects. Classes from both the junior and the adult schools are sent to this Museum for study, sketching, and painting. This Museum furnishes a special classroom and other facilities, most important of which are its collections of animals, plants, and other nature material that provide the students with subject-matter and inspiration. The drawing of an owl on our cover is an example of work done in these classes. It is by Robert Erwin, of Chicago, a young first-year student in the adult school. Annually this Museum presents a special exhibit of approximately a hundred selected pictures by students who range from children of grammar-school age in the junior classes to high-school, college, and older students in the adult school.

Membership Division Chief Named

Gloria (Mrs. Charles) Pagano has been appointed head of the Museum's Division of Memberships to fill the vacancy caused by the recent death of Miss Pearle Bilinske, who had been in the Museum service since 1923 and head of the division from 1928. Mrs. Pagano was formerly in charge of personnel recruitment for the Chicago campus of Northwestern University and had worked in several commercial organizations. She is a former resident of New York and attended New York University.

Gloria Pagano

Miss Mary Felsenheld, a former employee of the Art Institute of Chicago, has been appointed Assistant in the Division of Memberships.

The entire geological sequence of life over some three billion years is illustrated by the exhibits in Frederick J. V. Skiff Hall (Hall 37—Fossil Animals without Backbones) and Ernest R. Graham Hall (Hall 38—Fossil Animals with Backbones).

GEMS ARE RICH IN LORE AS IN LUSTRE

By PATRICIA McAFEE

A DROP OF DEW from Heaven, or the pearl as we know it, is the birthstone for the month of June. The association of a precious or semiprecious stone with a month of the year is only one of the many age-old customs surrounding gem stones. It is believed that the custom is based on the twelve foundation stones of the Holy City mentioned in Revelation or on the twelve stones in the breastplate of the High Priest of Israel.

The long and occasionally infamous history of gems is older than the first written accounts in Pliny the Elder's *Natural History*. But there are no records of the first discovery of the gems of long-standing fame. We can only imagine that the first precious stone may have been found the same way a small boy walking along a pebble-strewn beach finds one that takes his fancy. It is usually the beauty of the stone that causes him to pick it up and pocket it, and beauty is the first quality a gem stone must possess today.

QUALITIES OF GEMS

Beauty, when used to describe a gem, refers to transparency, brilliancy, color, lustre, and fire. Only one of these may be present, or all may be displayed as they are in the blue diamond. However, beauty alone is usually not enough. A gem must be resistant to abrasion. The diamond, being the hardest of all minerals, is the most durable. A third quality, which is essential but does not describe the physical attributes of the stone, is rarity. Portability should not be overlooked, as it is convenient for men to represent a large investment by a small piece of merchandise. The last determining quality of a gem is fashion or style. Temporary fads have occasionally caused a popular stone, such as the amethyst, to go "out of style." Fortunately it is more common to add to the list of gem stones.

Those qualities causing the appeal of gems have been known to man for many years, but their exact physical and chemical properties were discovered after the evolution of mineralogy into a science. Practically all gems are minerals, the exceptions being pearls, amber, and coral, which are organic products. The pearl is composed of carbonate of lime, but ranks high among the precious stones as it exhibits several of the qualities mentioned. Its exceptional beauty compensates for its softness (a pearl is only slightly harder than a fingernail).

ANCIENTS IGNORED DIAMONDS

Among the minerals considered gems the most notable are: diamond, ruby, sapphire, emerald, aquamarine, morganite, topaz, garnet, zircon, opal, jade, tourmaline, peridot, spinel, turquois, moonstone, Amazon stone, lapis lazuli, and varieties of quartz.

Discoveries in ancient tombs of Asiatic, Etruscan, and Egyptian cultures revealed the use of sapphires, emeralds, rubies, pearls, agates, and garnets as ornaments. Apparently the diamond in its natural state did not exhibit enough beauty to warrant its use as a gem stone. Its virtues were to remain hidden until means of polishing and cutting the stone were devised.

The first major source of diamonds was India. It was not until 1727 that Brazilian diamonds were discovered, and another 150 years passed before the South African deposits were found. Today the South African mines yield the major portion of the world's supply.

One of the finest collections of gems in the world may be seen in H. N. Higinbotham Hall (Hall 31) of the Museum, where cut and uncut specimens of nearly every known precious and semiprecious stone are exhibited. Ancient jewelry, some pieces dating back to 3000 B.C., and reproductions of world-famous diamonds are also included in the collection. In addition to the Museum's permanent collection the Chicago Lapidary Club's special display of handcrafted gems and jewelry will be on view in Stanley Field Hall from June 5 through June 29.

Romance and mystery have surrounded the diamond since antiquity. Its durability gave rise to the belief that the stone, if placed on an anvil, was capable of breaking the hammer that struck it a blow. Another, and even more fantastic, tale recommended soaking the diamond in the blood of a male goat or lion to lessen its hardness.

HISTORIC ROLE OF DIAMONDS

Large diamonds, though rare, have played quite a role in history. One famous diamond, the Regent or Pitt (nearly 137 carats), once belonged to Napoleon Bonaparte. Napoleon, finding myself short of funds, pawned it to the Bavarian government in order to continue his campaigns. A story is told that Henry III, King of France, borrowed the Sancy diamond (53 carats) from his treasurer to raise money from the Swiss government. A trusted servant was to carry the stone to Berne, but he was intercepted en route and murdered by robbers. The treasurer, upon hearing of the robbery and murder, called for the body to be exhumed. The stone was found in the stomach of the faithful man.

Today the diamond is a symbol of betrothal. It is presumed to have been chosen

(*Continued on page 4, column 1*)

LAPIDARIES OF CHICAGO STAGE MUSEUM SHOW

A DISPLAY, almost complete in scope, of nature's many varieties of gem material is offered in the Eighth Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition to be held in Stanley Field Hall at the Museum from June 5 through June 29. The exhibit is sponsored by the Chicago Lapidary Club.

Members of the club and other "rockhounds" have been collecting and preparing material from all parts of the United States and also from Canada, Labrador, Mexico, Australia, Africa, and Argentina to display in this show. A greater variety of gems and jewelry than in any of the previous shows has been assembled, and the exhibits are notably improved, compared with earlier years, as a result of the greater skills developed by many of the contestants who have repeatedly entered.

Only those entries that have won prizes or awards of ribbons will be included in the Museum exhibition. The contestants include qualified members of lapidary classes held in fieldhouses of the Chicago Park District throughout the past year and other amateur lapidaries and jewelry craftsmen in Chicago and suburbs within a 50-mile radius of the city. Contestants are required to do every bit of the work themselves, including all operations involved in cutting and polishing gem material, and, in the case of jewelry items, all elements of design and of fabricating gold and silver mountings.

MANY CRAFT DIVISIONS

The two main classifications of exhibits are: (1) the work of novice craftsmen and (2) the work of advanced craftsmen. In each group are ten specialized craft divisions: individual cabochon-cut gems, individual faceted gems, collections of gems of a certain species, collections of gems in general, collections of polished specimens or slabs, individual jewelry pieces, sets of jewelry, enameled jewelry, special pieces, and enameled special pieces ("special pieces" include objects to which lapidary and jewelry techniques have been applied, such as gem-encrusted jewel boxes, book ends, pen stands, letter openers, and tableware).

The large number of medals, trophies, ribbon awards, and extra honors attracts hundreds of entries and assures a large and varied display. In all, 91 prizes and ribbons were awarded, with a full quota designated for the winners in each of the 20 craft divisions comprised in the two main classifications. The winners of the five top awards are: Dalzell Trophy (Robert A. Dalzell Memorial) for the exhibit adjudged the "best of the show" —J. Lester Cunningham, of Chicago, for his All-American Agate Collection; Presidents' Trophy for outstanding lapidary work— Alvin Ericson, of Chicago, for an emerald-cut golden sapphire; Councilmen's Trophy

for outstanding jewelry—Doris E. Kemp, of Riverdale, Illinois, for a pendant of Arizona wonderstone; Juergens Award for best lapidary work by a novice—Opal Lyons, of Chicago, for a brilliant-cut faceted synthetic amethyst; and the Milhening Award for outstanding jewelry by a novice—George Marcek, of Chicago, for a pin and earrings with moss agate. The trophies and medals will be displayed at the Museum with the winning exhibits.

VARIED OCCUPATIONS

The lapidary's art has a broad appeal, and the roster of competitors includes such widely varied occupations and professions as school teachers, electronics experts, engineers, advertising executives, policemen, bankers, housewives, steel-mill workers, welders, machinists, doctors, dentists, and lawyers.

In past years the Chicago Lapidary Club's display of gems and jewelry has proved to be one of the most popular of the Museum's special exhibits. Many visitors have been attracted not only from Chicago and vicinity but also from far-distant places. This year the Midwest Federation of Mineralogical and Geological Societies, which is holding its convention at Downers Grove (June 19, 20, 21), is planning a special trip to the Museum so that its delegates may view the gem exhibit.

GEMS ARE RICH IN LORE AS WELL AS LUSTRE

(*Continued from page 3*)

for this purpose because of its alleged powers to encourage love, control tempers, and keep harmony between husband and wife. But the romantic powers of the diamond seem too fanciful for our era. "Diamonds are a girl's best friend" is an allusion to their more prosaically realistic quality.

The sapphire and the ruby, known today as varieties of the same mineral, corundum, were once supposed to be entirely different stones. The red ruby suggests passion and warmth. The incomparable blue of the sapphire has been symbolic of things sacred. It long represented constancy and truth and was believed to have power over all bodily sicknesses. The Greeks knew the sapphire by the name Hyacinthus, derived from the likeness of its color to the blue flower that sprang from the blood of Hyacinthus, a young man accidentally killed by Apollo. Legend has it that the gem became sacred to Apollo and was to be worn when asking advice of his oracles. In mediaeval times gems were thought to reproduce. The sapphire, which is found in many colors, was feminine if it was of light color and masculine if it was dark.

LEGENDS SURROUND EMERALD

The emerald, as well as the ruby and sapphire, has a long history as an ornamental stone. There is a legend, to which little credibility is attached today, that Nero had a glass made of emerald through which he watched the gladiatorial fights. The stone was reputed to restore eyesight—obviously because of its restful and pleasing green color. A folk tale, still occasionally heard, relates that an emerald belonging to a woman who has been betrayed by her husband will turn white.

Cloaked in superstition is the lovely, but at one time cursed, opal. The stone exhibits a fascinating play of colors under certain conditions. This quality has caused some civilizations to credit it with great powers. The Romans placed the opal in a high position as the herald of joy. But others have attributed powers of black magic to it and have let the gem fall into disuse. The heroine of Sir Walter Scott's *Anne of Geirstein* owned an opal that brought her nothing but ill fortune. For a time following the publication of the book the market for opals dropped considerably.

The white pearl, symbol of purity, was believed to have been formed by a drop of dew from Heaven falling into the shell of the pearl oyster at breeding time. However, all pearls are not white. Some are tinged with blue, pink, or yellow; others are gray or black. The pink pearl is highly valued by the Buddhists, who decorate their temples with it. The natives of Chipinga, a village in southern Rhodesia, also attach a significance to the pink pearl. They customarily place one in the mouth of their dead before cremation.

CREDITED WITH REMEDIAL POWERS

Most stones were once thought to cure certain diseases and ailments. Amber, for instance, could cure sore throat, chills and fever, insanity, dropsy, and toothache. It would also charm snakes away. Amethyst had sobering powers, and spinel was believed by the Persians to prevent evil dreams.

From antiquity man has known and valued gem stones. He has adorned himself with them, placed them in tombs and graves for the afterlife, invested fortunes in them, and woven fantastical myths around them.

ORNAMENTAL STONE OBJECTS IN GEM ROOM

In center foreground is a rare and delicately carved bowl of rose quartz crystal. In the center rear is a rock crystal screen upon which has been carved, on a thin section of quartz, "The Finding of Moses."

CHILDREN'S MOVIES

The summer series of color motion-pictures for children will be presented by Raymond Foundation in James Simpson Theatre of the Museum on six Thursday mornings during July and August. There will be two showings of each program, one at 10 A.M. and the other at 11 A.M. The first in the series, Walt Disney's "Living Desert," will be on Thursday morning, July 10. The complete schedule will be announced in the next issue of the BULLETIN. Admission is free and no tickets are needed. Children may come alone, with adults, or in organized groups. Seats may be reserved for Members and their children.

FINGERPRINTS ARE CLUES TO EXHIBITS' POPULARITY

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

THE FINGERPRINTS and even the noseprints that visitors leave in the Museum are the best clues we have to the popularity of an exhibit. No one knows this better than Jack Roberts, whose job includes seeing that the glass in front of the exhibits is clean. The glass in front of Bushman, the gorilla that once lived in the Lincoln Park Zoo, quickly is plastered with prints; next to it is a family of hyraxes from Abyssinia, and there is rarely a print on its glass-sided case. It's pretty elementary detecting to establish that more people are interested in Bushman than in hyrax.

Not everyone who looks at an exhibit leaves a print on it as a record. Most of the prints are made by children and some of the marks, at the bottom of the case, indicate that the children are pretty small. But some are made by adults. One noseprint in front of a group of insects was level with my face, and I'm above average height. I saw one dignified lady point out a clam to her companion and inadvertently touch the glass. In front of an exceptionally interesting exhibit with reading matter a visitor may rest his forehead on the glass. Anyone may leave prints. We don't really mind the prints although it keeps Roberts busy polishing, and we make a virtue of a necessity and use these prints as automatic popularity computers. Summertime is better for fingerprints than winter, Roberts tells me. In hot weather prints take better, evidently due to the extra activity of human sebaceous glands.

OTHER CHECKUPS TRIED

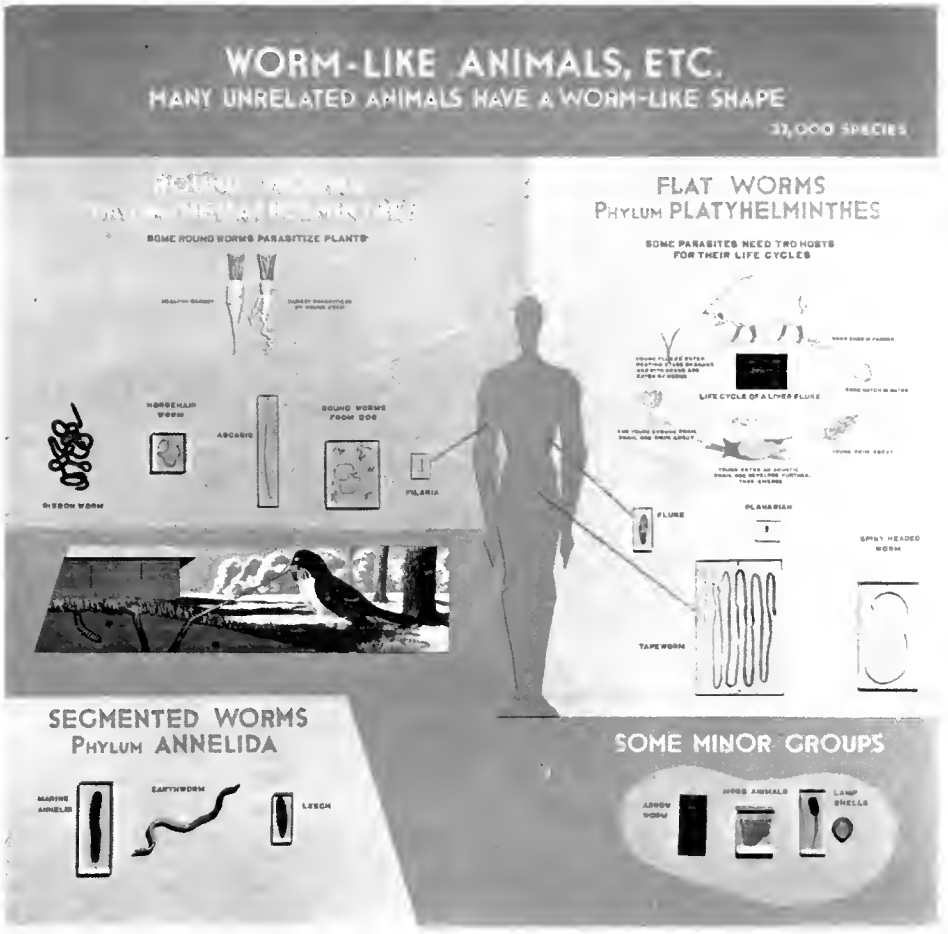
Of course these marks do not tell us how many of the 2,000 to 3,000 visitors in an average day look at any one exhibit, nor do they tell us how long those who do so devote to it. We've tried other methods for estimating popularity. Presenting a questionnaire to visitors as they left the Museum was tried for a while; visitors have been followed and their courses plotted and timed (all very discreetly of course); an observer has been stationed by an exhibit, recording very unobtrusively the length of stay of the visitors, and the comments made. Frequently on my way to lunch I saunter through the exhibition halls, gathering general impressions.

But none of the methods are as reliable as Roberts' automatic computer. It's not infallible, mind you. A fingerprint on the glass does not necessarily mean that someone was interested in an exhibit. This I found by observing a "control" exhibition case, one temporarily empty. A group of fourth or fifth-grade boys, after looking at cases full of snakes and lizards came to the empty case. At once they peopled it in their imagination with crocodiles and boa constrictors and called their friends' attention to them, pointing out color and size. This resulted in a fine crop of prints on the glass that might have been confusing to an uninitiated observer.

FASCINATED BY WORMS

Over a recent long holiday weekend when we had our usual large crowds in the Museum, we got an abundant crop of prints and I made a quick survey of the glass in Zoology to buttress earlier impressions. Some of the exhibits that are most popular are not those one might expect. This has been especially true for the units in the "Animal Kingdom" exhibit that have been on exhibition for less than a year. Of all the groups of animals in this exhibit the most popular were the arthropods, insects, crabs, etc., which show much color and bizarre shapes as well as attractive paintings. The third most popular unit was still more of a surprise. It was the protozoan exhibit, with microscope and slides and greatly enlarged replicas of the microscopic single-celled animals carved in plastic and an illustrated text covering a synopsis of the animal kingdom. This last was apparently the real attraction, judging by the position of the marks of foreheads on the glass. Perhaps it was the result of the activity of a group of students taking notes.

Backboned animals, starfish, and clams and snails ran neck-and-neck for fourth place, then corals and jellyfish, and sponges last.



WORMS ARE POPULAR—IN AN EXHIBIT

This has proved to be one of the most crowd-attracting panels in the Animal Kingdom series of exhibits. Although worms are simple in appearance and obscure in habitat, some of them have very complicated life histories. Some also are important in relation to man as parasites of humans and other animals, or of food crops.

popular is that of the worms. Not only that, but the section showing tapeworms and flukes has received most attention, in which a long tapeworm is folded back and forth in a piece of plastic in which it is embedded, and a liver fluke is shown with a diagrammed life cycle passed partly in a snail's insides and partly in those of a sheep. Next most

I went on through the other halls (exclusive of habitat halls) and, in each hall, the most popular items were as follows:

Mammals: furbearers; kangaroos; lion

Reptiles: snakes, especially the huge python

Insects: the malaria mosquito exhibit; the temporary beetle case

Comparative Anatomy: "Birth of a Baby"; the very popular whale has no glass and can't be included

Birds: eggs; fossil bird restorations

SURVEY AIDS PLANNING

From this cursory survey certain points emerge which we must keep in mind in planning other exhibits.

1. Interest in the subject matter may be decisive, as indicated by the attractiveness of snakes, Bushman, tapeworms and flukes, and "Birth of a Baby."

There are things about which the visitor knows before he comes to the Museum; one of our functions is to make the visitor aware of other things which he does not know, while he is here.

Yet the general interest in birds and mammals does not offset the greater appeal of the worms and insects over the vertebrates in the "Animal Kingdom" series.

2. The size of an object does not necessarily influence attractiveness as indicated by both Bushman and a tapeworm being popular, drawing interest from both larger and smaller animals exhibited nearby.

3. The location within a hall is not decisive, for some of the popular snake exhibits are in the center of a hall, while other popular exhibits are at the ends. A good location is undoubtedly an advantage, but it can be offset by other factors, which is just as well, for we must utilize all the space in the Museum halls.

4. Excellence of preparation is not a decisive factor. The very popular python is not as well done as is the less popular boa constrictor opposite it in the same hall. From this we can conclude that the exhibitor's interest must be subordinated to the visitor's interest.

5. An exhibit that is different from the others in the hall, in both material and treatment, is likely to be popular. This is well shown by our exhibit of eggs in the bird hall. This question of diversity within a hall, the relieving of monotony, is a very important one. Also we must remember that a striking treatment will become monotony through repetition.

6. The aversion of people to reading long labels is well known in museum circles. But the long labels that give a synopsis of the animal kingdom in the exhibit of protozoans are popular. Perhaps the extent to which the text is broken up by small illustrations is the decisive factor. This must be explored further in label writing.

7. Thoughtful, teaching exhibits are not necessarily popular. For instance, the exhibit "What is a Bird?" is not nearly as popular as the exhibit "Fossil Birds" opposite it, which simply shows some restorations. The striking strangeness of these birds may be the main factor. But explanatory, teaching exhibits can be popular, witness the "Birth of a Baby" and the life cycle of a liver fluke.

This survey does not try to evaluate whole halls contrasted with other halls, and we do know that some halls are much more popular than others. But from comparisons within each hall there are some generalizations possible. It appears that a wide variety of factors determines the interest-appeal of an exhibit. Exhibition seems to be not a science, nor a craft, but more an art, like writing and painting. There are certain basic rules, and the subject matter and space available impose limits on exhibits. Standards of scientific accuracy must be kept in mind, and there are a host of intangibles. The treatment of these will spell the difference between an exhibit that will be studied and one that will be passed without a glance.

STAFF NOTES

Dr. Theodor Just, Chief Curator of Botany, attended a symposium sponsored by the New York Academy of Sciences last month, and participated in a panel discussion of "The Present Status and Future Development of Germ-free Life Studies." . . . **John R. Millar,** Deputy Director, has been in the East visiting museums of New York, Philadelphia, and Washington, D.C. . . . **Dr. Donald Collier,** Curator of South American Archaeology and Ethnology, and **George I. Quimby,** Curator of North American Archaeology and Ethnology, attended the annual meeting at Norman, Oklahoma, of the Society for American Archaeology and the Central States Anthropological Society. Quimby retired as president of the Society for American Archaeology, and Collier was appointed review editor of the society's official archaeological journal, *American Antiquity*. . . . **Henry S. Dybas,** Associate Curator of Insects, conducted a seminar on population ecology of the periodical cicada for the Department of Entomology at the University of Illinois (Urbana). . . . **Dr. G. Alan Solem,** Assistant Curator of Lower Invertebrates, was a recent guest speaker on the Phil Bowman Show on WMAQ-NBC. . . . **Loren P. Woods,** Curator of Fishes, attended the Illinois Academy of Science meetings at Urbana and served as a judge of the biological exhibits of the high school section. . . . **Rupert L. Wenzel,** Curator of Insects, held a seminar on problems of the systematics of a genus of histerid beetles for the Department of Biology of Northwestern University. . . . **Melvin A. Traylor,** Assistant Curator of Birds, recently made studies of specimens at the Museum of Comparative Zoology at Harvard University.

Products of wood distillation are shown in the Hall of Plant Raw Materials and Products (Hall 28).

BIRD EXPERT BEGINS PERU JUNGLE TREK

Madre de Dios, Peru, an area rich in bird life and as yet virtually unexplored by zoologists, is the locale of a Museum expedition that began late in May. This field project, led by Emmet R. Blake, Curator of Birds, is part of the Museum's long-range program of South American research. Efforts on this trip will be devoted solely to gathering a large representative collection of the bird life of the area.

Blake will be making his ninth trip to tropical America but his first to Peru. He will arrive by plane in Lima on June 1 and will fly from there to Cuzco, where he hopes to pick up a young zoology student from the University of Cuzco as assistant.

A truck route leads out of Cuzco to the head of Rio Madre de Dios, where native canoemen, campmen, and hunters will be hired to accompany Blake on his descent of the river. Through this sparsely settled, jungle rain-forest the party will travel in dugout canoes almost to the Bolivian frontier.

The area to be explored is geographically situated east of the Andes in the Amazonian lowlands of southeastern Peru. In contrast to the Andean section of Peru, which has already been explored by scientists, relatively little is known of the flora and fauna of these lowlands.

A small collection of some 100 birds from the Madre de Dios region was received by the Museum a few years ago. In this collection were found several birds unknown to science. It is probable that still others will be discovered on Blake's expedition—the first ambitious ornithological reconnaissance of this section of South America.

The greater part of the collection will be gathered on the trip down river. Camps will be set up at intervals along the bank and occupied for several weeks at a time. Mornings will be spent in hunting, and the afternoons and evenings devoted to skinning, labeling, and cataloguing the specimens.

Additional small collections will be made in the foothills of the Andes. These specimens from higher elevations will be compared with those gathered from the lowlands. After the trip down river is completed Blake hopes to charter a small plane to carry him to outlying lowland areas where he will make spot checks to see if the bird life is stable throughout the Madre de Dios territory.

The expedition, which will last from five to six months, is financed by the Conover Game-Bird Fund, established by the late Boardman Conover, a former Trustee and Research Associate at the Museum.

The principal facts about bird migrations, including migration routes and a timetable of average dates of arrival and departure, may be obtained from an exhibit in Boardman Conover Hall (Hall 21).

HUNGER AND THIRST: MAN AND SNAILS

By G. ALAN SOLEM
ASSISTANT CURATOR OF LOWER INVERTEBRATES

WE ALL KNOW PEOPLE who can't last from one meal to another without eating. While Mahatma Ghandi undertook several 20-day hunger strikes, this was accomplished only by drinking water and fruit juice at frequent intervals. No human being can live more than a few days without water, and in a desert man can survive less than 72 hours without drinking. Other animals are less delicate.

Recently Miss Jane Netting, an Antioch student assigned to the Division of Lower Invertebrates, was unpacking a collection of Libyan desert snails purchased from Dr. Rolf Brandt of Bengazi, Libya. The snails had been a few weeks in passage and had been collected several weeks before they were shipped. Some of the shells seemed too heavy to be empty and Miss Netting wondered if the animals could still be alive. Some were, and four species of Libyan desert snails are now living in my office on the fourth floor of the Museum.

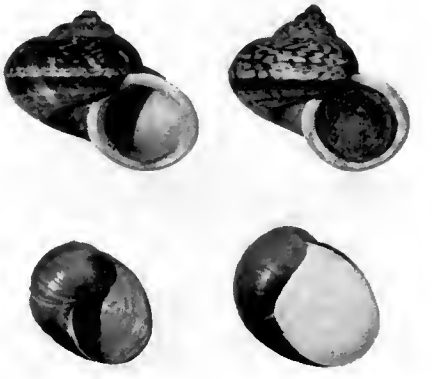
Without food or water, these animals had survived the dryness of a Libyan house, the cold of a transatlantic flight, and the wet cold of a Chicago March. In past years snails from Cuba, South Africa, and Europe have arrived at Chicago Natural History Museum still alive after intervals of up to several months without food or drink. Lest this seem a record, let me add that an Egyptian desert snail, *Eremina desertorum*, revived after more than four years of being glued to a label in an exhibition case in the British Museum, and *Micrarionta veatchii*, a snail from very dry Cerros Island off west Mexico, survived for more than six years in a desk drawer.

LONGER RECORDS CLAIMED

Two much longer records are doubted by some scientists, but may be accurate. Dr. Fred Baker of Stanford University had a specimen of *Orthalicus capax* (a Brazilian tree snail) appear crawling around his home 23 years after his collecting trip, and Walter F. Webb of St. Petersburg, Florida, stated that a European snail, *Eobania vermiculata*, given him in 1900, revived in 1920 but was dead when re-examined in 1951.

Four to six years without food or water is remarkable, and a possible 20 to 25 years is astounding. Behind these records lies a means of adapting to an inescapable biological fact—that living matter is based on water. A jellyfish is more than 95 per cent water and even a man is about 67 per cent water. Life originated in the sea. When living things colonized the land, they had to bring their "liquid environment" along and keep it liquid. There are many ways of maintaining an internal liquid environment and there are as many papers written on the methods as there are ways. Insects, flowering plants, reptiles, birds, and mammals developed a hard external covering (to prevent evaporation of water from the body surface) and varied internal mechanisms for conserving water. A general treatment of water conservation in vertebrates is found in Homer Smith's *From Fish to Philosopher*.

Other organisms, such as snails, most worms, nearly all amphibians, and, at certain stages in their life cycle, mosses and ferns, never became truly terrestrial. They can be active only during periods when the air is nearly saturated with water vapor. When humidity is not high, they are inactive and must wait for the return of moist conditions. Generally they live only in areas where optimum humidity can be found, but



SHUT OFF FROM THE WORLD

The colorful Cyclophorus from Burma (top) is a tree-living operculate snail. The specimen on the left shows the empty shell; the one on the right died with the operculum sealing the aperture. Helix aperta (lower left) is a pulmonate snail from the French Riviera. Its heavy white epiphragm (lower right) effectively seals off the animal from the hot summer air. The dead animal is still inside the shell.

a small number of species have adapted to living even in desert areas. All these "nonterrestrial" land organisms have some inactive stage in their life cycle that is resistant to drying out. The organism thus lies dormant until the moist conditions return. Even in deserts a few days each year see heavy rains or there is a morning dew. The active life of many desert organisms is compressed into the few wet days while the rest of the year is spent in a dormant state in which the necessary functions of living are still carried on, but at such a slow rate that their condition comes close to being "suspended animation."

DROUGHT PROTECTION

Each group of organisms has its own means of surviving droughts, but only the land snails will be considered here. Most species of these have a large hard shell that is capable of holding the entire animal. By retreating into the shell, a snail can effectively reduce the area of the body exposed to the air (and thus the area from which water can evaporate). In dry regions, further protection is needed. Two ways, each characteristic of a major line of snail evolution, provide the protection.

The operculate land snails, descended from marine ancestors, have a horny or calcareous disk on the back part of their foot. When the animal draws into its shell, the disk exactly fits the opening of the shell (*see figure*). This closed door protects the snail from enemies, such as insects and mice, and also prevents water loss. The seal is so very effective, however, that even air is completely excluded unless special provisions are made.

The pulmonates probably went from the sea to fresh water and then to land. They have no ready-made door and must build a new one each time they wish to close the aperture. During July and August large brown land snails can be found in Chicagoland woods around old logs and in leaf mold. They are inactive and have retreated far into their shells. Across the aperture is what looks like a piece of cellophane. This is the *epiphragm*, which serves the same functions as the disk of the operculates. In relatively moist regions (such as Chicago), it is very thin and transparent. In drier regions, the epiphragm is quite thick and opaque (*see figure*). The snails are inactive over dry periods, just as many mammals hibernate over the cold winters.

The snail survives by restricting its activities to periods of extreme moisture and by being quiescent through long droughts. Our relatively impervious skin and internal water-conserving devices enable us to be more or less active regardless of the weather. To maintain this activity requires constant addition of food and water, since even when we are asleep, our body functions are operating at several hundred times the rate of a dormant snail. Our increased activity is maintained only by a lessened ability to go without food and drink.

Snail and man survive and occupy their respective ecological places in the world of living things. Biologically, both are equally "successful" organisms, if success is the same as survival of the species. But man uses different criteria to judge success in the living world, although I'm certain that a snail is totally unaware of such abstractions as "progress," "beauty," "truth," or "culture."

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

Books

ORCHIDS OF PERU (No. 1). By Charles Schweinfurth. 260 pages, 45 illustrations. Published by Chicago Natural History Museum, 1958. Bound in paper. Price: until December 31, 1958 (if ordered with future numbers), $4.00 postpaid; after December 31, 1958 (or if the single number is ordered currently), $4.50 postpaid. No. 2 will probably be published in 1959. It is anticipated that the work will consist of four numbers in all. A special prepublication discount of 10% is offered on orders for the full set placed before December 31, 1958. Full sets bound in heavy buckram may be made available at approximately $2.00 additional.

Although the orchid flora of the Andes is the richest in the world, no comprehensive treatment commensurate with its beauty and importance has been available until now, when Chicago Natural History Museum has undertaken the publication of *Orchids of Peru* by Charles Schweinfurth, of which No. 1 is off the press.

The book, expected to appear in four numbers when completed, will describe accurately every species recorded from Peru. The distribution of the various species in Peru and elsewhere is indicated, and all pertinent information is appended, especially in regard to economically important orchids. Many of the species are shown in line drawings. The book is therefore useful to botanists, horticulturists, and orchid lovers.

Thirty-five years of research and meticulous scholarship have gone into preparation of this book. It is the first detailed orchid flora of any portion of the Andean region and will, as such, provide a foundation for similar studies for other Andean countries. As a pioneering work, it will give a strong impetus to studies of the largest family of flowering plants.

The research on which this work is based was done at the Orchid Herbarium of Oakes Ames, which is housed in the Botanical Museum of Harvard University. Charles Schweinfurth, the author, who has been associated with this herbarium since 1915, is now Research Fellow in Botany at Harvard University and was for many years curator of its herbarium. Since 1922 his major project has been this work on orchids. The beautiful line-drawings are the work of such widely known botanical artists as Blanche (Mrs. Oakes) Ames, Gordon W. Dillon, Elmer W. Smith, Dorothy Marsh, and Douglas E. Tibbitts.

The flora is arranged according to Schlechter's system of classification, and the technical names are in accord with the International Rules of Botanical Nomenclature. Schweinfurth has critically evaluated the obscure Ruíz and Pavón concepts and thus provided a sound historical basis for consideration of the work of later collectors. *Orchids of Peru* is a part of the *Flora of Peru* now being published by Chicago Natural History Museum.

POPULAR DEITY IN JAVA

The stone sculpture shown above, exhibited in Case 44 of Hall G (Peoples of the Malay Peninsula and Indonesia), represents Amitabha, the most popular Buddha of Java or, in fact, of the whole Far East. This Buddhistic deity, who was developed in the first century of our era, is regarded as the personification of light. He is believed to preside over a Paradise located in the West, where, it is thought, his faithful votaries will be reborn from lotus flowers to enjoy a state of eternal bliss. For this reason he is the most popular of Buddhas, and is constantly invoked with prayers that express the wish to be reborn in his paradise. Buddhism developed out of Hinduism in India and later spread to Indonesia with Indian migrations.

The Museum has several of these stone sculptures from Java. In character they go back to origins in India and represent beings belonging to Hindu and Buddhist religion and mythology. Such sculptures are found in many ancient stone structures, mostly in ruins, scattered over central and eastern Java, as at Borobodur. The Hindus apparently arrived on the island shortly after the beginning of the Christian era, but they did not establish powerful states until the 7th or 8th century. They were overthrown by Mohammedans in about the 16th century.

About 20,000 years (from 18,000 B.C.) of the story of the American Indians, from their arrival in the New World out of Asia down to recent times, is covered by the exhibits in seven halls of the Museum (Halls 4 to 10 inclusive).

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: Howard Anderson, Flossmoor, Ill. —Indian artifacts

Department of Botany

From: Dr. Barbara F. Palser, Chicago—105 herbarium specimens, 5 photographs

Department of Geology

From: National Confectioners Assn., Chicago—a portable ultraviolet-light unit; Edward Olsen, Chicago—foshagite specimen, Asbestos, Quebec

Department of Zoology

From: Mrs. Ruth Allchin, England—8 nonmarine shells, Guatemala; Thomas C. Barr, Jr., Lubbock, Tex.—a cave silphid beetle, Tennessee; Eugene Dluhy, Chicago—a butterfly, Indiana; Dr. H. M. Harris, Ames, Ia.—16 bugs of the family Anthocoridae; Harry Hoogstraal, Cairo, Egypt—66 birdskins, 181 amphibians and reptiles; Dr. Taiji Imamura, Mito, Japan—25 slides of water mites; Lester G. Rees, Chicago—a Jagourundi cat, Mexico; Dr. F. Zumpt, Johannesburg, South Africa—100 slides of parasitic mites

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NEW MEMBERS

(April 16 to May 15)

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A. Watson Armour III, Edwin C. Austin, Mrs. James E. Baum, Dr. Sam S. Chrisos, Col. Henry Crown, David W. Davidson, Mrs. Burt J. Denman, Robert William Elich, Ray P. Hoover, Glen A. Lloyd, Dr. Eleanor I. Leslie, Franklin J. Lunding, Mrs. Cyrus Mark, William A. Perry, Mrs. W. L. Phelps, Dr. Albert L. Raymond, Mrs. Robert C. Ross, James G. Shakman, Nathan M. Sharpe, Louis L. Stephens, Bolton Sullivan, James L. Taylor, Louis A. Wagner, Herbert P. Zimmerman

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

IN PURSUIT OF DARKNESS

BY EUGENE S. RICHARDSON, JR.
CURATOR OF FOSSIL INVERTEBRATES

PERHAPS you think that the scientists who work behind the scenes at the Museum are always seeking to cast light on their special fields of natural history. Well, so we are, but recently Dr. Rainer Zangerl, Curator of Fossil Reptiles, and I have been assiduously pursuing some darkness.

This came about because we are not chemists, and we have not been able to persuade a chemist to work on our particular problem. The problem sounds simple: How black is our black shale and how much variation is there in its blackness?

The black shale in question is a thin bed lying above Coal IIIA in Parke and Vermillion counties, Indiana, and in the last several years we have been endeavoring to learn about the conditions under which it was deposited. Since it contains an unprecedented number of exceedingly rare fossil sharks and armored fishes, beautifully preserved, we have been seeking to unravel the clues in the shale that might tell us how these extraordinary fishes came to live and to die where we now find their remains.

One of the most obvious clues to the vanished environment lies in the composition of the shale itself. It is black. The black is due to heavy carbon compounds, bitumens, derived from the partial decay of vegetation. We have long noticed that in the blackest layers are the most fossils, and we want to be able to chart this in detail so that we can say (if indeed this is so) that the quantity of fossils and fossil debris in a given level is in a definite proportion to the bitumen content of that level. If the proportion is definite, one conclusion may result regarding the environment; if it is variable, another conclusion may be forced on us.

Although this determination is of considerable interest and value in our work, it is not one of the major points, and we felt that we would not be justified in employing a high-priced chemical laboratory to analyze the bitumen content of the shale. Analysis of a single sample would cost in excess of $200 and we have more than a hundred specimens to be determined. So we have attempted to find our own answer.

The process has been long and perhaps roundabout, and a play-by-play description of it may serve to illustrate some of the problems that sometimes are behind an apparently simple scientific statement.

FIRST STEP: WEIGHT LOSS

First we attempted to measure the loss of weight when a sample of shale was ground to a fine dust and then heated to a temperature that would destroy the bitumens. The difference in weight before and after heating should have told us how much organic matter had been present. But the results were not encouraging, for the simple reason that some of the clay minerals in the shale also lost weight at the temperature we had to use. We then tried dissolving the bitumens from the finely ground shale, but found that none of the available solvents would remove them. So we abandoned the direct attack on the bitumens.

It then occurred to us that we could measure the opaqueness of the shale to X-rays. We knew from studying our X-ray pictures of the fossils that the bitumen in the shale was transparent to X-rays and the clay minerals were not. But on second thought we had to abandon this method too. For we remembered some chemical analyses that had been made for us at the University of Chicago that showed a notable amount of heavy elements present in the shale. Now the heavier an element is, the more opaque to X-rays it is, and we had in the shale variable amounts of such heavy atoms as ytterbium, tin, silver, and uranium. If the amount were the same in all levels of the shale, we could accept it as a constant with respect to the bitumens, but it was not.

Farewell, then, to the X-rays. Could we measure some other character of the shale that might give us a value for the bitumen content? We settled next on color and decided that if we could measure the darkness of the shale we would know its relative bitumen content in the 35 levels that we were investigating.

Thus began our search for darkness. We attempted first to photograph a set of small samples and to measure the relative density of the resulting photographic negative in the parts corresponding to each sample. But we could not be sure that the lighting was uniform, and in any case it was difficult to distinguish enough shades of gray to make a worthwhile chart.

At this point we discovered that the Museum's Division of Photography was using a very sensitive photoelectric cell for measuring the amount of light on the ground glass of a camera—a device known as a Densichron, which was lent to the Museum by John Maurer of Chicago. We borrowed the Densichron. Then it was necessary to obtain a uniformly bright vertical source of light. Again this was found in the Museum, an Ultrapak illuminator used by the Division of Insects for photographing microscopic beetles. And again an important piece of equipment was borne into the geology darkroom.

Meanwhile it was necessary to prepare the shale samples for examination. We could not trust the random reflections that might rise from a naturally broken surface of the shale, so we ground our samples with a fine carborundum powder on a plate-glass surface, producing a set of about a hundred small pieces of black shale with a uniform matte surface. Next, it was necessary to mount these samples so that they would lie horizontally under the Ultrapak illuminator. After several hours of manipulating, we finally had them all fastened temporarily on glass microscope slides, with the upper surface of the shale measured exactly parallel to the bottom of the slide.

REFLECTIONS MEASURED

Having mounted the photoelectric cell above the Ultrapak, shielding it from extraneous light with a camera bellows, we

(Continued on page 8, column 1)

THIS MONTH'S COVER

The head of a carved wooden figure from Africa is shown on our cover. The figure is one of the objects selected for a special exhibit "What Is Primitive Art?" that will be on view in Stanley Field Hall from July 1 to September 30 (see page 3). This figure, which is 43 inches tall, was made and used about 50 years ago by members of one of the Cameroons tribes. Probably it represented a female ancestor of the person for whom the carving was made and was used as part of an ancestral shrine.

"WHAT IS PRIMITIVE ART?"—ANSWER TOLD IN EXHIBIT

By PHILLIP H. LEWIS
ASSISTANT CURATOR OF PRIMITIVE ART

A SPECIAL exhibit entitled "What is Primitive Art?" will be shown in Stanley Field Hall from July 1 until the end of September. This exhibit will serve as an introduction to the increasingly popular field of primitive art by attempting to answer the title question.

In addition the exhibit shows the scope and quality of the huge art holdings of the Museum. Civilized societies, such as China, Egypt, and Rome, as well as the many primitive societies of the world are represented at the Museum. The great collections from North and South America, the enormous and excellent Melanesian collections, the Malaysian collections, including that from Madagascar, and the Cameroons and Benin collections from Africa form an aggregation of primitive art unequaled in most museums of the world.

NEW GUINEA ART
Wooden bench carved by artists of tribe living on the banks of Sepik River.

The exhibit defines art by comparing it with non-art. It also shows the distribution of the Museum's collections containing art, compares primitive art with the art of civilized societies, and deals with the dating of primitive art objects.

Primitive art is the art that is made and used by members of primitive societies. To understand this answer to the question "What is primitive art?" we must first define art (visual art, not music, literature, or the dance) and then explain what is meant by a primitive society.

ART ALWAYS HAS PURPOSE

An art object is first of all an artifact, which means that it is a product of conscious human design. Art is produced only by human beings—"chimpanzee art" notwithstanding. As products of conscious and deliberate design, art objects are therefore purposefully made. Only in civilized societies can anyone pretend that art objects have neither purpose nor function. Whenever it is possible to discover the meaning of primitive art objects, it is clear that they are useful. Therefore uselessness as a criterion for art is completely wrong—it would eliminate from consideration most of the art of the world.

It is the peculiar way in which art objects are made and used that points to an essential quality of art. An ax must have certain physical characteristics so that the implement can be grasped, held, and manipulated by human hands. A pottery vessel, to be used, must hold liquids and resist heat. The design of an art object—the imposition of physical form upon the material—is determined by one factor. Art functions by being *seen*.

Art, therefore, is, in part, a matter of shapes and surfaces that present visually apparent forms to human eyes. When such art forms are seen, they can communicate ideas, as in depicting real or supernatural beings, in recording historical events, and in commenting on real or imaginary happenings of life. Decorative art embellishes objects of everyday use, perhaps to bring magic protection or power to such objects by making visible to other men the fact that the object has magic qualities.

ART DEFINED

Art is the conscious design or elaboration of material objects that enables them to be used primarily by visual perception. Visual art has to be seen, and that necessity determines its form. Art objects must contrast with their physical surroundings. Their component lines, flat planes, solid volumes, colors, and textures must be arranged into rhythmic and harmonic compositions. These are elements of which systems of visual art have been made by *all* men in *all* known times.

There can be varying degrees to which the design of art objects succeeds. Craftsmanship and artistry vary among members of all human societies, among primitive as well as civilized ones. Thus there is good and bad art, just as there are well-made and poorly made tools. To make aesthetic judgments of primitive art objects we are faced with the considerable task of determining how well the visual design has succeeded in meeting the artist's intent, of knowing how well the design conforms to the traditional style, and, most important, of knowing how well the object functions in its social context.

Let us now consider the word "primitive" as applied to art. It has come to mean various things: an early period of art of a civilized society, or the work of supposedly naive artists who live in civilized societies, or the art of non-European civilized peoples.

PRIMITIVE SOCIETY

In anthropological use the word "primitive" refers to societies with a certain kind of social organization and way of life. When anthropologists speak of primitive societies we mean that these societies are small, intimate, isolated, self-contained, self-sufficient, and homogeneous. They have no writing and few or no political institutions. Primitive societies are held together by bonds of kinship and by the sharing of common traditions of thought and action. Specialization is rare in primitive societies. Except for the fact that there is work for women and for men and work for young and for old, everyone does much what everyone else does.

Artists in primitive societies stay at home, often just a few feet from where they were born. They work at their art when not engaged in subsistence tasks. They often work while being watched by other people, who do not hesitate to direct the progress of the work or to comment on what has been done. The sharing of traditional thought affects the primitive artist's treatment of his subject matter. The natural and supernatural environment that the artist pictures in his world is known to all. The problem of being original or different does not exist for primitive artists, except as one to be avoided. Everyone, including the artist, knows what the art ought to look like, and expects that it will indeed turn out that way.

ARTIST CONFORMS

The public for whom the primitive artist works is often comprised of his own relatives. He must meet their demands—they are his own kinsmen and must be treated as such. Revolt against a patron of art in a primitive society would be the same as disobedience of one's own father or uncle, who at the same time might be a chief or clan leader.

The isolation of primitive societies is such

that outside influences rarely reach the artist. The organization of primitive societies is such that, if such influences do reach him, he probably would reject them. Changes in art styles in primitive societies thus proceed very slowly and by processes that are not apparent to the people. When strong foreign influences do intrude, they disrupt much of the society's activities, including the art. Under such circumstances, change can occur rapidly.

A very important difference between the art of primitive and of civilized societies is in the attitude of the people towards the idea of art. Only in civilized societies do there arise elaborations of art schools, art critics, art historians, art collectors, art museums, and the like—all, of course, are in addition to those almost forgotten creatures, the artists themselves.

In primitive societies there are but two divisions of artistic endeavor—the makers and the users of art. It frequently happens that one individual acts in both roles.

We can thus see that the differences between primitive art and the art of civilized societies lie in the social and cultural background of the art and in the places of geographic origin. Such differences are not readily apparent in the form of art objects. The art of the world must be classified into categories of the place of origin, kind of society, and function. Then it will be possible to deal more meaningfully with the familiar categories of technique and form. It is hoped that the exhibit "What is Primitive Art?" will serve as a start in that direction.

KARL P. SCHMIDT FUND COMMITTEE NAMED

The Karl P. Schmidt Fund (see March 1958 BULLETIN) has completed its permanent organization and the selection of its permanent committee, which includes Dr. Alfred E. Emerson of the University of Chicago, Harry G. Nelson of Roosevelt University, and Dr. Theodor Just, Dr. Rainer Zangerl, George I. Quimby, and D. Dwight Davis of the Museum staff. Dr. Robert F. Inger of the Museum staff has been selected as permanent chairman.

The permanent committee has the responsibility of awarding grants to aid naturalists who desire to visit Chicago Natural History Museum for study. The committee has turned over $4,900 to the Museum for investment, but grants will be made at the sole discretion of the committee.

To date approximately 300 persons and a few institutions have contributed to the fund in memory of the late Dr. Schmidt. Noteworthy among the latter is a contribution from the Institut des Parcs Nationaux du Congo Belge.

Contributions in honor of Dr. Schmidt may be addressed to The Karl P. Schmidt Fund in care of the Museum.

ABUNDANCE OF ANIMALS DEFIES CALCULATION

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

I DOUBT that anyone has been bold enough to guess how many individual animals there are in the world. And if they have, the total number would be so large as to be meaningless. Not only mammals (animals in the vernacular) but fishes, frogs, birds, worms, crabs, insects, sponges, jellyfish, starfish, and amoebas are animals, too. And there are a great many more of those of tiny or microscopic size than the few larger ones we see in a day in the country. For example, many millions of animals of various sizes, and perhaps three times as many plants have been estimated to live in the soil of an acre of meadowland in the eastern United States. In the sea, animal life is still richer. In a quart of sea water, there may be one million one-celled animals and plants, perhaps one-quarter of them animals.

Among the protozoans, or one-celled animals, most of which are microscopic, is Euglena, scarcely visible to the naked eye. Yet it may be abundant enough to color the water of a pond green. Other species can tinge glaciers pink, cause red snow, and help make sea water red. Other protozoans may cause the phosphorescence that lights the oceans's surface at night.

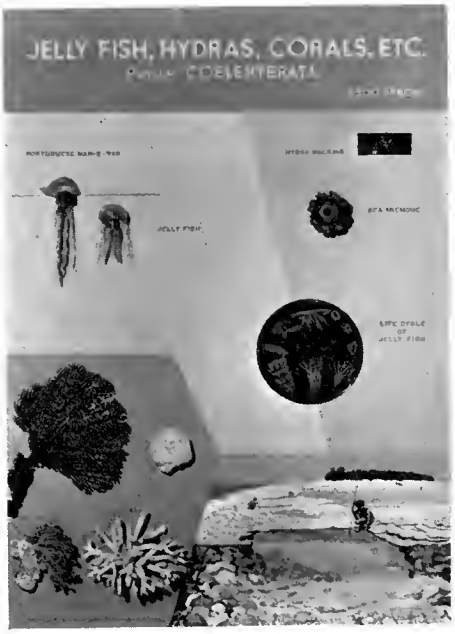
Tiny shelled-amoeba, such as foraminifera, are so abundant in the sea's surface water that the shells of the dead animals falling to the bottom have covered a large part of the ocean depths with ooze. The bulk of these shells that has accumulated over the years is nowhere more apparent than in the white cliffs of Dover and the 1,000-foot thick chalk deposits of Mississippi and Georgia, which are composed entirely of the remains of these creatures.

PARASITES BY THE BILLION

The abundance of microscopic one-celled parasites is illustrated by the one that causes malaria. It is introduced into the human blood stream by a mosquito whose salivary glands may contain 200,000 parasites. In a man's blood they feed on the red blood corpuscles and multiply until there are 40,000 of them in a cubic millimeter (there are about 25 millimeters to an inch) of the victim's blood (and a man has about five quarts of blood). There is another protozoan of the order *Spirotricha* that lives in the digestive system of cows, and it is estimated there may be as many as 50 billion of them in a single animal.

Sponges do not seem so impressive in density of population. But an interesting numerical note is sounded by the numbers of other animals that lived in the crevices and canals of one sponge, about a yard across, that came from Florida waters. It harbored some 17,120 other animals, including a number of fishes.

Perhaps none of the living animals are quite as impressive in their massed abundance (aggregate bulk) as the coral (Coelenterates, relatives of jellyfish and sea anemones). This is seen in the reefs they build —coral reefs that are composed of the living skeletons of certain small kinds of polyps, as this type of coelenterates is called. The most famous reef of this sort is the Great Barrier Reef of Australia that stretches for more than 1,000 miles along the east coast of Australia and extends scores of miles off shore in places. On the west coast of Madagascar is another, where I've sailed for days



CORALS AND THEIR RELATIVES

One of the panels in "Synopsis of the Animal Kingdom." Tiny coral animals may be so abundant that their skeletons form reefs extending a thousand miles, as in the Great Barrier Reef of Australia, a section of which is shown in the exhibit.

inside the reef. The reef-building corals are all inhabitants of warm, shallow seas, and it is off our Carolina coast, in Bermuda, that the farthest north of these reefs exist.

Some worm-like animals of diverse sorts are parasitic and have a tremendous reproductive potential: a liver fluke may produce a half-million eggs; a large female roundworm that parasites humans may contain 27 million eggs. The complicated life histories of some of these parasites, with transfers from host to host and development in more than one kind of animal, undoubtedly result in the loss of most of them. But that they can still be very numerous is indicated by a species of roundworm which exists at one stage in swine; an ounce of heavily infected sausage may contain 100,000 of their encysted larvae. The minute free-living roundworms of the soil may reach 3 billion in the upper part of an acre of ground.

The most familiar of the worm-like animals is probably the earthworm, which may

exist in tens of thousands to the acre, and whose activities in loosening and fertilizing the soil may improve its crop potentialities greatly. Among the arthropods, the insects on the land and various crustaceans in the sea are obviously abundant. You only have to think of the swarms of mosquitoes that rise as you walk through a swamp, the fireflies that rise from a field of ripening wheat on a summer evening, the lacewings feebly fluttering above an alfalfa field like a shimmering mist at sunset, the swarms of flying ants, or of the grasshoppers (or locusts) that devastate crops in eastern Asia or in our American west.

In California in winter, two people can collect 50 to 100 pounds of massed hibernating ladybird beetles in a day—a collection that would probably contain 1 to 2½ million ladybirds. A hive of bees in summer may contain 60,000 bees. It may be necessary to unwind 25,000 cocoons to get one pound of silk thread.

NUMBERLESS CRUSTACEANS

On some tropical mud beaches, and in mangrove swamps the crabs may be the conspicuous and common animals in sight. But the crustaceans of the plankton in the open ocean are in more enormous numbers. The copeopods, that feed on microscopic floating plants and are themselves only a small fraction of an inch long, are so abundant that the whalebone whale (which may reach a length of 100 feet) feeds on them, straining them out of the water with its baleen-fringed mouth. It is said that two tons of tiny copeopods were found in the stomach of a large blue whale.

Mollusks may lie side by side on a shallow sea bottom or buried in the bottom. On some Florida west coast beaches, if you make a scratch in the sand where the waves are breaking, the little coquina clams will simply pour out into the retreating wave. On the bottom of the North Sea there are miles of banks where 1,000 to 8,000 bivalve mollusks per square yard are estimated. On oyster beds as many as 400 to 500 million oysters have been harvested annually from a bay with an area of about 60 square miles. In the stomach of a fish about 35,000 small snails have been found.

The echinoderms are of moderate size, so one wouldn't expect the great numbers you find in smaller animals. But crinoids (sea-lilies) are common enough that a dredge has brought up, in one haul, 10,000 of them, and the brittle stars are sometimes as abundant as 18 to the square foot in some places on the ocean bottoms.

The fishes are probably the most numerous vertebrates. Standing on a Lake Michigan pier I've seen the emerald shiner pass in what seemed endless schools. Perhaps no fishes in the sea are caught in such numbers as the herring. One fishing boat may catch a million in a day. In northern and western Europe an estimated 7½ billion herring have been taken in a year.

Mammals are sometimes extremely conspicuous parts of the scenery as were the big game animals of the east African savannas. In America the herds of bison were once impressive. Now, especially in our western parks, herds of elk and in a few places bison can still be seen. But it is the smaller mammals that are actually more common. Red-backed mice of the spruce and pine forests have been estimated at 16,000 per square mile; and meadow mice at 70,000 per square mile.

SEVEN BILLION BIRDS IN U.S.

There are places in North America where water fowl congregate, and it is possible to see a million birds at once on the California wintering grounds, or the great Bear Lake marshes. But over much of our country the breeding bird population is only about two pair of birds per acre or perhaps 7 billion birds in the United States. By contrast there are only between two and three dozen whooping cranes left alive, and probably between 1,000 and 2,000 trumpeter swans.

I've tried to refrain from hyperbole, from adjectives which would lose their force by repetition in writing of animal numbers. When we discuss the actual numbers of microscopic and very small animals they are so great that their numbers actually surpass those of the leaves of the trees, of the blades of grass, and perhaps of the grains of sand.

As a general rule we can say that small animals tend to be more abundant than large ones. Space and food that can support one cow will support six sheep, many more rabbits, still more meadow mice, and still more grasshoppers along with still smaller things such as angleworms, roundworms, and protozoans in the soil. Predators must be less common than their prey species and are usually larger, as robins are larger than angleworms, or foxes than mice. Internal parasites are obviously smaller than their hosts, and often very much smaller as well as very much more numerous.

When we go into the countryside near Chicago, the plants, the grasses, and the trees are the obviously abundant living things, no matter how common swarming black birds, grasshoppers or mosquitoes may be. How different it is on a coral reef. In these beautiful sea gardens the corals form the substratum, with sponges, crustaceans, and fishes everywhere. Nowhere on the globe is animal life more obviously abundant.

In closing, let us remember that an acre of meadow may have a total population of animals, of various kinds and mostly very small, much more numerous than the human population of Chicago.

If your Museum visit coincides with lunchtime, don't forget there is a cafeteria, open from 11 A.M. to 2 P.M.

RADAR MAY BECOME BIRD-STUDY TOOL

The "spurious echoes" now called "angels" that began to plague the operators of radar sets as they became more powerful are now regarded as caused by birds. This was first demonstrated in 1941 in Britain, but most physicists continued to believe that "clouds of ions" were responsible. Security considerations restricted the exchange of information for some years. The facts have been rediscovered independently several times during the past few years, in Britain and Switzerland, and the evidence seems incontrovertible.

The use of radar equipment as a new tool for studying bird migration opens wonderful new vistas. Where knowledge of actual volume, height, direction, and speed of night migration has been limited to observations through telescopes trained on the moon or to deductions from deaths at radio towers, we may now get data from ornithologists watching migration on radar tubes.

Ibis, 1958

STAFF NOTES

An honorary degree of doctor of laws was conferred on **Dr. Clifford C. Gregg**, Director, on June 6 by the University of Cincinnati (of which he is a graduate). . . . **Dr. Sharat K. Roy**, Chief Curator of Geology, who since last September has been conducting a research project on meteorite collections in foreign museums, under the joint auspices of the National Science Foundation and the Museum, has completed his work in London, Paris, and Calcutta. He will next proceed to Vienna, Frankfort, and Helsinki, and possibly to Moscow and Leningrad. . . . **Henry S. Dybas**, Associate Curator of Insects, is engaged in field work in southern Illinois. . . . **Dr. Alan Solem**, Assistant Curator of Lower Invertebrates, has begun a survey of collections in midwestern museums. . . . **Dr. Robert H. Denison**, Curator of Fossil Fishes, recently lectured at a seminar on evolution at the University of Illinois and also at a seminar on paleoecology at the University of Chicago. . . . **William D. Turnbull**, Assistant Curator of Fossil Mammals, recently lectured at the University of Illinois. . . . **D. Dwight Davis**, Curator of Vertebrate Anatomy, **Philip Hershkovitz**, Curator of Mammals, and **Miss Sophie Andris**, Osteologist, attended the annual meeting of the American Society of Mammalogists in Tucson, Arizona. . . . **J. Francis Macbride**, Curator of Peruvian Botany, was made an Honorary Professor of the University of San Marcos during the recent South American Botanical Congress in Lima, Peru. . . . **D. S. Rabor**, Field Associate in Zoology, has been named Associate in the Division of Birds.

MASTODONS AND MEN IN THE UPPER GREAT LAKES AREA

By GEORGE I. QUIMBY
CURATOR OF NORTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

WHO were the first settlers of the Upper Great Lakes region? At the present time direct archaeological evidence is lacking. Nevertheless, as will be shown subsequently, a good circumstantial case can be constructed by using evidence from fields of natural history.

The first settlers in the Upper Great Lakes area probably were the Paleo-Indians who hunted mastodons and used spears pointed with fluted blades of chipped stone.

Fluted points are unique and easily recognized because they have longitudinal grooves or channels. There are several varieties of fluted points.

Clovis fluted points are the type most commonly found in the Upper Great Lakes region. They are lanceolate points with parallel or slightly convex sides and concave bases. They range in length from one and one-half to about six inches. The longitudinal flutes or grooves sometimes extend almost the full length of the point but usually no more than half-way from base to tip. The flutes are most often produced by the removal of multiple flakes. Most Clovis points are fluted on both faces, but some are fluted on only one face. Generally the basal parts of fluted points have been dulled and smoothed by some sort of grinding.

USED TO HUNT MAMMOTHS

In the West, Clovis fluted points were used by Paleo-Indians who hunted mammoths (elephants) that lived in the lush grasslands that prevailed long ago in that region. There is some evidence indicating that the western Clovis points belong to a period older than 8000 B.C., and many archaeologists have assumed that the fluted points found in the eastern half of North America are as old as those found in the West.

Although large numbers of fluted points have been found in the eastern portions of the United States, there are very few known sites and these have not yet been radiocarbon-dated.

Upwards of 200 fluted points have been found in the Upper Great Lakes region. Unfortunately no sites attributable to the Paleo-Indians who used these points have been discovered so far. All of these points were surface finds.

Fortunately the distribution of these fluted points and the specific places they were found can be related to radiocarbon-dated geological events in such a way as to provide a generally dated period during which the Paleo-Indian makers of these fluted points lived.

For instance, where certain areas were covered by glacial ice or by waters of a glacial lake, they were inaccessible to Paleo-Indians. These first settlers could only have lived and hunted in regions available to them. Local areas of the Upper Great Lakes did become available to these Paleo-Indians as the ice retreated and the glacial lake waters receded. And by knowing where these first Paleo-Indians were and were not, it is possible to estimate the period during which they lived and hunted in the region.

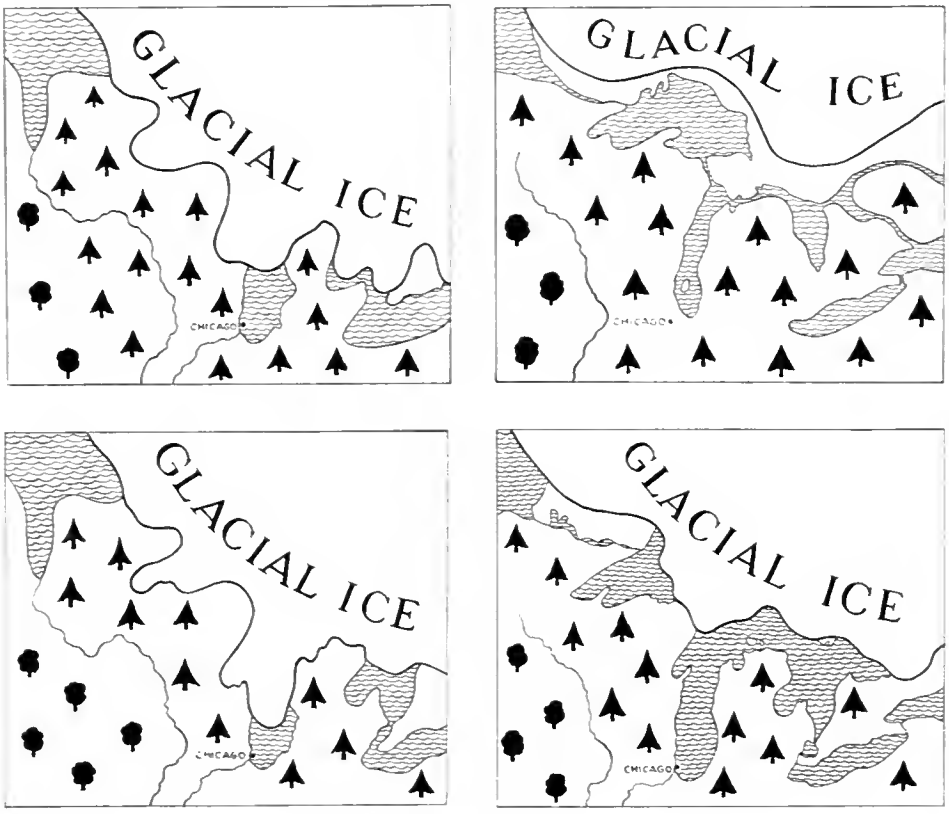
AFTER 10,000 B.C.

Fluted points have never been found in Michigan north of the Port Huron Moraine, a system of glacial deposits that indicates the front of the glacial ice as late as about 10,000 B.C. So the Paleo-Indians who used fluted points could have been and presumably were inhabiting available areas south of the glacial ice at this time.

Some fluted points have been found in places on an old bed (Glenwood stage) of glacial Lake Chicago that was in existence until about 10,000 B.C. Therefore these particular points were left there some time after 10,000 B.C.

Other fluted points have been found in Wisconsin north of the southern limits of Valders till, reddish clay glacial deposits that were left by melting ice about 9000 B.C. These points could not have been placed where they were found until some time after the retreat of the Valders glacier. Therefore they date from a time later than about 9000 B.C.

One fluted point was found on an old bed (Calumet stage) of glacial Lake Chicago that



Maps by Gustaf Dalstrom

CHANGING ENVIRONMENT OF PALEO-INDIANS

Upper left: region at about 10,000 B.C. during retreat of glacier and at end of Glenwood stage of glacial Lake Chicago. Upper right: region at about 9500 B.C. during retreat of glacier and Bowmanville low-water stage. Lower left: region at about 9000 B.C. during advance of glacier and the Calumet stage of glacial Lake Chicago. Lower right: region from about 8000 B.C. to 7000 B.C. during glacial Lake Algonquin.

BIG GAME OF EARLY HUNTERS

Mastodons, now long extinct, were contemporary with Upper Great Lakes Paleo-Indians and undoubtedly were hunted by the early tribesmen. The photograph shows a restoration in a mural painting by Charles R. Knight. It is one of a series in Ernest R. Graham Hall of Historical Geology (Hall 38).

was coeval with the Valders glacier of 9000 B.C. This point, therefore, would have reached the spot where it was found some time after about 9000 B.C.

Some fluted points found on the old bed of later Lake Oshkosh, a glacial lake in Wisconsin formed by the retreating Valders glacier, must have been deposited after about 8500 B.C., the approximate terminal date of later Lake Oshkosh.

No fluted points have been found on the old bed of glacial Lake Algonquin, but fluted points have been found on the landward side

CHICAGO-AREA ARTIFACT

Fluted spearpoint of chipped flint from Great Lakes area near site of Chicago. The point is probably more than 9,000 years old. It is two and one-quarter inches long and typical of its genre.

of fossil beaches of this glacial lake. Since the Lake Algonquin stage was terminated about 7500 or 7000 B.C., fluted points must be earlier than this date.

ERA OF MASTODONS

The distribution of these fluted points and their relationships to radiocarbon-dated geological events as well as evidence gleaned elsewhere, indicates that the Paleo-Indians who used fluted points were in the Upper Great Lakes region in the period from about 10,000 B.C. to about 7500 or 7000 B.C. This is also the period in which mastodons were most abundant in the region.

Mastodons, like mammoths, were members of the elephant family and are now extinct. Those in the Upper Great Lakes area were similar in size and appearance to modern Indian elephants but lower and longer in relative proportions, and probably were hairy. Mastodons, unlike mammoths, were browsers. They ate leaves, stems, and twigs. They lived in forests and seem to have been most concentrated around swamps and the lowland areas near streams, rivers, and lakes.

The distribution of mastodon remains in the Upper Great Lakes Area indicates that they are all more recent than the maximum of the last glacial period. Some mastodon remains have been found in deposits on top of an old lake bed (Glenwood stage) of glacial Lake Chicago that was abandoned about 10,000 B.C. Such mastodon remains, being in place on top of the old lake bed, must date from a period more recent than 10,000 B.C.

Other mastodon remains have been found on top of a later bed of glacial Lake Chicago (Calumet stage) that was abandoned slightly after 9000 B.C. These particular mastodon remains, therefore, must represent mastodons that were living some time after 9000 B.C.

FOSSILS RADIOCARBON-DATED

Three fossil mastodons found in or near the Upper Great Lakes region have been radiocarbon-dated by the University of Michigan. One of these found in Noble County, Indiana, had a radiocarbon date of 10,676 B.C., another from Madison County, Ohio, has a date of 7645 B.C., and one from Lenawee County, Michigan, had a radiocarbon date of 7613 B.C.

Thus the evidence from distribution and geological situation as well as radiocarbon dates shows that mastodons lived in the Upper Great Lakes region during the period from about 10,000 B.C. to 7500 B.C. or 7000 B.C., the same period during which lived the Paleo-Indians who used fluted points.

Despite the lack of direct evidence, these Paleo-Indians who used fluted points must have been elephant (mastodon) hunters. The western Paleo-Indians who used fluted points were elephant (mammoth) hunters par excellence and it seems inconceivable that similar Paleo-Indians dwelling in the Upper Great Lakes during the time of the mastodons would not also be elephant hunters. Consequently it looks as if the first settlers of the Upper Great Lakes, the Paleo-Indians who used fluted points, were mastodon hunters.

These Paleo-Indians made their living by hunting. Among the animals available to them were not only the mastodons but also the giant beavers, deer, elk, and caribou.

NOMADIC TRIBES

The first settlers of the Upper Great Lakes were nomadic by necessity. In order to obtain food, shelter, and clothing by hunting, they would have had to range over wide areas of the region. Their shelters probably were made of sapling poles covered with bark or skins. They wore clothing made of animal skins and made tools and weapons of chipped stone and probably bone and wood. Nothing is yet known of their burial customs or of their physical appearance because no skeletal remains have been found.

What is known of their culture and habitat suggests that these Paleo-Indians were socially organized in small bands and that political and religious institutions were lacking. Probably they possessed simple religious ideas based upon awe of nature, attempts to control their luck in hunting, and philosophical adjustment to their habitat.

ENVIRONMENTAL FACTORS

At the time these Paleo-Indians lived in the Upper Great Lakes region the environment was much different from what it has been in recent times. A large continental-type glacier was present in the region throughout the period. This glacier, in retreat at about 10,000 B.C., advanced southward at about 9000 B.C. and then retreated northward leaving the northeast shore of Lake Superior about 7000 B.C.

The Lake Michigan and Lake Huron basins at first had high water-levels. In the Lake Michigan basin the surface water was 60 feet above its present level. With retreat of the glacier, low eastern outlets became available and the water levels in the lake basins were lowered some hundreds of feet by drainage. Then with the advance of the glacier and the subsequent closing of the low eastern outlets by ice, the water levels rose again. In the Lake Michigan basin the surface water stood 40 feet above its present level. During the final retreat of the glacier the surface water-levels in the Huron and Michigan basins became stabilized for a long time at a level 25 feet above the present one.

The climate was colder and moister than that of modern times. The forests were dominated by spruce and fir trees. The animals that lived in the forests included the mastodons, giant beavers, deer, elk, and caribou. In the Lake Huron basin there seemed to have been whales and walruses, probably in very small numbers.

ADVENT OF WARMER CLIMATE

By the end of the period, about 7000 B.C., the climate was getting warmer. The continental glacier was retreating rapidly and the spruce-fir forest was waning as pine trees advanced their hold over the land. The mastodons were disappearing, too, either becoming extinct or moving northward in decreased numbers.

With the disappearance of the spruce-fir forests and mastodons, fluted points also disappeared. Perhaps some of the Paleo-Indians who used fluted points went northward following the spruce-fir forest and the dwindling supply of mastodons. Others remaining in their old areas underwent cultural change in response to changes of habitat and the arrival of other Paleo-Indians with a different technological tradition.

Whatever the cause, the cultural stage based on fluted points, mastodons, and spruce-fir forest ended by about 7000 B.C. and was succeeded by the Aqua-Plano cultural stage of Paleo-Indians in the Upper Great Lakes region.

De-salting Nasal Gland

The nasal gland of cormorants acts as an accessory kidney, and is important in excreting salt from the body, according to experimenters from Duke University. This function of the gland in birds is unique among higher vertebrates. It may be an adaptation for cormorants living on the edge of the sea, where they are said to drink salt water.

—*American Journal of Physiology, 1958*

2 LECTURE-TOURS DAILY IN JULY AND AUGUST

Morning guide-lecture tours, as well as the usual daily afternoon tours, will be given during July and August. There will be no tours on Saturdays or Sundays (or on July 4), but the Museum will welcome visitors on those days during the regular hours, 9 A.M. to 6 P.M.

The morning tours, at 11 o'clock, will be devoted, except on Thursdays, to the exhibits of a single department. All the afternoon tours, at 2 o'clock, and also the 11 o'clock tour on Thursday mornings, will include outstanding exhibits in all departments. Lecturers of the Raymond Foundation staff conduct the tours. Following is the schedule for each week during July and August:

Mondays: 11 A.M.—The World of Plants
2 P.M.—Highlights of the Exhibits

Tuesdays: 11 A.M.—The Earth's Story
2 P.M.—Highlights of the Exhibits

Wednesdays: 11 A.M.—The Animal Kingdom
2 P.M.—Highlights of the Exhibits

Thursdays: 11 A.M. and 2 P.M.—Highlights of the Exhibits

Fridays: 11 A.M.—People and Places
2 P.M.—Highlights of the Exhibits

Museum a Summer Spot for All Children

With the closing on June 27 of Chicago public schools, the Museum issued its annual invitation to children and parents to use its facilities during the long summer vacation. Dr. Clifford C. Gregg, Director, calls the attention of fathers and mothers to the Museum as a safe, cool, and absorbingly interesting haven where children may visit for a few hours or for a whole day.

The forty-nine large exhibition halls offer a world to discover and explore. Indians, dinosaurs, strange animals and plants, mummies, and countless other things provide endless adventure for active minds. Admission to the Museum is always free to children, and there is ample material to occupy them for as many Museum visits as they can make.

PURSUIT OF DARKNESS—

(*Continued from page 2*)

then measured and recorded the amount of reflection of the standard illumination from the various prepared surfaces. This was somewhat complicated by casual variations in the city electrical voltage and by a fairly rapid "aging" of the light bulb in the Ultrapak when it was freshly installed. But by adjusting the light meter and by frequently referring to a block of standard blackness, we finally developed a chart of the darkness of the shale.

As we expected, the darkness is significant. We are still exploring the conclusions that may be drawn from comparing it with the amount of fossil debris in our many levels of black shale, but we have come to some tentative conclusions that promise to be very helpful. Using the darkness curve in combination with other data that we have accumulated in the laboratory and in the field, we think that it may be possible to say how long it took to deposit the shale, when there were periods of high and of low water, and what the biological condition of the muddy sea-bottom may have been at various times during the deposition.

In this case, we feel that a search for darkness has helped us to cast some light on a difficult aspect of our total problem.

NEW MEMBERS

(May 16 to June 15)

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GIFTS TO THE MUSEUM

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

Department of Anthropology

From: H. Otley Beyer, Manila—stone implements, Philippine Islands; E. D. Hester, Chicago—3 stone implements; Dr. Fred Eggan and E. D. Hester, Chicago—sherds, Thailand; E. J. Grumbecker, Chicago—modern Japanese sword and sheath, Japan

Department of Botany

From: Holly Reed Bennett, Chicago—230 phanerogams, Montana; Florida State University, Tallahassee—40 phanerogams; Dr. E. E. Sherff, Hastings, Mich.—33 phanerogams, Hawaii, and 32 herbarium specimens, Arkansas; Dr. Alfred Traverse, Houston, Texas—313 phanerogams

Department of Zoology

From: C. E. Dawson, Wadmalaw Id., S. C.—one sea-snake, Persian Gulf; Sgt. Edward Fobes, Chicago—collection of marine shells; Harry Hoogstraal, Cairo, Egypt—80 mammals; A. Lindar, Chicago—2 landsnails, Haiti; J. I. Menzies, London—77 frogs, Sierra Leone; Dr. William W. Milstead, Lubbock, Texas—23 frogs, Brazil and Argentina; Dr. Jeanne S. Schwengel, Scarsdale, N. Y.—collection of shells; Miss Nancy Traylor, Winnetka, Ill.—cottontail rabbit; U. S. Fish and Wildlife Service, Brunswick, Ga.—2 fish specimens; Vernon L. Wesby, Chicago—a fish specimen, Alaska

MOVIES FOR CHILDREN ON 6 THURSDAYS

Children are invited to six free programs of color motion-pictures to be presented by Raymond Foundation in James Simpson Theatre of the Museum on six Thursday mornings in July and August. The series will open on July 10. There will be two showings of each program, the first at 10 and the second at 11 or 11:15 (see schedule below). No tickets are needed. Children may come alone, accompanied by parents or other adults, or in organized groups. Following are the dates and titles:

July 10—THE LIVING DESERT
(*10 and 11:15 a.m.*)
One of Disney's "True-Life Adventure" movies (*repeated by request*)

July 17—SINBAD THE SAILOR
(*10 and 11 a.m.*)
The adventures of Sinbad, the beggar boy of Baghdad
Also a cartoon

July 24—DUMBO (*10 and 11:15 a.m.*)
Disney's story of a baby circus-elephant (*repeated by request*)

July 31—BEAR COUNTRY (*10 and 11 a.m.*)
One of Disney's "True-Life Adventure" movies (*repeated by request*)
Also a cartoon

August 7—A TRIP TO THE MOON
(*for older children*)
(*10 and 11:15 a.m.*)
Also a cartoon

August 14—VACATION SPECIAL
(*10 and 11 a.m.*)
Vacation fun in your own backyard and in the wilderness
Also a cartoon

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Bulletin

Vol. 29 No. 8
August 1958

Chicago Natural History Museum
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Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

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

SUCCESS IN LOVE AND WAR ATTRIBUTED TO MAGIC

An abiding faith in the efficacy of charms —for success in love, in war, in curing afflictions, even in thievery—is held by one of the peoples who inhabit the Gazelle Peninsula of New Britain, in Melanesia (South Pacific area near New Guinea). An exhibit of these strange devices to which are attributed magical powers is in Hall A (Case 71), a hall that houses the world's most comprehensive collections representing the cultures of Melanesia. Among the most elaborate of these charms are the thieves' amulets, which, when waved back and forth over a victim, are supposed to put him in a sleep so deep that the thief can steal with ease whatever he desires. The thieves of Gazelle Peninsula must have great faith in these amulets, for they spend much time in designing and making them. The handle is of wood, often with a pig's jaw attached, over which a mass of mashed *Parinarium* nuts, modeled to represent a grotesque face, is placed.

One form of love charm for men is a girdle made of shell disks, Nassarius shells, and teeth of a small marsupial something like an opposum joined on wide belts and grass ropes. The effectiveness of these charms upon women is believed to vary with the arrangement of the various parts, which leads to much experimentation in design. Furthermore, the wearing of several different kinds of these girdles at one time is thought to increase their very powerful effect in gaining the affections of a woman. The truly smitten swain, therefore, will appear heavily burdened with a multiplicity of girdles, and the state of his mind and heart will be recognized by everyone. Love being a major concern of the makers of charms, other kinds are also used. One, particularly favored by young men, is a hair ornament of nautilus shell, which, when well oiled before being placed upon the head, is believed to be almost irresistible to members of the fair sex.

Another charm of interest is a flaxy-looking wig, which, instead of making its wearer conspicuous as one would suppose, is believed to make him invisible and therefore is considered valuable in making a sneak approach upon an enemy to do violence or for kidnaping. The Museum exhibit includes also charms to prevent or cure disease, to protect one in war, and to imbue the wearer with both courage and strength.

NEW PHOTO EXHIBIT TELLS STORY OF LIFE IN IRAN

"Impressions of Iran," a special exhibit of photographs of Iranian life, architecture, and landscapes, will be displayed on the ground floor of the Museum in Hall K (Hall of Babylonia) through Labor Day (September 1). The 45 black-and-white scenes are from the private collection of the photographer, Joseph Kostal, who took the pictures while living in Iran from 1936 to 1957.

'THE PORCH OF XERXES'
Winged and bearded figure, half man and half beast, carved in stone at Persepolis. One of the photographs in "Impressions of Iran" by Joseph Kostal. The special exhibit will be shown through Sept. 1.

The collection includes a variety of subject matter which ranges from sensitively handled portraits of native Iranians to Persian rug-weavers, street scenes, and ancient Persian and modern Iranian architecture. Isfahan, one of the most beautiful cities in Iran, and Persepolis, one of the world's oldest cities, are featured. Mr. Kostal's architectural photographs show clearly the detailed decoration of the buildings.

Mr. Kostal, a Czechoslovakian by descent, now lives in New Jersey. His work has been displayed in Europe and the Middle East, as well as in various cities in the United States.

THIS MONTH'S COVER

Can you identify the clay figurines shown on our cover? If you think they look rather old, you are on the right track. But where are they from? Egypt, or ancient Mesopotamia? . . . or China, or the cliff-dwelling region of Arizona? No, they are not from any of these places. They were made by the Chupicuaro Indians of Mexico about 500 B.C. These people lived in the southern part of the present state of Guanajuato during the Archaic or Formative period. These and other pottery figurines are displayed in a newly installed exhibit in Hall 8 (Ancient and Modern Indians of Mexico and Central America). It is thought that the figurines were used in family shrines and were connected with fertility rituals.

CURATOR TO COLLECT OCEANIC FISHES

Additions to the Museum's collections of deep-water fishes from offshore areas of the Tropical Atlantic will be sought by Loren P. Woods, Curator of Fishes, on a cruise aboard the U. S. Fish and Wildlife Service motor vessel *Oregon*. Woods will fly to Trinidad early in August and there board the ship. He will sail along the coasts of the Guianas where the crew of the *Oregon* will be trawling. The cruise will then continue to the eastern or outer edges of the Lesser Antilles to the Virgin Islands, and finally to San Juan, Puerto Rico, whence Woods will fly back to Chicago late in September. The mission of the *Oregon* personnel is a search for new shrimp and groundfish beds and tuna schools. This is the 52nd exploratory cruise of the *Oregon* and the sixth cruise since 1951 in which Curator Woods has participated on behalf of the Museum.

FROM OUTER SPACE?—ORIGIN OF TEKTITES IS A MYSTERY

By ALBERT W. FORSLEV
ASSOCIATE CURATOR, MINERALOGY AND PETROLOGY

EVENTS of recent months have focused considerable scientific interest on the behavior of objects entering the earth's atmosphere from outer space. Scientists have concentrated on the study of extraterrestrial material known to have landed on our planet. There can be no doubt that meteorites are of cosmic origin since they have been observed to fall from time to time and are commonly picked up on radar screens. Study of the surface, shape, and composition of meteorites has afforded valuable information to the scientists and engineers engaged in designing rockets, missiles, and artificial satellites.

Meteorites are generally classified according to their composition; thus we have iron, iron-stone, and stone meteorites. Another class of objects that many people believe also to be meteoritic in origin is the tektites. These are small pieces of silica-rich glass found in widely scattered parts of the world. Whether or not they are cosmic in origin is still highly problematical since no one has ever seen them fall and there is evidence favoring both a cosmic and a terrestrial origin.

Tektites have been found in southern Australia, Czechoslovakia, the Ivory Coast, Java, the Libyan Desert, the Philippine Islands, and Texas. Specimens from most of these localities are in the collection of Chicago Natural History Museum and a collection of 200 Philippine tektites has recently been donated to the Museum by Prof. H. Otley Beyer of the University of the Philippines. According to Prof. Beyer this collection is the best representation of Philippine tektites yet deposited in an institution outside the Philippines with the exception of the Koenigswald collection at the University of Utrecht in Holland. It is planned to exhibit these tektites in Clarence Buckingham Hall (Moon, Meteorites, and Minerals—Hall 35), which is presently being reinstalled.

Tektites occur in sedimentary deposits of Eocene to Pleistocene age and seem to be otherwise unrelated to these deposits. Generally, tektites are rather small; most of them are less than an inch in diameter and weigh only a few ounces. They are usually found in great numbers at each locality (approximately 20,000 have been found at the Australian locality alone), but only in the case of the Libyan Desert material do the true size and shape of the strewn field appear to be known. The tektites are relatively unweathered and may be rounded, elongated, or irregular in form. The glass composing them is green, brown, or black and the surfaces of many of them exhibit "flow patterns," an indication that they have solidified from a viscous melt.

Scientists engaged in research on tektites have proposed various hypotheses for their origin. Those which seem most practical are summarized herewith.

VOLCANIC ORIGIN

Tektites are very similar in appearance to the volcanic glass, obsidian. Their chemical composition, however, is quite different from it and other volcanic rocks. Also, the water-content of tektites is approximately one-tenth of that of obsidians, indicating that they were formed in a water-free environment or at a very high temperature (over 2000° C.) on the earth's surface. This, coupled with the fact that they are found in areas where there is no associated vulcanism make a volcanic origin seem very unlikely to most investigators.

TEKTITES—A NATURE MYSTERY

These are some characteristic forms of strange glassy objects suspected to be of extraterrestrial origin. Their shapes indicate that they have cooled from a molten state.

"IMPACTITE" ORIGIN

One possibility is that tektites were formed as a result of the collision with the earth of a large meteorite, which fused and scattered terrestrial rock material when it hit. This hypothesis is supported to some extent by the fact that tektites are similar in chemical composition to certain terrestrial sedimentary rocks, and the forms exhibited by tektites could have resulted from such an event. A similar hypothesis that has been suggested is that the head of a comet collided with the earth and produced the tektites by also fusing terrestrial material.

"LUNAR IMPACTITE" ORIGIN

It has been proposed that the collision of a meteor with the moon would produce fused material similar in nature to the tektites, and if the scattered molten material entered the earth's gravitational field it could account for the tektite-strewn fields observed. Astronomical calculations are now being programmed for electronic computers in order to ascertain whether or not this is a valid hypothesis.

METEORITIC ORIGIN

The idea that tektites are meteoritic matter originating from the disruption of another planet has been entertained by many scientists for years. The low water-content of tektites and a radioactivity that could have been induced by cosmic rays seem to substantiate the hypothesis. Since it is difficult to account for their distribution and occurrence on geological grounds, this fact has also been used as evidence for a cosmic origin. Many scientists consider it very unlikely, however, that a swarm of particles would stay so close together on their flight through space as to produce the small, tektite-strewn areas on the earth's surface. On the other hand, some have suggested that a solid glassy meteor would break up into smaller molten particles upon hitting the earth's atmosphere and thereby account for the small areal distribution of the tektites. The difference in chemical composition of tektites from that of known meteorites is explained by assuming that the tektites are fragments of a thin crust of a disrupted planetary body, perhaps similar in composition to our terrestrial rocks.

The question of whether these glassy bodies are of cosmic or terrestrial origin is by no means settled. Much work remains to be done to establish the validity or nonvalidity of each of the above hypotheses. This includes the accurate mapping of the pattern of distribution of tektites on the earth's surface, field observations on the association of tektites with meteor craters, volcanoes, and other geologic features. Chemical analyses of many more tektites must be carried out in order for a valid comparison to be made between their composition and that of terrestrial materials and meteorites. A comparison of tektites with known "impactite" glasses may also provide much useful information.

Primitive Art Special Exhibit Continues Through September

The special exhibit entitled "What Is Primitive Art?", which opened July 1, will remain on view in Stanley Field Hall throughout August and September. The display, which has proved especially popular with visitors, aims to provide an answer to the question in its title, and serves as an introduction to the vast collections of primitive art from many parts of the world scattered through the halls of the Department of Anthropology. Art objects from African tribes, peoples of Pacific islands, Indians of the Americas, and other primitive societies are included in the exhibit.

HOW WE DIG — MUSEUM'S ARCHAE

1. What lies hidden here? Higgins Flat Pueblo, a typical site as it appeared before Museum archaeologists excavated.

2. Rooms of ancient pueblo are uncovered down to a fe above the floor. Each layer is a little older than one at

5. Worker Thomas Alder digs out unbroken pot with trowel and brush.

6. An ancient burial is unearthed. Remains reveal much data about vanished Mogollones.

7. Completed excavation of structure that hous

FOR 24 years the Museum's Archaeological Expeditions to the Southwest, led by Dr. Paul S. Martin, Chief Curator of Anthropology, have been excavating sites inhabited by prehistoric Indians as long ago as 4,500 years. The diggers have worked in Colorado and New Mexico, and this summer they are engaged in their third season in Arizona. Each year, upon return to the Museum, Dr. Martin and his chief field associate, Dr. John B. Rinaldo, Assistant Curator of Archaeology, devote themselves to research upon the ancient pottery, tools, weapons, clothing fragments, skeletal remains, and other artifacts recovered. From this evidence they have been able to dispel much of the mystery surrounding the history of the long-vanished Mogollon tribe.

...LOGISTS AT WORK IN SOUTHWEST

nches
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3. With a small handpick, field assistant Wayne Gaines cleans masonry walls.

4. Soil removed in excavating site is screened to make sure that no pieces of Indian pottery or stone tools are overlooked.

Higgins Flat Pueblo reveals standing walls
community of Indians about 700 years ago.

8. (Left) Dr. Paul S. Martin, expedition leader, aided by Tod Egan, uses surveyors' instruments to map pueblo village.

9. (Left) Caves too, once used as habitations, are explored by the expedition. In them are often found well-preserved perishable artifacts not yielded by pueblo excavations.

10. (Right) Vivian Broman (at left) and Elaine Bluhm catalogue artifacts in workroom of base camp. All specimens are carefully listed before shipment to Museum. Data to guide later research is included.

NESTLING TO NUISANCE —BIRDS MAKE NEWS

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

SOME TIME AGO I made a "Bookish Christmas Bird Census" (BULLETIN, Feb., 1956), an attempt to evaluate people's interest in birds. My material was supplied by the magazines and papers on my coffee table one evening just before Christmas. My results, which yielded 27 birds, were inconclusive. Since then I have made another survey, more restricted in area but covering more time.

I have on my desk 250 newspaper clippings from the four Chicago dailies, a two-year harvest gleaned in a desultory manner.

A survey of them gives gratifying evidence that today people are indeed bird-conscious. The amount of bird material presented is amazing. Every two or three days an item appears (exclusive of the nature columns and the material in the Sunday supplements and the sporting pages). They range in length from a few lines to a half-column or more. Many are illustrated. The subject matter covers a wide variety of bird news, and 130 kinds of birds are mentioned. The public reached by these stories is the combined daily circulation of the four papers, totaling more than 2,500,000. Such an audience dwarfs into insignificance the 3,000 specialized readers of the quarterly bird journal, *The Auk*, and the 30,000 readers of *Audubon Magazine*, the popular nature periodical.

Ornithology would seem to have achieved a signal success in making birds and their ways familiar to the man in the street; in making its findings the material of everyday reading and conversations; in making the general public aware of birds as part of its environment; and in putting bird-lore in the public's domain. This is one of the ultimate goals of any science. What better measure of this success than seeing what the daily press presents to its urban readers?

LOCAL STORIES PREDOMINATE

As one would expect, almost half the bird news is local. People like best to read about themselves, and after that, about their neighbors. Thus it is no surprise to find that the pigeon gets the most attention. It feeds in city streets, eats peanuts on elevated railway stations, and perches on statues in city parks. The young hatch on window ledges; a nest is in too dangerous a place for a boy to climb; there are too many pigeons, so professional trappers are hired; they race; a military pigeon, AWOL, is recovered; and a wanderer comes aboard a ship at sea and is rescued. One newspaper call that took a photographer to record a "pheasant" on a city roof resulted in a photograph of a pigeon, but this in itself made a story.

The robin, best known and best liked by city people, is a runner-up of the pigeon for attention, but its coverage is different. The robin has troubles in the spring when snow covers the ground; it drops eggs on lawns; young birds fall out of the nest and are hand raised, and then, tame, they will not leave on migrations.

People like to read about far places and strange birds, and they like to look at their photos. We have stories of such exotics as penguins in Antarctica, kookaburras from Australia, and sacred cranes from Japan. Photogenic subjects include also flamingoes; a closeup of an owl's eyes; and an adjutant stork from India, apparently deeply sunk in thought. Local birds are also photogenic: we have a Japanese-looking heron in a local pond; local purple martins, ready to migrate, lined up on telephone wires; and ducks, in flight, in an ice-rimmed pond, or standing on the ice.

Visiting personalities from the country, especially when they are photogenic, get space. They range from night herons on city roofs, and owls in trees in city yards and down chimneys, to a woodcock that came in through an office window.

FOREIGN RELATIONS

Foreign visitors have their place, too. Some came under their own power, like the African cattle egret and the European redshank. New arrivals at the zoo might be just a list of strange names if it were not for the thumbnail sketches of their habits or their appearance that help to make them entities, as the Malee fowl of Australia that buries its eggs in an earthen mound, and the Egyptian plover or crocodile bird, which, since Herodotus' time, has been reported to clean the teeth of crocodiles that open their mouths to allow the birds to perform this office. This report is now in disrepute.

Miscellaneous accounts of personalities range from the white storks of Europe to the California condors, the oil bird of caves in Peru, and crows that pull clothespins off the line and let the wash drop.

Much current news has to do with disasters and mishaps. Birds share in these. An oil slick appeared on Lake Michigan and distressed ducks and grebes, coated with oil, began to drift ashore daily. This made news for days. Another feature story related the poisoning of migratory shore birds on an industrial-waste dump.

Lesser troubles found their place, too: sparrows huddled under the eaves out of the icy rain; an Egyptian goose in a park was shot with an arrow; 150 baby chicks were victims of a traffic accident, and a duck was killed by hailstones.

CASES FOR THE POLICE

Police stations and police court news had their bird incidents: a swan disrupted traffic at a busy intersection and went to a police station cell; a lost wren came by itself to the station and liked it so much that it stayed four days; Joliet police procedure in handling the case of a woman bitten by a rooster.

Petty "crime" did not always reach the police court. An English crow that "stole" 800 golf balls was eliminated. In Ontario a Canada jay stole a workman's glasses when he laid them aside for a moment.

To round out the extent of the coverage, I will mention just a few of the many subjects: parakeets and myna birds figuring in divorce court cases; pet parakeets turning up in all sorts of strange places, nesting in vacuum cleaners, getting lost, being given courses at the local YMCA for $6 per series; Easter chicks dyed pink not to be used as playthings; the fate of abandoned nestlings; and a 21-year-old tanager.

That young things are appealing is abundantly demonstrated. There are photographs of young pigeons hatched in a March snowstorm; a truck driver trying to hatch a robin's egg; birds' nests on fire escapes, on electric lights, on a mop, and in traffic lights; young mallards in city parks; sparrows' nests in traffic lights and on a school bus in use; and a doves' nest that delayed a construction job.

MANY OTHER ASPECTS

There are stories on conservation; on sparrows suffering when automobiles replaced horses; on bird behavior and its instinctive-psychological aspects; on bird migration; on woodpeckers damaging buildings and insurance against it; city starlings' roosts disturbing citizens, and nesting albatrosses disrupting airplane service on a Pacific island; Dutch elm disease and its treatment killing birds; live bird trade in India; and birds killed at airport ceilometers.

The general impression one gets is that city people are interested in birds. These clippings represent real happenings. The standard of accuracy in all these accounts is high. The reporters knew what they were writing about, or consulted those who did (often they called the Museum). The educational, conservational, and economic importance or furthering-of-science aspects of birds are of interest only as they are news. The stories are not aimed at the hobbyist or the bird-lover who has his special column. Birds are reported as interest-

ing beings: their birth, life, and death. Silly and tragic things happen to them. They get mixed up with the police, are lauded, or joked about; their private lives, their comings and goings, and how they affect the community in which they live are all reported as they happen. We can hardly say that birds are on the way to becoming citizens, but the citizens are certainly becoming aware of them. As far as birds are concerned, the newspaper reading public has a chance to be biologically literate.

FOSSIL COLLECTORS COMB WYOMING AREA

For the third successive season, a paleontological expedition is working in the upper and lower formations of the Washakie Basin in Wyoming. Leader of the expedition is William D. Turnbull, Assistant Curator of Fossil Mammals. He is accompanied by David Collier, a volunteer assistant.

Objective is the collection of more fossil mammals of the middle Eocene epoch (about 50 to 45 million years ago). The 1956 and 1957 expeditions to the Washakie, a circular area of about 400 square miles, were highly successful, and the prospects of the present excavations to obtain additional species of the ancient fauna are promising. It is expected that fossil reptiles, fishes and other animals, as well as mammals, will be obtained.

Two More Free Movie Shows Offered for Children

The final two programs in the Raymond Foundation's free summer series for children will be given on the first two Thursday mornings in August. There will be two showings of each program, the first at 10 A.M., and the second at 11 or 11:15 as per schedule below. No tickets are required. Children are invited to come alone, accompanied by parents or other adults, or in organized groups. Following are the dates and titles:

August 7—A TRIP TO THE MOON
(*for older children*)
(*10 and 11:15 a.m.*)
Also a cartoon

August 14—VACATION SPECIAL
(*10 and 11 a.m.*)
Vacation fun in your own backyard and in the wilderness
Also a cartoon

Albinism Thwarted

A robin that was partly albinistic, with underparts mostly white, mated with a normal bird, and raised two broods of normal young. It then moulted into a plumage that was nearly normal, according to a report from Salt Lake City.

—*Condor*

PRE-GUTENBERG PRINTING FOUND IN MEXICO

BY ALFRED LEE ROWELL
DIORAMIST, DEPARTMENT OF ANTHROPOLOGY

A RECENTLY INSTALLED EXHIBIT in Hall 8 (Ancient and Modern Indians of Mexico and Central America) deals with the Totonac people who lived in the central Veracruz region of Mexico from A.D. 900 to 1500. This exhibit includes several stamps made of pottery clay, fired like any other piece of pottery, that were used for printing designs on fabrics or on the human body.

These stamps, essentially devices for saving labor and time, are based on the same principle as all printing since and even before the time of Gutenberg. Our textile industry also uses the same principle in producing millions of yards of printed fabrics. A typewriter is really a highly efficient machine for applying small stamps to a suitable surface.

NOTEWORTHY IN DESIGN

These Totonac stamps have interesting, well-designed faces, probably with symbolic or mystical meanings that we do not comprehend because we do not have a complete understanding of the mental and spiritual background of the people. Two of the stamps, dating from about the 12th century, were selected to show their imprint as it would be made in actual use. One of these has a strong, bold design of heavy black lines, showing the traditional feathered serpent. The other, which is smaller, with a more complicated design of lighter lines, shows the wide-open jaws of a feathered serpent and a monkey. Both are highly stylized. The design of the monkey is unusually well conceived and gives a better expression of the nature and character of the subject than a photographically realistic drawing. It compares favorably with the best of our present-day designing.

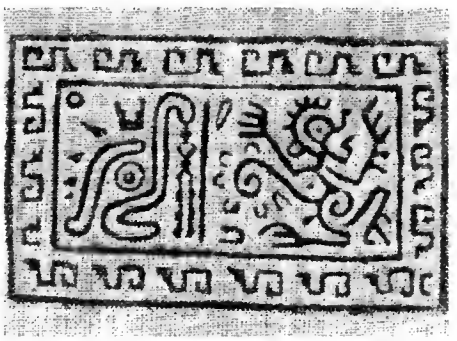
Another interesting feature of these stamps is their method of manufacture, especially the smaller one, as we learned in making plastic reproductions of them. These reproductions were made to avoid discoloring the originals in the printing process. We first made a squeeze, or impression, in Duron plastic, hardening it by baking it in place on the stamp at a temperature of 300° F. for about one hour. This provided a mold, or matrix, for casting a replica of the original stamp by pressing Duron into it and baking it in place. A dusting of talc acted as a separator. The cast replicas were used for making the prints shown in the exhibit.

It was immediately apparent from the Duron impression of the smaller stamp that it had been made by squeezing moist clay into a mold, or matrix, that had been formed by pressing the black parts of the design into moist clay, evidenced by the pushing up of the material. After this mold for making stamps was dried and probably fired, it could then be used for turning out an unlimited number of stamps in a primitive mass-production or for making replacements for broken stamps. The slabs of moist clay bearing the design could be bent into concave or convex forms, as might be required for printing on various surfaces. It is probable that the concave form shown in the exhibit may have been used for printing a fabric stretched across the thigh of the user or for printing on the skin of arms or legs.

POTTERY STAMP FOR PRINTING
Used by early Totonac teibesmen of Mexico for transfeeing design to fabric and sometimes to theie own skin. The stamp is about three inches long.

LABOR-SAVING METHOD

This method of making the stamp was an example of labor-saving practicality, since it is easier to press a line into clay than it is to build up a line, but there was further evidence of the same ingenuity. The small S-shaped elements in the border of the design had been pressed into the clay of the matrix by using a small stamp or die. There is no way of knowing how this die was made—whether it was carved from wood or other material or made of clay and fired.



IMPRESSION OF STAMP
The design imprinted on cloth shows a monkey (at right) and the gaping jaws of a serpent (left).

Thus it is clear from these 800-year-old stamps that Totonac craftsmen were not lacking in creative ingenuity and that they had worked out labor-saving methods for accomplishing their purposes.

The world's largest model of the moon is exhibited in Hall 35.

MALE BIRD ASSUMES MOTHER ROLE

A soft-wing on the way to feed its young may sit quietly for two hours with an insect in its bill. This is an indication not only of the lethargic temperament of the bird but also of the patience and perseverance of the naturalist, in this case Dr. Alexander Skutch of Costa Rica who studies soft-wings.

Puffbirds, of which the soft-wing is one, are among the least-known tropical American birds. Relatives of the woodpeckers, they act like forest kingfishers and nest in burrows in the forest floor. Skutch's recent studies reveal that some facets of their behavior are most unusual. The male incubates all afternoon and all night. When the young are small it is the male, not the female, that broods most of the day and all night, while the female brings food! When the young are partly grown and left alone at night they use part of the dead-leaf nest to barricade themselves in the underground nest chamber.—*Ibis*, 1958.

STAFF NOTES

Roland W. Force, Curator of Oceanic Archaeology and Ethnology, has returned from London where he has been engaged for several months on a special project for the Museum. The results of his mission will be announced at an early date. . . . With regret the Museum records the death of **Matthew S. Moroney,** Captain of the Guard, on July 9. Mr. Moroney had been a member of of the Guard Force since September 1, 1952, and was appointed Captain in October, 1957. He was a native Chicagoan, born December 9, 1885, and prior to joining the Museum personnel he had been employed for more than 40 years by the Illinois Bell Telephone Company from which he had retired in 1948. . . . **Harry Hoogstraal,** formerly a Field Associate in the Department of Zoology, has been elected by the Museum's Board of Trustees as Research Associate in Insects. For several years he has been collecting in Egypt and other areas of Africa. **Harry G. Nelson,** of Harvey, Illinois, has been appointed an Associate in the same division. . . . **Dr. Erik N. Kjellesvig-Waering,** who is associated with the Pan Venezuelan Oil Company in Caracas, has been elected a Research Associate in Invertebrate Paleontology by the Museum's Board of Trustees. He is a leading student of eurypterids in the Western Hemisphere, and has assisted in determination of Museum collections. . . . **Harry Changnon,** Curator of Exhibits—Geology, and **Albert Forslev,** Associate Curator of Mineralogy and Petrology, served as judges at the recent Midwest Gem and Mineral Show in Downers Grove, Illinois. Mr. Forslev also attended a Chicago conference on microscopy. . . . **George Langford,** Curator of Fossil Plants, was honored at a meeting in Downers Grove of the Earth Science Club of Northern Illinois on the occasion of the club's publication of his book, *The Wilmington Coal Flora*. . . . **Philip Hershkovitz,** Curator of Mammals, is in London studying South American mammals in the British Museum (Natural History) in continuation of the project "A Check-list of the Land Mammals of South America" sponsored by Chicago Natural History Museum under a grant-in-aid from the National Science Foundation. He also attended the International Zoological Congress. . . . **Mrs. Meta P. Howell,** Librarian, and **Mrs. M. Eileen Rocourt,** Associate Librarian, attended the Special Libraries Association's recent convention. Mrs. Rocourt was elected Vice-Chairman of the Museum Division.

Matthew S. Moroney

Delegate to Americanists' Congress

Dr. Donald Collier, Curator of South American Archaeology and Ethnology, flew from Chicago July 14 for San José, Costa Rica, as official delegate to represent both the Museum and the American Anthropological Association at the 33rd International Congress of Americanists. Following the meetings, he went to Mexico to study collections in various museums.

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: E. D. Hester, Chicago—18 ancient bracelets, Philippines

Department of Botany

From: Dillman S. Bullock, Angol, Chile—2 herbarium specimens; Dr. Rolla Tryon, Cambridge, Mass.—53 ferns, Peru

Department of Geology

From: Prof. H. Otley Beyer, Philippines—200 tektites; Jerry Zehrung, Warsaw, Ind.—a lower jaw of mammoth

Department of Zoology

From: William J. Gerhard, Chicago—1,065 Hemiptera (true bugs) Colombia; Dr. Robert E. Kuntz, APO 63, San Francisco—18 frogs, 12 lizards, 6 snakes, Formosa and Pakistan; Dr. Graham Netting, Pittsburgh—collection of sea shells, Oregon; Dr. Charles H. Seevers, Glen Ellyn, Ill.—2,131 Termitophilous Staphylinid beetles; Fraser Walsh, La Paz, Bolivia—22 birdskins; Dr. F. Zumpt, Johannesburg, South Africa—140 flies

AUGUST LECTURE-TOURS SLATED TWICE DAILY

Guide-lecture tours remain on a two-a-day schedule until the end of August. The tours are given daily except Saturdays and Sundays (on weekends the Museum is open to visitors, however, during the regular hours, 9 A.M. to 6 P.M.).

The morning tours, at 11 o'clock, will be devoted, except on Thursdays, to the exhibits of a single department. All the afternoon tours, at 2 o'clock, and also the 11 o'clock tour on Thursday mornings, will include outstanding exhibits in all departments. Lecturers of the Raymond Foundation staff conduct the tours. Following is the schedule for each week:

Mondays: 11 A.M.—The World of Plants
2 P.M.—Highlights of the Exhibits

Tuesdays: 11 A.M.—The Earth's Story
2 P.M.—Highlights of the Exhibits

Wednesdays: 11 A.M.—The Animal Kingdom
2 P.M.—Highlights of the Exhibits

Thursdays: 11 A.M. and 2 P.M.—Highlights of the Exhibits

Fridays: 11 A.M.—People and Places
2 P.M.—Highlights of the Exhibits

NEW MEMBERS

(June 16 to July 15)

Life Members

James R. Offield, Hugh Robertson

Associate Members

Stanton L. Ehrlich, Carl D. Guldager, Allen D. Holloway, Edmund Kutchins, Dr. William J. Schnute, George R. Steiner, Joseph Wegrzyn, Frank H. Woods

Sustaining Member

Robert S. Adler

Annual Members

Robert Ackerberg, Jr., Milburn P. Akers, Craig T. Allen, Jr., Dr. Herbert L. Anderson, Edward D. Benninghoven, George Benisek, Joseph L. Bernardi, James Carroll, Norbert L. Chaplicki, Dr. J. A. Chenicek, Ronald J. Chinnock, Thomas R. Coyne, Walter Dabasinskas, Stanley P. Dodd, James H. Dunbar, Jr., Robert T. Dyer, Joseph R. Ernest, Walter H. Flinn, Jr., Dr. Smith Freeman, Raphael N. Friedman, Lincoln R. Goward, Howard E. Green, David J. Harris, John M. Hill, Sidney R. Hill, Stephen Y. Hord, Schuyler Dean Hoslett, Harold Hyman, Harvey A. Jacobs, Russell B. James, Carl M. Jelinek, David M. Kennedy, L. H. Kramer, William E. Roberts, George E. Rodman, R. G. Rowe, Karl F. Vollmer, Charles J. Whipple, Mrs. Connie Wilander

The important part of the Plant Kingdom in human existence and in the world's economics is strikingly portrayed by exhibits in the halls of the Department of Botany.

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Bulletin

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TELEPHONE: WABASH 2-9410

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

MYSTERIES OF LIFE FAR IN OCEAN DEPTHS

Far down in the depths of the oceans exists a world unexplored by man. The ocean depths remain very much a mystery in spite of the fact that recent years have brought about more widespread exploration resulting in an increased recognition of the importance of the sea as a sustainer of life.

A single bottom haul made in the Gulf of Mexico by the United States Fish and Wildlife Service vessel *Oregon* bears out this point. On May 26, 1955, the *Oregon* brought up a haul from 1,150 to 1,200 fathoms that contained 72 specimens of fish belonging to 7 families, 14 genera, and 17 species. These specimens were sent to Mrs. Marion Grey, Associate in the Division of Fishes at the Museum. In the collection were discovered two new species of fish. Also included were nine other species never before found in the Gulf of Mexico. Seven of these were unknown from western Atlantic waters. A full description of the collection will be found in Mrs. Grey's forthcoming work, *Descriptions of Abyssal Benthic Fishes from the Gulf of Mexico.*

It is not extremely unusual that species of deep-water fish unknown to man were brought up by the *Oregon*, although the haul was quite a fruitful one. But it is significant that this and other hauls in offshore waters are contributing to a more complete understanding of the unknown fauna of the seas.

ECONOMIC GEOLOGIST JOINS STAFF

Bertram G. Woodland has been appointed to the Museum staff as Associate Curator of Economic Geology, and began his duties in August. Mr. Woodland, a native of Wales, is a graduate (B.Sc.) of the University of Wales in Cardiff, and has been engaged in graduate studies at the University of Massachusetts. From 1943 to 1946 he was experimental officer, first with the Ministry of Home Security and later with the Air Ministry of Great Britain. From 1946 to 1954 he worked with the Manchester and London offices of the Ministry of Housing and Local Government as research officer in national surveys of natural resources. From 1954 until this year he has been an assistant professor, teaching geology, first at the University of Massachusetts, and later at Mount Holyoke College, South Hadley, Massachusetts. He has also acted as a consultant for Petroleo Brasileiro Depex of Rio de Janeiro, and in geological mapping for the Vermont Geological Survey. His field work has included geological studies in central France and Great Britain.

Back From Eternity

A bird, the short-tailed albatross, has been named a national monument of Japan. For years this bird which once visited our Pacific Coast was thought to be extinct. But it has been discovered again on an island south of Japan. In 1953 there were 23 adults there and in the 1956–57 season eight young were raised. (*Auk*, 1958, p. 82)

STAFF NOTES

"Yellowstone," a film made by **John Moyer**, head of the Museum's Division of Motion Pictures, has been chosen by the educational division of the State Department as one of a small group of outstanding travel pictures to represent the United States in showings at the current international world's fair in Brussels. . . . **Dr. Francis Drouet**, Curator of the Cryptogamic Herbarium, resigned as of July 31 to accept a research position in the Department of Biology at New Mexico Highlands University (Las Vegas, N.M.). . . . **Chin Chen**, a temporary field assistant in paleontology, has been awarded a Sohio Petroleum Company scholarship to continue graduate studies at the University of Cincinnati where he is a doctoral candidate. . . . **Dr. Theodor Just**, Chief Curator of Botany, attended the annual meeting of the American Institute of Biological Sciences at Indiana University (Bloomington) in August. The Department of Zoology was represented by **Dr. Robert F. Inger**, Curator of Amphibians and Reptiles, and **Hymen Marx**, Assistant in Reptiles.

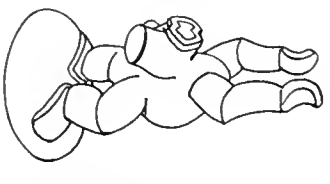
Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

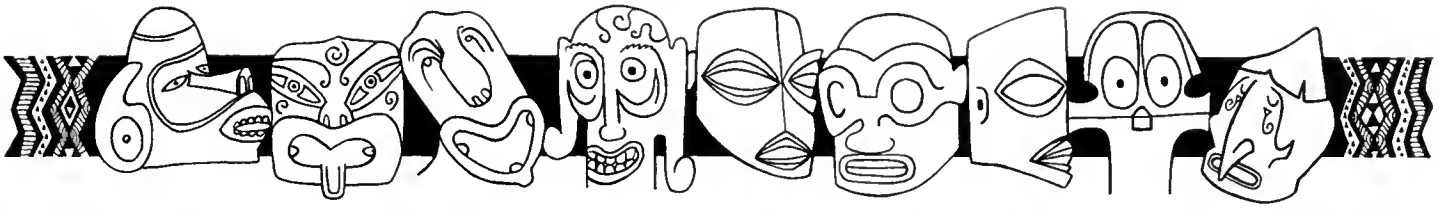
There will be no tour on September 1 (Labor Day), but the Museum will be open to visitors.

THIS MONTH'S COVER

This month's cover by Staff Artist E. John Pfiffner was inspired by one of the outstanding specimens in the Fuller Collection (*see page 3*). It is a carved wooden rest for supporting the long spears which leaned against the front of Hawaiian chiefs' houses as emblems of prestige and elevated rank. The rest is actually a very contorted anthropomorphic figure seen here in outline drawing at a slightly oblique angle. The posture depicted by the Hawaiian carver a century or two ago is one in which the torso is bent backwards—breast upward, arms upraised, with the face inverted in the cover view. Actually, the figure in a horizontal position as shown here, was attached to the side-wall of the house in such a way that the outstretched hands held the leaning spears and the face of the figure looked skyward. Mr. Pfiffner's skillful treatment of the figure (in a vertical position) was adapted from a simple sketch made in 1898 by James Edge-Partington, from whom the specimen was acquired by Captain and Mrs. A. W. F. Fuller. The background design is that of an early piece of rare Hawaiian *tapa* cloth.



Other drawings, on pages 3 and 4, are by Mr. Pfiffner, Marion Pahl, and Roland W. Force, Curator of Oceanic Archaeology and Ethnology.



MUSEUM OBTAINS LAST OF GREAT OCEANIC COLLECTIONS

By ROLAND W. FORCE
CURATOR OF OCEANIC ARCHAEOLOGY AND ETHNOLOGY

ONE AFTERNOON in 1896 in a London auction room a boy in his early teens sat with his father watching the sale. On the block that day were a miscellaneous lot of items, one of which happened to be a war club from the Fiji Islands in the South Seas. The boy went home with the club that was to form the nucleus of a collection of Pacific Island ethnological specimens that ultimately became known the world over as the finest of its kind outside museum walls.

Sixty-two years later on August 2, 1958 a Norwegian freighter, the S. S. *Rutenfjell*, left London and sailed down the Thames, bound across the Atlantic for Chicago via the Great Lakes—the route of the new improved Seaway now nearing completion. Packed securely in one of her holds were 15 tons of boxes filled with more than 6,500 specimens destined for Chicago Natural History Museum. The shipment arrived at Chicago's Calumet Harbor on August 25. At BULLETIN press time the crates were being moved into the Museum's Pacific Research Laboratory.

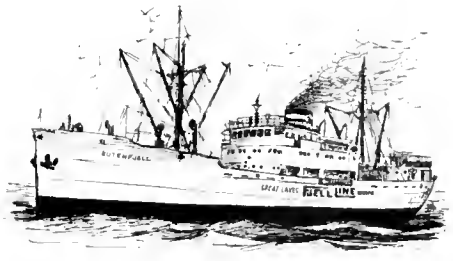
The youngster who bought his first specimen in 1896 was A. W. F. Fuller, who, for well over a half-century—in collaboration with his wife, Estelle Winifred Fuller, and aided in the early years by his father, the Rev. A. Fuller—continued to haunt the famous auction rooms of London in search of outstanding specimens. Sales in private homes, the selling-out of the inventories of small provincial museums throughout the length and breadth of England and Scotland, and the shops of dealers both in Britain and on the continent were the sources of the pieces which went into the collection. Though he was trained in the law and became a solicitor, A. W. F. Fuller's first loyalties were to his collecting, and with the exception of an extended period of military service during and immediately following World War I, from which he emerged with the permanent rank of captain, he devoted himself almost exclusively to this interest.

BEGAN WITH BUTTERFLIES

Captain Fuller was much influenced by his father and developed his bent for scientific investigation and collecting during a childhood in which books, butterflies, and boomerangs were a part of his everyday life at home. For close to 30 years Captain Fuller's father, the Rev. Mr. Fuller, a naturalist who specialized particularly in insects and within this field Lepidoptera especially, provided inspiration and collaboration in the formation of the Fuller Collection of Ethnological Materials. Through the years, discriminating purchases of outstanding specimens, which had found their way back to England in one way or another, resulted in the formation of this superb collection. Some specimens were acquired from missionaries, explorers, and traders or their descendants. An enormous wealth of "native" objects was amassed in England by these intrepid individuals who ventured into the "savage South Seas" during the era when the inhabitants first came into contact with Europeans and when pristine island cultures first felt the impact of a vast sweep of cultural change—change which was destined to wipe out the old ways and even, in some cases, the island peoples themselves. Because of these catastrophic developments, materials collected during these early days could never be duplicated.

DOCUMENTING THE COLLECTION

For months in London, Curator Roland W. Force (left) conferred almost daily with Captain A. W. F. Fuller, to compile the vast amount of data pertinent to the thousands of Pacific island specimens now transferred to the Museum.



CULTURE CARGO COMES VIA SEAWAY

The famed Fuller Collection of Pacific ethnological materials, comprising some 15 tons of specimens packed in 71 crates, was shipped direct from London to Chicago via the Atlantic-Great Lakes route aboard the Norwegian cargo vessel "Rutenfjell."

For a number of years Captain Fuller held a post at the British Museum where he came to know the excellent Pacific collections there intimately. Through the years he competed for specimens with the keepers of all of the major museums in England. He early became a Fellow of the Royal Anthropological Institute and served on its council for several years. Most of the illustrious names in British anthropology belonged to men he counted as personal friends.

His colleagues were not confined to England, however. As the Fuller Collection became larger, its scope and worth became known abroad, and scholars from New Zealand, Hawaii, America, and Europe visited the Fuller home to study the collection. A number of scientific institutions became interested in acquiring the collection, of course,

and through the years a number of overtures were made. None came to fruition.

ESCAPED WAR BOMBS

During World War II the collection miraculously escaped destruction in the "blitz." Certain extremely valuable specimens were removed to Wales, along with British Museum collections, and spent the war years deep in a coal mine. The major portion of the collection, however, survived V-bomb raids, which leveled neighboring houses and which severely damaged the Fuller home where they were housed.

A curious chain of events resulted finally in the purchase of the Fuller Collection by Chicago Natural History Museum. The chain began just after the turn of the century when the Fullers became acquainted with Percy H. Edmunds, a British subject who was the Chilean government's representative on isolated Easter Island in Polynesia. Mr. Edmunds' parents placed an advertisement in a London newspaper requesting information about the island where their son was stationed. Captain Fuller answered the inquiry and thereby began an acquaintance—at first by mail—which has lasted for 50 years. For half of this period Mr. Edmunds collected specimens on Easter Island for the Fullers. Such a protracted period of "on-the-spot" collecting has rarely, if, ever, been duplicated.

Following World War II, Mr. Edmunds retired and made his home in Tahiti. It was there that he happened to meet Robert Trier, a former Chicago resident who is a Contributor to the Museum and whose interest in the institution is of long standing. During a period of residence in Tahiti, Mr. Trier learned of the Fuller Collection through Mr. Edmunds. Later he visited Captain and Mrs. Fuller in London in order to view the collection. Following his report of this visit to Museum officials, Mr. Trier was requested to make inquiries as to the possibility of acquiring the Fuller Collection while on another visit to England in early 1957. When it was reported that Captain and Mrs. Fuller were interested in housing their collection in a major museum which afforded facilities for both exhibition and scientific study, plans were made for an inspection by a member of the Museum staff.

Accordingly, Dr. Paul S. Martin, Chief Curator of Anthropology, recommended that the writer be sent to England to inspect the collection. After a three-week period of inspection in August of 1957, a recommendation to acquire the collection was immediately made to the Museum administration.

Under the leadership of President Stanley Field and Director Clifford C. Gregg a purchase fund was established and donors responded within a very short time. Particularly generous assistance and support is being supplied to this growing fund by members of the Museum's Board of Trustees.

In late January of 1958 the writer departed for London and in early February began with Captain and Mrs. Fuller the documentation and preparation of the collection for shipment to Chicago. Until mid-July taped records of basic catalogue data were made and information relating to individual specimens was transcribed. It is especially fortunate that we have been able to secure such complete documentation from the collectors concerning the provenience, use, function, and historical background of the individual pieces in the collection.

WEALTH OF MATERIALS

While the Fuller Collection contains materials from all three of the major subdivisions of the South Pacific (Polynesia, Melanesia, and Micronesia), certain areas are especially well-represented. Particularly desirable as adjuncts to the Museum's already outstanding Pacific collections are specimens from areas of Polynesia heretofore not as strongly represented as those from Melanesia in general. Fuller Collection materials from New Zealand, Easter Island, Hawaii, Tonga, the Marquesas, and the Cook Islands are truly exceptional. Australia and certain parts of Melanesia such as the Torres Straits, Solomons, New Hebrides, New Caledonia, the Bismarck Archipelago, the Admiralties, and mainland New Guinea also are included. Materials from these areas will either add specimens not previously present in Museum collections or will augment areas already represented through the addition of unique or otherwise remarkable pieces. In addition to the wealth of materials from the areas mentioned above, there are also numerous specimens from the Polynesian outliers whose cultures are considered as primarily Polynesian although the islands lie in what anthropologists generally term Melanesia. Fiji and the Micronesian Islands to the north also have contributed to the collection.

Throughout the formation of the Fuller Collection careful attention has been paid to technology, the delineation of regularities and differences in design and motif, specific stylistic emphases, authenticity, historical background, and literary reference.

Virtually every material available to islanders for the manufacture of tools, weapons, clothing, utensils, implements, and ornaments is included in the collection. Shell, wood, stone, bone, coral, and vegetable fibers are all present. These materials have been worked for the most part by so-called "stone-age" artisans whose workmanship is all the more remarkable because it was carried out without benefit of metal tools. Stone and shell adzes, knives of shell, stingray skin rasps, and various abrasives, such as sand, comprised the tool-kits of Pacific craftsmen who lived before contact with the Western World produced vast changes, among which were alterations in style and techniques that occurred following the introduction of metal tools.

In addition to important sub-collections in the form of series, the Fuller Collection contains some remarkable individual specimens. For example, several items of sculpture in wood from Hawaii are excellent. One in particular, a carved statue of a god, is exceedingly rare. It formerly was a part of a very old 18th century collection which, of course, means that it dates back to the days of the early voyages of exploration by British seafarers in the Pacific.

Also from Hawaii is a small feather-head idol—one of the so-called war-gods or *Kukailimoku*. Only about a dozen such idols are known to exist today and only a few of these have retained their feathers. Most are in European museums and are attributed to Captain Cook's third voyage (1776–80). Equally outstanding from the historical standpoint, but less rare, are two feather capes formerly worn by Hawaiian royalty. One of these is especially interesting from the standpoint of history since it was brought to England in 1821 by Kamamalu (wife and sister of Liholiho, Kamehameha II) and given by her to King George IV. It was on this "state visit" to England that the King and Queen of Hawaii were taken fatally ill.

From the Marquesas Islands come an exceedingly rare carved drum, which is in excellent condition, and an ancient trophy skull. Easter Island materials include stone figures

(Continued on page 7, column 3)

NEW PUEBLO IN ARIZONA BROUGHT TO LIGHT

By HOWARD ANDERSON
ASSISTANT, SOUTHWEST ARCHAEOLOGICAL EXPEDITION

THE SITE presently under excavation by Chicago Natural History Museum's 1958 Southwest Archaeological Expedition lies approximately one-half mile east of St. Johns, Arizona. It is a gradually sloped mound about 30 feet high, 200 feet long, and 150 feet in width.

Near this mound, from which a pueblo is being excavated, stands an "altar" of rock. It is a large, flat-topped, table-like rock resting on a center pedestal, also of rock. On the upper surface of this altar are grooves, and pockets or holes, chipped out by the ancient Indians. These varied types of indentations were possibly used to collect sacred rain water, but their actual use is unknown. However, the peculiar shape of the rock plus the obviously man-made grooves and holes lead to the conjecture that it had a sacred use. (A photograph of the altar accompanies this article.)

PREHISTORIC RITUAL SITE

Member of Museum's Archaeological Expedition to the Southwest inspects an "altar" that may have been used to collect sacred rain water in grooves and pockets carved into its top surface. In background is the mound from which archaeologists are excavating an ancient pueblo. The many rooms uncovered have yielded human burials, vast amounts of pottery, and other evidence of the life of the early Arizona Indians.

The area was occupied intermittently by the descendants of the Mogollon Indians for a period of about 750 years. As revealed to date, the architecture indicates that the dwellings of the later period were composed of small single-story rooms displaying an ostensible paradox in structural ideas. The stone placement in the foundations, to a large degree, is reminiscent of a period about 700 years earlier than the one that concerns us at this time. Within one room, however, we have unearthed what was undoubtedly a chimney—something *not* found at the earlier sites of similar construction. Such an inconsistency as this makes it very difficult to formulate a simple concept of the cultural development of this pueblo.

The presence of late Hopi Yellow wares indicates that trade was carried on in the region until about A.D. 1450*—a full 250 years later than previously conjectured. This time difference places the group under study in the region very close to the Spanish conquest of the Southwest in 1540.

The earliest known native occupation, dating approximately at A.D. 750, is revealed to us by the recognition of a White Mound Black-on-White bowl found with a burial under one of the floors.

GLAZED POTTERY A CLUE

The presence of many types of Zuni glazes and various polychromes brings into the picture the technological and artistic abilities of the later inhabitants of the site. In spite of the temptation to speculate regarding these arbitrary matters, I feel that it is best to remain attached to the evidence. Since much of the glaze ware discovered ranges from poor to a relatively high grade —as far as firing techniques and decorations are concerned—we may safely assume that a period of experimentation took place. The presence of the chimney indicates that these people may have discovered the principle of forced draft firing that was needed to produce such pottery. Without this knowledge, consistent glazing could not occur.

The plain wares, like the painted wares, vary a great deal in design and method of construction. One point of difference between the two resides in the fact that the general style of the plain ware may have a life span of from 200 to 300 years, while the life of a painted type is usually not more than 50 to 75 years. It is because of this finer sensitivity that the painted wares constitute the backbone of our chronological deductions.

WHY DID THEY LEAVE?

It is most difficult to ascertain the reasons for final evacuation of this area. The abundance of charred corn cobs about the size of a man's little finger, may indicate a prolonged drought. The plausibility of this idea, however, must remain in "suspension" since the excavation is not yet completed and all the evidence brought to light.

Many avenues of thought may be used in a study of this nature. Bringing to life once again a culture that has ceased to exist requires much more than the compiling of dead statistics. It necessitates a knowledge of the human mind and its reaction to the various types of pressure which it may encounter. Certainly the deceased Indians who are now under our microscope of history had no concern about income taxes, atom bombs, and the like; but nevertheless, they were human beings like ourselves, and possessed the same spirit.

* Dr. Paul S. Martin, Chief Curator of Anthropology and leader of the expedition, notes that the date will be confirmed later by means of tree-ring or Carbon 14 methods.

Luminosity in Birds

From the Gulf of Mexico, J. Y. Christmas reports terns appearing luminous during a night rainstorm. The more distant birds were formless spots of pale light that recalled sea stories of St. Elmo's fire playing about the masts of sailing ships. Birds that were closer, their forms and beating wings plainly visible, glowed with a clear steady light. Apparently the birds, disturbed by the night storm, had been splashed with luminous seawater. The luminosity, or phosphorescence, is caused by light-producing, one-celled organisms in the sea-water adhering to the birds' feathers.

Though no birds produce light, there is another type of secondary luminescence. Owls that sleep in hollow trees may become luminous through light-producing fungi of rotten wood adhering to their feathers.

Auk, 1958.

Change in Visiting Hours

On September 2, the day after Labor Day, the autumn schedule of visiting hours, 9 A.M. to 5 P.M., will go into effect at the Museum in place of the 9-to-6 summer hours. After October 14, the closing hour will be 4 P.M.

POISONS SAVE OUR TREASURES FROM PESTS

By PATRICIA McAFEE
ASSOCIATE EDITOR

AUTUMN—the prelude to icy cold weather—is approaching, and soon the boxes and trunks packed with winter clothes will be brought from storage. Just as winter woolens and furs are packed away in mothballs during the summer months, so must

Museum collections be protected from varieties of insects eager to attack everything from hides and textiles to the insect collections themselves.

Museum collections, however, are not taken out of mothballs when fall arrives. They remain year-round in treated storage-study rooms or in specially prepared cabinets. In fact, moth crystals are useful only as a repellent. Stronger chemicals are needed to destroy insect pests that may have made their home on new specimens.

From department to department the preventive measures vary, but the result is the same—destruction of harmful insects. All collections housed in the Museum are valuable and will still be valuable years from now. One small beetle the size of a grain of rice may crawl into an exhibition case and deposit her eggs. These eggs—if they are not destroyed—develop into larvae which can destroy many specimens.

ANTHROPOLOGISTS BATTLE MOTHS

The chief insect-enemies of Anthropology collections are moths—insects commonly believed to be more attracted by dirty materials than clean. This is not true. What actually happens is that the cleaning procedure destroys the larvae that were already on the material. Therefore specimens are cleaned, whenever possible, before filing. Certain articles cannot withstand cleaning—a primitive mask, for instance, may be painted with a substance that would be harmed in the process.

After cleaning of perishables, which include hair, feathers, hides, mummies, textiles, and furs, they are stored in poison rooms. These rooms offer protection from dust as well as insects. Twice a year two gallons of ethylene dichloride and carbon tetrachloride are placed in open containers in each of Anthropology's seven poison rooms. The gaseous vapor emitted by these chemicals is deadly—not only to insects but to man. It is of a cumulative nature and will produce little effect, other than a headache, upon a person entering the room for a short time. But a continuous exposure could cause serious ill effects. Therefore, no risks are taken; anyone entering a poison room is equipped with a gas mask. If extensive work is to be done in any of the poison rooms a blower is turned on for 24 hours beforehand. This removes all of the fumes, but necessitates repoisoning when the work is completed.

Textiles that can be stretched flat are not stored in the poison rooms with other perishables. They are kept in special study collections in custom-made steel cabinets. The repellent used is paradichlorobenzene—the same chemical found in some commercial moth crystals.

Unlike Anthropology, Zoology maintains no poison rooms. Small mammals and bird study-skins are kept in cabinets protected against insects by paradichlorobenzene and naphthalene crystals, which are renewed twice a year. Suspect specimens receive a concentration of the same poisons that is twice as powerful. The birdskins are also given the anti-insect treatment when they are made up in the field.

The large furs are stored in a room that has been treated with paradichlorobenzene and naphthalene too. But they are also poisoned while they are being prepared. After the flat hides have been shaved, tanned, and oiled they are soaked in drums filled with a solution of eulan (a moth-off) and arsenic (one ounce of arsenic to the gallon). This method, plus periodic cleaning, assures the safety of the furs.

Of major concern to Zoology is a small beetle called the Dermestes. This creature feasts upon skin and does not seem much concerned with hair or feathers. The larvae attack the remaining fatty parts of the

specimens, and, unless arrested, will leave nothing but a mass of feathers or fur.

IRONY AND ODDITY

Ironically enough the Dermestes also renders a great service to the Museum. A colony of them is kept by Osteology to clean the bones of animals later to be placed on exhibition or in study collections. They work efficiently, are more sanitary than other small scavengers, and they leave the bones intact.

The Division of Insects has—you guessed it—one insect menace which causes 99 per cent of their control problems. This little creature, called the "odd beetle," was discovered in 1903 by Mrs. Annie Slossen, an entomologist. Mrs. Slossen, who found the insect in her collection, named it *Ignotus aenigmaticus* or the enigmatic unknown. In later years it was colloquially referred to as the "tissue paper bug" due to its appearance in bits of tissue paper tucked away in the corners of closets. The female is wingless and looks much like an insect in the larval stage, while the male is equipped with wings. The "odd beetle" needs very little to live on—a piece of dust in the corner is quite satisfactory. Man supplies the perfect environment for the family of insects, known as Dermestidae, to which both the "odd beetle" and the Dermestes used by Osteology belong.

To protect collections from the "odd beetle," specimens are placed in a chamber containing ethylene dichloride and carbon tetrachloride for 24 to 48 hours. After fumigation they are enclosed in cases with naphthalene fumes in them. Collections are inspected once a year and if there is suspicion of damage the entire drawer is fumigated twice.

The methods used to protect botanical specimens differ again from those used by Anthropology and Zoology. If field work covers a long period of time the plants are poisoned before they reach the Museum. The unpoisoned plant specimens received from the field are first heated for eight hours in a chamber 160 degrees F. Then the dried plants are dipped in a solution of 95 per cent ethyl alcohol and bichloride of mercury. They are blotted and dried, and after the alcohol has evaporated they are put in dust-proof cases, which have been treated with the same chemical used by Anthropology in storing textiles and Zoology—paradichlorobenzene. If plants are not adequately dried, however, they are subject to further damage from mold growth.

Bichloride of mercury is a highly toxic stomach poison and effectively does away with any beetles that chance to nibble upon a plant specimen. Since it is so strong, an exhaust fan is kept running during the poisoning process, and rubber gloves are worn and forceps used to prevent the solu-

tion from touching the skin of the poisoner.

Only one department in the Museum is free from insect worries. Geology specimens do not contain organic matter that would interest the scavengers. The Divisions of Reptiles, Fishes, and Lower Invertebrates have no insect problems because their specimens are preserved in an alcohol solution.

All of the exhibition cases with anything subject to insect attack in them are treated alike. With the exception of the Department of Anthropology, which handles its own poisoning, the cases are poisoned annually by the Division of Maintenance with ethylene dichloride and carbon tetrachloride.

In the Museum insects are studied, not exterminated, but if certain precautions were not taken no collections would remain for study.

NEW SHELL COLLECTION ACQUIRED BY MUSEUM

Chicago Natural History Museum has just received the shell collection formed by the late Archibald Christopher Billups of Lawrenceburg, Indiana. About 5,700 sets of shells with approximately 75,000 specimens are included.

Mr. Billups was born in England in 1865 and soon after coming to this country settled first in Louisville, Kentucky, then moved to Lawrenceburg. Through the influence of friends at the Cincinnati Society of Natural History, he became interested in the land and freshwater shells of the Ohio Valley. Over the years he made many extensive collections in this area and used duplicate specimens to exchange with other collectors in all parts of the world.

The activities of man have altered the rivers of the Ohio Valley. Many of its freshwater shells are now extinct and much of the Billups collection could not be duplicated today.

For several years Mr. Billups served as Honorary Curator of Conchology at the Cincinnati Museum of Natural History. Since his death in 1914, the collection has been stored in the attic of his son's home in Lawrenceberg.

NEXT MUSEUM JOURNEY: 'PLANTS INDIANS USED'

Many years ago the Indians who lived in North America used many plants in their daily life. In fact some of them are even used today. The fall Museum Journey, "Plants the Indians Used," provides the opportunity for boys and girls to see and learn how plants supplied the Indians with food, household articles, and medicines. The Journey, offered by the Raymond Foundation, may be taken any day in September, October, or November during regular visiting hours. Instructions and questionnaires are available at either the north or south entrance of the Museum. After visiting the exhibits and answering the questions the journey sheet may be dropped in a barrel at either door.

A child is eligible for an award as a Museum Traveler after successfully completing four different Journeys. The completion of eight different Journeys entitles him to a Museum Adventurer award and twelve different Journeys a Museum Explorer award. A special award, which will be announced later, will be given for sixteen successful Journeys.

Exhibit of Orchids Set for October

The first annual orchid exhibition sponsored by the Illinois Orchid Society will be held October 4–12 in Stanley Field Hall of the Museum. More than 250 living orchid plants in bloom are expected to be submitted by about seventy-five exhibitors. In addition to a floral display of individual plants, there will be special exhibits of different types of orchids, of hybridization in orchids showing parent stock as well as resulting crosses, and of the life cycle of an orchid.

Books

GUPPIES. By Herbert R. Axelrod and Wilfred Whitern. 64 pages. Sterling Publishing Co., New York. $1 paper cover, $2 cloth binding.

In this handbook on the special requirements for keeping, breeding, showing, and judging fancy varieties of guppies, many of the available varieties are illustrated both in monochrome and in color plates (the latter rather dull and the colors not correct). The methods of selective breeding to produce different strains are described. Detailed instructions are given on feeding to maintain the strains.

LOREN P. WOODS
Curator of Fishes

Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Anthropology, Vol. 48. *Marianas Prehistory. Archaeological Survey and Excavations on Saipan, Tinian and Rota.* By Alexander Spoehr. 187 pages, 89 illustrations. $4.50.

Fieldiana: Zoology, Vol. 39, No. 7. *A New Species of Ant-Thrush from Peru.* By Emmet R. Blake. 3 pages. 10c.

Fieldiana: Geology, Vol. 10, No. 30. *A Restudy of the 1917 Eruption of Volcan Boqueron, El Salvador, Central America.* By Sharat Kumar Roy. 20 pages, 21 illustrations. 75c.

OCEANIC COLLECTION—

(Continued from page 4)

and an emaciated birdman of the highest quality carved in wood. A lizardman figure stands as an example of the best workmanship known from the island. Perhaps the only complete tapa cloths in existence from Easter Island are also included. Wooden pillows or neck-rests from the Society Islands, paddles and ceremonial adzes from the Cooks, an ancestral idol or god from Tonga, and the finest Maori *toki* or nephrite-bladed adze now in existence all qualify as exemplary pieces.

Similarly, two molded skulls from the Solomons are new additions to Museum materials from this island group. Up to this time the Museum has had no such specimens. One of the outstanding new specimens that derives from an area not at all well represented in Museum collections may well be the finest mask of its kind. It is from the Torres Straits between New Guinea and Australia and is made of tortoise shell and human hair. Not only is it outstanding because of its large size, but its condition and the quality of the workmanship that went into its making are truly magnificent.

The extraordinary pieces contained in the Fuller Collection are too numerous to list here, but in every case they will expand and round out the existing collections in the Museum, and will contribute to this institution's eminent position in the field of Pacific ethnology.

RESEARCH POTENTIAL

Beyond the fact that numerous specimens from the Fuller Collection will ultimately be placed on exhibition in the Museum's Oceanic halls, the research potential of the collection is considerable. Relatively few of the objects which comprise the collection have been the subjects of publication. One segment, for example, comprises an extremely comprehensive series of clubs. These specimens constitute an exceedingly valuable source for comparative study of design elements in ornamental surface carving and in general over-all configuration. The portion of the collection devoted to fishhooks is probably the most complete series extant. Likewise, weapons from Australia, New Guinea, New Zealand, the Admiralties, and the Solomons form individual series which will allow fruitful scientific treatment. As an addition to the Museum's Pacific Research Laboratory the Fuller Collection will encourage the future use of this excellent study-storage facility by Museum staff members and by other Pacific scholars as well.

The details of ancient Babylonian cylinder seals are brought out in a frieze of impressions, enlarged 25 times, around the walls of Hall K, containing exhibits of the civilizations of the ancient Near East.

Film Travel for Adults . . .

LECTURES ON SATURDAYS BEGIN OCTOBER 4

Finland and the Congo are among the places to be featured in color films and lectures on Saturday afternoons when the Museum's 110th series for adults begins in October. The autumn series, presented under the provisions of the Edward E. Ayer Lecture Foundation Fund, will be given on each of the nine Saturday afternoons in October and November. All of the programs will begin at 2:30 P.M., in the James Simpson Theatre of the Museum. Programs for October are:

October 4—Marsh Mysteries
C. J. Albrecht

October 11—Kayaks Down the Congo
John Goddard

October 1 —The Country Beyond
Henry Briggs

October 25—Finland
Harry R. Reed

A complete schedule of the lectures will appear in the October BULLETIN. A section of the Theatre is reserved for Members of the Museum, and each is entitled to two reserved seats for each program. Requests should be made in advance by telephone (WAbash 2-9410) or by mail. Seats will be held in the Member's name until 2:25 P.M. on the day of the lecture.

NATURE PHOTO SHOW ENTRIES WELCOME

Although the deadline for entries in the Fourteenth Annual Chicago International Exhibition of Nature Photography does not occur until January, the present season is a good one to select pictures made on vacations which might qualify for the contest. The exhibition, sponsored by the Nature Camera Club of Chicago, will be held at the Museum in February.

This annual contest ranks as the largest held anywhere in the world in the field of nature photographs exclusively, and one of the largest photo competitions of any kind.

Medals will be awarded for prints and color slides adjudged the best in several classifications, and many ribbons will go to those deserving honorable mention. In addition to the awards made by the Nature Camera Club, there will be special prizes from the Photographic Society of America. Contestants are permitted to submit up to four entries in each of two divisions: (1) prints, and (2) color slides. Prints may be either in color or black-and-white. Entries should be sent directly to the Museum, which will furnish entry forms upon request.

Each of the two divisions includes three subclassifications: Animal Life, Plant Life, and General. The General group is for scenic views, geological formations, clouds and other natural phenomena which would not fit into either the animal-life or plant-life sections.

GIFTS TO THE MUSEUM

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

Department of Botany

From: Illinois State Museum, Springfield, Ill.—specimen of *Lipocarpha maculata*

Department of Geology

From: Olin D. Atwood, Wheatland, Wyo. —moss agate nodules; Dr. Richard Konizeski, Missoula, Mont.—*Diceratherium* jaw

Department of Zoology

From: Mrs. Ruth Allchin, Solihull, England—land snails, Guatemala and England; Dr. J. Bequaert, Cambridge, Mass.—2 land snails, Chisos Mts., Tex.; Michael Duever, Riverside, Ill. and Thomas O'Neill, Chicago —a turtle, Africa; Dr. Henry Field, Coconut Grove, Fla.—3 frogs, a centipede, a whip scorpion, a Cerambycid beetle, land shells and sowbugs, Bahamas; Fish and Wildlife Service, Brunswick, Ga.—fish specimen, Atlantic Ocean; Raymond Grow, Gary, Ind.— a birdskin; James A. Hartman, Chicago— 3 velvet ants, Nebraska; John R. Hendrickson, Singapore—2 bats, 3 flying squirrels; Harry Hoogstraal, Cairo, Egypt—embryos of hedgehog, 47 birdskins; Dr. Libbie Hyman, New York—5 land slugs; Ralph Jackson, Cambridge, Md.—land snails, Argentina; Morris K. Jacobson, Rockaway Beach, New York—non-marine shells, North America and West Indies; Dr. N. L. H. Krauss, Honolulu—4 lizards, non-marine shells, freshwater shrimp, Guam, Saipan and Mariana Islands; Dr. Robert E. Kuntz, APO 63, San Francisco—non-marine mollusks, 96 fish specimens, Formosa, Pakistan, East Pakistan; Willard Mohorter, Cincinnati—marine shells, worldwide; Dr. Juan A. Rivero, Mayaguez, Puerto Rico—a frog; Dr. Jonathan D. Sauer, Madison, Wis.—snails, Jamaica and Cuba; Standard Oil Co., Whiting, Ind.—a blue heron; A/1c Tom F. Whismant, APO 231, New York—9 frogs, 28 lizards, 12 snakes, Libya

NEW MEMBERS

(July 16 to August 15)

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Movies for Children . . .

TRAVEL AND ADVENTURE ON SATURDAY MORNINGS

"Marshland Mysteries," a color film of the sights and sounds in a swamp, and a story told by naturalist C. J. Albrecht, formerly a member of the Museum staff, will open the Museum's fall series of motion pictures for children on **October 4.**

These free programs, which are sponsored by the James Nelson and Anna Louise Raymond Foundation, will be held every Saturday morning during October and November at 10:30 in the James Simpson Theatre of the Museum. Children are invited to come alone, accompanied by adults or friends, or in groups.

In addition to "Marshland Mysteries" on October 4, the October programs will include:

October 11—Mexico

October 18—Siam

October 25—Our Friend the Atom

A complete schedule of the children's programs will appear in the October BULLETIN.

Special Primitive Art Show Goes Into Last Month

September is the last month for "What Is Primitive Art?", the special exhibit which opened in Stanley Field Hall in July. The display provides a synopsis of the Museum's permanent collections of art objects from such places as Africa, Pacific islands, and the realms of aboriginal inhabitants of North, Central and South America.

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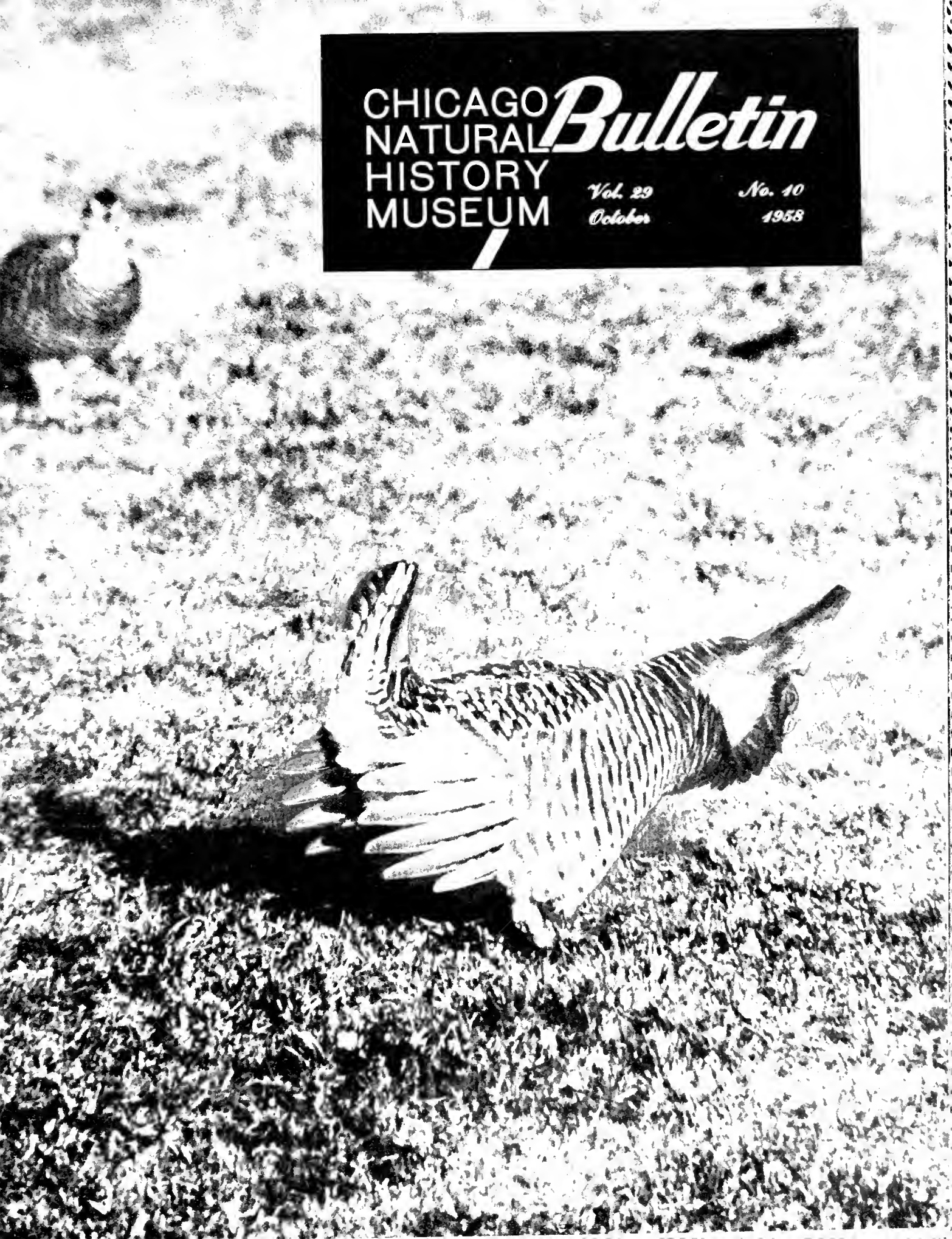

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Members are requested to inform the Museum promptly of changes of address.

HOW SHARK ATE SHARK IN ANCIENT INDIANA SEA

BY RAINER ZANGERL AND EUGENE S. RICHARDSON, JR.*

WHAT is the strange image pictured on this page? It is an X-ray of a fossil shark in a piece of Pennsylvanian black shale from the Museum's Logan Quarry in Parke County, Indiana. Besides being an exceptionally fine skeleton, this specimen is also a remarkable document of a different sort. It shows that the shark was eaten and soon thereafter disgorged by an ancient predator. How do we know? Among the many hundreds of specimens that we have collected from our two quarries in Parke County the vast majority are preserved in a peculiar manner that set us to wondering. There are heads with all their bones in place, but the bodies missing; there are bodies with the scales where they belong, but the heads are missing. Many times we have found portions of more than one kind of animal scrambled together on a small area of shale.

This kind of disarray cannot be explained by simple bacterial decomposition of the creatures after death. Some other factor must have been at work. In some of these specimens, bones and cartilage show a kind of corrosion such as we see in the coprolites (fossil dung) that are very common in our black shale. These observations have led us to the conclusion that most of the specimens from the Logan and Mecca shale quarries represent prey spat out by the predators in various stages of digestion.

Of the various kinds of fishes preserved in the shale only a few species of sharp-toothed sharks can be regarded as fish predators; the rest fed on crustaceans, mollusks and fry, and were themselves eaten by the predators. In many instances the predators were not successful in swallowing the prey whole, but

X-RAY BARES SHARK'S TRAGEDY
Paleontological detective work reveals fossil in a piece of black shale in curved position and with other evidence indicating it was eaten and disgorged by an ancient predator.

simply bit off a mouthful and let the rest sink to the bottom. This has resulted in our collection being quite rich in odd skulls and tail fins.

Apparently it was the practice of the predators to regurgitate partially digested food, perhaps because the food supply was plentiful, or possibly for the purpose of getting rid of hard parts such as bones and scales. Certain modern sharks disgorge freshly eaten prey when faced with an unlimited food supply; and owls, for example, clear their stomachs of hard-to-digest materials, thus producing the well-known owl pellets.

Under ordinary circumstances, such material would have little chance of escaping scavengers and bacterial decay on the sea floor. As conditions prevailed in Parke County, however, there were no scavengers, and mud rapidly covered anything lying on the bottom, preserving the remains from bacterial destruction.

Look again at the X-ray picture. The large shadow is the head of the shark with its mouth agape; next to it lies the bottom lobe of the tail fin, its tip beneath the snout of the shark. Behind the head we see the pectoral fins and various scattered parts of the skeleton. The backbone curves beyond the limits of the picture, loosely joining head and tail. Clearly, we would not expect to find a fish in this peculiar position if it had died without help and had quietly settled onto the mud; yet we have found more than one specimen in this position. Some of these have obviously been digested more thoroughly than others, making it possible to line them up in a series that demonstrates progressive stages of digestion.

Last year (August, 1957, BULLETIN) we reported the discovery of a very large shark in this same quarry. Could this have been the predator? We think not, because our large shark has a rather small head, and banks of blunt teeth that would undoubtedly have crushed the skull of the prey animal. On the other hand, we found in the same quarry a pair of very large jaws (16½" in length), armed with few, minute teeth, which belonged to a shark with an enormous mouth. Such a creature could have engulfed a specimen as large as the one in the picture without damage to its skeleton.

In previous articles in the BULLETIN we have stressed the enormous concentration of fossils, especially vertebrates, in the Mecca and Logan quarries. The animals buried here were not killed in a single calamity,

(*Continued on page 8, column 3*)

*Dr. Zangerl is Curator of Fossil Reptiles; Dr. Richardson is Curator of Fossil Invertebrates.

THIS MONTH'S COVER

"Goin' courtin'" is an appropriate title for our cover picture. It shows a male prairie chicken "booming" before a hen. Booming is a form of courtship ritual—an ecstatic dance accompanied by musical cooing. During its performance the cock's air sacs are inflated, its feathers are fully spread, and its movements are as abandoned as those of a calypso dancer. The bird postures with head held low and body parallel to the ground. The long neck tufts stick up like ears, and the tail stands up at the other end, making the cock appear astonishingly like a rabbit. The spectacular display and nervous behavior of the cock contrasts with the quietness of the hen (in left upper background of the picture). The photograph was made in Wisconsin by D. Dwight Davis, Curator of Vertebrate Anatomy, from a camera blind on a cold dawn. Davis tells the story of his experience on page 5.

SATURDAY AFTERNOON FILM-LECTURES TO BEGIN OCT. 4

FAR CORNERS of the earth will be brought within the compass of the Museum's James Simpson Theatre for audiences attending the 110th series of free illustrated lectures on travel and science, provided by the Edward E. Ayer Lecture Foundation Fund.

The lectures, all illustrated with color motion-picture films, will be given on the nine Saturday afternoons during October and November at 2:30. Admission is free. Museum Members, who are entitled to two reserved seats on request, are urged to make early reservations for all the following dates and program subjects:

October 4—Marsh Mysteries

C. J. Albrecht

More than ten years were required to film in color this around-the-year story of all the life surrounding a marsh from moose to goose. The photographer-lecturer, C. J. Albrecht, is a zoologist and explorer who has made 31 expeditions, and for years was a taxidermist at this Museum. The population, both permanent and migratory, of the marshland he studies in this film is most varied, ranging from frogs and toads to buck deer. In the film you see them all: creatures from the air, and inhabitants of the land, in all seasons and all phases of their lives.

October 11—Kayaks Down the Congo

John Goddard

This film recording the first expedition successfully to paddle the entire 3,000-mile length of the Congo River was made by a man who has devoted most of his life to exploration in almost impenetrable regions. John Goddard's color pictures show the most savage and treacherous rapids known, which he had to traverse in native "dugouts." In the most luxuriant jungles he captured on film the richest variety of bird and insect life as well as such large animals as gorillas, chimpanzees and okapi. There are meetings with picturesque primitive tribes. The journey starts at the Congo's farthest distant source below Lake Tanganyika in northern Rhodesia, and ends at its mouth on the Atlantic.

October 18—The Country Beyond

Henry W. Briggs

This is the most recent film of the meticulous nature-photographer, Henry W. Briggs, well-known for the time and care with which he makes his pictorial studies. It tells in full color the story of the great tract of wilderness that lies between Mount Katahdin, Maine, and the Canadian border—a region largely accessible only by plane, on foot, or in canoes. Here are deer, moose, and bears, and a great profusion of birds and plants, all of which play their roles in Briggs' pictures. To make the film, Briggs and his companions lived in the woods just as the Indians did.

October 25—Finland

Henry R. Reed

A remarkable documentary account of life in this small Scandinavian country, noted for the pride and fortitude of its people, has been achieved in the films of Harry R. Reed. It is a story with sociological as well as historic significance. Attention is given to the work, play, and daily life of the Finns, as well as to the country's agriculture, industry and architecture. The story of the rugged life of Lapland is included. There are many beautiful scenic sequences.

REINDEER TAXIS MEET THE AIRLINER

In Lapland the visitor may arrive on modern wings and round out his journey with primitive means of transportation. This scene at the airport of Rovaniemi is from the lecture-film "Finland" to be given October 25.

November 1—Rocky Mountain Rambles

Emerson Scott

High in the rugged peaks of Colorado and among the foothills are to be found some of nature's most colorful phenomena. Emerson Scott brings a color-film record of these to his audiences. Exciting are the scenes in which bighorn sheep and their lambs are seen jumping the mountain rimrocks, and grazing on flower-carpeted slopes. Herds of lordly elk feed on the velvet green of a valley floor. Sharp-tailed grouse and prairie chickens strut and dance a ritual all their own. The film ranges in scenic grandeur from the lofty peaks of snow-capped mountains to the turbulent rapids of swift-running canyon rivers.

RESERVED SEATS FOR MEMBERS

No tickets are necessary for admission to these lectures. A section of the Theatre is allocated to 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 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

November 8—North to the Polar Seas

Arthur C. Twomey

In a film rich in the color and romance of the Far North, Dr. Arthur C. Twomey, noted scientist of Pittsburgh's Carnegie Museum, presents an account of an expedition he led, 300 miles inside the Arctic Circle. He covers the remote Mackenzie River delta of extreme northwestern Canada, and introduces his audience to the Indians, Eskimos and wildlife in this fur-trading area. The expedition was made in quest of the rare Tule goose. Vast colonies of other birds are also shown—lesser snow geese, golden plover, Arctic tern, and whistling swan. A visit is made to Eskimo whaling camps, and the people are seen engaged in the hunting of the great sea mammals, and in preparation of the meat for winter food and the hides for clothing and shelter.

November 15—The New Guatemala

James Metcalf

Made entirely during and since the overthrow of the former Communist regime,

(*Continued on page 8, column 1*)

AUDUBON SOCIETY OFFERS SUNDAY SCREEN-TOURS

Six Sunday afternoon screen-tours, accompanied by lectures, will be presented under the auspices of the Illinois Audubon Society during fall, winter and spring months in the James Simpson Theatre of the Museum. The series will open on **October 5** with **"Land of Early Autumn"** by Cleveland P. Grant. Grant, a former member of the Museum staff, has been acclaimed as a naturalist-lecturer for some 25 years, and has frequently appeared here. His newest film ranges from Wisconsin through the wildernesses of the Canadian Rockies and Alaska. His "cast of characters"—the animals whose inner lives he has penetrated with his cameras—include grizzly bears, bull moose, caribou, mountain goats, elk, bison, coyotes, as well as many birds. This program, and all the others in the series, will begin at 2:30 P.M.

The other lectures scheduled in the series are as folows:

November 16—Kiwi Commonwealth
Patricia Bailey Witherspoon

January 4—Outdoor Almanac
Charles Mohr

February 22—Animals at Night in Color
Howard Cleaves

March 8—Secrets of the Sea
G. Clifford Carl

April 19—Animals at Home and Afield
Robert C. Hermes

Seats in the reserved section of the Theatre are available to Members of the Museum, as well as Members of the Illinois Audubon Society, on presentation of membership card of either organization.

EDGAR ALLAN POE, 'GHOST WRITER'

By G. ALAN SOLEM
ASSISTANT CURATOR, LOWER INVERTEBRATES

The literary works of Edgar Allan Poe are known to every high school student in the country. It is not widely known, however, that a small book on seashells, *The Conchologist's First Book*, appeared with Poe as author in 1839 and was reprinted in a second edition in 1843.

As early as 1850, it was recognized that this was a pirated book, with Poe being responsible only for the preface and for a paraphrase of an introduction taken from a book by Thomas Brown published in 1833.

The text is not taken directly from Brown, but originates partially from Georges Cuvier and mainly from Thomas Wyatt who published a handbook on shells in New York in 1838. The description of shells and lists of species follow Wyatt even to copying typographical errors.

In fact, this is probably a case of "ghost-writing" rather than piracy. Apparently the book was organized by Thomas Wyatt, then Poe's name added in order to increase the sales.

If one considers the number of books by celebrities published today that are actually written by a "ghost," such an arrangement should not be surprising. Nevertheless, the use of a "ghost-writer" in the 1830's is an interesting sidelight on conchological and literary history.

STAFF NOTES

Dr. Robert F. Inger, Curator of Amphibians and Reptiles, and **Hymen Marx,** Assistant in Reptiles, attended the recent annual meeting of the American Society of Ichthyologists and Herpetologists at Bloomington, Indiana. . . . **Dr. Fritz Haas,** Curator of Lower Invertebrates, and **Dr. Alan Solem,** Associate Curator of the same division, attended the annual meeting of the American Malacological Union, at Ann Arbor, Michigan. . . . **Allen Liss,** Assistant in Anthropology, recently participated in excavations of the Anker Site, an area in Cook County that was occupied by a community of prehistoric Indians.

Winter Visiting Hours

Effective October 15, the winter schedule of visiting hours, 9 A.M. to 4 P.M., will be observed at the Museum. On Sundays the hours will be 9 A.M. to 5 P.M. This schedule will remain in effect through February 28.

NEW MEMBERS

(August 16 to September 15)

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Associate Members

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FILMS ON SATURDAYS FOR CHILDREN

On the nine Saturday mornings during October and November, at 10:30, free programs of motion pictures will be given for children in the James Simpson Theatre of the Museum. This is the annual autumn series presented by the James Nelson and Anna Louise Raymond Foundation.

Children are invited to come alone, in groups, or with parents or other adults. No tickets are needed. Following is the schedule:

October 4—Marsh Mysteries

The sights and sounds of a swamp, in color movies. C. J. Albrecht, of Homewood, Illinois, maker of the film, will tell the story

October 11—Mexico

Movies of this colorful country will show a small girl's birthday celebration in Patzcuaro; popular arts and crafts; where and how orchids grow (tying in with special exhibits of living orchids to be displayed in Stanley Field Hall)

Also a cartoon

October 18—Siam

A Disney "People and Places" color-movie showing the tropical faraway land now called Thailand

Also a cartoon

October 25—Our Friend the Atom

A Disney movie that tells how atomic science helps people. Film includes views of a model of the *Nautilus*, the world's first atom-powered ship

November 1—The Great Adventure

The adventures of two children on a Swedish farm. Made by Arne Sucksdorff, this film won the Edison Foundation's 1955 award for best children's film

November 8—Where Mountains Float

Danish film showing Greenland, a primitive hunter's world, as seen by a 12-year old Eskimo boy

November 15—Alice in Wonderland

Lewis Carroll's humorous classic presented in a Disney color-movie

November 22—Winter Fun

Things to look for and things to do in the winter

Also a cartoon

November 29—Panama: Land of Contrast

Murl Deusing, of Milwaukee Public Museum, will appear in person to tell the story of his film

The story of 4,000 years of civilization's development in ancient Babylonia is presented by exhibits in Hall K.

11 BOY-BIRDS FLOCK TO WOO ONE LITTLE PRAIRIE HEN

In order to photograph prairie chickens, once common around Chicago but now extinct in this area, Curator D. Dwight Davis recently spent three days as a guest of Dr. and Mrs. F. N. Hamerstrom (Fred and Fran in the story herewith), near Plainfield, Wisconsin. The Hamerstroms are engaged in a long-term study of prairie chickens, on which the Wisconsin Conservation Department will base a management program designed to prevent this spectacular bird from becoming extinct in Wisconsin. Mr. Davis's article describes a morning in one of the observation blinds.

By D. DWIGHT DAVIS
CURATOR OF VERTEBRATE ANATOMY

IT WAS AN HOUR before dawn that April morning. The temperature was only 25 degrees and it felt very cold. The sky was starry clear except for a bank of low clouds in the east. The clouds disturbed me because they meant there would be no sunrise and the blackness would hang on for perhaps half an hour longer than it should, making the cameras useless that much longer. If they spread a little there would not be enough light for picture-taking before the birds left the booming ground. The field as I started across it was flat and featureless without a tree or even a bush but only stubby grass that made a soft sound against my shoes. Somewhere up ahead was the blind and as I stumbled toward it, eyes bugged with the strain of trying to see in the darkness, the heavy tripod banged against my leg and the camera bag pulled heavily on one shoulder. The motion-picture camera was in one hand and the clipboard and sniperscope in the other. I felt weighed down and clumsy like a soldier in full battle dress.

The clipboard and sniperscope belonged to the Conservation Department and were for data the Hamerstroms are compiling on the prairie chickens. Fred had briefed us at a long session the night before, as we sat with hot coffee around a long table in the big farmhouse Fred and Fran live in and use as headquarters for their work. There were several teams of observers going out the next morning, all students who had come up the night before from the University of Wisconsin. Fred had assigned each team to a particular booming ground, and we listened intently to the long and careful instructions because none of us had ever seen a booming prairie chicken and it was all very strange. I had a booming ground to myself because of the cameras, but a clipboard and sniperscope had been issued to me and I was expected to use them.

IN THE DARK

"There is a fence over there," Fran had said, pointing as I got out of the car. "Walk straight back about a block, keep parallel to the fence and you should hit the blind. I will pick you up about 8 o'clock."

After going about a block I stopped and looked around without seeing the blind so I went on another hundred feet, beginning to fear I had missed it in the darkness. At the briefing session Fred had said "If you don't find your blind, get down and look for it against the horizon." I did, and there it was off to the left a bit and in the darkness it looked as big as a house. Inside the blind it was black, and I noted on the clipboard "entered blind 4:31," feeling with my fingers

BLIND FROM BEHIND

The prairie chickens performed in the grassy area in front of the blind, while early-morning motorists passed along the road in the distance.

for the edge of the paper and wondering if the invisible scrawl would be legible in daylight. I sat there alone on the low bench surrounded by the familiar odor of canvas. The two peepholes in the front of the blind were just visible against the sky. Nothing was happening and I felt foolish, because sitting there waiting in the empty darkness it seemed improbable that prairie chickens would really choose to come to this particular field. It was silent except for the liquid bubbling of prairie horned-larks flying overhead in the darkness, and I did not know how long I would have to wait.

I had not been in the blind ten minutes, still fumbling with setting up the cameras in the darkness, when there was a startling great whirr of wings, a great but brief cackling, and then a chorus of low cooings that I knew must be the booming of the cocks. The cooing sounded like blowing across the mouths of many empty bottles. It was not at all what I expected, and it seemed inexcusable to call such musical sounds "booming." I looked out through a peephole, still half incredulous about the prairie chickens. I could just barely see them. In the half-light they looked as big as turkeys, and I felt a fine glow of excitement because they were out there in front and very close and they did not know I was there.

The light was coming up fast but it was still too dark to see much. The cold was already beginning to get through the heavy Air Force flight pants and the sheep-lined jacket, and my feet were numb. I shifted my legs, carefully because of the tripods, but the blind was too small to straighten them and it was very cramped.

THE AIR RESOUNDS

After fifteen minutes the birds were clearly visible but still colorless and only moving silhouettes against the stubble. I counted eleven of them—from their behavior all were cocks—scattered over an area perhaps a hundred yards across and all dancing and booming almost continuously. The air was filled with the fine sound. Each cock held his head low and his body parallel to the ground, and with feathers fluffed and the long neck tufts sticking up like ears and the tail sticking straight up at the other end, they did not even look like birds but were so rabbit-like that I was astonished and very pleased. It is sad that this splendid thing is gone from what once were the prairies of America, except in a few places, such as the one we were working, where the soil is too poor to cultivate. For a long time I watched and listened and waited for the light to come up; this was something I long had wanted to see. It was much better than I had imagined, and very pleasant.

While I watched, a hen suddenly moved quietly among the cocks, and her presence intensified the tempo of the booming; the cocks postured lustily in front of her as she moved about. It was light enough inside the blind to read my watch now and I noted on the clipboard "Hen appears 5:12." I then put the sniperscope on her to see if she was banded, but her legs were bare. Each time a cock boomed now his vivid orange air sacs and his orange eyebrows were visible in the gaining light, and there was a furious drumming of his feet. It was still ten minutes before sunrise, but in my eagerness to start shooting, and in spite of the clouds, it seemed bright enough to shoot wide open and at a slow shutter speed, but when I took a light-reading the needle barely moved and I had to wait. The closest bird was never less than 30 feet away, so while waiting for the light I broke out the biggest telephoto lens and connected it to the Exakta. In the viewer and through the lens the nearest cock looked big and sharp and I could see him better than with the naked eye. I wanted a few pre-dawn pictures, so I took several and then ran off a few feet with the motion-picture camera.

The blind was really punishing me, and finally even the excitement of seeing the booming birds and the light, now nearly enough for good pictures, did not drown out the cramping pain and I had to shift my legs. My foot struck a tripod leg and the camera fell against the side of the blind, making a dull thud. I waited tensely for the birds to flush and spoil everything, but the nearest ones only turned their heads momentarily and looked at the blind. Then suddenly the

sun came out, making long shadows behind the birds but lighting them on the side toward the cameras, and it was high time to start shooting. It was late because the clouds had hidden the sun. My luck had already been pushed too far and I was beginning to fear the birds would leave before I had anything.

A TENSE MOMENT

Through the big lens and in the morning sun the nearest cock made a fine sight. In the viewer his image seemed almost to fill the field, and as he moved around his territory, nervous as a cat, I had to swing the camera like a machine gun to keep it on him. He was strutting and booming every few seconds and I followed him in the viewer a couple of times to fix the pattern and get the feel of it before shooting. The moment to shoot was at the end when he lowered his head and boomed, and for a second was fluffed out and spread in full display, but it was difficult because he always pivoted around and often as not ended up with his backside facing the camera. I held the cable release and waited tensely, watching him in the viewer. The next time he came up broadside and the image looked sharp so I tripped the shutter. When I rechecked the light and the camera settings they were all right and it was a beautiful shot. I was sweating a little in spite of the cold, but with one good picture safely in the camera the strain let up a good deal. I shot several more pictures of the cock but none was as good as the first. Then I switched to the motion picture camera and worked him over with it.

The sun was beginning to warm the rear of the blind and it felt good on my back. The canvas was very warm when I touched it with my hand, but the front wall was still cold and clammy and it was still chilly inside. By the time I had shot a roll of film and a hundred feet with the motion picture camera, the steam had gone out of the birds and they were all resting or eating quietly and only occasionally stirred up when one cock stepped across the line into another's territory. Long ago the hen had left as quietly as she came. There was no more shooting, but the birds were still there and I could not bring myself to flush them because they belonged there and I did not. I sat there planning what to do from the blind the next morning, wishing the birds would leave so I could get out and stand up. It was still cold and the thought of the big coffee pot and the hot stove back at the house tortured me. A few cars were passing now on the road at the end of the field, but it was only 7:30 and still too early for Fran to be in any of them. Suddenly there was a whirr of wings and I looked out quickly, but the field was bare. A moment later a marsh hawk passed low over the field and from the blind I could see his eyes.

COCKS 'BOOMING' BEFORE A HEN

Both cocks caught at the moment of full display, with air sacs inflated and feathers fully spread.

COLD AND SORE

After ten minutes the birds had not returned so I tipped the blind up and crawled out. The muscles in my legs were sore when I stood up and the sun felt warm, but an icy wind had come up and I put my gloves on. In the full light of day and without the birds the field looked drab and the blind looked absurd in the middle of the empty field. It seemed faintly ridiculous that an hour ago prairie chickens had been booming on the spot where I stood. The birds had left little coils of white dung on the ground and one of them had dropped a feather. By the time I had packed up my gear and started for the road, Fran's car pulled up.

"How did it go?" she asked as she opened the door.

"Fine," I said. "I was afraid the sun wasn't going to make it."

"Did you have any chickens?"

"Twelve. One was a hen."

"Was the hen banded?" she asked quickly.

"No," I said, wishing I could say yes because I knew they particularly wanted data on the hens.

"I hope you got your pictures."

"Oh yes. They were still performing after the sun came out."

"Good."

The warm air from the car heater felt very good. In fifteen minutes we were back at the big old unpainted book-filled farmhouse. The yard was filled with cars because we were the last ones in. When we entered Fred was already going over the report sheets, checking with each team back from a different booming ground. The room was filled with people, and papers were piled on the table along with coffee cups and a box of sweet rolls. There were paintings of prairie chickens on the walls and silhouettes of them on the lampshade. Everyone except Fred was excited and talking about prairie chickens.

Fran had gone out to trap hawks for banding. The students left as soon as they had finished their reports and it was very quiet and empty after they had gone. It was 10:30 by my watch, and I was dead because I had been up since 3, and the cold and the excitement had drained me. Fred stacked the papers carefully and laid them on a desk in the next room.

"I don't know about you," he said quietly, "but I am going to hit the sack until lunch time."

This was more than I had dared hope for, and I said: "Me too," trying not to sound as eager as I felt.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

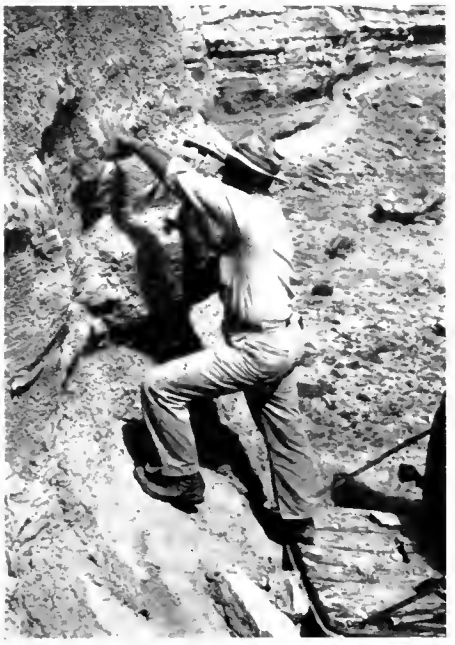
Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

EXPEDITION UNEARTHS WYOMING FOSSILS

By WILLIAM D. TURNBULL
ASSISTANT CURATOR OF FOSSIL MAMMALS

THIS IS THE THIRD consecutive year that the Museum has sent a paleontological expedition into the mid and late Eocene deposits of the Washakie Basin of southwest Wyoming in search of fossil mammals. The goal for each of these trips has been to collect systematically and to record the mammals and other vertebrates from each stratigraphic horizon. Records of the sedimentary types and strata are made to help interpret the structure of the basin and the ecologic picture of Washakie.

On the previous trips (reported in December, 1956, and January, 1958, BULLETIN) I have had the valued assistance of Orville L. Gilpin, Chief Preparator of Fossil Vertebrates. This year, David Collier (son of anthropologist Donald Collier) accompanied me as a most willing and enthusiastic volunteer assistant. We began work by prospecting a 100-foot-high rim exposure that marks a level near the contact of the two horizons (Upper and Lower) of the Washakie formation. On the second day, we were rewarded with the discovery of a uintathere humerus, pelvis, and sacrum. Uintatheres were gigantic mammals that possessed very large, distinctive horns or crests on their yard-long heads. These beasts are members of one of the numerous aberrant branches of mammal lines, which were successful for a time, but became extinct. They have no close relatives alive today. The pelvis we collected came from a hard, massive sandstone deposited in an ancient river channel. It is complete, articulated with the sacrum, weighs about 150 pounds, and measures 3 feet 9 inches across the iliac crests. Nearly a week was spent in working out and jacketing this great block, which, incidentally, had to be hauled by the truck's winch for 160 feet up a 40–45-degree cobble-covered slope to the point where it could be loaded into our field vehicle.



FOSSIL HUNTER AT WORK
Lower jaw of the long-skulled titanothere Dolicorhinus is removed from channel sandstone like a stubborn tooth being extracted under the zealous efforts of Paleontologist "Bill" Turnbull on a cliff-side in Washakie Basin.

Two more weeks were spent in a thorough prospecting of this horizon for a total distance of about two and one-half miles. In it we were lucky enough to find the partial remains of a three-toed horse, probably *Epihippus*, and the complete skull of a very rare crocodile, *Brachyuranochampsa eversolei* Zangerl.

Some of the most interesting materials from this horizon are the teeth and jaws of the smallest mammals (insectivores and rodents), which are exceedingly difficult to find and for this reason rare in collections. Ants helped us to find these little mammals. They bring in stones, pebbles, and the tiny bone and tooth fragments with which they construct a mound that serves as a protective covering to their nest. The hill or mound also helps to control the humidity and temperature of the interior of the nest. We merely sacked up the sandy and gritty surface of the ant hills and sieved off the fine sand and silt—a collecting technique long used by vertebrate paleontologists. The concentrate of bone, teeth, and pebbles that was kept will have to be sorted in the laboratory. We took our concentrates only from hills in which we saw one or more teeth, so we are confident that a considerable number of specimens will be recovered from the concentrates.

SAFEGUARDING FOSSILS
Hips (pelvis and sacrum) of uintathere, partially jacketed with plaster for shipment to Museum, but still in position as found in massive sandstone channel in Washakie Basin.

The most abundant large mammals in the fauna are titanotheres, especially in the Upper Washakie beds. These early titanotheres differed from their more spectacular descendants of the Later Eocene and Oligocene in their smaller size and in the lack of horns. One of the titanotheres, *Dolicorhinus*, was the size of a large horse with a skull over 2 feet long. Channel sandstones have yielded the best of our specimens.

In order to trace the outcroppings of many of the horizons, a photo mosaic map was constructed in 1956 from a series of aerial photographs. The map has since proved invaluable in locating exposures and recording routes of access to the more isolated regions of the basin. The Washakie formation covers about 400 square miles. Over much of this area the formation is not exposed on the surface but is covered by dunes and alluvial deposits. On eroded rims the rocks are exposed at the surface, and these are the places that most prospecting for fossils is done. Each of these rims may be traced for miles along the strike of the beds. To date we have systematically prospected about 30 miles of these outcroppings, sampling each of the major horizons.

On the last day, when we were ready to pack up and break camp, we found a partial skeleton of what appears to be a tillodont. This is a very rare form. Like the uintatheres, tillodonts are archaic mammals that lived during Paleocene and Eocene times. They are seldom found in collections, and probably they were never very abundant animals. It took three additional days' time to collect this specimen. I shall certainly have it prepared as soon as my shipment of fossils arrives at the Museum.

LIVING ORCHID GARDEN COMING TO MUSEUM

A garden of about 300 living orchid plants, with a background of tropical foliage and a temporary greenhouse, will form a special exhibit in Stanley Field Hall of the Museum from October 4 to 12 inclusive.

In addition, each day there will be some 300 fresh-cut orchids on display. Other features will be corsages and arrangements showing various uses of orchids. The scientific aspects of the exhibit include a display showing the life-cycle of an orchid from seed to blooming plant; the breeding of hybrid orchids; a series of water-color paintings of orchids from various parts of the world by H. Gilbert Foote, a Chicago artist; a series of large published prints of orchids from the Botanical Library of the Museum, and copies of the Museum's publications on tropical American orchids.

The show is sponsored by the Illinois Orchid Society. About 75 orchid growers of the Middle West, California, Florida, and Hawaii will display plants, and another part of the exhibit will be supplied by Allied Florists. While many exotic species of orchids will be shown, they have all been grown domestically from introduced plants. Orchids native to the United States will also be represented. Horticultural varieties (those used commercially) and plants of purely botanical interest will be included in the exhibit.

FILM-LECTURES—

(*Continued from page 3*)

James Metcalf presents a most modern and up-to-date film-document of fascinating Guatemala. From the modern and beautiful capital, Guatemala City, the cameras carry the audience to the spectacular highlands in the south of the country. Here the life of the present-day Mayas, heirs of a great ancient civilization, is observed, including a gay annual fiesta and a sacred ceremonial masked dance. Other features are a restoration of an ancient Maya city, the re-enactment of a pagan ceremony of human sacrifice, and a visit to the rim of a live volcano.

November 22—Sumatra

Robert Leighton

In this film-lecture, Robert Leighton offers the story of an island, the fifth largest in the world, whose polyglot population represents some of the problems which Indonesia as a whole faces. The various ethnic groups are as diverse as the scenery. In the film, visits are made to many tribes in remote villages in all areas—north, central and south Sumatra. A spectacular harvest festival in the shadow of a living volcano is seen. Surviving symbols of the Stone Age give the audience a glimpse into the mysterious past. The island's economic potential is represented in the oil fields which lie in the heart of the tiger country. Far eastern glamor is witnessed at a wedding among the Menangkabau people.

November 29—Panama: Land of Contrast

Murl Deusing

The life both of Panama, the nation, and of the American-controlled Canal Zone, as shown in this picture by Murl Deusing, of the staff of the Milwaukee Public Museum, reveals many contrasts. A visit is made to the valley of square trees and golden frogs, and to the mountain slopes of El Volcan with its cloud forest and tree ferns. On San Blas Island, where no white man is permitted to stay overnight, the camera focuses on the picturesque Cuna Indians among whom are numbered many albinos. More thrills are found in the luxuriant Darien jungle, and amid the varied fauna of Barro Colorado.

Early Entries Are Urged for Nature Photo Show

Preparations are now in progress for the Fourteenth Annual Chicago International Exhibition of Nature Photography to be held at the Museum in February. Those wishing to participate are urged to begin sending their entries. Co-sponsor of the exhibit is the Nature Camera Club of Chicago. Medals and ribbons will be awarded for prints and color slides adjudged the best in several classifications, such as animal life, plant life, scenery, etc. On the panel of five judges will be two members of the Museum staff: Roland W. Force, Curator of Oceanic Archaeology and Ethnology, and William D. Turnbull, Assistant Curator of Fossil Mammals.

Books

ENCYCLOPEDIA OF TROPICAL FISHES. By Herbert R. Axelrod and William Vorderwinkler. 731 pages, 127 color plates, numerous monochromes. Sterling Publishing Co., New York. $7.95.

This unusually comprehensive volume contains a great amount of information about aquarium fishes and is recommended to serious aquarists as well as to beginners. The emphasis is on breeding aquarium fishes and the text is arranged into chapters on fishes of a certain type of spawning habit (e.g., egg scatterers, egg anchorers, live bearers, etc.). The section on general breeding conditions is fairly complete while that on water plants is considerably more detailed than in other general aquarium books.

An unusual feature is background information on collecting fishes for aquaria by dealers in various parts of the world. This section briefly describes native habitats of some kinds of fishes and the problems of handling and shipping live fishes at the source. There are also numerous pictures of the establishments of various aquarium-fish wholesale dealers in the United States, showing facilities for spawning, rearing, or holding different kinds of tropicals.

The text is profusely illustrated with both monochrome and color prints. A number of identical pictures appear more than once, monochromes being repeated in color. While most of the color plates are beautiful, in the majority the colors are not accurate. The index is not complete, some entries referring only to a picture and not to text, and some to text but not to picture.

LOREN P. WOODS
Curator of Fishes

Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Geology, Vol. 10, No. 31. *The Problems of the Origin and Structure of Chondrules in Stony Meteorites.* By Sharat Kumar Roy. 14 pages, 12 illustrations. 50c.

Fieldiana: Zoology, Vol. 41, No. 1. *Birds from Nepal.* By Austin L. Rand and Robert L. Fleming. 216 pages, 4 illustrations, 2 maps. $3.50.

Fieldiana: Zoology, Vol. 39, No. 9. *Notes on Lizards of the Genus Dicrodon.* By Karl P. Schmidt. 7 pages, 2 illustrations. 20c.

SHARKS—

(*Continued from page 2*)

however. Fishes lived and died throughout the time of shale deposition. What, then, was responsible for this fantastic concentration of fish remains? The interpretation of most of the remains as disgorged prey provides a clue. Apparently the larger predators became trapped during periods of low water in such shallow basins as existed at Mecca and at Logan, but the prey did not. The smaller fishes could move in and out of these places, thus providing a constant supply of food for the confined predators.

The story of the "kitchen middens" of the sharks of Parke County, Indiana, clearly shows again that fossils can tell a great deal more about life and living conditions in the distant past than merely to provide a list of the kinds of animals and plants. Such insights, however, require the systematic collection of all remains, not merely the exceptional ones that make perfect exhibition specimens. By the technique of quarrying we obtain not only this totality of evidence, but also the rare and fine show pieces.

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: Miss Marion G. Gordon, Chicago—projectile point of chipped flint, Indiana; Mrs. Chester Hart, Oak Park, Ill.—2 wedding gowns, Japan and Tunisia; Harry Hoogstraal, Cairo, Egypt—stone blade (knife or sickle); Charles Pagano, Skokie, Ill.—projectile point of chipped flint

Department of Botany

From: American Museum of Natural History, New York—Sigillarian stump, Pennsylvania; Mrs. Dorothy Gibson, Chicago—38 vascular plants, Kentucky; Prof. Winona H. Welch, Greencastle, Ind.—moss specimen

Department of Geology

From: Buckingham-Victoria Slate Corp., Richmond, Va.—slate flooring and slate roofing specimens; Ronney Kovalik, Palatine, Ill.—3 fossil cephalopods, Wisconsin; Reserve Mining Co., Silver Bay, Minn.—taconite specimen; Tom Solenberger, Albuquerque, N.M.—brachiopod specimen

Department of Zoology

From: Bernard Benesh, Burrville, Tenn.—315 insects; Harry Hoogstraal, Cairo, Egypt—14 longhorn beetles, 22 frogs, 134 lizards, 64 snakes, 8 clutches of eggs, New Guinea and Egypt; Ralph Jackson, Cambridge, Md.—25 lots of inland shells, Ecuador; W. L. Klawe, La Jolla, Calif.—4 lizards, lizard eggs, Cocos Islands; Dr. F. C. Lehmann, Colombia—20 monkey skins; Arthur Loveridge, St. Helena Island—12 frogs, frog larvae; U. S. Fishery Laboratory, Beaufort, N.C.—fish specimens, Florida and Georgia; U. S. National Museum, Washington, D.C.—slides of sucking lice, North Africa

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

CURATOR FORCE NAMED IN HONOR GROUP

Roland Wynfield Force, the Museum's Curator of Oceanic Archaeology and Ethnology, was recently honored by the Chicago Junior Chamber of Commerce, which selected him as one of Chicago's ten outstanding young men (under age 35) for 1958.

Roland W. Force

A few days after this honor, Force also received, in absentia, a Doctor of Philosophy degree from Stanford University, of which he is a graduate, and where he had earned his Master of Arts degree.

Dr. Force was the only scientist in the group honored by the "Jaycees." The others represented fields of industry, education, medicine, and religion. They were chosen from among more than 5,000 nominees in recognition of their contributions to their professions and to general welfare. Selections were made by a panel of seven judges: Karin Walsh, City Editor, *Chicago Sun-Times;* Wesley Hartzell, City Editor, *Chicago American;* Clem Lane, City Editor, *Chicago Daily News;* Fred Nichols, Assistant to the Publisher, *Chicago Tribune;* Robert C. Liebenow, President, Chicago Board of Trade; Dr. Richard H. Young, Dean, Northwestern University Medical School, and the Very Rev. Comerford O'Malley, President, De Paul University. A testimonial luncheon was tendered to the ten chosen young men at the Palmer House on October 3, and individual plaques were presented to them.

The selection of Curator Force, who is 33, was in recognition of the outstanding work he has done in anthropological research on peoples of South Pacific islands, and his efforts in obtaining for the Museum the Pacific collection of Captain and Mrs. A. W. F. Fuller of London. This was the largest and most important collection of its kind remaining, until this time, in private hands (BULLETIN, September, 1958).

Dr. Force joined the staff of the Museum in June, 1956, shortly after completing (with his wife, Maryanne) eighteen months of field work in Micronesia. He conducted studies among the peoples of the Palau Islands (Western Carolines, in the Trust Territory of the United Nations) for the Tri-Institutional Pacific Program sponsored jointly by Yale University, the University of Hawaii, and the Bernice Bishop Museum of Honolulu. Dr. Force was an associate in ethnology at the Bishop Museum, and prior to that he taught in the department of anthropology and sociology at Stanford University.

REPORT ON METEORITE STUDIES ABROAD

BY SHARAT KUMAR ROY
CHIEF CURATOR OF GEOLOGY

I have just returned from a year's stay in Europe and India where I was engaged in research and consultation work on stony meteorites, especially concentrating on those which contain certain spheroidal bodies called chondrules. These bodies are aggregates of one or more silicate minerals and occur in about 90 per cent of all stony meteorites. The total number of all classes of meteorites known, excluding the doubtful ones, and those that might be identical, is in the neighborhood of 1,550. Of these, nearly 800 are stony meteorites.

Since most of the major collections of meteorites are found in the museums of the capitals of Europe and in certain universities, it was necessary for me to travel extensively. For some unaccountable reason a large number of stony meteorites have fallen in India. The Indian Museum at Calcutta houses the largest number of observed falls of stony meteorites of that country. While in Calcutta, I had the opportunity to work on this fine collection. The only notable collection that I did not see was the U.S.S.R. collection. This I regret, for the Meteorite Committee of the Academy of Sciences in Moscow is very actively engaged in increasing the facilities for the preservation and study of meteorites, particularly from the viewpoint of geophysics. Of course, there are many collections in private hands to which I did not have access.

My main objective was to search for a solution to the problem of the origin and mode of formation of chondrules in stony meteorites. Chondrules hold the key to the origin of meteorites at large, and give some indication as to the type of material likely to be found in the interior of the earth. It was realized that a study of this sort could not be made on examination of limited material. It was also realized that the problem was more one of petrography and petrology than of analytical chemistry, and that the study should be based on the critical examination of thin sections. This was precisely the procedure I followed and, among other features, noted the following: order in which the different minerals had appeared; degrees of metamorphism; textural and structural variations; and distributions and interrelationships of the various components of the chondrules. I also took some 1,400 microphotographs, both in color and black-and-white, of thin sections, in ordinary and between crossed nicols, to enable me to visualize and to interpret the features observed and as a permanent reference for comparison and discussions of controversial points.

I wish to express my sincere appreciation for the research grant I received from the National Science Foundation and for the supplementary appropriation from the Museum to pursue this study. I also wish to extend my hearty thanks for the cordial co-operation and effective laboratory facilities given me by museums and institutes at Calcutta, London, Paris, Zurich, Vienna, various cities in Germany, Stockholm, Helsinki, and a number of other places where fewer but rarer specimens are preserved. It has been my good fortune to have had the opportunity to examine more than 80 per cent of known chondritic meteorites.

THIS MONTH'S COVER

The portrait on our cover this month is "A Young Man of Cuzco." The oil painting is one of 39 by Caroline Van Evera that form a special exhibit: "People of the Highlands—Indian Types in Central and South America." The exhibit will be on display in Stanley Field Hall November 1–30 (see story on page 3).

Veteran Museum Aid Dies

The Museum notes with regret the death on October 5 of Timothy Reidy, former Sergeant of the Guard. Mr. Reidy entered the service of the Museum in 1917 and was retired on pension in 1943. He was 94 years old when he died.

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CULTURAL CROSSROADS OF THE SOUTHWEST

By PAUL S. MARTIN
CHIEF CURATOR OF ANTHROPOLOGY

A VILLAGE—occupied by Mogollon Indians about A.D. 1350–1500—to which traveling salesmen may have come from time to time to pursue their honorable profession of trade and barter, was revealed by the excavations of the Museum's Southwest Archaeological Expedition in its 1958 season.

We conjecture that trading parties—from perhaps a hundred miles or more away—may

ARIZONA KIVA UNCOVERED

The room, used by prehistoric Indians for ceremonials, is paved with sandstone slabs. Tesellated arrow in center indicates location of firepit. The two workers are excavating a niche which was found to contain turquoise pendants and gaming pieces. The room, one of several opened, measures 10 by 14 feet.

have met here, for we find abundant evidence of trade in the pottery we dug up. Some of it apparently came from the Gila valley to the south (Globe and Phoenix) and some of it from the Hopi towns in northern Arizona. Microscopic studies, yet to be undertaken, will settle this point finally; but at the moment we base our guess as to the source of the trade pottery by means of its colors and designs.

The site excavated this past summer is located about a half-mile east of St. Johns, Arizona, on the east bank of the Little Colorado River. The site or pueblo, composed of almost sixty rooms and two kivas (men's ceremonial rooms) lies on top of a sloping mound about 30 feet high, 200 feet long, and 100 feet wide. It is quite possible that many of the dwellings were arranged in a bi-level manner; and certainly some portions of the pueblo-town were two stories in height. There were no doorways such as we have in the walls of our houses. On the contrary, entrance to each room and house was through the roof. By that I mean there was a doorway or hatch in the roof (covered in bad weather by means of well-cut, neatly shaped, thin stone slabs), and through this everyone entered and left. Thus, to enter your house you climbed a ladder to the roof and descended another ladder into your apartment.

TORTOISE-LIKE DEFENSE

Such an arrangement had practical advantages besides being, apparently, one of traditional usage. In time of peril or raids, ladders could be drawn up to the roof making easy penetration impossible. If was a kind of tortoise arrangement whereby the occupants withdrew to safety until the danger abated.

One of the greatest factors in producing cultural changes is trade—trade in both materials and ideas. The site excavated this last season brings into view a segment of the Mogollon civilization that was significantly altered by these mechanisms, as "foreign ideas" are reflected in the pottery, the architecture and the stone tools.

The Davis site—named after Mark Davis, the owner—was perhaps one of the latest pueblos in the area to manifest Mogollon identity before the Mogollon Indians disappeared as a separate group.

We conjecture that the site was occupied between A.D. 1350 and 1450. These dates are guesses only and are based on a hurried examination of the pottery. We may revise these figures up or down after more data are in.

It is probable that the site was occupied for a relatively short time—perhaps fifty to one hundred years. We had assumed we would find earlier towns under the top or latest one, but we were doomed to disappointment, for the floors of the excavated pueblo rested on bed rock.

POTTERY IN A TOMB

It is of interest here to note that under the floor of one room and excavated partly in the sand rocks we found the tomb of a woman, with whom were buried two pieces of pottery whose homeland is about 50 miles distant. These pots date from about A.D. 750! Now, one may infer either that these pots were heirlooms and had been handed down from mother to daughter without breakage for about 700 years, or that the family traveled many miles for some obscure reason to bury their loved ones on a lovely knoll far from the family hearth.

We have followed the trail of "our" Mogollon Indians with undiminishing vigor for nearly 20 years. As a result, I am in an eminently fortunate position of being able to make a few assertions and conjectures.

Briefly, the evidence from the site gives me a fairly clear image of the inhabitants and their way of life.

First, the founders of this town—the ancient name of which we do not possess—were Mogollon Indians of brownish skin and of medium stature. The culture they had developed was an old one—one of the longest

(*Continued on page 5, column 1*)

PAINTINGS SHOW INDIANS SOUTH OF BORDER

"People of the Highlands," a special exhibit of paintings by Caroline Van Evera, will be on display November 1–30 in Stanley Field Hall of the Museum. Included in the exhibit are 39 oil paintings of Indians typical of the highlands of Guatemala, Bolivia, Ecuador, and Peru.

Miss Van Evera, now of Greenwich, Connecticut, traveled to Central and South America where she found the subjects of her paintings. Of documentary as well as artistic value, the portraits of individuals convey racial and cultural characteristics of the people. Under Miss Van Evera's brush, the "Young Man of Cuzco," "The Witch Doctor of Calca," "Woman of Cochabamba," "The Musicians," and "Guadalupe" reveal their moods and temperaments.

One of the most typical and exciting aspects of Indian life in Latin America is the weekly market to which come vendors and buyers from the remotest villages. In her paintings of market scenes in Antigua, Guatemala; Otavalo and Ambato, Ecuador; Cuzco, Peru; and Cochabamba, Bolivia, the artist has captured the color and rhythm of costumed fig-

WOMAN OF COCHABAMBA

Bolivian Indian type in the series of paintings by Caroline Van Evera which will be on exhibition in Stanley Field Hall throughout November.

ures, vegetable produce, and handicrafts, and the lively bustling spirit of occasion.

The collection was exhibited in Paris in 1950, but this is the first time it has been shown in its entirety in the United States.

The ancient Roman Empire is represented in the Museum by antiquities recovered from Pompeii and Boscoreale that were buried by the eruption of Vesuvius in A.D. 79. The exhibit is in Edward E. and Emma B. Ayer Hall (Hall 2).

GIFT OF OVER 7,000 SHELLS INCLUDES MANY RARITIES

By PATRICIA McAFEE
ASSOCIATE EDITOR

WHEN THE STORM subsides, the shore of Sanibel Island is left heavily sprinkled with numerous shells of great beauty. These shells—of many shapes, sizes, and colors—have lured collectors and visitors to this island off the west coast of Florida since the early 1900's.

Dr. Charles Webb Yarrington was not a shell collector when he and Mrs. Yarrington first visited Sanibel Island 15 or 20 years ago. They traveled there out of curiosity, but it was one of the days after a storm had just swept the island and the abundance of shells cast upon the beach inspired Dr. Yarrington to begin his collection.

This excellent collection, which he spent the remainder of his life amassing, was recently donated to Chicago Natural History Museum. In recognition of the gift, the Museum's Board of Trustees has posthumously elected Dr. Yarrington a Contributor to the Museum.

Dr. Yarrington was a doctor of medicine by profession. He graduated from the University of Michigan in 1902 and began practice as a company physician for the Calumet and Hecla Mining Company in Calumet, Michigan. He remained there for 10 years, leaving for Gary, Indiana in 1912 to become the first full-time school physician in Indiana and probably the first in the United States. The type of practice originated by Dr. Yarrington—the medical inspection of schools—has been widely adopted over the whole country. In 1914 he went into private practice and maintained it until his death in March, 1957.

CONCHOLOGY LABORATORY IN HOME

The late Dr. C. W. Yarrington of Gary, Indiana, inspecting one of the larger specimens of marine snails in his extensive collection, which has now been acquired by the Museum.

Dr. Yarrington was one of Gary's foremost doctors during his lifetime, and he was also one of Gary's foremost citizens. During his early career he was one of the first to promote a hospital for Gary; in later years he headed a drive to build Gary Memorial Auditorium. He served as president of the staffs of both Mercy and Methodist hospitals, and was president of Lake County Medical Association and Gary Rotary Club. His services were never of short duration—he was one of the 10 who signed the first Red Cross charter and he served in that organization for 40 years. He was a member of the Indiana Medical Association, the American Medical Association, and the American College of Surgeons. During World War I, he served as a captain, but was never called overseas because he was badly needed to battle a flu epidemic that had broken out in Gary.

It seems amazing that a man as successful and civic-minded as Dr. Yarrington would still have time to devote to a shell collection. Even more surprising than this, Dr. Yarrington maintained several other fine collections during his lifetime. He began collecting arrowheads and brass when he was but a boy on a farm in Norvall, Michigan. Later collections included brass, keys, and antique glass. None of these, however, reached the importance of his stamp collection and his shell collection.

SHELLS OF EXCEPTIONAL QUALITY

Many of the 7,000 to 8,000 shells in the collection were gathered by Dr. Yarrington himself, either in Florida or in Michigan and Indiana. The remainder were bought from dealers, particularly the late Walter F. Webb of St. Petersburg, Florida. The Yarrington Collection is composed chiefly of marine shells from medium to large size, which are of especially beautiful color, unusual form, or ornamentation. Most of them are over 2 inches in size, although the majority of marine shells existing are less than one-half inch in size. The collection will be particularly valuable for use in exhibits because of the size and outstanding quality of the specimens.

CHINESE WENTLE-TRAP

In the 1890's these three shells would have been worth several times their weight in gold. Because of this, counterfeits were often made of rice paste. By now, fishermen have found enough so that most amateur collectors possess at least one example.

Extensive and complete representations of groups of shells long prized by collectors are included in the Yarrington Collection. Murices, cones, volutes, cowries, olive shells, scallops, and spike shells are examples of this. Deep-water shells, which have been collected in small numbers only in recent years, also make up a notable part of the collection.

HERMIT CRAB IN CONCH SHELL

Many a collector has put an "empty" shell aside on a beach, only to have the hermit crab hidden inside scuttle off with the shell. The claws and head of the crab are heavily armored, but its soft belly must be protected from enemies by being backed into an empty snail shell.

In addition to the well represented groups of shells, certain specific shells have a rather unique history behind them, while others have an unusual appearance tending toward the bizarre. The *Scala pretiosa* or wentletrap are deep-water shells dredged off the coasts of China and Japan. Before 1900 they were among the rarest shells known and were sold by dealers for as much as $100 per shell. This was a lucrative sum, and man's deceit left not even shells uncounterfeited. Copies were made from rice paste and sold to dealers for the worth of the real shells. In later years the genuine shells have become more plentiful, and the imitations are now the rare items.

A type of shell exceedingly common 250,000,000 years ago was *Pleurotomaria*, commonly called the slit shell. At that time several hundred species existed, whereas today there are less than a dozen—evolution being responsible in this case for any change, and not man. The slit shell is no longer a shallow-water shell, as it once was, but

lives in deep water. It derives its common name from the slit at the bottom of the shell through which a tube protrudes enabling the animal to breathe as the water sweeps over its gills.

TENANT IN ANOTHER'S SHELL

The strange looking creature pictured in an accompanying illustration is not a new type of snail; it is a hermit crab that has moved into a conch shell after the death and decay of the animal which originally inhabited it. The hermit crab begins its life in a small shell and as it grows moves on to occupy a larger one. So we see that in the economy of the sea little is wasted. The living are provided housing by the natural deaths of other animals.

Because of their particular interest and fine quality, selected specimens from the Yarrington collection will be presented in a special exhibit, which will open to the public in December. The exhibit will be designed not only to display the rare beauty and unusual form of shells but to present biological facts about them and the animals that inhabit them.

SOUTHWEST CROSSROADS—

(*Continued from page 3*)

unbroken histories we know of—stretching back 10,000 to 12,000 years. Their remote ancestors had found the means of living on the desert partly by hunting but mostly by gathering wild plants—berries, nuts, roots, and the like.

Through many vicissitudes, migrations, upheavals and evolution—all of which we have traced and which are described in my forthcoming book *Digging Into History*—these people gradually converted their wandering way of life to a dynamic manner of living which embraced agriculture, town-dwelling and pottery-making.

About A.D. 1200–1300, they migrated from the Pine Lawn Reserve area in western New Mexico, for reasons as yet unclear, to eastern Arizona in the Springerville–Vernon–St. Johns area, located in the drainage of the Little Colorado River. We have closely followed their trail.

MORE SOPHISTICATED COMMUNITY

Here at the Davis site, we find our Mogollon Indians more sophisticated. They lived in a fair-sized town whose population may have been about 150 to 200 souls.

They retained many of their ancient culture traits—brown, smudged and red polished pottery, tools of stone and bone, and perhaps the same kind of mother-line inheritance and social organization.

But, in addition, as noted above, trade and contacts had greatly influenced many of the material aspects of their civilization. The pottery shows definite signs of experimentation with a glaze-point for decorative purposes. I say "experimentation" because some of it was well executed and some of it was not—a sign perhaps that the new glazing technique had not been brought under control.

They lived in rooms built on the surface of the ground, and the walls of these were stone masonry of a fair order. Some of the walls were undoubtedly about 6 feet high; while the two-story rooms were probably twice as high. The rooms were small, measuring about 6 by 12 feet. For roofs, they used large cedar beams, then branches and twigs cunningly interlaced so as to make a tight covering; and over this to make it all waterproof they plastered 6 to 8 inches of mud. In the center of each roof was the hatchway-entrance.

ADVANCES IN AGRICULTURE

The Mogollones grew crops of corn, beans and squash. Hunting was resorted to, certainly, for we find many animal bones; but primarily these chaps were farmers and good ones, too. Some of the corn cobs (charred) were found to be almost as slender as a thick lead pencil, and this fact leads us to wonder if drought was not present and if it was not, in fact, a prime cause of abandoning this site—maybe about A.D. 1450 or 1500—just a few years before the Spanish discovery of this very area. Cortez and his men probably marched within shouting distance of this town.

The living rooms were provided with well-built rectangular, slab-lined fire-pits. Smoke escaped through the hatchway. Many rooms were provided with a ventilating apparatus—the great grandfather of our air conditioning; and some rooms had special ventilators the like of which we had never seen before. Usually located in a corner, in the vicinity of the fire-pits, these may have served also as crude chimneys.

Clothing was scanty in summer; in winter it probably consisted of cotton kilts and ponchos and rabbit-fur blankets.

Transportation was entirely by shank's mare so that when a trading venture was dreamed up or when a big ceremony required attendance at a village miles away, walking got our Indians there. No horses, mules, or camels, no wagons or sleds. Just plain walking. Dogs were certainly present as pets and as a possible source of food in hard times; and turkeys may also have been partially domesticated, both for food and because turkey feathers were much admired in ceremonial headdress.

EVIDENCE OF RELIGION

Religion, although very different from ours, was important. It demonstrated an interest in the whys and hows of life and death and of the cosmos. Two chambers, especially built and spacious, were set aside for religious activities. These rooms are called kivas and they also served as clubhouses for men during winter months. The floor of one of our kivas was beautifully constructed of finely cut and neatly fitted sandstone slabs laid on a sacred foundation of golden river sand. In a niche in the wall of this kiva we retrieved a forgotten offering—a turquoise pendant, some stone beads and some dice.

During non-religious times men wove cotton blankets in the kiva. Specially constructed loom-holes were found in the kiva floor. It is assumed that the lower end of the loom was lashed to these (as in contemporary Hopi and Zuni kivas). The upper part was made fast to the wooden roof-beams.

What is the use of research into all this? There is no breathtaking answer. We may learn from the past. We are a part of the past and we cannot cut ourselves off from our heritage. But beyond this lies the curiosity that everyone has concerning something or other. If a person's curiosity is directed toward the past and to questions of how men met and conquered difficulties just like ours—then that in itself is the answer to why we investigate. Without this curiosity and knowledge concerning man's past adventures we would be like people without memory—vegetables and morons. With such knowledge, we can understand ourselves—we can realize our common humanity and we can perceive the potentialities that distinguish man from all other animals.

MOVIES FOR CHILDREN ON 5 SATURDAYS

Five more free programs of motion pictures for children will be given on Saturday mornings in November, completing the autumn series provided by the James Nelson and Anna Louise Raymond Foundation. The shows will be given at 10:30 A.M. in the James Simpson Theatre of the Museum. Following are the dates and titles:

November 1—The Great Adventure

The adventures of two children on a Swedish farm.

November 8—Where Mountains Float

Danish film showing Greenland, a primitive hunter's world, as seen by a 12-year old Eskimo boy

November 15—Alice in Wonderland

Disney color-movie

November 22—Winter Fun

Things to look for and things to do in the winter

Also a cartoon

November 29—Panama: Land of Contrast

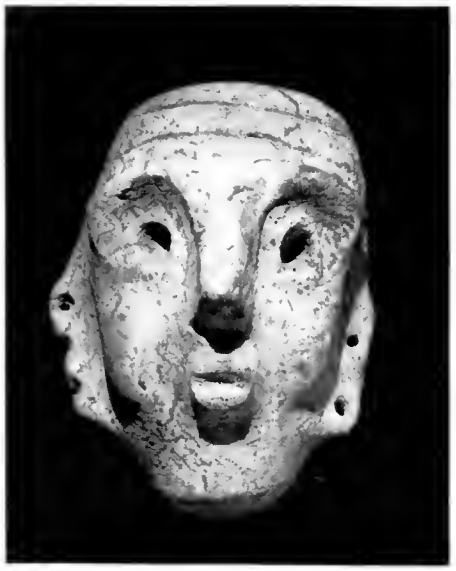
Murl Deusing, of Milwaukee Public Museum, will appear in person to tell the story of his film

Children are invited to come alone, in groups, or with parents or other adults. No tickets are needed.

MUSEUM AIDS IN CHICAGO AREA SALVAGE DIG

By ALLEN LISS and ELAINE BLUHM*

FOR MANY YEARS archaeologists at Chicago Natural History Museum have been interested in learning more about the prehistoric Indians who long ago inhabited the Chicago area. Much of the prehistoric record that can be obtained from former Indian villages and cemeteries is being destroyed by modern urban progress. The expanding city and towns, new shopping centers and



TOBACCO-PIPE BOWL

Made of stone, this item of smoking equipment carved in the form of a human face, was found in one of the excavated burials. It is not typical of Chicago area specimens.

factories, and more recently the transcontinental highways with their large-scale earth-moving operations destroy the prehistoric record.

In order to recover some information from these sites before they are completely destroyed, an archaeological salvage program was begun in Illinois through the Illinois Archaeological Survey several years ago. A number of state institutions participate in the survey, other institutions co-operate with it, and numerous individuals assist in various ways.

Not long ago, Theodore Shapas and David Pedric called the Anker Site to our attention. This prehistoric Indian village in the southern part of Cook County was being destroyed as new homes were built in the area, for the ancient dwelling place was situated on what is today a desirable location. In order to obtain more information from the site, the Museum and the University of Illinois agreed to co-operate with the Illinois Archeological Survey and carry out the salvage excavations.

Permission to excavate was obtained from Alfred Simpson of Simpson Home Developers, Inc., owners of the property. George A. Beemsterboer of Beemsterboer, Inc. provided a road grader which removed the top soil from the area and greatly facilitated our work. Then, with the assistance of a number of volunteers, the authors and Dr. J. F. Epstein of the University of Illinois began excavations. Although limited in time and extent, the "dig" proved most rewarding and much valuable information was obtained.

From our excavations we obtained many fragments of globular pottery vessels and tools, including small triangular arrow points of flint and others of deer antler, flint knives and scrapers, and bone awls. These artifacts closely resemble those found at the Hoxie Farm Site excavated several years ago (BULLETIN, February, 1956).

Throughout the village area we found the remains of firepits and storage pits utilized by the Indians. But perhaps the most important feature of the site was the discovery and excavation of a large house structure —the first found in the Chicago area. This building, rectangular in shape with rounded ends, was 55 feet long and 13 feet wide. It was indicated by the pattern of small postholes around the edge and larger holes in the center. The house is similar to both houses and ceremonial buildings found throughout northeastern United States, as far west as Wisconsin. We believe that at one time a framework of small saplings may have been covered by bark or matting and the house may have resembled the Winter House of the Indians of the Chicago Area, a reconstruction of which is shown in Mary D. Sturges Hall (Hall 5). This house is different from the smaller rectangular houses found in central and southern Illinois in sites occupied at this time, and it may indeed offer valuable information about the prehistory of Chicago.

PERCHING BIRD

This odd object was carved from a deer's antler. It was found in one of the Chicago area burials. The bird is three inches long, and with pedestal stands two and one half inches high.

There were two burial areas in the Anker village, and from Messrs. Shapas and Pedric we have obtained much information about the burial patterns and something of the religion and art of these people. The majority of the buried bodies were extended on their backs in oval pits, and many were accompanied by grave offerings. Skulls of mink, otter and bobcat were found in three graves. These may have been parts of medicine bags made of the skins of the animals from which the skulls were not removed. We know that these animals had ceremonial significance for the historic tribes in the Great Lakes area, and similar medicine bags are reported from modern Indian groups.

Associated with other burials were such items as a carved shell gorget in a mask shape, shell ear ornaments shaped somewhat like small mushrooms, and a small bird delicately carved out of antler, seated on a separate pedestal. Several pipes were also found at this site, including the disc type, elbow type, and effigy forms with human and animal heads.

The inhabitants of the Anker site probably lived a settled life, with farming the main source of food. The numerous animal and fish bones, identified by Dr. Paul Parmalee of the Illinois State Museum, suggest that their diet was supplemented by hunting and fishing. Based on what we know of present conditions under which animals such as deer, badger, beaver and bear now live, we believe that the environment faced by the Indians differed in no major way from present conditions. The Calumet and Little Calumet rivers also provided fish in quantity and clams seem to have played a part in the Indian diet. Traces of duck and other birds were also found.

These Indians were not only excellent craftsmen and industrious farmers, but also appear to have been traders. Three pottery vessels from the site may have come from the Mississippi River valley area to the south; the mask gorget and ear ornaments of marine shell are also of southern origin. In addition, catlinite was found which came from Minnesota, and copper was undoubtedly traded from the Upper Peninsula of Michigan.

On the basis of the material found at the site, we believe that A.D. 1400 to 1600 is a reasonable approximate date for the site. Although the laboratory and research work has just begun, we feel that the final study and analysis of these artifacts will add greatly to our knowledge of the Indian occupation of the Chicago area in the days before recorded history.

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* Mr. Liss is Custodian of Collections in the Museum's Department of Anthropology. Dr. Bluhm, formerly of the Museum staff, now is associated with the University of Illinois.

Former Museum Auditor Dies

With regret the personnel of the Museum learned of the death of Adelbert L. Stebbins, former Auditor, on October 18, at his home in Clearwater, Florida, to which he retired in 1955. Mr. Stebbins became a member of the Museum staff in 1931, serving in various capacities in the institution's business offices. He was elected Auditor in 1953.

ICHTHYOLOGIST RETURNS FROM OCEAN CRUISE

Loren P. Woods, Curator of Fishes, returned to the Museum on September 29 after participating in the 53rd exploratory fishing cruise of the *M/V Oregon* along the northeast coast of South America. The objective of this trip was to obtain more detailed information regarding the distribution of pink and brown shrimp which were observed over wide areas during *Oregon* cruise 47, in November, 1957. A total of 178 trawl drags were made during the 27-day cruise between Trinidad and Cayenne, French Guiana. The ship belongs to the U. S. Fish and Wildlife Service.

As is usual when trawling for shrimp, a great volume and variety of fishes and invertebrates are caught. The collection is made by selecting specimens from the mass of material available. This year an attempt was made to supplement the collections made in the same area in 1957 (BULLETIN, March, 1958) by preserving series of species that have been found to be undescribed and by making a more representative collection of the fishes living on the shrimp grounds than was possible during the former cruise which covered a much greater area.

STAFF NOTES

Alfred Lee Rowell, Dioramist in the Department of Anthropology, has taken up residence in Phoenix, Arizona, but will continue his work for the Museum there until his retirement in February, 1959. After that date, he will work for the Museum on a part-time basis. . . . **Allen Liss,** Custodian of Collections—Anthropology, attended the recent Midwest Archaeological Conference at Springfield, Illinois. He was elected a member of the board of directors of the Illinois Archeological Survey. . . . **Dr. Roland W. Force,** Curator of Oceanic Archaeology and Ethnology, was a recent guest speaker on the hour-long "Chicago Speaks" program on radio station WSEL-FM. He was interviewed about the notable Fuller Collection of Pacific ethnological material recently acquired by the Museum. . . . **Dr. Austin L. Rand,** Chief Curator of Zoology, and **Melvin A. Traylor,** Assistant Curator of Birds, attended the annual meeting of the American Ornithologists' Union in New York. Mr. Traylor remained in New York for two weeks of study of Angola birds in the American Museum of Natural History. . . . **John R. Millar,** Deputy Director, represented the Museum at a second conference of administrative officers of research museums of natural history held at the New York State Museum, Albany, October 13–14. The first conference, which he also attended, took place at the Philadelphia Academy of Sciences last May. Both meetings were supported by grants from the National Science Foundation, and were held to help determine the needs of institutions engaged in research in systematic biology. . . . **Miss Lillian A. Ross,** Associate Editor of Scientific Publications and Associate in the Division of Insects, attended the meetings of the American Institute of Biological Sciences in Bloomington, Indiana.

Archaeologists Survey Lake Superior Area

An archaeological survey of the coastal region of Lake Superior, on both the United States and Canadian sides, was recently made by George I. Quimby, Curator of North American Archaeology and Ethnology, accompanied by Winston Elting and James R. Getz. The areas investigated include the vicinity of Huron Mountain in northern Michigan, the Grand Portage area of northern Minnesota, and parts of Ontario as far east as the Pic River. Important collections were obtained in the vicinity of Pass Lake, Ontario, and the mouth of the Pic River. The earliest specimens brought back date from about 7000 B.C. and the latest at about A.D. 1700.

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: William H. Wehrmacher III, Morton Grove, Ill.—stone ax

Department of Botany

From: Frederick Bartlett, Chicago—2 specimens of naranjilla fruits, Ecuador; H. R. Bennett, Chicago—757 phanerogams, Illinois and Indiana; Dr. Gregorio Bondar, Bahia, Brazil—parts of palm; H. S. Dybas, Hazelcrest, Ill.—79 specimens of fungi; Archie F. Wilson, Summit, N. J.—type photo of herbarium specimen

Department of Geology

From: A. W. Forslev, Chicago—rock specimens, Wisconsin; Arthur M. Ritchie, Olympia, Wash.—specimen of fossil wood; Wheaton College, Wheaton, Ill.—fossil fish specimen, Bahia, Brazil

Department of Zoology

From: Bernard Benesh, Burrville, Tenn.—51 beetles, 122 bugs; Dr. Gregorio Bondar, Bahia, Brazil—40 paratypes of two species of weevils; Michael Duever, Chicago—2 snakes, Israel; W. E. Eigsti, Hastings, Neb. 3 lots of extoparasites; Dr. Glen M. Kohls, Hamilton, Mont.—5 ticks, Brownsville, Tex.; Arthur Loveridge, St. Helena, South Atlantic—8 frogs, a larval series and an egg mass of frogs; Milton Mahlberg, Rockford, Ill.—a land planarian; Dr. Jeanne S. Schwengel, Scarsdale, N. Y.—collection of cowrie shells; Dr. Eivind Sundt, Svartskog, Norway—46 featherwing beetles; A/1C Tom F. Whisnant, APO 231, New York—a frog, 5 lizards, 5 snakes, Libya; Estate of Dr. C. W. Yarrington, Gary, Ind.—collection of seashells, world-wide

RIO'S BOTANICAL GARDEN HONORS MUSEUM

The sesquicentennial of the establishment of the Botanical Garden of Rio de Janeiro (Jardim Botanico do Rio de Janeiro) was celebrated last June 13. On this occasion a commemorative medal was issued and Dr. P. Campos Porto, director of the Jardim Botanico, designated Chicago Natural History Museum and eleven other botanical institutions and individual botanists in this country as recipients of this medal in recognition of their services to Latin American botany.

Dr. George H. M. Lawrence, director of the L. H. Bailey Hortorium, Cornell University, was asked, through the State Department, to arrange the distribution and presentation of the medals to the designated recipients in this country, in further recognition of the centennial of the birth of the late Dr. Liberty Hyde Bailey.

Northwest Botanical Survey

Dr. John W. Thieret, Curator of Economic Botany, recently returned from a field trip devoted mainly to the study and collection of grasses in the northern Great Plains from northeast Wyoming to the Great Slave Lake region of Canada's Northwest Territories. He was accompanied by Chester E. Hansen, of Elmhurst, Illinois.

NEW MEMBERS

(September 16 to October 15)

Life Member

Herman Waldeck

Non-Resident Life Member

Charles Y. Freeman

Associate Members

Dr. Herbert K. Abrams, Mrs. Harry Bairstow, Jr., H. James Douglass, Stacy H. Hill, Mrs. Marjory A. Hillebrecht, Henry L. Kohn, Mrs. Fred A. Poor, Edward Robinson, John P. Suomela

Annual Members

Russell M. Baird, Meyer C. Balin, George Hugh Barnard, Stephen D. Barnett, David J. Barry, Herbert Barsy, Louis Baskin, Miss Margaret C. Baxter, Walter S. Bednarski, Dr. Carroll L. Birch, William B. Browder, Mrs. Edna W. Burgy, Rush C. Butler, Jr., Christian Christensen, Mrs. Agnes R. Eastwood, Curtiss E. Frank, Herbert L. Hart, Mrs. Louise Hayes, Robert Hirshberg, John C. Irvin, Lambert P. Karst, Dr. Francis A. Lagorio, Jr., Kenneth Laird, John H. Leslie, Bentley G. McCloud, Jr., Mrs. Mary McDougal, Fred H. Nesbett, Dr. Clarence B. Odell, James B. O'Shaughnessy, Admiral Francis P. Old, Moore W. Peregrine, Master Rutherford P. Rayfield, Miss Forsythe Render, Mrs. Evelyn Rochetto, J. F. Rosenthal, James E. Rutherford, Frederick O. Steadry, Frederick W. Straus, Sidney J. Sparberg, Jack Swan, James W. Tedrow, Dario L. Toffenetti, H. Stanley Wanzer, Miss Theresa M. Werner, Christopher W. Wilson, Jr., James C. Worthy, Paul L. Mullaney

5 MORE FILM-LECTURES IN ADULT SERIES

Five travel lectures, illustrated with color motion-pictures, remain to be given on Saturday afternoons in November to conclude the 110th series presented by the Edward E. Ayer Lecture Foundation Fund. They are to be given in the James Simpson Theatre of the Museum, and all will begin at 2:30 P.M.

Following are the dates, subjects and speakers for the remaining lectures:

November 1—Rocky Mountain Rambles
Emerson Scott

November 8—North to the Polar Seas
Arthur C. Twomey

November 15—The New Guatemala
James Metcalf

November 22—Sumatra
Robert Leighton

November 29—Panama: Land of Contrast
Murl Deusing

No tickets are necessary for these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two seats on request. Reservations should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 P.M. on the lecture day.

IT'S TIME TO SUBMIT NATURE PHOTOS

Photographs of animals, of plants, of scenery, and other manifestations of nature, are all eligible as entries in the Fourteenth Annual Chicago International Exhibition of Nature Photography. The deadline for receipt of prints and slides is January 17. The show, under the joint sponsorship of the Chicago Nature Camera Club and the Museum, will be held in Stanley Field Hall from February 7 to 27 inclusive. Public showings of color transparencies by means of projectors will be offered on two Sunday afternoons, February 8 and 15 at 2:30 P.M. in the James Simpson Theatre of the Museum.

A panel of five judges has been appointed to select from the thousands of expected entries several hundred for exhibition, and to award medals and ribbons to the best of these. Those named to the panel are: Anne Pilger Dewey, photographer, Hon. P.S.A., F.P.S.A.; Dr. Roland W. Force, Curator of Oceanic Archaeology and Ethnology of the Museum; N. J. Schmidt, photographer; Edward T. Triner, biology teacher and naturalist, and William D. Turnbull, Assistant Curator of Fossil Mammals at the Museum.

Entry forms and full information may be obtained by prospective competitors on request to the Museum.

Exhibit of 'Kenya Gems'

A special exhibit of an improved variety of "Kenya Gems," a synthetic mineral simulating diamond, will be on view November 24 to December 12 inclusive in H. N. Higinbotham Hall of Gems and Jewels (Hall 31). The cut stones to be shown weigh 52 and 38 carats. Natural diamonds of these sizes might have a price of $100,000 or more. The new Kenya gem boules are produced from strontium titanate. They have the fire and luster of real diamonds, but do not equal the genuine stones in hardness.

Autumn Journey for Children

"Plants the Indians Used" is the title of the autumn Museum Journey for children. Boys and girls may take this trip any day until November 30, using instructions and questionnaires furnished at the Museum entrances. Those completing this and three other Journeys on different subjects qualify as Museum Travelers; for eight Journeys they receive Museum Adventurer awards, and for twelve they become Museum Explorers.

AUDUBON SCREEN-TOUR OF NEW ZEALAND

"Kiwi Commonwealth," a color-film and lecture about New Zealand, will be the second in the series of Sunday lectures presented in the James Simpson Theatre of the Museum by the Illinois Audubon Society. It will be given on November 16 at 2:30 P.M. by Patricia Bailey Witherspoon. The film is a record of exploration made by Mrs. Witherspoon and her father, Dr. Alfred M. Bailey, director of the Denver Museum. Among the features are a visit to Cape Kidnappers, named by Captain James Cook after trouble with the Maoris; the famous colony of gannets; the "living fossil" reptiles of Cook Strait islands; Mount Cook and the great Tasman glacier; forests of tree ferns, and in contrast to the wildlife, the modern cities of this British commonwealth. The film is especially rich in studies of the country's unique bird life, including the wingless kiwis.

Seats in the reserved section of the Theatre are available to Members of the Museum as well as members of the Illinois Audubon Society, on presentation of membership card of either organization.

SENATOR INVESTIGATES HISTORY OF POPCORN

Photo courtesy of The Popcorn Institute

Pre-Inca popcorn poppers (the round pottery utensils with holes in the top and jutting handles, on table in illustration) from the Museum's archaeological collections, were used in the celebration of the Popcorn Fall Festival in the week of October 25 to dramatize popcorn as an ancient Indian heritage. The Peruvian corn poppers are about 1,500 years old.

In the photograph (left to right) are Chief Whirling Thunder of the Winnebago, Pat Backes, a Chicago-dwelling Winnebago girl selected as the "Indian Popcorn Princess," and U. S. Senator Paul H. Douglas of Illinois. The senator was present because he is sponsor of a congressional resolution to make the golden corn tassel the national floral emblem of the United States.

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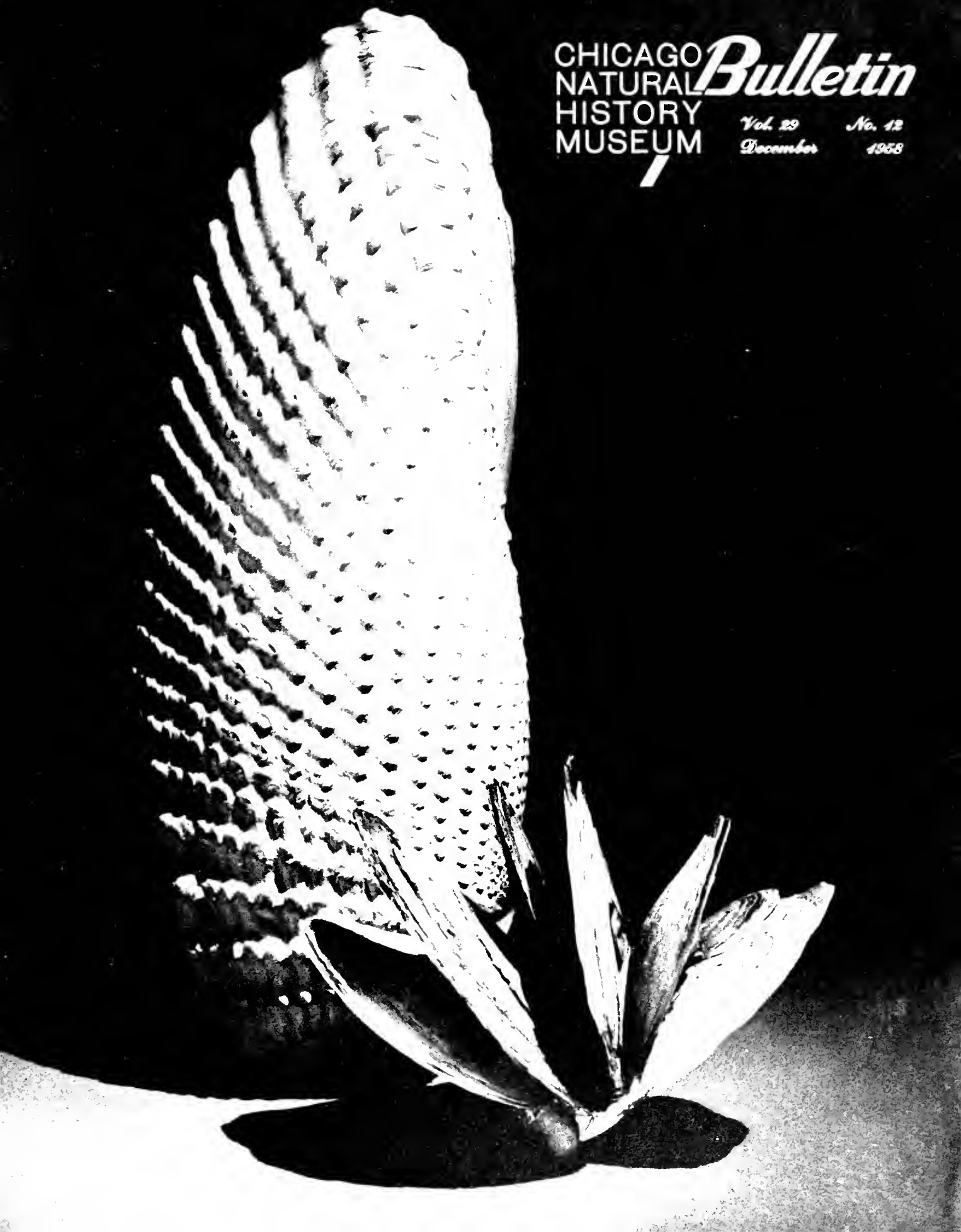

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THE BULLETIN

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

ALBERT W. HARRIS
1867–1958

The Museum lost one of its truly great friends and most generous benefactors by the death on November 9 of Albert Wadsworth Harris, famed as the dean of Chicago's banking fraternity. He was 91 years of age.

Albert W. Harris

As a monument to Mr. Harris, as well as to his father, the late Norman Wait Harris, there stands a most important department of the Museum, the N. W. Harris Public School Extension. This foundation brings natural history exhibits from the Museum directly into practically every school—public, parochial, private and special—in Chicago, thus reaching more than half a million children on a biweekly schedule throughout each school year. Thus authentic scientific material of great variety, all presented in attractive forms with constant changes of subjects, is supplied for use in classrooms. This Museum service is regarded by educators as one of the most valuable of supplements to the regular curricula. The foundation for this purpose had been established by the elder Harris in 1911 with an initial endowment of $250,000, and this sum has been more than doubled by the accumulated contributions Mr. Albert Harris and other members of the Harris family have made during the course of many years.

Mr. Harris served as a Trustee of the Museum from 1920 to 1941, and as Third Vice-President from 1933 to 1941. His contributions to this institution have assured the continuance in perpetuity of his name on the roll of Museum Benefactors, a special honor accorded to those whose gifts total $100,000 or more. Mr. Harris was also an Honorary Member and a Life Member. During his 22 years as a Trustee, Mr. Harris took a very active part in the deliberations of the Board, and contributed valuable counsel in connection with the policies of the Museum. Personal considerations made it necessary for him to retire from his trusteeship and vice-presidency in 1941, but his interest in the progress of the Museum was sustained in the years that followed.

Mr. Harris was one of Chicago's most prominent figures in banking, and a sage and respected authority on both local and national business and economic conditions. He was noted for many philanthropies, and played an active role in a broad range of civic affairs. He was as well-known for his part in promoting the interests of youth through the Chicago Boys Clubs, and for his aid to welfare in general through the Chicago Community Trust, as he was for his noteworthy career with the Harris Trust and Savings Bank, whose staff he joined in 1888. In the bank, he began at an early age in a minor capacity, and was required to work his way up to the top rungs through application to details and merit in his work, without regard to his close family relationship. After many years as vice-president, president, and chairman of the board, he retired from the bank in 1943.

Martin C. Marx Dies

With regret the Museum notes the death on October 31 of Martin C. Marx, a member of the guard force since 1955.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

Specimens of the huge whale shark and of the devilfish, which is the largest of the rays, are exhibited in the Hall of Fishes (Hall 0).

THIS MONTH'S COVER

Selected shells from the recently acquired collection of Dr. Charles Webb Yarrington are featured in a special exhibit to be shown in Stanley Field Hall December 1–January 31 (see page 3). The clump of flat tree oysters (Isognomon alata) on our cover is a common sight in Florida waters. This clam attaches itself in groups to surf-swept rocks or pilings, and the sharp edge of the shell slices through the sweep of the water. The tall angel wing (Barnea costata) dominating the photograph is pure white with occasionally a faint pink line. The shell is often seen on Florida beaches, but the animal lives buried in one or two feet of black sticky mud. Collecting living specimens is extremely hard and dirty work.

ORCHID FOR AN ARTIST

A tea was given in the Museum on November 4 to honor Miss Caroline Van Evera, artist of Greenwich, Connecticut, whose portraits of Central and South American Indians formed a special exhibit during November.

The photograph above shows Miss Van Evera on this occasion with Dr. Donald Collier, Curator of South American Archaeology and Ethnology, after he had presented her with an orchid. Among the guests who welcomed Miss Van Evera were: Winston Elting, president of the American Society of Contemporary Art; Prof. Sol Tax, chairman of the department of anthropology of the University of Chicago, and Mrs. Tax; Mrs. Ruth Butler of the Newberry Library; Mrs. Hermon Dunlap Smith and Mrs. Ralph Milman of Lake Forest; Florence Arquin and Frances Foy, both well-known Chicago artists; Dr. Clifford C. Gregg, Director of the Museum; Dr. Paul S. Martin, Chief Curator of Anthropology, and other members of the anthropology staff.

SHELL EXHIBIT FEATURES LITTLE-KNOWN INHABITANTS

By ALAN SOLEM
ASSISTANT CURATOR OF LOWER INVERTEBRATES

THE CURRENT special exhibit in Stanley Field Hall, featuring shells from the C. W. Yarrington collection (November BULLETIN), was started by a casual remark which grew beyond any expectations into four display cases.

In early June I learned that the collection of shells formed by the late Dr. C. W. Yarrington of Gary, Indiana, would be donated to the Museum in the fall. In arranging the details of the donation, I suggested that it might be well to make a temporary exhibition of some of these fine specimens. Since many people vacation in Florida during the winter months, and Florida is the best American "breeding ground" for shell collectors, the months of December and January were picked for the special exhibit.

In the 1800's, shell collecting was an extremely popular hobby. Many popular books and articles were published about shells and even in the 1890's nearly every home had a few large, polished shells on the fireplace mantle. But fashions change, and from about 1900 to World War II shells and shell collecting were relegated to the attic. The late 1930's saw a slight increase in interest, which World War II swelled to a torrent. Thousands of GI's visited foreign beaches and sent shells back to friends and relatives. In many cases the interest aroused by these gifts caused a permanent case of "collectoritis" which is often transmitted to acquaintances in short order.*

Today there are at least fourteen different clubs of shell collectors loosely affiliated with a national organization that holds annual conventions. Thousands of shell collectors in this country and abroad exchange shells with one another and buy specimens from more than 50 different dealers, not to mention the more than 600 Florida shops which sell shells to tourists.

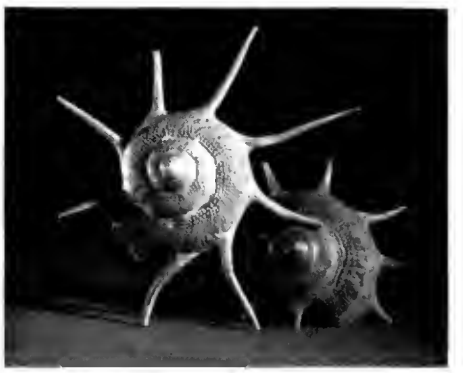
Thus, great interest exists in shells, and it was apparent that an exhibit devoted to stimulating this interest would be timely and worthwhile. But just what should go into the exhibit, and how?

A NEW SLANT

Individual shells have great beauty, and with proper lighting and positioning rate as art objects (see photographs). But shells are only part of a living animal and this is a *natural history* museum. Every museum in the country has some shells on display, either in scientific order with one or two kinds of each family (as in our Hall N) or else as decorative displays of pretty shells.

No museum features the shell as being part of a living organism, or shows adequately the range of variation which is found within single species or families of mollusks. The animals of marine shells, often with completely different coloration, are as attractive as the shells themselves. Our exhibit would thus be slanted towards variation in mollusks and trying to emphasize that a shell is part of a living animal.

With the co-operation of the Department of Botany, Samuel H. Grove, Jr., Artist-Preparator in botany was assigned to the task. He designed the exhibit and transformed my ideas and scientific information into attractive displays. After seeing the collection in Gary, we roughed out a general plan and received permission to prepare the exhibit in its present form.



STAR SHELLS

The deep-sea shells of the genus Guildfordia are named star shells because of their long projecting spines. This genus is one of many kinds of mollusks which have developed lung spines, the function of which is unknown.

Primarily oriented to the amateur collector are three small flat-topped cases which show cone, spike, harp, scallop, rock, and volute shells. The scallops and rock shells are presented simply as masses of variation in color and form, but the rest are accompanied by at least one model of the living animal and labels which emphasize the shell as part of that animal and not just an object in a case.

ROCK SHELL AND HAIRY TRITON

Posed in this fashion, the spiny Murex cornutum and the striped Cymatium pileare look like curious and playful animals. In life, the Murex lies hidden in rock crevices and the Triton's color is buried under a brown, hairy epidermal layer.

Making the models was quite a problem. There are thousands of books and articles on sea shells. Very few mention the animal that inhabits the shell and only a small portion of the latter attempt to illustrate the entire organism in a natural position. As a guide to the color and form of molluscan animals found in the South Pacific, we had to refer to a French exploring expedition report which was published in 1832. Nothing more modern was available.

With only these illustrations to depend upon, the models sculptured by Joseph B. Krstolich, Artist in Zoology, and painted by Marion Pahl, Staff Illustrator, represent a great accomplishment.

MANY ASPECTS ILLUSTRATED

The major exhibition case has a corner devoted to the shell collector, showing the difference between beach-worn samples, the shell taken fresh from the sea, and the latter after being carefully cleaned by the collector. Most of the case attempts to develop general ideas about mollusks. One section shows growth in one species, which is less than one-fourth of an inch at hatching and can attain a length of nearly two feet. Another area presents variation in the cowries. Still another section demonstrates the extreme variations to which the shells of mollusks have been subjected during evolution, all of which conform to basic mathematical formulae.

These, and several other sections try to impress people that shells were once part of an animal that was born, grew, ate, reproduced, and eventually died. One area even shows what often happens to shells after the death of the animal.

Come and see this exhibit that we proclaim to be different!

Nature Photo Contest Deadline Near

Only a short time remains in which to submit entries, both prints and color slides, for consideration in the Fourteenth Annual Chicago International Exhibition of Nature Photography. The final day for receipt of entries at the Museum is January 17, at which time the contest will close, and the judges will begin their task of selection, and awarding medals and ribbons. The show of prints, under the joint sponsorship of the Chicago Nature Camera Club and the Museum, will be held in Stanley Field Hall February 7 to 27; color transparencies will be presented by projection on the screen of the James Simpson Theatre on two Sunday afternoons, February 8 and 15, at 2:30 P.M.

The contest is limited to photographs of animal life, plant life, scenery, and other manifestations of nature. Prospective competitors may obtain entry forms and full information by request to the Museum.

Museum memberships make good Christmas gifts.

*Shells sent by an uncle in the Ses-Bees led to my becoming a zoologist. A. S.

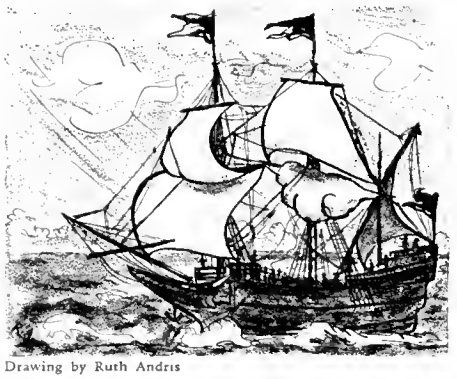
The 'Good Old Days' . . .

WHEN ALL EXPLORERS HAD TO BE TOUGH

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

SOMETIMES as we leaf over an old book and admire the accomplishments and discoveries of the giants of former times, we sigh for the good old days. Those were days when a traveler couldn't fly to the center of Africa and be met with a jeep to take him to his air-conditioned hotel—when he wouldn't be met by newspaper reporters, magazine writers, and radio commentators. Those were days when there were blank places on the map, and whole faunas were unknown.

But the good old days were not all good. The blank areas on maps and unknown animals to be found, it is true, were challenges to the exploring naturalist, but there were



Drawing by Ruth Andris

drawbacks. Travel was by boat, by canoe, camel, oxcart, or on foot—accompanied by native porters; picturesque perhaps, but always slow and often uncomfortable. There were tropical diseases and no adequate medicine to combat them. Sometimes the local people were actively hostile, and food supplies sometimes were scant.

The actual hazards of tropical exploration in the good old days are pointed up by history of bird exploration in central Africa in its first hundred years, from 1800 to 1900. There are fifty naturalists listed as taking part, and of these fifty, six died there, about one in every eight. This does not include the non-naturalists who accompanied the parties. For instance, not only naturalist John Cranch, but also many of his comrades perished from the fevers of the Lower Congo in the very early days. While fever claimed some, others died violent deaths, as did Edouard Schnitzer—better known as Emin Pasha, one-time governor of the then "Aequatorial Africa"—who was murdered by Arabs in 1892. Boyd Alexander, known for his West African bird work, took part in the relief of Kumassi in 1900 with the Gold Coast Constabulary, and crossed from the Niger to the Nile in 1904–07 losing both of his white companians, his brother Claud, and Captain G. B. Gosling. Finally, in 1910, he too was shot by a native lad northeast of Lake Chad.

Accustomed as we are in these days to violence reported in the sensational press, the stark simplicity and understatements of some of the early narratives strike us with strong impact.

The 18th century African traveler, James Bruce of Kinnaird, when sketching Roman ruins near Tunis for a few days wrote that the only annoyance to which he was exposed was an attack by a tribe of plundering Arabs—and left it at that. A few lines farther along he told of accompanying a *haj* or pilgrim caravan on the way to Mecca, and of being attacked by Arab horsemen who were repulsed with considerable difficulty. Shortly afterwards, fleeing from pestilence and plundering on the north African coast, he embarked on a Greek ship loaded with starving passengers. Commanded by an inept captain, the ship struck a rock outside the harbor, sunk, and many of the passengers were drowned. But Bruce managed to swim ashore. Lying exhausted and insensible on the sand, he was roused from his stupor by a blow on the head from a lance in the hands of an Arab. The Arabs, mistaking him for a Turk, stripped him and treated him very badly (Arabs detest Turks, it is explained) until they found he was a Christian physician. And Bruce had as yet barely started on his trip that via the Red Sea took him to the "coy fountains," which are the headwaters of the Blue Nile in Abyssinia, and until then had been unvisited by any white man.

In these days of airplane travel, to turn back to early sailing ships is a contrast indeed. Pierre Poivre's name is familiar to me from his work in collecting birds of Madagascar and the Philippines. Trained in France for a missionary career, he started out in 1741 for Canton and Cochinchina where he was to stay four years. Then he started home on a French ship. It was attacked and captured in the Strait of Bangka by a British ship of war, in which attack Poivre lost an arm and all his diaries and drawings (he collected no bird specimens on this trip). The prize ship was sold to the Dutch in Batavia. Despite many delays, Poivre made his way on various ships over a circuitous route to France. First he went to Mergui (kingdom of Siam), then Pondicherry (India), Isle de France (Reunion), Angola, Martinique in the West Indies, and finally France. The Dutch boat on which he made the last lap of his journey was twice captured in the English Channel, once by the French, and once by the British. He arrived home in 1748, having set out in 1741 for a four-year stay in the Orient.

On Poivre's next trip, begun in 1748, and made in connection with the spice trade, he at one time waited two years in Manila for a boat to take him to the Spice Islands (the Moluccas). This delay enabled Poivre to draw and collect birds in the Philippines—he had learned to skin birds since his first trip in 1741. On his return trip, a delay of several months during a season of contrary winds at Madagascar enabled him to do pioneer bird work there. In 1756, the day before Christmas, in sight of the European coast, the ship on which he traveled was captured by a British ship and towed into Cork. Not until April 22, 1757, did he reach France with his bird specimens and drawings. Delays, there had been aplenty, but it was these very delays that made possible important bird work. At least 79 new bird species were described from Poivre's specimens and drawings.

An incident that from its very casualness is an excellent example of an earlier attitude toward time and travel comes from Charles J. Andersson, who went out to Walvisch Bay in Southwest Africa in 1850 to collect natural history specimens, and spent the rest of his life there. He traveled on foot, by riding oxen, and by wagon. Once, having reached Lake Ngami, north of the Kalahari Desert (which had just been made known to the civilized world by Dr. David Livingstone), he amassed large collections of natural history specimens and a considerable quantity of ivory, but stood in need of a wagon to transport them to Cape Town (a distance, air line, of nearly 1,000 miles). With a single attendant he set off for Namaqualand (Walvisch Bay was only about 500 miles away) to procure one of these vehicles. "It was a hurried journey of four months' duration . . ."

Andersson had his troubles, too, from time to time. There were always burning heat and extreme thirst, worn-out draft oxen, and attacks by lions and natives. In one attack his knee was shattered by a Namaqua musket ball. One night, watching at a waterhole, he escaped from an elephant that stood over him, had his thigh ripped open by a black rhinoceros' horn, and narrowly escaped from another rhino. On another occasion he escaped from a wounded, charging lion that misjudged its leap and jumped clear over him. Yet again, weak from fever, and coming to country untraversable owing to lack of water, he learned the Ovampo tribe (after whom Ovampoland is named) was planning to attack him. The "situation about the middle of November was critical." But a friend of his, Frederick Green, traveling to the east, heard of the Ovampo's "evil designs," and set out all but alone to help or avenge his friend, whichever would be appropriate when he arrived. Green arrived in time to help, and after a five-day march "through a fearful desert" with "little to satisfy hunger or thirst," they reached the safety of Green's camp "without accident of any kind."

It was naturalists such as these who made known the animals of the far parts of the world. When we sigh for the good old days, we should also take off our hats to the giant figures who lived then and did the pioneering.

MYSTERY GEM-STONE, 312 POUNDS, SHOWN IN NEW NICHE

By HARRY CHANGNON
CURATOR OF EXHIBITS—GEOLOGY

ONE OF THE LARGEST known masses of the semi-precious stone lapis lazuli was recently reinstalled in the new Hall of Minerals (Clarence Buckingham Hall—Hall 35). It is displayed in one of the wall niches designed for larger and uncommon specimens. It is a 312-pound rectangular block, 2 feet long, 14 inches wide, and 9 inches deep. The entire block is lapis lazuli of gem quality.

Did the ancient Incas of Peru transport this enormous block of lapis-lazuli, now on exhibition in the Museum, across 600 miles of rugged terrain? (This, and the other sketches accompanying Curator Changnon's article, were made by Maidi Wiebe, Artist in the Department of Geology.)

It was found in an Inca grave in Peru along with other artifacts that, presumably, had been in the possession of the interred owner. Mystery surrounds the origin of this enormous block of gemstone. No deposits of gem quality lapis lazuli are known in Peru. The nearest known deposits are more than 600 miles to the south, in Chile. Did the Incas transport the great block of stone overland through hundreds of miles of rugged mountain country?

In medieval times, lapis lazuli was the most highly esteemed of all blue stones. In the 11th century, Marbrodus wrote:

"Opaque of color which excludes the eye
By Nature with superior honors graced,
As gem of gems above all others placed."

The Romans, Greeks and Hebrews called it sapphire, a name now ascribed to varieties of the mineral corundum. In ancient times, it was esteemed a sovereign remedy for numerous ills and believed to be a potent charm to avert many evils. Until the latter part of the 19th century it also had a very important technical application as a pigment. It was the only fine blue pigment known, and was highly prized by artists as a source of ultramarine blue, which is now chemically produced at a much lower price.

The Incas of Peru, according to experts on the subject, rarely made use of lapis for fashioning beads or mosaics. They used about twelve different colors to decorate their pottery, but never blue. They evidently had little or no knowledge of the art of manufacturing an inorganic ultramarine blue pigment from finely crushed lapis lazuli. Blue colors, made from organic (vegetable) dyes, though not common in everyday dress, do appear as decorative colors in cloth used for ceremonial dress. Did the color have a religious meaning that barred more common usage? What significance then would a 312-pound block of blue stone have to the original owner with whom it was buried? He might have had a religious attachment to this object, or it could be that deep azure blue evoked a superstitious feeling of good or evil in him. He might even have known how beautifully it could be carved. Certainly a 312-pound stone did not follow a man to his grave unless there was some reason for it.

Was it transported from Chile? Such a possibility is somewhat remote. No blocks of lapis lazuli of this size have ever been reported from Chile. The quality and color of this stone are also far superior to the Chilean lapis, and the percentages of constituent minerals are also quite different.

It cannot be ruled out that somewhere in the rugged mountainous terrain of Peru there may be a deposit of gem quality lapis lazuli that was known to the Incas but never revealed to the conquering Spaniards—so well hidden from the invaders that it remains undiscovered to the present day.

Were the original plans for carving this huge rock of gem material thwarted by death?

Lapis lazuli is not a mineral but a metamorphic rock. It most commonly occurs in contact metamorphic deposits at or near the line of contact, where limestones were intruded and altered by ascending igneous rocks.

The stone is composed chiefly of a blue mineral, hauynite (also known as lazurite),

Could it be that the deep azure blue of the giant lapis lazuli evoked in the Incas a superstitious belief that the rock had power for good or evil?

with relatively smaller amounts of the white mineral, calcite; a brassy-yellow mineral, pyrite; and traces of other minerals such as diopside, muscovite mica, etc. Its beauty lies wholly in the blue mineral, and the degree of beauty is dependent upon the amount of this mineral in the stone. Calcite is commonly present as small veins or blotches in the blue background. The pyrite, when present, occurs as tiny brassy-yellow flecks sprinkled throughout the mass.

Lapis lazuli has been found in quantity in only a few places in the world. The oldest and most famous mines are situated in Badakshan in the northeast corner of Afghanistan on the upper reaches of the river Oxus. These mines have been known for over 6,000 years and were visited and described in A.D. 1271 by the celebrated Venetian traveler Marco Polo. There is little doubt that all the lapis lazuli of the ancients really came from this source, although various other localities in Tibet and Persia have been named; the latter were probably only the markets. Descriptions of such occurrences are always vague and no exact localities are given. The lapis lazuli from which the ancient Egyptian scarabs

(*Continued on page 7, column 2*)

CLASSIC ART OF VERACRUZ COAST EXHIBITED

By DONALD COLLIER
CURATOR OF SOUTH AMERICAN ARCHAEOLOGY AND ETHNOLOGY

A NEW EXHIBIT called "Tajin and Related Cultures" has been installed recently in Hall 8 (Ancient and Modern Indians of Mexico and Central America). Included in the display are pottery vessels and sculptures in stone and clay made by the peoples of central and southern Veracruz during the Classic Stage, A.D. 200–900.

A characteristic feature of the classic art of the Mexican Gulf Coast is a complex of superbly carved stones of problematical use.

Priest wearing a palma and "axhead" attached to a heavy belt. From a carved frieze in the great ball court at Tajin. Drawing by Gustaf Dalstrom, Artist in the Museum's Department of Anthropology.

They are carved with conventionalized human or animal forms and elaborate scroll patterns. These strange and beautiful objects fall into four general classes: yokes, palmas or palmate stones, "axheads" or thin stone heads, and padlock stones. The yokes are U-shaped stones, the size and shape of horse collars, covered with fine carving depicting human faces, rain-god masks, serpents, or toads. The palmas are tall, graceful, paddle-shaped stones with concave bases. They are carved to represent men or animals or are ornamented with abstract scrolls. The misnamed "axheads" are thin or rounded human heads in profile, finely carved of hard stone and often with a tenon at the back for mounting. The padlock stones are eccentrically shaped objects with cutout openings and knobby projections. Some look as if they had been designed to fit into a Rube Goldberg machine and others are like modern abstract sculpture.

STONE 'AXHEAD,' THIN TYPE

In the past, this stone complex and the art style of which it is a part were called Totonac because the Totonacs were living in this region at the time of the Spanish conquest. But the stone complex extends beyond the known range of the Totonacs and there is no proof that they were the creators of this art. At present, archaeologists call it the Tajin style, after one of the most important Classic sites in Veracruz, or simply the Classic Veracruz style.

There has been much speculation about the purpose of yokes, palmas and "axheads." It has been suggested that they were made for burial with the dead or that they were mounted in decorative rows on the terraces or cornices of temples. The most probable theory, which has been elaborated by Dr. Gordon Ekholm of the American Museum of Natural History, is that these objects were used in connection with the ceremonial ball game called *tlachtli* by the Aztecs. This game, which was a combination of soccer and basketball, was played with a solid rubber ball 10 inches in diameter in an elaborate, stone-walled court with T-shaped ends. The goals were stone rings projecting vertically from the side walls. The players could not touch the ball with their hands but struck it with their forearms, hips or knees. For protection against the heavy ball they wore wide belts of wood, basketry or leather, leather pads on arms and knees, and sometimes helmets. This game was of great ceremonial importance among the Aztecs and Toltecs, the Zapotecs, the people of the Gulf Coast, and the Mayas.

STONE PALMA
The specimen is 22 inches in height

The evidence connecting yokes, palmas and "axheads" with the ball game comes from clay figurines and from stone carvings on the markers and walls of Maya and Tajin ball courts. These figurines and carvings depict ball players wearing heavy, yoke-like belts, often elaborately carved like the stone yokes. Some of these players have palmate objects attached to the front of their belts, and heads resembling the stone "axheads" attached to the back of their belts or to their wrists. The theory is that the stone yokes, palmas and "axheads" were ceremonial replicas of paraphernalia actually worn in the ball game. These replicas may have been worn by priests in ceremonies connected with the game. They seem too heavy to have been worn during the contest.

DAVIS FLIES TO ORIENT ON SCIENCE PROJECTS

D. Dwight Davis, Curator of Vertebrate Anatomy at Chicago Natural History Museum, left Chicago on November 23 for Singapore, where he will participate in a Centenary Science Congress to be held at the University of Malaya December 2–9. The congress will commemorate the studies of Charles Darwin and Alfred Russel Wallace that culminated in the publication of Darwin's *Origin of Species* in 1859. Wallace's studies, which led him independently to the same conclusions that Darwin had reached, were made in the Malayan area—Borneo, Sumatra, Java, and other nearby islands.

Davis flew first to Japan to consult with biologists at the University of Tokyo. Then he flew to Bangkok for consultation with Siamese biologists, before proceeding to Singapore.

Following the science congress, Davis and J. R. Hendrickson, of the University of Malaya, will spend about six weeks in the dense tropical rain-forest north of Singapore. Until very recently most of this territory was closed to travel because of the activities of Communist guerillas. One of the areas where the scientists plan to work was cleared of guerillas only within the past two months.

Davis and Hendrickson will collect specimens and data on the mammals, reptiles, amphibians, insects, and mollusks of the tropical rain-forest for Chicago Natural History Museum and the University of Malaya. The work is being financed in part by a grant from the National Science Foundation.

For the Birds . . .

YULE TREES TO DELIGHT FEATHERED GOURMETS

HERE'S SOMETHING for the birds in a non-satiric sense—a deal that has a sound humane purpose and also solves what is a household problem for many families: how to remove painlessly the needle-shedding Christmas tree after the holidays over the protests of youngsters who would like to keep it all year.

The answer: re-erect the tree outdoors, laden with food tidbits which will attract the birds, and will alleviate their hard struggle to find sufficient food during the winter months.

DEMONSTRATION AT MUSEUM

The suggestion comes from the staff of the Museum's Raymond Foundation. During December, the Raymond Foundation will exhibit in the Museum a Christmas tree especially trimmed with food for the birds. Mrs. Ellen Miller, a Raymond lecturer, will demonstrate for groups of children and their mothers the best ways of preparing the tree for this purpose, and will furnish recipes of dishes that will please the palates of birds in the same way that a dinner at Antoine's in New Orleans pleases people. Here is a sample Miller recipe for a treat for the birds:

SUET CAKE. Ingredients:

1 pound of *beef* suet (it must be *beef* suet, Mrs. Miller insists)
2 cups of mixed bird seed
½ cup of cornmeal
1 jar (12 oz.) of peanut butter (the *crunchy* kind)
1 cup of raisins

Melt the suet over a low heat. When it is all melted, blend in the peanut butter, then add the other ingredients and mix well. It can be frozen or refrigerated if you don't want to use it all right away. (And there's no harm in you or the children tasting it yourselves, if you care to.)

SOME FANCY TOUCHES

Strict etiquette for entertaining birds at Christmas calls for some finesse in serving, too, Mrs. Miller indicates. She suggests that the suet cake be placed in dainty paper cups attached to the tree with pipe cleaners or string. If you have the soul of a French pastry chef, you may want to make it even more decorative by placing it in colorful empty half-shells of oranges and grapefruit. For serving hors d'oeuvres of peanut butter, Mrs. Miller says the accepted thing is to spoon it into attractive pine cones, and tie them to the tree. Other recommended delicacies for hanging on the tree are pieces of apple; strings of cranberries, raisins, grapes and popcorn; cookies, doughnuts and stale bread; and paper cups of nuts.

If display is no object, Mrs. Miller points out that pieces of plain suet tied to the trunk and peanut butter merely smeared on branches of the tree will be found equally appetizing by the birds.

Mrs. Miller also offers the following further suggestions:

1. Be sure that the tree is *lashed* or *tied* to something steady. Wind will blow it over if it is in an ordinary indoor stand, and dogs or cats might knock it over.
2. Put the food near a perch. Except for hummingbirds, most birds can't keep flying and eat at the same time.
3. Don't be discouraged if no birds visit your tree the first day. They will want to make sure that it is safe.
4. Birds need food all winter long. It is hard for birds to find food in cold weather, and once you have started to feed them you should go on feeding them until spring.

WHAT BIRDS WILL COME?

If you live right in the middle of Chicago, most of the birds that come to your tree will be starlings and English sparrows.

In the suburbs, or in residential areas with more trees and gardens, you may have cardinals and bluejays visit you, and probably downy woodpeckers. Some robins and mourning doves stay here through the winter, so you might see them. You will probably see juncos, and, if you are very lucky, chickadees, creepers and nuthatches.

MYSTERY GEM-STONE—

(*Continued from page 5*)

were cut is also thought to have been obtained in Afghanistan. Many of the world's finest lapis lazuli carvings now in the crown jewels of European countries, and the fabulous gem collections of the old rulers of the Near East and Asia were fashioned of material from the Badakshan mines.

These mines are located in a contact metamorphic zone where granites intrude white and black limestones of the Badakshan region. The lapis lazuli obtained is a dark indigo blue with imbedded tiny silvery pyrite flecks daintily distributed throughout the stone. Small quantities of good quality gem material, brought from Afghanistan by nomad traders, continue to filter into the markets of the Near East and command extremely high prices.

Another group of lapis lazuli mines is situated at the western end of Lake Baikal in Siberia. These mines are known to have been worked since the early 19th century. The production has been small, and the material obtained is inferior in quality to that of the Badakshan mines. The color ranges from fine azure blue to violet and green. When available, the material from these mines may be bought at a price somewhat lower than that asked for material from Afghanistan.

The gem mines of Burma and India have produced small quantities of lapis lazuli from time to time, but little or no gem quality material appears to be available at the present time.

In the Western Hemisphere the main source of gem lapis lazuli is from the mines of Coquimbo province in Chile and also farther north, near Antofagasta. The material from these localities is, in the main, pale blue in color, often tinged with green, and disfigured by white patches of calcite. Nevertheless, because of the scarcity of lapis lazuli in this part of the world the best gem quality of this material is sold at about $200 per pound, which is about one-half the price quoted for material from the marts of the Near East.

In the United States the only notable locality for gem quality lapis lazuli is in San Bernardino County, California. The material obtained has a good azure blue color but is very limited in quantity.

The introduction and popularity of plastics, glass and other artificial substances as settings for costume jewelry caused a slump in the demand for most semi-precious stones during the early part of the 20th century. Lapis lazuli, because of its scarcity and high price, became a collector's item. Today there is renewed interest in semi-precious stones because of the demands of thousands of amateur collectors ("rock hounds") and lapidary clubs, and lapis lazuli is to be had only at fabulous prices. Cut and polished pieces are sold at a price far above that of pure gold.

The Museum's huge block of lapis, which has been polished on one face since it was acquired by the Museum, weighs 706,000 carats. If present day market prices of cut and polished stones were applied to such an enormous specimen, it would be worth about $400,000 but practical economics reduces the estimated value to about $10,000.

Cut and polished specimens of lapis lazuli from Afghanistan, Siberia and Chile are on exhibition in the Hall of Gems (H. N. Higinbotham Hall—Hall 31).

Semi-precious varieties of blue minerals commonly sold as substitutes for lapis, such as sodalite, dumortierite, diopside, and azurite, may be seen in Hall 35.

Boys and Girls of 4-H Clubs Coming for Museum Tours

Continuing a custom of many years' standing, the 37th National 4-H Club Congress will send groups numbering approximately 1,300 boy and girl delegates to the Museum for tours on December 2. The young people, who come from rural areas of all parts of the United States and some foreign countries as well, are selected in recognition of achievements in their local areas, and sent to Chicago to attend both the 4-H Congress and the annual International Livestock Exposition. The boys and girls, about equally divided, will be assisted in finding the Museum exhibits of most interest to them by Museum staff members.

CHILDREN TO MEET BIRDS ON NEXT 'JOURNEY'

"Chicago—Winter Resort for Birds" will be the next Museum Journey presented by the Raymond Foundation. The winter Journey will give children the opporunity to learn about birds that migrate from the north to feed upon the fish in Lake Michigan, and birds that remain here throughout the cold months searching for enough food to keep alive. Boys and girls will also discover how to adopt these birds as "winter pets" and keep them from starving by setting out the proper food.

Children may take the Journey any day in December, January, or February during regular visiting hours. Instructions and questionnaires, which will direct them to habitat groups and other exhibits of birds, are available at either the north or south entrance to the Museum. The successful completion of four different Journeys enables a child to become a Museum Traveler, and eight different Journeys entitle him to an award as a Museum Adventurer. After twelve successful Journeys he may become a Museum Explorer.

AUTUMN 'GRADUATING CLASS'

The most recent group of boys and girls to win their awards as Museum Travelers by completing four journeys, with John R. Millar, Deputy Director (in rear center).

NEW MEMBERS

(October 16 to November 14)

Life Members

Hyman Bolotin, Mrs. C. Pardee Erdmann, David K. Sengstack

Non-Resident Life Member

Fred W. Strassheim

Associate Members

James Ross Abrams, Edward L. Barsumian, Ralph W. Davis, G. H. Edwards, Daggett Harvey, Marshall M. Holleb, Nathan J. Kaplan, Mrs. K. K. Lilien, Albert J. Lindar, Howard Linn, Allen C. Michaels, C. G. Newton, Mrs. Gilbert H. Osgood, John S. Reed, Lester C. Rogers, Dr. William A. Smallberg

Sustaining Members

Fred W. Fairman, Jr., Dr. William H. Wehrmacher

Annual Members

Martin Addis, Corliss D. Anderson, Stanley I. Auerbach, William T. Bacon, Jr., Edward H. Baker, Jr., Joseph Barbera, George E. Barnes, A. R. Basile, Edwin R. Bates, Arthur W. Baum, Dr. Anthony Belickas, J. Delos Bell, Dr. Alfredo Bellizzi, Jason Ernest Bellows, Alex M. Berk, Dr. Edward Berkwits, Dr. M. Bernauer, Dr. Max M. Bernstein, Dr. William P. Betz, Dr. Morris Binder, Dr. Arnold Black, Mrs. Nelson L. Buck, Mrs. Dulcie Evans Burns, Hugh Campbell, Mrs. LeRoy T. Carlson, Mrs. Olen R. Clements, John S. Coulson, Orville G. Daily, Robert W. Donigan, James P. Feeley, James F. Hayes, Samuel Hirsch, Howard G. Hokenson, Chauncey K. Hutchins, Anthony C. Karlos, A. T. Kearney, Mrs. Florence K. Meier, T. Clifford Noonan, Stephen Parshall, Wade R. Ringenberg, George S. Read, Joseph Schallmoser, Mrs. I. Spencer, Jacob Trom, Richard Uslander, Philip A. Weinman, John G. White

Museum Will Not Be Open Christmas or New Year's

In accordance with its custom, the Museum will be closed on Christmas and New Year's day, to permit all of its employees to enjoy the holidays with their families.

AUDUBON SCREEN-TOUR ON JANUARY 4

The Illinois Audubon Society's series of screen-tours does not include an offering in December, but the schedule will be resumed early in January. Charles Mohr, of the National Audubon Society, will appear on Sunday afternoon, January 4, at 2:30 P.M. in James Simpson Theatre of the Museum to narrate the story accompanying his color motion picture, "Outdoor Almanac." This film, consists of intimate studies of the lives of small animals.

The Illinois Audubon Society invites Members of the Museum, as well as the general public to its meeting and luncheon in the cafeteria preceding the lecture.

STAFF NOTES

Dr. Theodor Just, Chief Curator of Botany, conducted a seminar on "The Dawn of Life" last month at St. Louis University. At the jubilee in St. Louis of the Palaeontological Society he participated in the symposium on "Fifty Years of American Paleontology" with a paper, "Paleobotany, 1908–58." . . . **Albert W. Forslev,** Associate Curator of Mineralogy and Petrology, who has been consulted by police on several murder cases, presented a paper on X-ray diffraction and spectographic techniques in forensic problems at the homicide workshop held recently in the Museum by the Society of Forensic Pathologists. . . . **Dr. Paul S. Martin,** Chief Curator of Anthropology, **Dr. Roland W. Force,** Curator of Oceanic Archaeology and Ethnology, and **Phillip H. Lewis,** Assistant Curator of Primitive Art, attended the annual meeting of the American Anthropological Association in Washington, D.C. Mr. Lewis presented a paper on New Ireland art. . . . **Bertram G. Woodland,** Associate Curator of Economic Geology, attended the recent meetings of the Geological Society of America in St. Louis. . . . **Dr. Rainer Zangerl,** Curator of Fossil Reptiles, attended a meeting of the board of directors of the American Geological Institute in St. Louis. He also attended a joint meeting of the Society of Vertebrate Paleontology and the Society for the Study of Evolution in Ann Arbor, Michigan, where he was accompanied by **Dr. Robert H. Denison,** Curator of Fossil Fishes, and **David Techter,** Assistant in Fossil Vertebrates. Dr. Zangerl and Dr. Denison read papers. . . . **André Mitecki** has been appointed Cataloguer in the Library. . . . **Dr. Robert F. Inger,** Curator of Amphibians and Reptiles, attended the recent symposium on systematics at the Missouri Botanical Garden in St. Louis, and participated in a symposium on vertebrate speciation at the University of Texas in Austin. . . . **Loren P. Woods,** Curator of Fishes, joined members of the Shedd Aquarium staff on a collecting trip on the Mississippi.

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