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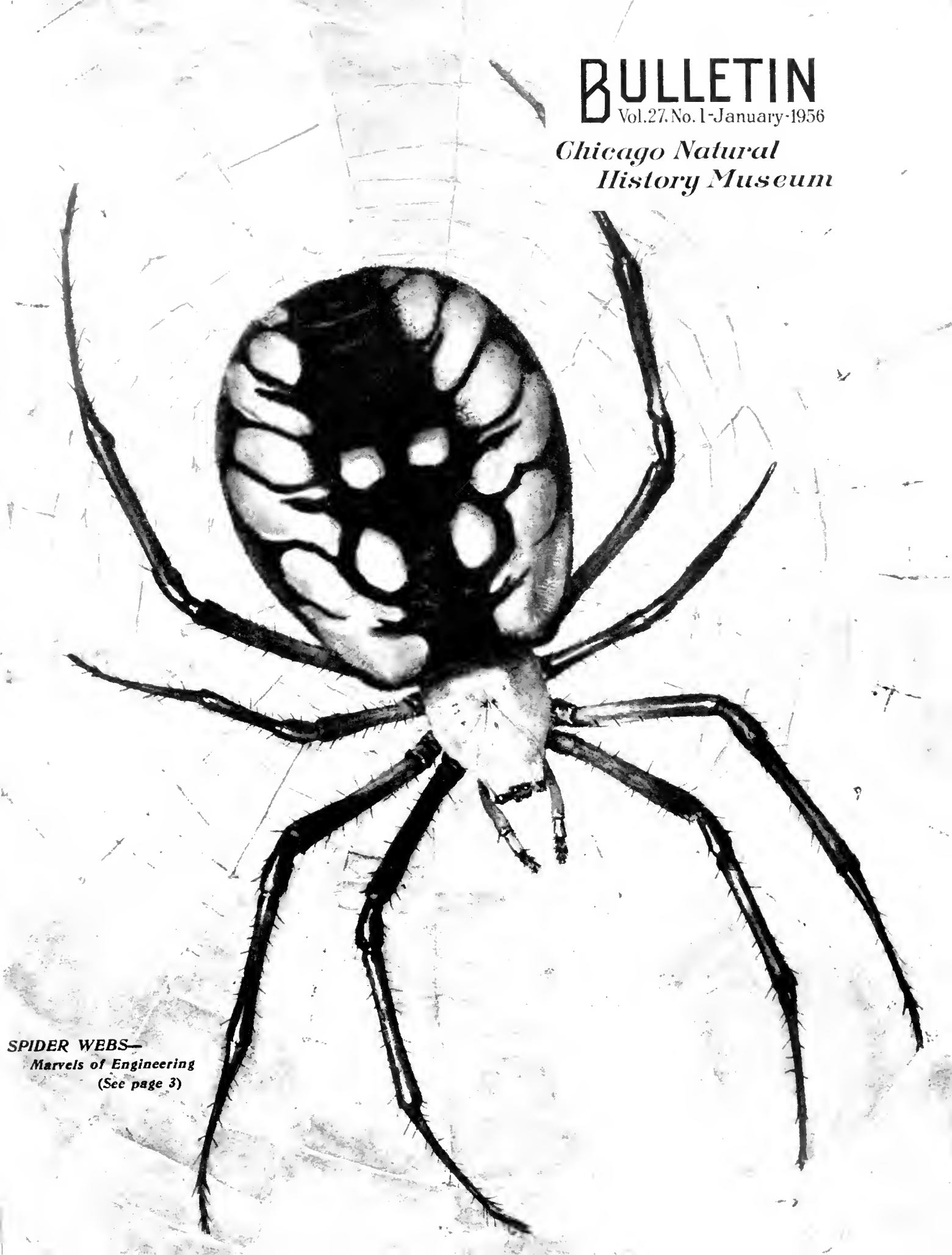

SPIDER WEBS—
Marvels of Engineering
(See page 3)

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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COLIN C. SANBORN, MAMMALOGIST, RETIRES

Colin Campbell Sanborn, a member of the staff of the Department of Zoology since 1922 and Curator of Mammals since 1937, retired from the service of the Museum effective December 31. Because of ill health, Mr. Sanborn will come under the provisions of the Museum's Pension Plan a number of years in advance of normal retirement age.

Colin C. Sanborn

Mr. Sanborn began his career at the Museum at the age of twenty-five as a field collector. He immediately was dispatched to Chile as a member of the Captain Marshall Field Expedition (1922–24), and his talents as a skillful collector were subsequently employed on the Captain Marshall Field Expedition to Brazil (1926–27), the Magellanic Expedition (to Peru, Chile, Argentina, Bolivia, 1939–40), two expeditions to Peru (1941–42 and 1946), the Rush Watkins Zoological Expedition to Siam (1949), the Aleutian Zoological Expedition (1952), and the National Science Foundation Trinidad Field Trip (1954). His explorations in Peru have qualified him as an authority on the zoogeography of that country.

Mr. Sanborn was awarded a fellowship by the John Simon Guggenheim Memorial Foundation for a special research project on bats in 1938–39, during which he made notable studies of collections in the British Museum (Natural History) and in principal museums on the European continent. Mr. Sanborn's interest originally was in ornithology, but early in his association with the Museum it turned to mammals. In recent years he specialized assiduously in bats and built up for the Museum what may be the finest collection in existence. He has contributed twenty-two publications to the zoological series published by the Museum (Fieldiana) and fifty-six scientific papers to mammalogical journals. He also has written popular leaflets published by the Museum and articles for laymen that have appeared in the Museum BULLETIN.

During World War II Mr. Sanborn was commissioned in the Navy as lieutenant and then as lieutenant-commander. He was assigned to special duties in Peru and at Pearl Harbor, Washington, D.C., and New York.

THREE STAFF MEMBERS ARE PROMOTED

Effective January 1, Philip Hershkovitz has been appointed Curator of Mammals. Mr. Hershkovitz was a student at the University of Pittsburgh and the University of Michigan, earning both bachelor's and master's degrees in science at the latter. He joined the Museum staff in 1947 as Assistant Curator of Mammals, and in 1954 he was appointed Associate Curator of Mammals. For nearly four years (1947–52) he conducted the Zoological Expedition to Colombia, one of the longest continuous collecting undertakings in the history of the Museum, and brought back thousands of specimens providing a highly varied representation of the country's fauna. Before coming to this Museum, he collected for several years in Ecuador and Colombia for the University of Michigan Museum of Zoology and the Smithsonian Institution.

Mrs. M. Eileen Rocourt has been appointed Associate Librarian. She joined the staff as Assistant Librarian in 1948. Before coming here, she worked in Columbia University Libraries, on the staff of *Magazine Digest*, and as a translator of five European languages. She is a graduate (B.A.) of Victoria College, University of Toronto, and earned a master of arts degree at Columbia University. In the Museum Library she has been engaged in very important cataloguing and classification tasks.

Miss Jane Rockwell, Assistant in Public Relations since the beginning of 1955, has been promoted to Associate Public Relations Counsel. She has been a frequent contributor of feature articles to the BULLETIN as well as active in the Museum's relations with all types of publicity media—newspapers and press services, magazines, radio and television. She is a graduate (B.A.) of the University of Nebraska and was a postgraduate student at New York University.

THIS MONTH'S COVER

The spider in the unusual enlarged portrait on our cover is the female of the common garden spider, sometimes called "yellow garden spider" or "orange garden spider." The web it weaves is a marvelous engineering feat, as can be learned in a perusal of the details told by Lillian A. Ross, Associate in the Museum's Division of Insects, in her article on page 3. This spider is harmless, for although it may bite and inject poison into a human intruder, it seldom does, and its poison is not dangerous to people. The picture, by Frederick E. Seyfarth, is reproduced here by courtesy of Row, Peterson and Company, publishers, of Evanston, Illinois, by whom it is copyrighted.

Audubon Lecture on January 8

"Rocky Mountain Rambles" is the screen-tour to be presented by the Illinois Audubon Society in the James Simpson Theatre of the Museum on Sunday afternoon, January 8, at 2:30 o'clock. The lecturer, W. Emerson Scott, an authority on the natural history of the Rockies, is well-known for the excellence of his color motion-pictures. Seats in the reserved section of the auditorium are free to Members of the Museum and of the Illinois Audubon Society upon presentation of their membership cards.

Next lecture in the Audubon series, "The Long Flight Back," will be given by Robert P. Allen on March 18.

Technical Publications

The following technical publications were issued recently by the Museum:

Fieldiana: Botany, Vol. 24, Part II. *Flora of Guatemala. Part II: Grasses of Guatemala.* By Jason R. Swallen. *Bamboos.* By F. A. McClure. November 10, 1955. 390 pages, 113 illustrations. $6.

Fieldiana: Zoology, Vol. 34, No. 32. *A New Species of Chondria with a Key to the Bornean Species (Coleoptera: Endomychidae).* By H. F. Strohecker. November 10, 1955. 2 pages. 10c.

Fieldiana: Zoology, Vol. 34, No. 33. *Three New Bulbuls from Africa (Class Aves).* By Austin L. Rand. November 10, 1955. 4 pages. 10c.

SPIDER'S WEB: ENGINEERING FEAT AND ART CREATION

By LILLIAN A. ROSS
ASSOCIATE, INSECTS

ARACHNE was the name of a mythological Lydian princess who was famous for her exquisite spinning. She became so proud of her work that she challenged Athena, the Goddess of Weaving, to a contest. Athena accepted the challenge, but Arachne produced such beautiful tapestry that the jealous goddess destroyed the weaving and changed the princess into a spider, condemned to spin forever. From the unfortunate maiden's name is derived the scientific name for spiders and their kin —Arachnida.

This ancient fable is proof of man's long-time knowledge of the symmetry and beauty

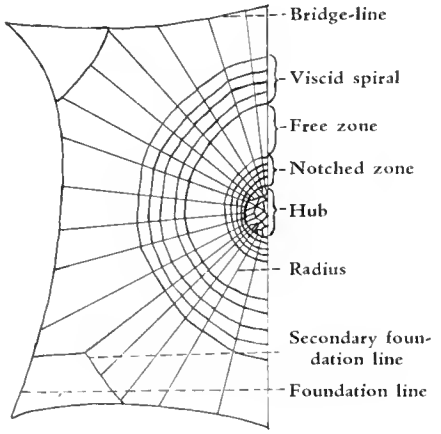


DIAGRAM OF AN ORB WEB

of the webs spun by spiders. In the course of evolution, spiders have developed glands that produce a remarkable substance—their silk—and have adapted it to manifold uses. From it they make cocoons to protect their eggs and young. It forms for them a home, a shelter, a weapon to use in capturing their food, a protection from the winter cold, and a bridal veil that is woven in courtship. One of the most beautiful of their webs is the so-called orb, which is built by one group of spiders, the "orb-weavers," who take their name from their work. This circular silken web is both a home and a trap. It is often woven across a path because currents of air blow down that path, bringing the insects that are the prized food of the builder and inhabitant of the web. This builder is often hard to find, for it is a timid and wary creature.

AN ENGINEERING MARVEL

One of the familiar orb web spinners in the Chicago area is the yellow garden spider (*Argiope aurantia*). During July and August the Museum receives many inquiries about the large and brilliantly colored female, whose web is described in this article.

The construction of the web is a remarkable feat of engineering skill. First of all, a silken framework must be provided, for the web will blow in the wind and rigid supports will not withstand the resulting stresses. So the spider raises her spinnerets (her silk-producers) in the direction of the wind and emits a thread that blows through the air until it adheres to some object—a branch, a leaf, or perhaps a post. Then she runs along the silk to the point of adherence, where she pulls the thread until it is tight and then fastens it. To and fro she runs on the line, adding another thread on each trip, until she is sure that this bridge-line (*see drawing*) is strong enough to serve its purpose. Then she adds the other foundation lines until she has completed a frame, whose corners she then strengthens by adding supports (secondary foundation lines). Now she must build the radii. So back to the middle of the bridge-line she goes, dropping a thread (a diameter) to the bottom of the frame, where she fastens it. Then she runs up this line to a point bisecting it, where the middle of the web will be, and there she fastens another radius. As she spins out the silk for this one, she runs back up the first one, holding the thread free with her hind leg. At the top she moves along the bridge-line and fastens the new thread. She may even place it at a right angle to the first one by the simple expedient of running across the bridge-line and down the side of the foundation to the desired point, there pulling the radius tight and fastening it. Additional radii are built in a similar fashion, until the orb has been filled. Usually they are put in alternately on opposite sides of the web. Apparently the spider decides on the place for the next radius by checking the tension at the center of the orb. The radii are seldom equidistant, but the stress on each is the same.

Now she strengthens all the radii by placing a few turns of spiral thread around the point where they intersect (the hub). As the line crosses each radius the spider fastens the two together for a short distance, so that the spiral line will be firmly attached. This thread forms the notched zone. Then she goes to the outer margin of the web, spinning another spiral thread as she goes. This spiral is a temporary structure that is intended to hold the radii in place during the subsequent spinning.

THE FINAL PRODUCT

The important job is now at hand—the part for which all the other work has been a basis. The spider now produces a sticky thread and weaves it in another spiral. She begins at the outer edge of the web and goes around and around, spinning the viscid thread as she goes. The first lines may be short ones that fill in the corners of the web or they may be loops near the bottom that swing only part of the way around the circle; but after two or three of these have been made, she goes continuously around the web, attaching the thread to each radius. She may spin clockwise or counterclockwise. As she goes, she takes out the temporary spiral. Small silken remnants of it are often seen in the finished web. This sticky thread is a dry silk line evenly coated with a viscous film, but as she spins out the thread she alternately tightens and releases it so that the viscid coating forms round droplets. In weaving the spiral the spider first attaches the viscid thread to a radius and then grasps it with the claws of her hind leg as she swings across to the next radius. She usually leaves an open space between the spiral thread and the notched zone.

Her work now finished, the spider returns to the center of the web. Treatment of the center varies with different species of orb-builders but the spider whose web-building has been described above usually covers the center with a sheet of silk and adds zigzag bands called stabilimenta that probably strengthen and stabilize the web. This spider hangs head down across the hub of the finished web, holding the silk with her claws. The web is, of course, a trap. As the great French naturalist, Fabre, said: "What

'WON'T YOU STEP INTO MY PARLOR?'
A grasshopper, to his eternal sorrow, has fallen for an old line.

a work of art, just to catch a mess of flies." If an insect accidentally becomes entangled in the threads, the spider responds to the vibrations by running to the victim. A small intruder is quickly swathed in a bit of

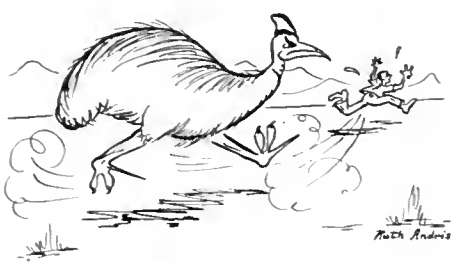
(*Continued on page 5, column 1*)

DANGEROUS BIRDS

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

FANS of our feathered friends wouldn't like it, but the fact remains: Some birds can be dangerous to human beings—they have caused damage and even death through physical violence. I don't want to be an alarmist, and I want to state emphatically that most birds are harmless.

One day when a woman called me about birds that were nesting on a branch over her back door and I diagnosed them as robins, she wanted more information. These birds swept down at her children, she said. Was there a chance they would do the children harm? Of course I told her no. The possibility is so remote that one can almost



completely disregard it. The same is true of most of our garden birds. A pair of grackles caused some alarm among our non-ornithological Museum workers by "dive-bombing" anyone who walked a certain path near the Museum. But as soon as everyone realized that the birds were defending their nearby nest and were not demented, the apprehension ceased.

The screech owl is a little different. It makes its nest in a hole in a tree, and with a spacious suburban or rural garden you can hope to attract a pair by putting up a nest box. The owls may catch a few songbirds as well as insects and mice, but to me the mellow whistled trill or whining of the screech owl and the sight of these birds sitting upright or swooping from branch to branch is ample recompense for the other songsters they eat.

MASKS FOR SAFETY

If its larger cousin, the great-horned owl, is sometimes called the tiger of the woods, A. C. Bent, well-known ornithologist, says the screech owl, scarcely larger than a robin, should be called the wildcat, for it unhesitatingly attacks birds larger than itself. Ordinarily inoffensive at the nest, there are records of its actively resenting intrusion. One of the most extreme cases was recorded by William Brewster, famous bird authority, as happening in Concord. The owls raised their brood near a house, and when people passed the owls' nesting place in the evening, the owls swooped down. Repeatedly people were struck on head and face, and the owls drew blood. This happened so often that people wore hoods or baseball masks when they went out in the evening.

The great-horned owl is a magnificent creature, about two feet long, with long sharp talons. The tiger of the woodland feeds not only on rabbits and the like but also on such unsavory characters as skunks and such tough customers as alley cats that have run wild.

When a person climbs to the owls' nest, which may be in an old crow's nest or on a ledge, the parent owls may sensibly flee and content themselves with hooting in the distance or clicking their mandibles together in anger. But now and then one finds a bolder pair, birds that won't give up without a struggle. Bent himself, climbing to a nest, had a great-horned owl give him a stunning blow behind the ear that knocked his hat a hundred feet away and gave him two ugly scalp-wounds. Deciding he wanted neither to be scalped nor knocked senseless to the ground, he retreated, leaving the owls the masters of the situation.

SWANS BEAT INTRUDERS

Many a farm lad has been run off by a gander. The swans that sail about so stately in the ponds in our parks and eat the bread thrown them can vent their displeasure at intrusions into their family life by beating the intruder with their wings. And this they can do vigorously enough to be dangerous to children.

The whooping crane is perhaps best known for being almost extinct, as the dodo is best known for being completely extinct. When the swamp and prairies of the West and Midwest were turned into wheatfields and pastures, there was no room left for this tall, shy bird. Ernest Thompson Seton, the naturalist-artist, tells a story much discussed in his early days in Manitoba when there were still whooping cranes to be hunted. A young Indian near Portage la Prairie went gunning for wild fowl in the spring. He crippled a white crane, and when he went up to the crane it struck its long, strong bill through the Indian's eye into his brain, killing him. Of course there were no witnesses, but searchers found the corpses of both man and bird and read the story from them.

The celebrated English nature photographer, Eric Hoskins, is minus the sight of one eye from an encounter at a nest of a tawny owl, a relative of our barred owl, which he was photographing in Wales. While Hoskins was reaching up to move a piece of his blind, the tawny owl swooped and hooked a talon into his eye. Despite his companion driving him at once to a hospital, some two hundred miles away, Hoskins lost the sight of his eye.

The cassowary of New Guinea is an ostrich-like bird that may weigh up to 90 pounds. Its inner toe is equipped with a stout, straight claw about three inches long, a claw that is such an effective weap that when some people kill a cassowa they save these claws to use in tippi their arrows. When I shot my first ca sowary my native guide told me to a proach it with care, as a kick from a cri pled bird could be dangerous. They al told me that New Guinea villagers som times raised these birds, which becar ill-tempered with age, and that the kick these tame birds could be serious.

MAN KILLED BY CASSOWARY

Tom Gilliard, of the American Museu of Natural History, wrote of actually seei in northeast New Guinea a tame cassowar which had killed one old man and injur two other people, make an attack on a fourt Having been released from its pen to photographed, the bird suddenly turne ran, jumped a fence, and, coming up a native woman carrying a bag of swe potatoes, struck her twice and then co tinued running. One blow had drive a claw an inch into her abdomen; the oth had cut her right upper arm to the bone.

When I was in North New Guinea I ha a chance to see how a cassowary attack In a stockade I had a freshly caught you cassowary about eighteen inches high ar a newly taken cuscus, or opossum. The were going round and round the stockad in opposite directions. Naturally, on eac circle they met twice. And for a long tin every encounter was the same: the cusc went right ahead and the cassowary jumpe up, striking with both feet, and fell over o its side. I formed a poor opinion of the ca sowary's mentality from seeing how lon the bird took to learn that this method handling a cuscus was not very satisfa tory.

Don't think that these are every-da occurrences. They're not. They're excep tions. But keep in mind that birds wit equipment to protect themselves may us it. However, don't drive the screech ow from your garden just because they migh scratch you if you disturb their nest, ar more than you would get rid of the famil tabby just because it might scratch you you pulled its tail. And don't both a cassowary any more than you woul molest a "tame" bear.

Dictionaries with three-dimensional illus trations in the form of actual specimens – that's what, in effect, the systematic exhibi of mammals in Hall 15 and of birds i Boardman Conover Hall (Hall 21) provid Study of these exhibits is an easy way t become familiar with animal characteristic

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How much do you know about the foo you eat? A survey of the food plants of th world and their products is presented b the exhibits in Hall 25.

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. Requests for such service must be made at least one week in advance.

SPIDER'S WEB—

(*Continued from page 3*)

silk. It may be bitten and consumed at once or trussed up in swathing bands and attached to the center of the web, there to await dinnertime. Larger prey may be handled more cautiously.

If the web entraps a more formidable victim than the inhabitant can handle, she may drop out of the web to the ground or other convenient hiding place. In so doing she always drops head first, spinning a thread of silk as she falls. This is the so-called dragline, and on it she climbs to her home again when the danger has passed. If the prey is large but manageable the spider is merely very cautious: a quick bite, a retreat to safety, another quick bite .... When the venom has taken some effect, so that the victim is merely struggling rather feebly, it is turned around and around and wrapped in wide bands of silk so that it is completely covered. If it is large enough it may furnish sufficient food to satisfy the spider for many days.

REMARKABLE STRENGTH

Spider silk is an albuminoid protein of remarkable strength and elasticity. It is produced by several types of glands and emitted through the spinnerets, which usually lie at the end of the spider's abdomen. Its tensile strength is said to be second only to that of fused quartz and its elasticity is so great that it can be stretched one-fifth of its length. The two varieties of silk differ in these qualities; the viscid silk, for example, is much more elastic and less strong than the other type. Its elasticity, no doubt, is an adjustment to its function, as the spiral thread must yield to greater impacts than the other type. The finest single threads of silk are only about one-millionth of an inch in thickness.

Silk is produced by all spiders, although they are not all equally dependent on it. But they have put it to many and varied uses and it has probably been largely responsible for their survival over many millions of years.

Like a scene from Biblical history is the restoration of a gateway of the ancient city of Kish to be seen in Hall K.

4-H CLUBS PRESENT MERIT AWARD TO MUSEUM

Each year the Museum is host to more than a thousand 4-H Club delegates, boys and girls sent to Chicago from farms all over the United States and Canada. In recognition of the institution's thirty-five years of support, the National Congress of 4-H Clubs recently presented the Museum with the 4-H Club Donor Merit Award. Above, Stanley Field (center right), President of the Museum, accepts the award from G. L. Noble, Director of the 4-H Club Nationa Committee on Boys and Girls Club Work. Others in the group are Kenneth H. Anderson, Associate Director of the 4-H National Committee (extreme left), and Dr. Clifford C. Gregg, Director of the Museum (extreme right). During the National 4-H Club Congress in November, hundreds of club members were taken on special tours of the Museum.

MUSEUM AMBASSADRESS TOURS N.Y. STATE

The story of the natural sciences, and in particular of Chicago Natural History Museum's role in the field, will be told to some 125 high school and "prep" school student groups throughout New York state on a three-month lecture tour by Miss Harriet Smith of the Raymond Foundation staff, beginning early in January. As on a previous tour in 1951–52, Miss Smith will be on leave from her duties at the Museum to fulfill this "on-loan" engagement to the School Assembly Service lecture agency. Her lectures will be illustrated with a specially edited version of the color motion picture "Through These Doors" made by John W. Moyer, Chief of the Museum's Motion Picture Division. Miss Smith's talks will replace the sound track ordinarily used, and new sequences will be interpolated in the film. The tour is being undertaken both as an educational project and as an extension of Museum public relations.

The wave of popularity that has brought parakeets into so many homes in recent years lends special interest to an exhibit of parakeets and parrots of many varieties in Boardman Conover Hall (Hall 21).

LAST CHANCE TO ENTER NATURE PHOTOGRAPHS

Closing date for entries in the Eleventh Chicago International Exhibition of Nature Photography is January 16. Prospective contestants are urged to send their prints and color slides to the Museum at once because the judges cannot consider entries received after the deadline.

Prize winning and other selected photographic prints will be exhibited in Stanley Field Hall from February 1 through February 26. All accepted color slides will be shown by projection on the screen in the James Simpson Theatre on two Sunday afternoons, February 12 and February 19, at 2:30 o'clock. The show is jointly sponsored by the Nature Camera Club of Chicago and the Museum.

Entries, both in the division of prints and the division of slides, must qualify under one of three classifications: (1) Animal life, (2) Plant Life, or (3) General (including scenic views, etc.). Except for special prizes awarded by the Photographic Society of America, a full and equal group of medals and ribbons is offered in each classification of each division. Detailed information is given in the official entry forms that are available by request to the Museum.

THE PAPAW, OUR LOCAL 'TROPICAL' FRUIT

By JOHN W. THIERET
CURATOR OF ECONOMIC BOTANY

THE PAPAW, with its seemingly exotic foliage, flowers, and fruits, reminds some of a plant displaced from the tropics. And this it has been called, for of all the members of the Custard Apple family—including the bearers of such fruits as the cherimoya, sweetsop, soursop, and custard apple—the papaw alone is a venturer from tropical and subtropical regions. But no alien this, notwithstanding its host of cousins in warmer latitudes. On the contrary, its maroon flowers with the odor of over-ripe strawberries, its large leaves, and its pendulous clusters of heavy fruits are an integral and familiar part of the landscape in much of the eastern United States in the river bottoms and rich woods where this singular species dwells.

THE AMERICAN PAPAW—A FRUITING BRANCH

The drooping leaves, often nearly a foot long, and the clustered fruits make the papaw one of autumn's memorable sights. The specimen here shown was collected near Chesterton, Indiana. A life-like model of a fruiting branch is exhibited in Martin A. and Carrie Ryerson Hall (Plant Life, Hall 29).

The distribution of the papaw in relation to the rest of the Custard Apple family is paralleled by a number of other temperate United States plants that are members of notably tropical groups. As examples might be cited our catalpa, trumpet-creeper, and cross-vine of the flamboyant Bignonia family; meadow beauty of the Melastoma family; the American persimmon, cousin of the ebonies; and the buckthorns of the Sapodilla family. These and others are considered remnants of a once luxurious subtropical flora that extended as far north as Alaska. Since that distant age the climate changed and became colder. Many plant groups—cycads, figs, breadfruits, rosewoods, palms—disappeared entirely from what is now temperate North America, surviving only in warmer areas nearer the equator. Others were not completely wiped out; they left in the now cooler regions one or several representatives that could successfully adapt to the changed conditions. This is the story that present-day distribution patterns and the fossil record reveal to us.

Long before the advent of Europeans in the New World the papaw was known to the Indians who, along with various wild animals—opossums, raccoons, squirrels, and skunks—relished the saccharine fruit. In the Mississippi Valley just over four hundred years ago, the followers of De Soto were the first white men to notice the papaw. In their journal they mention its "very good smell and... excellent taste." Nearly two centuries elapse before we hear of it again. In 1736 the plant was introduced into cultivation by Europeans who brought seeds to England. The first illustration of the papaw appeared 18 years later in Catesby's *Natural History of Carolina* (1754). On the return journey of Lewis and Clark, in the early 19th century, the explorers found the fruit a welcome supplement to their meager fare as did, at a still later date, the Kansas pioneers who subsisted partly on pecans and papaws in times of crop failure.

The common name papaw originated apparently from a fancied resemblance of our fruit to that excellent dessert fruit, the papaw of the tropics, better known in the United States as the papaya. The French New World colonists called the papaw "asiminier"—a gallicized form of the Indian name "assimin"—whence is derived the name of the genus to which the plant belongs, *Asimina*. There are eight species of *Asimina*, seven of which are confined to the southeastern United States, mostly in Florida. Our plant, *Asimina triloba*, ranges from Florida to Texas and as far north as the southern Great Lakes area. In the Chicago region, native stands of the papaw are found in several spots, including Black Partridge Woods, Indiana Dunes State Park, Pilcher Park, and, most appropriately, in Paw Paw Woods.

The papaw rises sometimes to a height of fifty feet and develops a trunk exceeding two feet in diameter, although the plant is usually a smaller tree or a shrub. Because of its suckering habit it is commonly found in clumps or thickets. In days gone by, some of these, particularly in the Mississippi Valley, were many acres in extent. The wood of the papaw is greenish-yellow, light, soft, brittle, coarse-textured, and has no uses. The inner bark, stripped off in early spring, has been used for weaving fiber-cloth, for making nets, and for stringing fish.

YELLOW FORM PREFERRED

The papaw flowers in the spring while its leaves are yet young and covered with rusty down. The stigmas mature sometimes long before the pollen is shed, and, as a result, the early-opening flowers set no fruit. The fruits, which may weigh up to a pound and attain a length of over five inches, are borne either singly or in clusters and change from green to brown or nearly black as they mature. When they ripen—from August to November, depending on the locality—the fruits contain a creamy pulp surrounding several large, flattened, brown seeds. There are, it seems, two rather distinct forms of the papaw: one, bearing white-fleshed fruits said to be of insipid to even disagreeable flavor; the other, more frequent, bearing yellow-fleshed fruits that occasionally are of an excellence that inspires some papaw lovers to remark that this is the most delicious fruit known to man.

Compared with the temperate and tropical fruits that are familiar in the northern states, the papaw is relatively rich in nutritive material. The fruit is noticeably high in protein. In spite of its food value and the pleasing texture and taste of the better varieties, the papaw remains little known and used except by rural people. It is only rarely seen in the markets of our larger cities.

Of the various ways of using the fruit, one author has written: "It makes a splendid custard pie. There is no finer dessert than papaw eaten with cream and sugar. It is used to make beer the same as the persimmon by putting the fruit in a jar, mashing it, and putting water on it and letting it stand until fermented. It also answers to make pudding just the same as persimmon pudding is made. It is also said that brandy equal to peach brandy is made of papaws. Marmalade which is equal to that made of pears or peaches may be made of papaws. The custard [pulp] may be spread on a board and dried like pumpkin leather."

All this, of course, is fine, but what can compare to a ripe papaw, just picked from among the yellowed leaves on a frosty autumn day and eaten in the woodland. It is then that James Whitcomb Riley's

words in Hoosier dialect are recalled perhaps most vividly:

"And sich pop-paws! Lumps o' raw
Gold and green,—jes' oozy th'ough
With ripe yaller—like you've saw
Custard-pie with no crust to."

NEGLECTED BY FRUIT GROWERS

Although its cultivation and improvement have been repeatedly urged, the papaw continues to be a horticultural Cinderella. There are few papaw orchards, perhaps a result of the fact that little is known about the cultural requirements and response of the species. The small number of attempts that have been made in hybridization and selection have had promising results. Several of the finer varieties have been named and propagated. Crosses have been made between these varieties and between our plant and other species of *Asimina* in efforts to improve the fruit. Those who have faith in the economic and gustatory possibilities of the papaw point out that even in the wild state it can produce fruits that compare favorably with our long-cultivated Old and New World fruits. Thus, would not some attention from horticulturists result perhaps in the development of distinctly superior papaws?

As is the case with so many of our deserving native species, the papaw has been little used as an ornamental plant, although it has much to recommend it. It is notably free from diseases and pests. It may be raised fairly easily from seed, or seedlings a

FLOWERS OF THE PAPAW

The blossoms, up to two ioches across, are green when newly opeoed, but soon change to brown aod finally to maroon. These figures are reproduced from Charles Sprague Sargent's "Silva of North America" (1891).

foot or less in height may be transplanted from the woods. When grown from seed, the plant may take eight or more years to begin to fruit, although the fruiting of three-year-old specimens has been reported. The papaw's handsome leaves, its attractive though somewhat inconspicuous flowers, and its curious, clustered fruits make it a horticultural novelty. In nature it occurs as an undergrowth plant, receiving shade and protection from wind. This suggests that in cultivation a sheltered position may be more to its liking than one in the open.

The American papaw is a species that deserves increased recognition and use, both as an ornamental and, of more significance, as a fruit tree. Perhaps someday it will be a plant of considerable economic importance. This is the end toward which papaw enthusiasts and breeders are striving.

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.)*

THE STORY OF MAN. By Carleton S. Coon. Alfred A. Knopf, Inc., New York. 437 pages, 32 plates, 54 line drawings, 10 maps. $6.75.

Books come and go, but here is one that will remain with us. The title is forthright and simple and so are the language and style. Dr. Coon undertakes to describe the main events of human history "from the time man appeared on the face of the earth until the present moment, when he has the power to destroy it." But this is not the ordinary dreary history. It is a sprightly one, as a glance at some of the chapter headings shows: "The Earliest Men," "Wheels, Metal, and Writing," "A Vision of Paradise."

The Story of Man begins about 700,000 years ago and follows the adventures of our ancestors to the present time. For the purposes of his book, Dr. Coon divides his material into four major phases:

The first of these deals with the biological phase of man's history. Because he possessed a superior capacity for culture, man had a great advantage over animals. Before the first phase ended, man had learned to make tools, probably to speak, and to keep warm with fire.

During the second phase of man's history, beginning about 35,000 years ago, man cooked food, made warm clothing, migrated into hitherto unoccupied regions (the Arctic and sub-Arctic and the New World), invented the bow, and domesticated the dog.

In the third phase, man domesticated all the barnyard animals that we know today, began to farm, invented pottery and writing, worked metals, and then moved swiftly on to other advances—money, cannon, printing, deep-water ships, coke, steam engines.

Man now stands on the threshold of the fourth phase of his history. At this time the trend toward increasing differentiation between cultures has turned toward the direction of global cultural uniformity.

Perhaps one example of the kinds of ideas that Dr. Coon puts forward will entice readers of the BULLETIN to read *The Story of Man*. In Greek times and during the early centuries of the Christian era, a "school" consisted of one man who taught *all* subjects to the students of the day. Gradually it dawned on men that the fields of human knowledge were becoming too vast for one man to comprehend. A division took place, and universities came into existence. A student could now learn geography from one professor, law from a second, and mathematics from a third. Thus it now was possible for scholars to specialize, to conduct experiments, to do research. A new source of energy was discovered, not by accident but by objective research. This new source of energy was the correct formula for gunpowder that would explode instead of merely fizzling.

As a result of objective research and increase in consumption of energy through improvements in furnaces and harnessing water and wind power, three new inventions came into being: ocean-sailing ships, printing, and banking. These inventions united, as never before, all the independent and ancient civilizations and brought them into the orbit of western Europe. Gunpowder enabled the Turks to capture Constantinople, thus blocking trade routes from Europe to India and the Far East. Marine architects then came forward and designed ships that could cross vast oceans. The academic division of labor also stimulated another great advance in communication—the invention of printing. Now thousands of ordinary people, merchants, and artisans learned to read and write. Communication could now take place among thousands of people who never saw one another. Economic and commercial institutions established trade relations with people of distant countries. Traders and manufacturers needed capital, and banks were formed to accommodate them. Thus a chain of events brought about vast unthought-of changes and united the parts of the world as never before.

Dr. Coon has selected his material with such care that the reader never feels bewildered even though the author takes him on many absorbing excursions. The author wisely resorts to speculation and imagination whenever necessary, but he plainly labels them as his personal guesses. His convictions he has stated with strength.

Because all of us are vitally interested in our futures, we can read this book with profit, enjoyment, and optimism.

PAUL S. MARTIN
Chief Curator of Anthropology

Saturday afternoon lectures and films will be given at the Museum in March and April.

A YOUNG MARCO POLO BEGINS MUSEUM JOURNEY

Jimmy Pavitt, 9, of St. Louis, takes off on his own private expedition! Here he embarks on Museum Traveler's Journey No. 4 to visit toys of other lands and cultures. Pausing before the special toy exhibit in Stanley Field Hall, Jimmy answers the first query on his Museum Traveler's questionnaire before proceeding to ancient Babylonia, modern Malaya, China, and our own Plains and Southwest Indian country for information about exotic toys. After filling in all the answers called for, Jimmy will turn his questionnaire in at the Museum where it will be checked for correctness. Successful completion of three additional journeys will entitle Jimmy to an award designating him as an Official Traveler of Chicago Natural History Museum.

NEW MEMBERS

(November 16 to December 15)

Associate Members

Thomas Boal, John M. Coates, Dennis De Witt

Non-Resident Associate Member

Mrs. Oma M. Bradley

Annual Members

Miles L. Abel, William P. Ayers, Harold Barclay, Horace G. Barden, W. E. Bikle, Miss Beryl Ann Brownell, James L. Calhoun, John Noble Campbell, John I. Dennehy, Edward F. Donham, William M. Doty, Albert J. Epson, Joseph Epstein, S. L. Fee, Jacob M. Fishman, Louis Fishman, Miss Grace S. Flagg, Dean D. Francis, Fred. W. Frank, Leon J. Gell, Eugene G. Hart, Dr. Helen Heinen, James V. Insolia, Dr. Michael C. Kessler, Karl N. Llewellyn, Marshall Malina, Edwin H. McGrew, Wesley C. Miller, Walter A. Mooney, Charles F. Naser, Erik Nilsson, Harold N. Payne, L. W. Porter, Mrs. M. Ann Reiff, C. H. Rosier, Miss Nina E. Schlatter, Robert B. Stitt, Newton E. Turney, William Wald, Mrs. Nelson C. White, Mrs. Jean Woollett

GIFTS TO THE MUSEUM

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

Department of Anthropology:

From: Dr. Henry Field, Coconut Grove, Fla.—10 plaster casts of seals, Pakistan; Mrs. Harry W. Getz, Moline, Ill.—2 Navaho blankets, southwestern United States

Department of Botany:

From: Karl Bartel, Chicago—Mimosa pudica; Florida State Board of Conservation, St. Petersburg, Fla.—2 aquatic phanerogams; Robert Sokal, Chicago—32 plants, southeastern United States; Floyd A. Swink, Chicago—Populus canescens; University of Southern Illinois, Carbondale—6 Andropogon Elliottii

Department of Zoology:

From: R. J. Fleetwood, Cocorro, New Mexico—2 snakes; Dr. J. L. Harrison, Kuala Lumpur, Malaya—64 bats; Dr. John R. Hendrickson, Singapore, Malaya—fish specimen; Harry Hoogstraal and Lt. Col. Robert Traub, Cairo, Egypt, and Kuala Lumpur, Malaya—117 fleas on slides, Yemen, Egypt; Dr. Henry Howden, Knoxville, Tenn.—5 scarab beetles, United States; Lt. Comdr. Don C. Lowrie, San Francisco—3 frogs, 5 lizards, 2 snakes, Riu Kiu Islands; Dr. Frederick J. Medem, Colombia—61 reptiles and amphibians, 13 mammals; Museo de Historia Natural, Montevideo, Uruguay—4 fresh-water clams; Oriental Institute, Chicago—43 lots of ectoparasites, 208 land shells, 84 mammals, Iraq, Iran, and Lebanon; Dr. Alexander Sokoloff, Chicago—2 snakes, Indiana; Lt. Col. Robert Traub, Kuala Lumpur, Malaya—19 slides of fleas, Africa, Madagascar, South America, New Guinea; Fraser Walsh, San Francisco—8 dragonflies, 7 butterflies and moths, 10 grasshoppers, Formosa; Loren P. Woods, Homewood, Ill.—4 bats, Indiana; Donald J. Daleske, Chicago—19 fishes, North and South Korea; W. E. Eigsti, Hastings, Neb.—41 insects; Dr. Howard Gloyd, Chicago—snake, Riu Kiu Islands; Dr. Robert F. Inger, Homewood, Ill.—400 fishes, Wyoming and South Dakota

STAFF NOTES

Dr. Paul S. Martin, Chief Curator of Anthropology, attended the recent annual meeting in Boston of the American Anthropological Association and the meeting of the executive committee of the Society for American Archaeology. He was guest of honor at the Twenty-fifth Anniversary Luncheon of the Social Sciences Division of the University of Chicago. Other Museum staff members who participated in the celebration were **Dr. Donald Collier,** Curator of South American Archaeology and Ethnology, who was in the academic procession; **George I. Quimby,** Curator of North American Archaeology and Ethnology; **Miss Elaine Bluhm,** Assistant in Archaeology; and **Evett D. Hester,** Thomas J. Dee Fellow in Anthropology .... Two members of the Museum staff recently published popular articles in national magazines: **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, gives an account of his expedition to the "lost world" of Venezuela in the November issue of *Natural History* and **Philip Hershkovitz,** Curator of Mammals, is author of "Know Your Rabbits" in the December issue of *Sports Afield* .... A paper on cave fishes, prepared jointly by **Loren P. Woods,** Curator of Fishes, and **Dr. Robert F. Inger,** Curator of Amphibians and Reptiles, was read before a meeting of the zoological section of the American Association for the Advancement of Science at Atlanta last month .... **D. Dwight Davis,** Curator of Vertebrate Anatomy, lectured recently on "The Biology of the Desert" before students of North Central College, Naperville, Illinois .... **Rupert L. Wenzel,** Curator of Insects, and **Henry S. Dybas,** Associate Curator of Insects, represented the Museum at the annual meeting of the Entomological Society of America in Cincinnati ... **Dr. Theodor Just,** Chief Curator of Botany, spoke on "Cycads, Living and Fossil" at a recent meeting of the Chicago Ornithological Society.

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BULLETIN
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Chicago Natural
History Museum

11th Chicago International
Nature Photo Exhibit
February 1—26

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

Museum Expeditions—1956 . . .

RANGE OF EXPLORATIONS: MILWAUKEE TO MINDANAO

FROM MILWAUKEE, Manitowoc, and Muskegon in a Great Lakes archaeological survey to far-off Mindanao in the Philippines for zoological collections, Museum explorers will range over many parts of the world in 1956 on expeditions with widely varied objectives. Outstanding on the list are excavations in Peru to uncover prehistoric cities that flourished before and during the time of the Incas and penetration of the jungles of Borneo in small boats and afoot to collect reptiles and other fauna.

The Archaeological Expedition to Peru, to be led by Dr. Donald Collier, Curator of South American Archaeology and Ethnology, will enplane for Lima early in February, where field work will continue for about seven months. Curator Collier will be assisted by Don Thompson, a Harvard graduate-student in archaeology, and additional helpers will be recruited in Peru. The expedition, which is financed by a grant awarded by the National Science Foundation, will excavate sites in the Casma Valley near the coast of Peru, about two hundred miles north of Lima in search of material for exhibits and for research purposes. Collier plans eventually to use the results of his studies as the basis of a publication on the prehistoric growth of urban life.

BY CANOE AND AFOOT

The Zoological Expedition to Borneo, which will be led by Dr. Robert F. Inger, Curator of Amphibians and Reptiles, will get under way late in March. First flying to Singapore, Dr. Inger will there organize for six months of intensive field work deep in the interior of northern Borneo. With Malayan aides he will travel on foot and by motorboat and canoe to make a representative collection of the island's reptiles, amphibians, and fresh-water fishes.

Dr. Paul S. Martin, Chief Curator of Anthropology, will, as in all its past seasons, lead the Archaeological Expedition to the Southwest, his principal associate again being Dr. John B. Rinaldo, Assistant Curator of Archaeology. Several other persons will accompany the expedition. This, the expedition's 22nd season, is the occasion for moving the base camp into new territory. In the first nine seasons excavations were made in southwestern Colorado and in the next twelve in New Mexico, with a brief sortie into Arizona in 1955. The expedition's work now will be moved entirely to an area near Showlow in east-central Arizona. Because of the transfer of the scene of operations, the first season's work in the new area will be largely reconnaissance, and if use of an airplane can be arranged, aerial surveys will be made.

Reference in the opening paragraph to Milwaukee, Manitowoc, and Muskegon indicates only a small part of the territory to be surveyed by George I. Quimby, Curator of North American Archaeology and Ethnology, who will begin field work for a study of the paleogeography, archaeology, and ethnology of the western Great Lakes region, centering upon the area within the drainage basin of Lake Michigan but including regions bordering on Lake Superior and Lake Huron. His studies will embrace a period beginning about 10,000 B.C. and continuing to A.D. 1800.

BIRDS OF THE PHILIPPINES

Mindanao, also mentioned in the first paragraph, refers to the continuance of zoological collecting, principally of birds, by an expedition begun in the Philippines several years ago by Dr. D. S. Rabor, Field Associate, who will work in the Mindanao area and other regions. Dr. Robert L. Fleming, another Field Associate, will continue collecting birds in Nepal, where he has been for several years.

Dr. Sharat K. Roy, Chief Curator of Geology, will return to Central America to continue studies of volcanoes. Dr. Rainer Zangerl, Curator of Fossil Reptiles, and Dr. Eugene S. Richardson, Jr., Curator of Fossil Invertebrates, will go for a month in the summer to the salt marshes of southern Louisiana. There they will study recent sediments for comparison with the Mecca, Indiana, black shales and fossils that have been their major project for the past two years. Curator Richardson will also make several short trips to Will and Grundy counties in Illinois to study distribution of fossils in spoil heaps of strip mines.

MARINE LIFE IN BAHAMAS

Dr. Fritz Haas, Curator of Lower Invertebrates, will spend May and June in Florida and at the biological station in Bimini, the Bahamas, collecting and studying specimens of marine life as the first step in a long-range program of preparation of exhibits for a hall of marine invertebrate life.

William D. Turnbull, Assistant Curator of Fossil Vertebrates, and Orville L. Gilpin, Chief Preparator of Fossils, will work in the late summer and early autumn in the Washakie Basin of Wyoming. Their expedition has as its goal faunal collections from each level of the Washakie formation.

A number of staff members will be engaged in a variety of projects classified as field trips rather than major expeditions. Rupert L. Wenzel, Curator of Insects, will collect histerid beetles and other insects in the Cumberland Mountains of eastern Tennessee. Henry S. Dybas, Associate Curator of Insects, will collect samples of microscopic fauna in northeastern areas of the United States. Loren P. Woods, Curator of Fishes,

(*Continued on page 3, column 1*)

THIS MONTH'S COVER

Our cover picture, entitled "Mother and Child," one of several thousand entries for the 11th Chicago International Exhibition of Nature Photography to be held at the Museum February 1 through February 26, was made by J. Musser Miller, of La Grange, Illinois. This interesting animal duo represents the white-mouthed langur, native to the high forests of Burma, Siam, and Indochina. Langurs, or leaf-eating monkeys, are the common simians of India and southeastern Asia. Their slender bodies and limbs, their very long tails used for balancing, and their long hands curved like hooks for grasping enable them to run and leap through the trees with exceptional speed and agility. They seldom descend to the ground except for water and to raid cultivated fields.

The photo contest and exhibit are jointly sponsored by the Nature Camera Club of Chicago and the Museum.

BEST IN NATURE PHOTOS ON EXHIBITION THIS MONTH

FEBRUARY is Nature-Photo Month at the Museum.

From February 1 through February 26 several hundred photographs of animal life, plant life, and scenery judged to be the best from among several thousand submitted by contestants all over the world will be displayed in Stanley Field Hall. Several hundred color-transparencies will be projected in James Simpson Theatre of the Museum at 2:30 o'clock on two Sunday afternoons, February 12 and February 19. These three events—the Stanley Field Hall exhibit of photographic prints and the two theatre showings of color transparencies—comprise the Eleventh Chicago International Exhibition of Nature Photography, an annual event sponsored jointly by the Nature Camera Club of Chicago and the Museum.

This exhibit, the largest in the world devoted exclusively to nature photography and one of the largest photography exhibits of any sort, is the result of much work by enthusiastic members of the Nature Camera Club as well as the effort of hundreds of amateur and professional photographers submitting pictures. Camera club members have devoted hours in evening and weekend sessions to processing the thousands of entries and doing all the clerical tasks required to safeguard the pictures and assure eventual return to their owners. Five judges in day-long sessions have performed the difficult task of carefully appraising each of the thousands of pictures submitted and finally selecting those worthy of display and those to be awarded medals or ribbons. This board of judges was composed of William J. Beecher, Naturalist of the Cook County Forest Preserve District; Philip Hershkovitz, Curator of Mammals at the Museum; John W. Mulder, Ranger-Naturalist of the National Park Service; and George W. Blaha and George M. Wood, well-known in Chicago for their own work with cameras.

'JUNIPER'—AN ENTRY IN NATURE PHOTO EXHIBIT
Submitted in General Division (landscapes, etc.) by Gertrude L. Pool of Palo Alto, California.

Each of the two divisions in the exhibit, prints and color slides, is divided into three classifications: animal life, plant life and general (scenery, clouds, geological formations, etc.). First prize in each classification of each division is a medal; in addition, ribbons are awarded to many others as honorable-mention awards. The Nature Division of the Photographic Society of America also awards two special prizes for the best photographic work using complementary colors and adjacent colors. Names of winners are placed on a bronze plaque, contributed by Mrs. Myrtle R. Walgreen, herself a camera enthusiast and an active member of the Nature Camera Club. A catalogue with reproductions of award-winning photographs will be published by the camera club. This BULLETIN went to press before the list of winners was available, but their names will appear in the next issue.

With this year's exhibit now ready for inspection by the public, the contestants have already been notified of their success or failure, and many are doubtlessly thinking of what to do for next year's nature-photo contest and show.

EXPEDITIONS—

(*Continued from page 2*)

will engage in research on West Coast fishes at Los Angeles, San Francisco, and Stanford University. Dr. Robert H. Denison, Curator of Fossil Fishes, will collect Devonian fishes in quarries in northern Michigan and will prospect in New York state. Dr. John W. Thieret, Curator of Economic Botany, will collect economic plants of the Midwest for the study collections and for revision of the economic botany exhibits.

George Langford, Curator of Fossil Plants, will make a field trip with Chief Preparator Gilpin to Lower Eocene and Upper Cretaceous clays of Alabama and Mississippi and to Pennsylvanian deposits of Will County, Illinois, with Dr. and Mrs. R. H. Whitfield, Associates in the Division of Fossil Plants. Miss Elaine Bluhm, Assistant in Archaeology, will continue her archaeological investigations in the Chicago area, conducted during the past two years in association with members of the Earth Science Club of Northern Illinois. Taxidermist Carl W. Cotton will spend some time in February at the American Museum of Natural History in New York and the Smithsonian Institution in Washington, D.C., for consultations with colleagues in the taxidermic arts and for studies of new exhibition techniques that may be applicable to future work in this Museum.

MUSEUM OFFICERS RE-ELECTED

All officers of the Museum who served in 1955 were re-elected for 1956 at the annual meeting of the Board of Trustees held on January 16. With the new term, Stanley Field has now begun his forty-eighth year as President. The others retained in office are: Marshall Field, First Vice-President; Hughston M. McBain, Second Vice-President; Joseph N. Field, Third Vice-President; Solomon A. Smith, Treasurer; Dr. Clifford C. Gregg, Director and Secretary; and John R. Millar, Assistant Secretary.

President Field's tenure of office corresponds with the most active period of expansion and development of the Museum in expeditions, in scope of exhibits, and in extent of research and publications. Plans for the present building were brought to fruition after his accession to the presidency.

COLLECTION OF BEETLES ARRIVES FROM VIENNA

By RUPERT L. WENZEL
CURATOR OF INSECTS

DURING the first week of January, the staff of the Division of Insects welcomed a present that had arrived on the last working-day of December, a little too late to be included in the Christmas celebration but in time for the New Year's greeting. The gift—from the Museum's Board of Trustees—was contained in a large packing case, 6 by 6 by 7 feet and weighing 2,600 pounds, large even by museum standards, shipped from Vienna, Austria. The case contained a collection—more properly, two collections—of approximately 119,000 beetles. Its arrival marked the successful culmination of negotiations and plans begun more than six months previously, but that had their origin in plans and hopes dating back a good many years.

MORE THAN A TON OF BEETLES ARRIVES

Much manpower is required to move huge packing-case from Vienna onto Museum's receiving platform, an elevator that carries shipment from outdoors into basement freight room. The crate, 6 by 6 by 7 feet, contains approximately 119,000 specimens. These include both European and worldwide collections.

In the hectic week that followed the arrival and unpacking of the collection, five questions were so repeatedly asked that it seems desirable to answer them here, at least in part. The questions were: What is it? Why was it purchased? How do you find out about such collections? How did you go about getting it? And finally, why on earth was the whole collection packed in one tremendous box instead of in several smaller boxes that could be more easily handled?

The collection actually consists of two separate collections, both purchased from Dr. Eduard Knirsch, a Viennese dentist who was an amateur coleopterist (beetle specialist) and who built up significant general and specialized collections of beetles. One of these collections was accumulated by Dr. Karl Brancsik, of Trencsen (later in Czechoslovakia), who had been an adviser to Emperor Franz Josef and a professor of higher physics in Trencsen. He was an ardent amateur naturalist and had accumulated significant collections of mollusks, bugs, flies, bees and wasps, grasshoppers and their allies, and beetles. His general world-collection of beetles consisted of about 150,000 specimens representing 35,000 identified species.

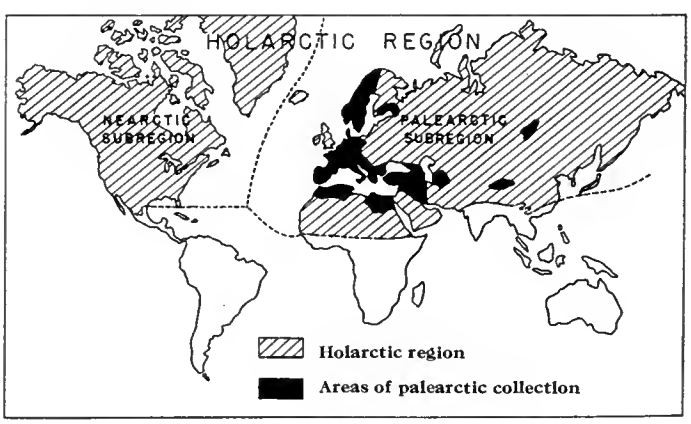
Shortly after Brancsik's death in 1915, his beetle collection was sold to Dr. Knirsch. The collection at present consists of about 67,000 specimens representing about 20,000 identified species (parts of it—containing certain large families—had been disposed of before it was acquired by Chicago Natural History Museum). The remaining valuable series of identified beetles, particularly from Africa, Australia, Europe, and the New World tropics help to fill out our world representation of identified material to the extent that we now have some of the more important genera at least represented by "signposts" that will aid us in identifying, organizing, and handling unidentified research materials from these parts of the world. Before the acquisition of the Brancsik Collection, we had almost no African material.

The second collection, of about 53,000 specimens representing about 8,500 species consists of Eurasian and North African beetles and was formed by Knirsch himself. It is a *palearctic* collection; that is, it consists of specimens from the Old World north-temperate zone (*see map*). Such collections are of particular importance to students of the North American insect fauna because of the close relationships that exist between many of the animals of the Old and New World (*nearctic*) north-temperate zones, which together constitute the zoogeographic region called the *holarctic*.

RESEARCH SCOPE BROADENED

In the past, entomologists of the United States largely confined their studies to North American insects. Our fauna was large and unknown and the entomologists engaged in classifying the American species felt that they had enough to do without venturing abroad. Further, the important world-collections so necessary for studies of the insects of other parts of the world were in Europe and thus were essentially unavailable to American workers. Time and events have caused the world to shrink for United States entomologists, too. More than ever before they recognize that the more provincial their studies are, the less valuable they are. They particularly realize that because of the many genera and species that are common to North America and Eurasia,

(*Continued on page 7, column 1*)



GEOGRAPHIC SOURCES OF BEETLE COLLECTIONS

Map of the world showing holarctic region (shaded) and areas (solid black) well represented by Knirsch Collection.

PREHISTORIC CULTURE OF CHICAGO AREA UNCOVERED

By ELAINE BLUHM
ASSISTANT IN ARCHAEOLOGY
AND DAVID J. WENNER, JR.

EARLY IN JUNE, 1953, a Cook County Forest Preserve superintendent, John Eenigenburg, learned that a new superhighway was to pass over an area in the forest where many Indian artifacts had been found. Because he believed that this site might be important, members of the Museum staff were notified of its location. During that spring and summer, members of the Earth Science Club of Northern Illinois had been conducting a survey (under the direction of Wenner) of archaeological sites in the Chicago area. When the notice of the site in the forest preserve came to the Museum, we visited it and decided that it would be well to excavate part of it before it was destroyed.

CHICAGO AREA 'DIG'

Excavation of prehistoric Indian site was begun by classic archaeological method: opening selected squares, in this case about five feet in dimensions. The earth removed was then systematically sifted for artifacts.

Members of the Earth Science Club agreed to do the digging and to be responsible for collecting and cleaning the specimens. A permit to excavate was granted the group by Charles G. Sauers of the Cook County Forest Preserve District, with the provision that the specimens be sent to Chicago Natural History Museum and the University of Illinois so that they would be available to students for study in the future. Then the work began.

The Hoxie Farm Site, as it was named, was excavated, under our direction, in ten weekends during the summer by members of the Earth Science Club and other interested amateur archaeologists. Usually the weather was hot and disagreeable, but the crew worked carefully with no compensation other than the satisfaction of knowing that they were contributing to scientific research.

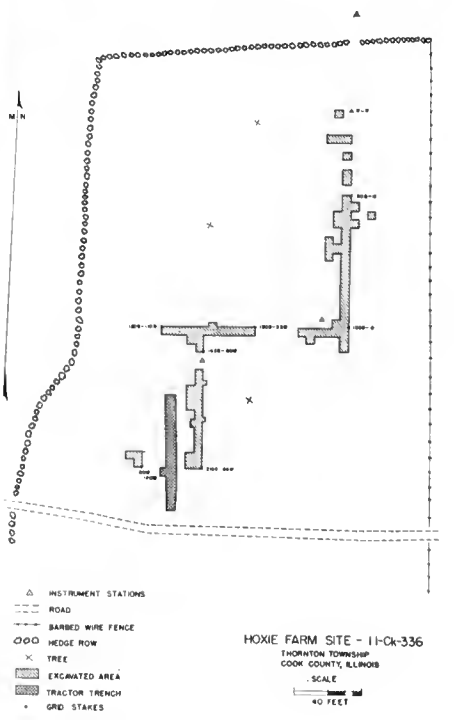
In terms of area tested and amount of material recovered, the dig represented the largest scientific excavation ever conducted in the Chicago area and one of the largest in the state. The number of specimens found and the information obtained from the site about its former inhabitants stand as a tribute to this group of excavators. The success of the work also must be credited to the kindness and co-operation of Mr. Eenigenburg and Andrew Ross, of the forest preserve staff, who realized the value of the site and protected it from vandalism during the weekdays that we could not be there.

Archaeological sites in the Chicago area frequently are not very large or very rich, and many are doubtlessly destroyed as the city and suburbs expand. Therefore it is important that we locate and protect the few that remain so that they may be studied and the story of the early Indian inhabitants of the area may be revealed before it is too late.

The Hoxie Farm Site was located on a sandy ridge about fifteen feet above a stream. Records by early settlers indicate that as late as 1850 this stream was navigable by small boats and that the lowland to the north and east was a swampy area that attracted many birds and other animals. The quantity of animal bones recovered from the excavation indicates that this condition must have prevailed in aboriginal times. Deer, elk, raccoons, beavers, ducks, turkeys, turtles, and many fishes were represented in the collection (presumably these animals were used as food by the Indians). To the south and southeast and across the stream were fields suitable for agriculture. Thus this site, with sandy soil that provided good drainage and dry footing for houses, land for cultivation, water for household needs and transportation, and an abundance of mammals, birds, and fish for food, satisfied all the requirements of the aboriginal inhabitants of our area who had to utilize every resource in order to sustain their primitive society.

FIREPITS AND BURIALS FOUND

At the beginning of the project we extended a long line down the length of the site and divided the area into five-foot squares. Selected five-foot squares were then excavated, the soil from each being removed in six-inch layers. All objects recovered were sacked and identified by square and level, so that we would know where each had been found. Walls and floors of the squares were carefully smoothed, and firepits, refuse pits, burials, and other features found in the soil were plotted on graph paper. In addition, the whole site was mapped, using surveyors' instruments, and thus we now have a record of all of the excavated area.



HOXIE FARM SITE

Map shows total area that has been excavated.

The major purpose of any archaeological excavation is to find out how the inhabitants lived, what kinds of tools and objects they made and used, and, if possible, when they

lived there, how long the site was occupied, and who they might have been. This information is obtained by study, with plans and notes of the site, of the artifacts, skeletons, animal bones, and objects in refuse pits and by comparing this material with that from other sites.

Once the pottery and stone and bone artifacts were catalogued, the job of study and analysis began, and it is not yet complete. The animal bone was turned over to an osteologist and the shell to Dr. Fritz Haas, Curator of Lower Invertebrates in the Museum's Department of Zoology, for identification. Results of their work were studied by Philip Young, a student member of the expedition.

THOUSANDS OF POTTERY FRAGMENTS

More than 10,000 potsherds (broken pieces of pottery) were recovered from the site. More than 90 per cent of these are shell-tempered—that is, when the pottery was made, the Indians mixed tiny pieces of ground clamshells in the moist clay to prevent it from cracking when it was fired. Shell-tempered pottery in the Middle West is an indication of a late site, dated, we guess, from between A.D. 1300 to 1600. Most of these sherds indicate that the pottery vessels were of globular shape with outflaring rims and sometimes small handles on the sides. Surfaces of most sherds were smoothed, but others were cordmarked. Many pots were small, between 6 and 10 inches in diameter, but some sherds indicate that the Indians also made much larger containers. The usual decoration on the pottery consists of wide trailed or incised lines in patterns of chevrons or parallel lines.

Some of the pottery was grit-tempered and had been traded perhaps from Indian villages near what is now the Northwest Side of Chicago or Joliet. Other sherds resemble types found in northern Indiana, Ohio, and southern Wisconsin.

In addition to the pottery, we found more than 1,200 stone tools and some of bone and antler. Most of the stone tools were chipped from cream-colored flint found in nearby creeks and glacial deposits. More than half of the tools were small scrapers with retouched edges, used for smoothing hides as well as other things.

There were slender, tapering flint drills and small thin flakes with sharpened edges, probably used much as we use paring knives and pocket knives today. Projectile points, or arrowheads, represented one-fourth of the chipped stone artifacts; most of them were small, thin, well-made triangular points.

There were also some ground stone tools in the collection—sandstone pieces with grooves used to straighten arrow shafts and to sharpen awls; flat shallow stones and smaller hand stones used for grinding corn and, in one case, for grinding red pigment; and rounded pebbles used as hammerstones for chipping flint.

There was an unusual variety of bone and antler tools at the site. Antler tips were hollowed out for fastening on a shaft to serve as arrowheads. Other antler tips were found that showed use as tools for chipping flint. Fragments of ribs and long bones served as awls, and one was perforated for use as a needle. Other fragments were smoothed for use, we postulate, as counters in a gambling game. One rib fragment was notched, and we believe it served as a musical rasp, making a sound somewhat like that of a washboard. Short sections of hollow bird-bones were cut and smoothed to form tubular bone heads. A whole turtle shell

PREHISTORIC CHICAGOAN
An extended burial found on Hoxie Farm Site.

was found that may have been a musical rattle. The largest bone tools were the hoes made from the shoulder blades of the deer and elk. These were often found in pairs on the top of cache pits.

The excavation revealed a little about the village itself. Many round-bottomed pits were uncovered, particularly in the southern half of the site. These may have been used originally for storage of corn and later were filled in with refuse. A few firepits were also found. We searched diligently for evidence of houses, but found only one or two places where sturdy posts had once been driven into the ground and several traces of what may have been smaller posts. This is not conclusive evidence, but it suggests that perhaps the Indians lived in houses supported by sturdy center posts and light superstructure built on smaller posts that were not planted very firmly in the ground. Similar houses with mat or bark walls and roofs are known to have been used by historic tribes in this area.

The burials were the most exciting finds in the site. Eleven were recovered from the burial area in the northern part of the village; others were uncovered but in some cases the bone was so soft that it could not be removed without crumbling. The bodies had been placed on their backs in shallow rectangular pits. Often a small pot was placed near the head of the burial. Near the shoulder of one individual had been placed an otter skull, covered with a piece of copper and powdered red ochre. The otter has ceremonial significance for some Indian groups in this area and may indicate the man was an important member of his family or clan. Other burials had arrowheads or copper ornaments placed with them.

CULTURAL TRAITS TRACED

All in all, our summer excavations at the Hoxie Farm site were well worth while. We learned much about the Indians who lived in that village on the edge of the creek. We know they hunted and fished, and we assume they planted corn and other crops nearby, although we found only the agricultural tools and none of the corn. Their houses are still something of a mystery, but we have much evidence about their storage pits and firepits. We know they buried their dead in an area somewhat apart from the main living-area of the village, with some care and ceremony, placing objects with them that show their daily life or perhaps prepared them for the journey to the other world. Their tools were well made and reflect much of their daily life and economy. Pipe fragments were found, which indicates smoking, a ceremonial activity among the Indians. The bone rasp and possible turtle-shell rattle are indications of their musical knowledge.

Trade was carried on with other areas and sites. The copper probably came from northern Michigan, a pipe found at the site came from Wisconsin, and some of the pottery may have been traded from, or influenced by, groups in Wisconsin, Indiana, and other sites in Illinois.

Exactly when this site was occupied we do not know. We found no trade silver or brass, which suggests the Indians lived there some time before the white men came into the area in the latter part of the 17th century. Probably the site was occupied some time around A.D. 1500 to 1600. Who these Indians were is still an unsolved mystery, but perhaps if we excavate other late sites and study documented sites in the area we may someday be able to identify this group. We can now say that they might have been Miami or Pottawatomi. As is true of every archaeological excavation, we have uncovered some information, but, in addition, we have found more problems that can be solved only by future work.

Sunday afternoon lectures and films will be given at the Museum in March and April.

BEETLES—

(*Continued from page 4*)

it is undesirable—and in many cases virtually impossible—to do certain types of work on the fauna of the one subregion without reference to that of the other. Yet, good representative general collections of European insects have been largely lacking in this country. Our staff has long wanted to acquire such collections, but no opportunities arose that would make it possible to translate these wishes into reality. The collections simply were not being offered on the market.

In the spring of 1955, I attended a meeting of insect curators in Washington, D.C., that was held to discuss mutual problems and policies, and to exchange information on subjects ranging from collections to technique. One of the items discussed was the desirability of stressing the need for American entomologists to study the palearctic fauna, and the associated need for United States museums to acquire Eurasian collections. Dr. P. J. Darlington, Jr., of the Museum of Comparative Zoology at Harvard, informed me that they had recently been offered a large collection of palearctic beetles by Dr. Knirsch and that they had purchased one large segment, the ground beetles, for their collection. The Harvard museum was not in a position to purchase the main collection.

This information was surprising, because Chicago Natural History Museum had been corresponding with Dr. Knirsch since 1946 in connection with other collections that he was offering for sale and Knirsch had never given any indication that he had a palearctic collection. The information was passed on to Dr. Clifford C. Gregg, Director of our Museum, who forwarded an inquiry about the collection to Dr. Knirsch's representative. His answer revealed that Knirsch still had the palearctic collection and that he also had a general world-collection, the Brancsik collection, that he was offering for sale.

Dr. Austin L. Rand, Chief Curator of Zoology, then approved a memorandum submitted to him by the Division of Insects and recommended to the Director that action be taken and that an offer be made. This recommendation was concurred in by the Director and Stanley Field, President of the Museum.

In the correspondence that followed, a tentative purchase price was agreed upon, pending an examination of the collections by a representative of the Museum. Fortunately, Dr. Charles H. Seevers, Research Associate in our Division of Insects, was in London studying rove beetles at the British Museum (Natural History). At our request he flew to Vienna and, with the help of Mrs. Seevers, examined and inventoried the collections. He then sent us a critical, detailed, and comprehensive report. On the basis of his report, it was decided to proceed with the purchase. John R. Millar, Deputy Director of the Museum, then began arrangements with the American Express Company in Vienna, and later in Chicago, for the shipment of and payment for the collection. Dr. Josef Eiselt of the Naturhistorisches Museum of Vienna had assisted me in packing the Bernhauer Collection for shipment in 1951. He agreed to do the same work on the Knirsch collections. During the period that the collection was being packed, Dr. Knirsch died and progress was delayed for a short time pending clarification of the legal status of the transaction. Payment was made through a lawyer appointed by the Austrian courts as executor of the estate, in favor of Knirsch's widow.

SAFEGUARDS IN TRANSIT

The final crating of the collection, as for the Bernhauer Collection, was accomplished by Bäuml & Co., a Viennese firm that handled the packing and shipping of the Viennese art treasures during their extended tour of the United States following World War II. It was at their suggestion that the collections were packed in the single huge liftvan. Their experience had been that when large collections of extremely fragile materials were packed into a container that could be lifted only by a crane, damage was reduced to negligible proportions and frequently eliminated altogether. Further, fragments of the shipment could not go astray. From our own experience, as well as that of other institutions, we know this to be a sound procedure for such large transoceanic shipments. Two large, valuable, and extremely fragile collections have now been moved from Vienna to Chicago Natural History Museum *without loss of any kind.*

The complex task of negotiating for the purchase, arranging for permits, packing, crating, shipping, and payment of such a collection from a foreign country can be fully appreciated only by those who have had to see it through. It is time-consuming, at times exasperating, and always surrounded by doubts and difficulties, as Mr. Millar can testify. But the day of arrival and unpacking that tells you whether or not judgment was sound and the fates kind is exciting and satisfying.

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. Requests for such service must be made at least one week in advance.

SATURDAY LECTURES BEGIN MARCH 3

"North to Adventure," a lecture by Frederick Machetanz illustrated with a really thrilling color motion-picture of life in the Yukon country, will be presented in the James Simpson Theatre of the Museum on March 3 at 2:30 P.M. It is the opening program in the spring course of lectures and films on science and travel for adults—the 105th such series to be offered under the provisions of the Edward E. Ayer Lecture Foundation Fund. Eight other lectures will be given on Saturday afternoons throughout March and April, all at 2:30 o'clock.

Machetanz, received with acclaim by Museum audiences at lectures in other seasons, spent more than a year in exploration of the fabulous pass between the Indian village of Kaltag, Alaska, on the Yukon River and the Bering Sea while making his latest film. He was accompanied by his wife and a team of sled dogs headed by his famous white dog Seegoo.

A schedule of the other eight lectures will appear in the March issue of the BULLETIN. For all the programs, a section of the theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for reserved seats should be made in advance by telephone (WAbash 2–9410) or in writing. Seats will be held in the Member's name until 2:25 P.M. on the day of the program.

Free Movies for Children

Nine free programs of motion pictures for children will be presented on Saturday mornings throughout March and April in the spring series offered by the James Nelson and Anna Louise Raymond Foundation. First program, on March 3, will be "North to Adventure," and Frederick Machetanz, the explorer who made the film, will be present to give a children's version of the lecture he will give for adults on the afternoon of the same day. No tickets are needed. Children are welcome either alone, accompanied by parents or other adults, or in groups from schools, clubs, and other centers. A schedule of the eight other programs will appear in the March BULLETIN.

Books by Machetanz

Books by Frederick Machetanz, lecturer on Alaska scheduled for both the adult and children's programs at the Museum on March 3, are available in The Book Shop of the Museum. Those for adults are *Here Is Alaska* ($3.50) and *Where Else But Alaska* ($3). Titles for children are *Panuck, an Eskimo Sled Dog* ($2.50), *On Arctic Ice* ($2.50), *Barney Hits the Trail* ($2.50), and *Rick of High Ridge* ($2.50).

HUGE WHALE SKELETON RECEIVED AS GIFT

The Museum recently received by truck the skeleton of a California finback whale as a gift from the Wistar Institute of Anatomy and Biology, Philadelphia. The skeleton, which was originally presented to the Institute by the late eminent E. D. Cope and was exhibited there for many years, is 65 feet long. The finback skeleton is 15 feet longer than the right-whale skeleton that it will replace.

Because Chicago is remote from the sea, the skeleton of a right whale has for many years been one of the Museum's major attractions. It will be gratifying to replace it with one of the largest of whales.

Annual Attendance Over Million for Twenty-ninth Time

Attendance at the Museum in 1955 exceeded a million, reaching a total of 1,072,676 visitors. Since 1926, a period of twenty-nine successive years, annual attendance has never dropped below a million.

As in other years, comparatively few visitors (129,151, or barely over 12 per cent) paid the 25-cent admission charged adults on Mondays, Tuesdays, Wednesdays, and Fridays. The overwhelming majority (943,525) came on the three free days or belonged to those groups to whom admission is free at all times (Members of the Museum, children, teachers, members of the armed forces, etc.).

The number of visitors coming into the building is, of course, an incomplete measure of the Museum's effectiveness. Hundreds of thousands of people are repeatedly reached through extramural activities such as the circulation throughout the school year of natural-history exhibits by the N. W. Harris Public School Extension and the lecturers with films and slides sent into the schools by the James Nelson and Anna Louise Raymond Foundation. Less directly the Museum's influence is spread to countless others by publications of the Museum press and by radio, television, magazines, and newspapers.

STAFF NOTES

Dr. Karl P. Schmidt, Curator Emeritus of Zoology, has been appointed to the American Institute of Biological Sciences' advisory committee on systematic biology to the National Science Foundation .... **Dr. Sharat K. Roy,** Chief Curator of Geology, is spending several weeks in Washington, D.C., at the United States National Museum in research on meteorites .... **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, recently lectured before the Evanston Garden Club on his Venezuela "lost world" expedition .... **Loren P. Woods,** Curator of Fishes, recently was the speaker before the Conservation Council on "Conservation in the Great Lakes." .... **Cameron E. Gifford,** formerly an assistant in taxidermy, has been appointed Preparator of Fossils in the Department of Geology. He received the degree of Bachelor of Science at Earlham College in June, 1955, before he joined the Museum staff.

NEW MEMBERS

(December 16 to January 13)

Contributor

Wm. McCormick Blair

Associate Members

Alfred S. Alschuler, Jr., Mrs. Robert T. Borcherdt, F. B. Milhoan, Robert H. Reid, Mrs. William M. Scudder

Annual Members

Lore W. Alford, Milton R. Beasley, W. S. Bodman, Howard A. Carlton, Peter Coladarci, M. M. Cole, Walter W. Denman, F. J. Dittrich, Dr. Jerome Fishman, Anthony M. Frale, Elton A. Herrick, Emil T. Johnson, Richard B. Keck, John O. Kindahl, Robert J. Koretz, Maxwell Kunin, Wenzel J. Love, Dr. Saul Mackoff, R. E. McGreevy, James P. McGuffin, Louis Nippert, J. V. Paffhausen, Lutz Pennigsdorf, Carl Dan Pierson, Dr. R. W. Pilcher, Mrs. William F. Ray, James A. Reynolds, Jr., Robert S. Russell, Aaron B. Weiner

GIFTS TO THE MUSEUM

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

Department of Anthropology:

From: Mrs. Edward R. Finnegan, Chicago —pottery jar, Dean's Island Arkansas; E. C. Holden, Chicago—object of horn and lead; Robert A. Stough, Chicago—Chinese rubbing, Hengshan, Hunan Province, China

Department of Botany:

From: Roger Boe, Broadview, Illinois—2 fungi; Dr. Fay K. Daily, Indianapolis—alga, New York; Margaret Fox, London, England—alga, Sierra Leone; Dr. Leroy J. Gier, Liberty, Missouri—moss; Dr. Herbert Habeeb, Grand Falls, New Brunswick—892 algae; Institut National pour l'Etude Agronomique, Belgian Congo—52 samples of seeds of agricultural Leguminosae; Dr. Jacques Rousseau, Montreal—2 algae; Emil Sella, Chicago—2 lichens, Oregon; Dr. I. Umezaki, Maizura, Japan—3 algae; M. B. Valero, Quezon City, Philippine Islands—3 algae; Mrs. Marion Wolf, Lafayette, La. —fruits of *Cercis, Mimosa, Campsis, Ipomoea, Wisteria,* 3 herbarium specimens

Department of Geology:

From: H. J. Carlson, Anchorage, Alaska —jar of volcanic ash; University of Chicago —107 fossil plant specimens; Shell Development Co., Houston, Tex.—undetermined placoderm plate, Canada; Dr. and Mrs. R. H. Whitfield, Evanston, Ill.—*Lepidoderma mazonense* and collection of Pennsylvanian fossil plant specimens, Braidwood, Illinois

Department of Zoology:

From: Chicago Zoological Society, Brookfield, Ill.—mammal, Madagascar; D. Dwight Davis, Richton Park, Ill.—mammal; Frederick R. Fechtner, Champaign, Ill.—collection of fresh-water clams; U. S. Fish and Wildlife Service, Milford, Conn.—14 parasitic snailshells; Cameron E. Gifford, Valparaiso, Ind.—13 small mammals, Cook County; Harry Hoogstraal, Cairo, Egypt—43 frogs, 95 lizards, 27 snakes, 12 birdskins, 98 mammals; Gary Manda, Chicago—5 small mammals; University of Michigan, Ann Arbor—5 paratypical land-shells, South and Central America; John R. Millar, Skokie, Ill.—7 small mammals; Jack T. Moyer, Hamilton, N.Y.—225 birdskins, Japan; Oriental Institute, Chicago—11 bird skeletons, 2 birds, 6 mammal skeletons, Iraq; Dr. Ralph S. Palmer and Frances Benedict, Albany, N.Y.—800 labeled microscope slides of bat hairs; Dr. Julian A. Steyermark, Barrington, Ill.—mammal skin; Roland von Hentig, Chicago—3,142 insects, Borneo and Sumatra; Dr. Frederick J. Medem, Bogotá, Colombia—4 lots of nonmarine shells

MELVIN TRAYLOR JOINS CURATORIAL STAFF

Melvin A. Traylor, Jr., who has been associated with the Museum's Division of Birds in various capacities since 1937, has been appointed Assistant Curator of Birds. He assumed his duties last month.

Mr. Traylor's interest in birds began in his boyhood and continued as an adult hobby, finally leading to his decision to adopt ornithology as a profession. His serious work in ornithology got under way with two collecting expeditions in Yucatan that he conducted on behalf of the Museum in 1937 and in 1939–40. Upon his return from the latter, he joined the Museum staff on a volunteer basis as Associate in the Division of Birds, and later he was appointed Research Associate. In 1941 he was a member of the Leon Mandel Galapagos Expedition, and the Southwest Zoological Expedition. He also conducted an expedition in the Veracruz area in 1948. He is a graduate of Harvard University, where he majored in biology.

Mr. Traylor joined the U. S. Marine Corps in 1941, enlisting as a private. He served with distinction through the war and was commissioned successively as lieutenant, captain, and major and won the Silver Star for valor in the Pacific theater. After retiring from the Marines in 1946, he returned to his ornithological studies at the Museum; then for several years he was engaged in private business ventures. In his new position at the Museum Mr. Traylor will specialize in Old World birds, while Curator Emmet R. Blake will continue to give his attention primarily to the New World collections.

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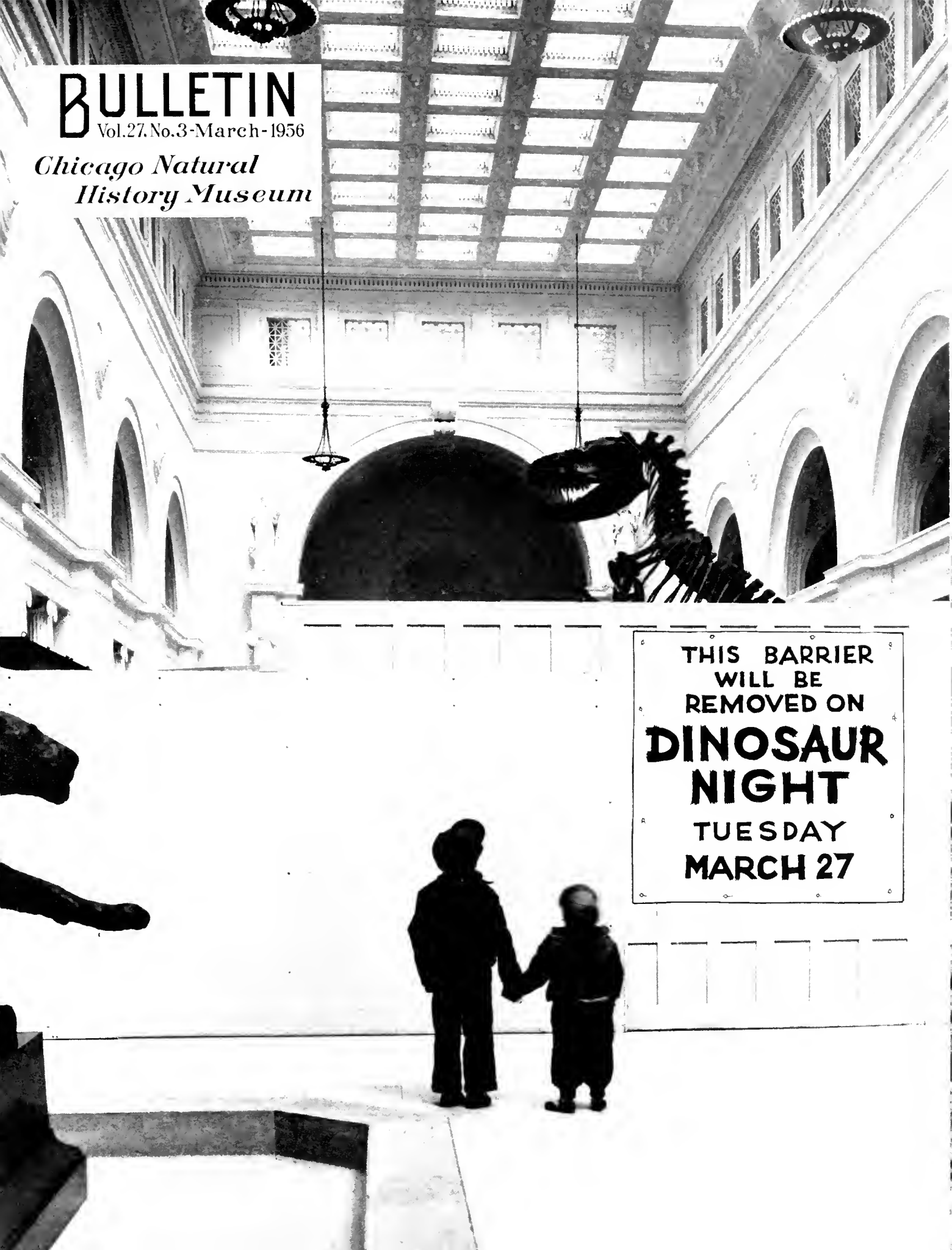

Chicago Natural History Museum

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THE BULLETIN

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SHARAT K. ROY ..... *Chief Curator of Geology*
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Members are requested to inform the Museum promptly of changes of address.

'SO YOU WORK IN A MUSEUM!'

The above exclamation, in astonished voice, and its complementary question, "How come?" or variants thereof, are frequently heard by members of the staff of this and other museums when their occupation is revealed for the first time to friends and acquaintances.

The question was recently asked of Melvin A. Traylor, Jr., who at the beginning of this year terminated a career in business to join the Museum staff in a full-time position as Assistant Curator in the Division of Birds. The interrogator was a reporter for the *Chicago Sun-Times*, who scented a feature story behind the announcement of the appointment.

"Birds are better than business," the reporter was told by Traylor, for whom the new Museum job was a return rather than a beginning. He had first become associated with the Division of Birds in 1937 as a volunteer worker and was a member of a number of Museum expeditions. After gallant war service with the U. S. Marines, Traylor had resumed his volunteer activities at the Museum. In the next few years friends kept up a constant pressure, he told the reporter.

"They told me I was wasting my life. They said I would never know what I might be able to accomplish in business if I didn't give it a try. I began to wonder what the answer might be."

Finally, in 1951, Traylor and two other young men formed the Allied Barge Company. A little later Traylor was offered and accepted the presidency of a toy-manufacturing company.

"I had offices in a Loop building opposite two second-hand book stores," he said. "I would spend most of my lunch hour in one or the other hunting for good buys in books on science. That became the one happy hour of my day. It was the only time I felt free of pressures. My business work did not leave me with the feeling I was doing anything constructive. In the Museum's work I had had a sense of accomplishment. The study of birds helps man toward an understanding of all of nature.

"Since my return to the Museum several businessmen friends have told me they envy me. They're not happy in their work but they have such a stake in it through time spent and big paychecks coming in that they can't bear to give it up and turn to something more appealing.

"But I haven't found any unhappy people working in the Museum. They're here because it's here they want to be."

BROTHER LEON

(Dr. Joseph Sylvestre Sauget y Barbier)
1871—1955

With the death on November 20, 1955, of Brother León the Museum lost one of its highly esteemed Corresponding Members. Born December 31, 1871, in Mesnay-les-Arbois, France, he was educated in Besançon and Dijon. He joined the order of Christian Brothers in 1885 and taught mathematics and natural science in France, Canada, and Cuba, where he spent the greater part of his life. His special field of interest was the vegetation of Cuba, particularly its palms. Renowned professor at the Colegio de la Salle in Vedado, Havana, he was one of the founders of that institution.

A monument to the founders stands in the patio of the Colegio in Vedado, but the monument entirely his own will be the herbarium he established and the publications he wrote. With Brother Marie Victorin of the University of Montreal, he collaborated in *Itinéraires Botaniques*, an account of their explorations of the vegetation of Cuba. His outstanding work is the *Flora of Cuba*, three volumes of which have been issued, while the fourth and last is still in the very competent hands of his pupil and collaborator Brother Alain of the same Colegio de la Salle, co-author also of the second and third volumes.

In recognition of his outstanding work, Brother León received in 1927 the degree of Doctor of Science, *honoris causa*, from Columbia University and many other honors from various institutions. On May 16, 1949, the Board of Trustees of Chicago Natural History Museum elected Brother León a Corresponding Member.

DINOSAUR NIGHT
Tuesday, March 27

THIS MONTH'S COVER

The barriers that have aroused the curiosity of the young visitors in our cover picture will be removed on Dinosaur Night (the evening of Tuesday, March 27) to reveal to Members of the Museum and guests the completed exhibit of Gorgosaurus and Lambeosaurus. Details of this event will be found on page 3. On pages 4 and 5 are pictures of stages in the long and intricate process of preparation.

NEW MEMBERS

(January 16 to February 13)

Contributor

Hughston M. McBain

Associate Members

Robert A. Kroeschell, John F. Milliken, Mrs. Harry J. O'Rourke, Dr. Edward L. Schrey, Lester N. Selig, Carl J. Sharp, Leonard P. Spacek, John Stewart, S. C. Waldman, Dr. Paul K. Weichselbaum

Non-Resident Associate Member

Gabriel N. Vas

Annual Members

J. Kenneth Baird, George L. Bower, Dr. Paul L. Bower, Alfred J. Brennan, Richard P. Brown, Jr., John C. Chatterton, Joseph F. Clary, Andrew F. Conlin, C. W. Duncan, Dr. N. Ercoli, Mrs. Anna Erichsen, Cyril Ewart, Isadore Fishman, Julius Fishman, Mrs. Mildred C. Fletcher, Allyn J. Franke, Miss Mary Garcia, Don R. Grimes, George J. Handzik, James Hansen, Mrs. Nina Harrell, John G. Heiland, George J. Heitz, Howard J. Johnson, Mrs. Ray W. Leonard, Edward Logrbrinck, Charles O. Main, Leo S. Maranz, Howard T. Markey, W. Stirling Maxwell, John C. McWilliams, Dr. Irene T. Mead, Chester F. Mikucki, Wesley A. Miner, Robert T. Morley, Albert E. Noel, DeWitt O'Kieffe, Robert E. Oscar, John C. Ott, Walter C. Paeth, F. W. Pain, Sidney A. Paradee, Roy J. Pierson, John J. Poister, B. B. Provus, Theodore H. Reed, Joseph E. Rich, Dr. William L. Riker, Dr. John Francis Ruzic, Dr. Wilma C. Stafford, Wirt W. Stafford, Fred W. Storner, Harry R. Swanson, Kenneth R. Turney, Walter Yust, Frank O. Zimmermann

'DINOSAUR NIGHT' FOR MUSEUM MEMBERS—MARCH 27

(Pictures on pages 4 and 5)

GORGOSAURUS, a giant dinosaur 26 feet long, with his head towering to a height of 15 feet, will make his debut at the Museum in a preview for Members on the evening of **Tuesday, March 27.** The event has been designated as Dinosaur Night. Featured will be a lecture by Dr. Edwin H. Colbert, outstanding paleontologist.

Gorgosaurus, a predatory carnivorous character, will be displayed with Lambeosaurus, his victim, also a large dinosaur but vegetarian in habits and probably a gentler creature. After the Members' preview, these spectacular prehistoric animals will remain in Stanley Field Hall on permanent exhibition for the general public.

Only Seven Known Skeletons

Gorgosaurus, king of beasts some 75 million years ago and a tyrannical monarch, has survived in almost complete fossil skeleton form. Most important acquisition the Museum has received in recent years, Gorgosaurus comes to the Museum as a gift from members of its Board of Trustees who contributed thousands of dollars for its purchase. It is an extremely rare specimen. Only seven skeletons of this genus have so far been collected.

Lambeosaurus, a duck-billed dinosaur of a variety believed to have been a favorite prey of Gorgosaurus, has been in the Museum for years awaiting a suitable installation such as now has been made. This skeleton was excavated in Alberta, Canada (where Gorgosaurus also was discovered), in 1922 by an expedition sponsored by Marshall Field, now First Vice-President of the Museum. Leader of the expedition was Elmer S. Riggs, former Curator of Paleontology.

Presentation Ceremony

At the Dinosaur Night ceremony, the presentation address will be made by Louis Ware, Museum Trustee who initiated the move that resulted in bringing Gorgosaurus to the Museum. The acceptance speech will be made by Stanley Field, President of the Museum. Dr. Clifford C. Gregg, Director, will act as master of ceremonies.

The exhibit showing Gorgosaurus looking down upon a dead Lambeosaurus is installed in a central location in Stanley Field Hall, to the south of the famous fighting African elephants mounted by Carl E. Akeley. Because of the vast dimensions of the hall and the large assemblage of the Museum Members and guests expected, arrangements have been made to assure that all may hear by providing a public-address system to amplify the voices of speakers.

The presentation ceremony is scheduled for 8:30 P.M., but the doors of the Museum will be open at 7 P.M. Early visitors will have the opportunity to tour the two large halls of prehistoric life on the second floor—Ernest R. Graham Hall (Hall 38) and Frederick J. V. Skiff Hall (Hall 37)—where they may inspect not only other dinosaur exhibits but other forms of fossils including the lowest invertebrates that flourished many hundreds of millions of years ago.

Preceding the presentation there will be an informal gathering of Museum Members, other guests, and members of the staff. Visitors will have opportunity to "talk shop"—dinosaur shop—with the paleontologists and preparators whose thought and toil resulted in the exhibit of Gorgosaurus and Lambeosaurus.

HOW THEY LOOKED IN LIFE

Miniature sculptured restoration of Gorgosaurus (right) and Lambeosaurus, by Maidi Wiebe, Artist of the Department of Geology. This model will be exhibited with the actual skeletons.

Illustrated Lecture in Theatre

At 9 P.M. on Dinosaur Night, guests are invited to the Museum's James Simpson Theatre where an illustrated lecture will be given by Dr. Edwin H. Colbert, one of the world's leading students of fossil reptiles and mammals. Dr. Colbert is Curator of Fossil Reptiles and Amphibians at the American Museum of Natural History, New York, and Professor of Vertebrate Paleontology at Columbia University. He is author of many scientific papers and of *The Dinosaur Book*, which is widely regarded as the best semipopular account of fossil reptiles. Dr. Colbert is responsible for the recent reoganization of fossil-reptile exhibits at the American Museum. He has led many expeditions, and recently discovered an aggregation of small early dinosaurs in Triassic deposits of New Mexico.

Souvenir Pamphlet

An illustrated leaflet on Gorgosaurus and Lambeosaurus, especially prepared for Dinosaur Night by Dr. Rainer Zangerl, Curator of Fossil Reptiles at this Museum, will be distributed to all who are present on this occasion.

The assembling of the Gorgosaurus skeleton, a major installation feat, was performed by Orville L. Gilpin, Chief Preparator of Fossils. He was assisted by Preparators Stanley Kuczek and Cameron E. Gifford and by William D. Turnbull, Assistant Curator of Fossil Mammals. Curator Zangerl supervised the entire operation.

In life, Gorgosaurus is believed to have weighed about six tons. The fossil skull is 42 inches long and weighs more than 200 pounds. The more placid vegetarian dinosaurs that were contemporaries had little chance to escape when Gorgosaurus pounced upon them. The flesh-eating monster was powerful and agile, despite his great bulk. His jaws are studded with large teeth having sharp edges and suggesting his fearful potentialities as a killer. He was first cousin to the better-known Tyrannosaurus, which also was a terror to its herbivorous contemporaries in the prehistoric world.

Gorgosaurus was excavated from the Belly River Formation in the Red Deer River area of the province of Alberta, Canada, not far from the city of Edmonton.

Special Bus Service

For the convenience of visitors on Dinosaur Night, there is ample free parking-space at the north of the Museum building. For those who do not wish to drive their cars, special free motor-bus service has been arranged. A special bus marked to indicate Museum shuttle-service will leave Jackson Boulevard at State Street at 15-minute intervals beginning at 6:45 P.M. The last bus will leave the Museum at 11 P.M. In both directions the bus will make intermediate stops on Michigan Avenue at Jackson and at 7th Street. This transportation is free—no fares collected, no transfers required.

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. Requests for such service must be made at least one week in advance.

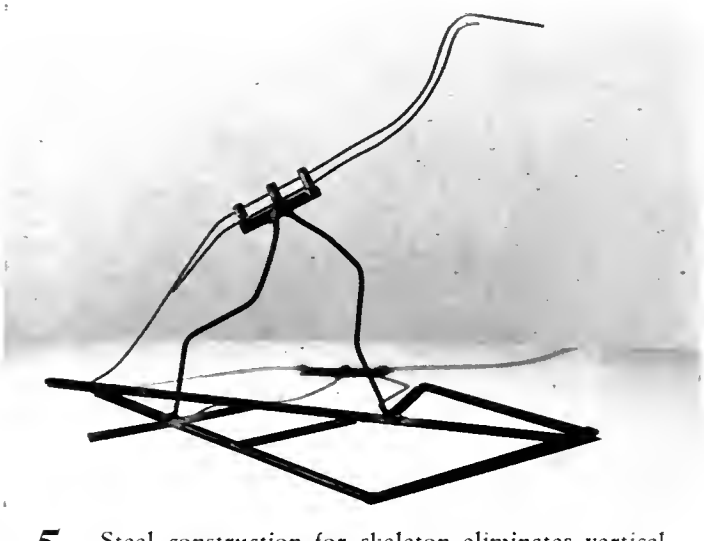
Disease Chaser

Among the Tinguian people in the Philippine Islands, natives weave potek (a variety of bamboo) into necklaces and anklets worn to ward off smallpox.

GORGOSAURUS

1. Plaster jackets removed and bones prepared. Lambeosaurus awaits move to main hall.

2. But Orville Gilpin was faced with months of patient chipping.



5. Steel construction for skeleton eliminates vertical supports and maintains balance.

GORGOSAURUS, one of the largest and most vici
make their debut March 27 as a permanent exhibit
toil by staff paleontologists. Gorgosaurus is some 26 fe
six tons. It is a recent gift from the Museum's Trustee
cavated years ago by an expedition sponsored by Marsh
here are the principal steps involved in restoring these t

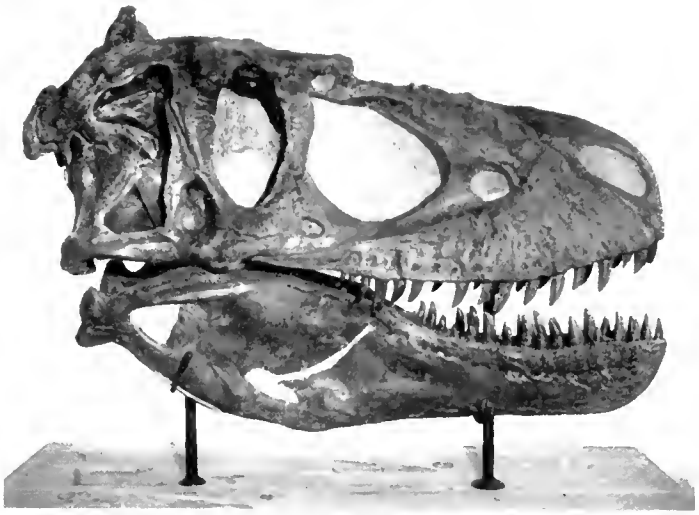
6. Metal discs that separate vertebrae are welded into place.

7. Gilpin and William Turnbull bolt leg-irons to frame.

8. Skull is hoisted fi
and tackle.

—Giant Jigsaw Puzzle

3. Skeleton of Gorgosaurus arrives in seven large crates; Gilpin and assistant remove scapula.



4. Skull is unpacked; it weighs 205 pounds and is an impressive 42 inches long.

linosaurs, and its unfortunate victim, Lambeosaurus, will tanley Field Hall. They represent 18 months of arduous ng, towers 15 feet above floor, and in life weighed about ambeosaurus, a plant-eating duck-billed dinosaur, was ex- ield, now First Vice-President of the Museum. Pictured ptilian enemies of 75 million years ago.

11. DRESS REHEARSAL in workroom is a success. Two skeletons reach final stages of preparation for Dinosaur Night, Tuesday, March 27, when Museum Members are invited to a preview.

eet on block

9. Cameron Gifford assists Gilpin and Turnbull in placing skull.

10. Skull and jaws emphasize terrifying character of giant carnivore.

SEE THE WORLD IN LECTURE-FILMS ON SATURDAYS

IF YOU CAN'T get away from town, you can still see the world. In fact, you can see places and phases of life you would scarcely encounter as a tourist. Yukon country . . . mountains and jungles of Ecuador . . . "down under" in the bushland of Australia . . . the Nile deep in Africa beyond Egypt . . . the forbidding icy slopes of Mount Everest. These are a few of the out-of-the-way places to be brought to Chicago audiences in color motion-pictures and lectures by explorers of eminence on the nine Saturday afternoons during March and April.

TOUGH DOGS FOR TOUGH TRIP

Fred Machetanz, lecturer to appear at Museum March 3, and wife (left) harness their team of malemutes to haul sledge on rugged journey through fields of ice and snow in Alaska between the Yukon and Bering Sea.

The Edward E. Ayer Lecture Foundation for the 105th time will provide vicarious adventures abroad for those whose stay-at-home obligations prevent satisfaction of wanderlust. The programs, to be given in the James Simpson Theatre of the Museum, all will begin at 2:30 P.M. Admission is free. Only adults can be accommodated, but on the mornings of the same Saturdays the Museum provides free motion-pictures for children. Following is a synopsis of the programs for adults:

March 3—North to Adventure

Fred Machetanz

This program takes you on a long trip through Alaska by dog team—in much more comfort than if you actually made the trip. Machetanz, who lives in Alaska, an artist and author of many books, was accompanied by his wife on this journey by sledge and on snowshoes. His film shows the exploration in subzero weather of a rugged pass between the Yukon and the shore of the Bering Sea as well as the continuation of exploration in outboard-motored boats during the milder summer. The life of the Eskimos is well documented.

March 10—Ecuador

Eric Pavel

Pavel presents in color film a survey of Ecuador from end to end. Shown are its gateway port of Guayaquil, its mountain areas in the Andes, its wild jungles where the headhunting Jivaro Indians dwell, and its offshore possession, the Galapagos Islands, where Darwin developed his theory of evolution. The Otavalo Indians, famed for woodcarving and painting, are seen at work and play, in picturesque markets, and at a colorful wedding ceremony. The Galapagos sequences provide studies of unique giant tortoises and other strange animal life.

March 17—Northern and Western Australia

Alfred M. Bailey

Dr. Bailey, Director of the Denver Museum of Natural History, presents the first film in natural color of out-of-the-way places in the vast western half of Australia. A land of contrasts—red desert and green palms, salt lakes, and vast cattle stations—it is the home of aborigines still living in the equivalent of the Stone Age. The film includes intimate studies of strange animal and plant life found in dunes, mountains, and lakes. Besides the wilderness areas, Dr. Bailey shows the interesting cities of Adelaide, Darwin, Derby, Carnarvon, and Perth.

March 24—Kayaks Down the Nile

John Goddard

The Nile, longest river in the world, yielded its secrets to the camera of John Goddard, who had the interesting idea of traveling its 4,200 miles in small boats patterned after Eskimo kayaks. Only a fourth of this great river's length lies within Egypt. The Nile in the wilder Africa beyond, strewn with roaring cataracts and passing through steaming fever-ridden jungle, ranks among the most treacherous of all waters. This is the first complete color-record of the Nile's entire course. During his adventure-packed voyage Goddard encountered hazardous rapids, wild animals, river pirates, and even the threat of starvation. Many of the strange and vast areas he invaded had seldom before been glimpsed by explorers.

March 31—Spain

Clifford J. Kamen

Spain from the Pyrenees on the north to Andalucia in the south, ancient Spain where the Greeks, Phoenicians, Carthaginians, and Romans settled centuries ago, Spain of the 700-year occupation by Moorish conquerors, and busy modern Spain dotted here and there with isolated communities where yesterday's ways have changed but little over the centuries—all these are made vivid in Kamen's comprehensive color-film and narrative. The film is a remarkably thorough survey of the story of a great nation. The

DINOSAUR NIGHT
Tuesday, March 27

THESE LECTURES ON SATURDAYS; TWO OTHERS ON SUNDAYS

The Museum wishes to emphasize that the lectures announced on this page will be given on Saturday afternoons. A brief notice in the last Bulletin stating that there would be Sunday afternoon lectures in March and April referred only to *March 18* and *April 22*, when the Illinois Audubon Society will present lectures in the Museum.

No tickets are needed for either the Museum's Saturday lectures or the Audubon Sunday lectures. Members of the Museum are each entitled to two reserved seats. Reservations may be made by telephone (WAbash 2-9410) or in writing. Seats will be held in the Member's name until 2:25 p.m.

Alhambra in Granada, quaint old Seville, medieval castles, and a festival in the Basque country where the inhabitants hold to old and unique traditions are features of interest.

April 7—The Challenge of Everest

Norman G. Dyhrenfurth

Dyhrenfurth's film of an attempt to scale the forbidding giant of the Himalayas has been acclaimed as one of the most spectacular ever produced. The lecturer was official photographer of the second Everest Expedition (1952) that climbed to within 900 feet of the long-sought summit. Tenzing Norkay of Sir John Hunt's later successful British expedition was a member of the Swiss party, and the experience gained was credited with being a large factor in the final conquest of the peak. Dyhrenfurth's lecture and film combine to tell a fascinating story of intrepid mountaineers desperately battling enormous glaciers, steep icy slopes, and freezing gales.

April 14—Saga of the Swamplands

Earl L. Hilfiker

If you like to commune with nature, this film will stir memories and let you relive cherished days and nights when you sat in duckblinds or poled an old flatbottomed boat on a meandering stream between solid green walls of cattails. If you have never done these things, Hilfiker's film and lecture will introduce you to a fascinating segment of the world of out-of-doors. You will see a dead marsh come alive with a chorus of frogs and peepers, while geese by the thousands and ducks by the tens of thousands wing their way to feed and rest during their migration toward their northern breeding grounds.

April 21—Penguin Summer

Olin Sewall Pettingill, Jr.

Penguins, those comical seabirds that seem to be nature's caricatures of men, are seldom seen except in zoos because they dwell and nest in some of the most inaccessible lands of the southern hemisphere. Dr. Pettingill's movie and lecture take you to a colony of 100,000 or more penguins in the Falkland Islands, 300 miles east of the southern tip of South America. Three species—gentoo, rockhopper, and jackass penguins—are the film's featured players. All are social birds, nesting in communities that are in constant and dramatic turmoil. Courtship and family rearing are conducted with the deadpan seriousness of circus clowns. Juvenile penguins romp and play, annoy their parents, and are so completely fascinated by human beings that they follow them around.

April 28—Blizzards to Blossoms

William Parsons

A large part of this film is devoted to the blizzard of 1952 that almost buried the state of Maine. Not only are the scenes of this terrific storm recorded on the film, but even the fearful sound of the vicious wind and the crashing of trees and houses are heard from an accompanying tape recording. What a blizzard can do to man and beasts is shown in a gripping demonstration of nature's fury and force that most people would prefer to experience in the comfort of the lecture auditorium rather than on the scene. Tension is relieved by sequences of the beauty and beneficence of nature in her gentler moods with the coming of spring to the north country.

DINOSAUR NIGHT
Tuesday, March 27

Audubon Lecture March 18 on Bird Conservation

"The Long Flight Back," a lecture by Robert P. Allen, Research Director of the National Audubon Society, will be presented at 2:30 P.M. on Sunday, March 18, in the James Simpson Theatre of the Museum under the auspices of the Illinois Audubon Society. Allen, a leader in the movement to preserve birds from the fate that befell the lamented passenger pigeon, will tell the story of "returning wings"—birds such as the whooping crane, roseate spoonbill, and American flamingo that had been threatened with extinction but are now being aided in survival by conservation measures. His notable color-film of wildlife from the Caribbean to northern Canada shows, among many other birds, the now abundant American egrets and their relatives that have been saved from extinction.

Seats in the reserved section of the auditorium are free to Members of the Museum and of the Illinois Audubon Society upon presentation of their membership cards.

Final lecture in the Audubon series will be "Rhapsody in Bluegrass" by Walter H. Shackleton on Sunday afternoon, April 22.

STAFF NOTES

Using the resources of the Missouri Botanical Garden during a recent visit to St. Louis, **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, has been continuing his studies of Missouri flora. Curator Steyermark has also had a strenuous lecture schedule, relating his Venezuelan "lost world" expedition experiences before audiences at Washington University and Henry Shaw School of Botany in St. Louis as well as the Chicago Ornithological Society, Barrington Lions Club, and Evanston Garden Club and talking on wildflowers before the Lake Bluff Garden Club and the Downers Grove Garden Club . . . . **Dr. Paul S. Martin,** Chief Curator of Anthropology, recently appeared in the series "Visits with Interesting People" at the Central Y.M.C.A. in Chicago . . . . **Dr. John B. Rinaldo,** Assistant Curator of Archaeology, spoke on careers in anthropology before an assemblage of students at Lyons Township High School in La Grange.

PROGRAMS FOR CHILDREN ON NINE SATURDAYS

Eight free programs of motion pictures and a puppet show will be given for children on the nine Saturdays in March and April. On four of the film programs the explorers who did the camera work will appear to tell their stories in person. The programs, presented by the James Nelson and Anna Louise Raymond Foundation, will all begin at 10:30 A.M. Children are invited to attend in groups from schools, clubs, or other centers, or they may come individually, with or without their parents or other adults. No tickets are needed. Following are the titles and dates.

March 3—North to Adventure (Alaska)

Story told by Fred Machetanz

March 10—Below the Sahara

A technicolor picture made on African safari to find and photograph, not to kill, animals

March 17—Northern and Western Australia

Story told by Alfred M. Bailey

March 24—Spring Is an Adventure

A look at the out-of-doors in the spring

March 31—Bible Lands

April 7—In the Circus Arena

A close-up view of the circus with all its exciting acts and animals

April 14—The Little House by the Creek

Living close to Mother Nature's children
Story told by Earl L. Hilfiker

April 21—Wild Animals in India

Story told by John Moyer

April 28—The Amazing Voyage of Nicky Noodle

Puppet stage-production by Coleman Puppets, Maywood, Illinois

New Contributors Elected

In recognition of notable gifts to the Museum, Wm. McCormick Blair and Hughston M. McBain, eminent Chicagoans, were recently elected Museum Contributors by the Board of Trustees. Contributors are a special membership class including all whose gifts in funds or materials are valued at $1,000 to $100,000.

NATURE PHOTO CONTEST WINNERS NAMED

Stanley Field Hall was a busy place last month as throngs of people came to view photographs of animals, plants, and scenic phenomena at the Eleventh Chicago International Exhibition of Nature Photography. More than 200 prints were displayed in the

HYDRANGEA

By William L. Van Allen, of Bend, Oregon. Awarded first-prize silver medal in Plant-Life Section of Nature Photography Exhibition.

exhibition hall, and more than 800 color transparencies were shown to the public on the screen of the James Simpson Theatre on two Sunday afternoons. The prints and slides were selected from more than 3,700 entries sent to the Museum and to the Nature Camera Club of Chicago, co-sponsors.

Prints and slides for this exhibition, the largest nature-photography show held anywhere, were received from amateur and professional photographers all over the world. Six contestants won silver medals, and 111 honorable mentions were awarded, seventeen of them to Chicago-area residents. Two special medals were awarded by the Photographic Society of America for color harmony in color-transparencies. Following are names of entrants who received silver medals and honorable-mention awards:

THE BLIZZARD

By Gertrude L. Pool, of Palo Alto, California. Awarded first-prize silver medal in General Section of Nature Photography Exhibition.

MEDAL WINNERS

Prints:

ANIMAL-LIFE SECTION: Leslie Campbell, Belchertown, Mass.—*Evening Grosbeak*

PLANT-LIFE SECTION: William L. Van Allen, Bend, Ore.—*Hydrangea*

GENERAL SECTION: Mrs. Gertrude L. Pool, Palo Alto, Calif.—*The Blizzard*

Color Slides:

ANIMAL-LIFE SECTION: S. G. Blakesley, Merced, Calif.—*Mocker*

PLANT-LIFE SECTION: Mrs. Mabel Fuller, Riverside, Ill.—*Clintonia*

GENERAL SECTION: M. Hilo Himeno, Madison, N.J. —*Lava Flow*

HONORABLE MENTIONS

CHICAGO AREA

Prints:

ANIMAL-LIFE SECTION: Ted Farrington

PLANT-LIFE SECTION: Louise K. Broman, Louis A. Schulz

GENERAL SECTION: John S. Bajgert, Lillian Ettinger

EVENING GROSBEAK

By Leslie Campbell, of Belchertown, Massachusetts. Awarded first-prize silver medal in Animal-Life Section of Nature Photography Exhibition.

Color Slides:

ANIMAL-LIFE SECTION: W. J. Javurek

PLANT-LIFE SECTION: Mary Abele, J. H. Boulet, Jr., Willard H. Farr, Ethel P. Owen, Dr. Frank E. Rice

GENERAL SECTION: Henry Krull, M. J. Schmidt, Anne E. Stroh, Phyllis Wolgemuth

OUTSIDE CHICAGO AREA

Prints:

ANIMAL-LIFE SECTION: Nevrouw Van den Bussche, Antwerp, Belgium; W. T. Davidson, Warren, Pa.; James Ford, Louisville, Ky.; John H. Gerard, Alton, Ill.; H. Lou Gibson, Rochester, N.Y.; Dr. Gerhard Graeb, Cologne, Germany; Mrs. Harold Kuhlman, Oklahoma City, Okla.; Robert Leatherman, San Bernardino, Calif.; Charles J. Long, San Antonio, Tex.; Charles J. Ott, McKinley Park, Alaska; R. W. Poulter, Horicon, Wis.; Dr. Olof Theander, Stockholm, Sweden; G. H. Wagner, Omaha, Neb.

PLANT-LIFE SECTION: Cy Coleman, Detroit, Mich.; Rudolph G. Flores, Los Angeles, Calif.; Otto Litzel, New York, N.Y.; Dr. Carrol C. Turner, Memphis, Tenn.

GENERAL SECTION: Otto Litzel, New York, N.Y.; George J. Munz, Bergenfield, N.J.; Edward A. Nusbaum, Richmond, Ind.; Mrs. Gertrude L. Pool, Palo Alto, Calif.; Leonard Lee Rue, Columbia, N.J.; Henry W. Ryffer, San Diego, Calif.

Color Slides:

ANIMAL-LIFE SECTION: George Clemens, McConnelaville, Ohio; Alford W. Cooper, Worland, Wyo.; Bernice Foster, Worcester, Mass.; Charles B. Harris, Merced, Calif.; Torrey Jackson, Marblehead, Mass.; Ted Johnson, Worthington, Minn.; B. J. Kaston, New Britain, Conn.; Eugenie Manheim, New York, N.Y.; Harry W. Pike, Springfield, Ill.; Louis Quitt, Buffalo, N.Y.; George W. Robinson, Merced, Calif.; Arthur H. Rosien, White Plains, N.Y.; Dr. Fred Ruch, Plainfield, N.J.; Mrs. Irma Louise Rudd, Redondo Beach, Calif.; Le Roi Russel, Prescott, Ariz.; Frances Steffensen, Omaha, Neb.; J. R. Swain, Winsted, Conn.; Grace Thompson, El Paso, Tex.; H. A. Thornhill, Watertown, N.Y.; Burdette E. White, Perris, Calif.; Robert Leatherman, San Bernardino, Calif.

PLANT-LIFE SECTION: Dr. Blanche E. Burton, Toronto, Canada; J. Campbell, Coal City, Ill.; William I. Campbell, Guelph, Ontario, Canada; Ellen Cubitt, Toronto, Canada; E. J. Flesher, Pittsburgh, Pa.; H. L. Gebhardt, Erie, Pa.; J. E. Goodwin, Toronto, Canada; Henry Greenhood, Hollywood, Calif.; Ferrel W. Hessing, St. Louis, Mo.; Harry G. Hoke, Stillwater, Okla.; Jim Huber, St. Joseph, Mich.; Safford L. Jory, Berkeley, Calif.; Adolph Kohnert, Amenia, N.Y.; Henry M. Mayer, Cleveland, Ohio; E. L. O'Brien, Peoria, Ill.; J. B. Pearson, Mt. Vernon, Ohio; C. H. Pulver, Vestal, N.Y.; Jack Roche, Caldwell, N.J.; Hoyt L. Roush, Charlotte, N.C.; John H. Tashjian, Oakland, Calif.; Grace Thompson, El Paso, Tex.; William L. Van Allen, Bend, Ore.; N. E. Weber, Bowmansville, Pa.; M. V. Westmark, Minneapolis, Minn.

GENERAL SECTION: K. F. Blakie, Los Angeles, Calif.; Beatrice Bruin, Toronto, Canada; Raymond Feagans, Bremerton, Wash.; H. E. Foote, New York, N.Y.; H. Gantner, New York, N.Y.; Katherine Jensen, Pittsford, N.Y.; R. H. Kleinschmidt, Rochester, N.Y.; J. A. Krimmel, Denver, Colo.; Smith MacMullin, Los Angeles, Calif.; C. R. McLead, Raleigh, N.C.; J. O. Milmoe, Golden, Colo.; Ruth J. Nicol, Butte, Mont.; Bernard G. Purves, Glendora, Calif.; Richard F. Smith, Lititz, Pa.; Ruby Watters, Toronto, Canada; Otto Litzel, New York, N.Y.

SPECIAL MEDALS FOR COLOR SLIDES

(Awarded by the Photographic Society of America)

Otto Litzel, New York, N.Y.—*Frozen Brook*

Benjamin Koehler, Urbana, Ill.—*Obsidian and Lichens*

DINOSAUR NIGHT
Tuesday, March 27

EXPEDITION TO EXCAVATE ANCIENT PERU SITES

The Museum's first expedition of 1956 is under way. It is the Archaeological Expedition to Peru, which will seek material both for new Museum exhibits and for research that will be the basis of future publication on development of urban life in prehistoric times. The leader, Dr. Donald Collier, Curator of South American Archaeology and Ethnology, left Chicago on February 4 by air for Lima, where he was joined by Don Thompson, a Harvard graduate-student in archaeology. A group of local helpers was organized, and field operations were begun at the sites of ancient civilization to be excavated in the Casma Valley near the coast, about 200 miles north of Lima.

Excavation of these sites, which were occupied from about 1000 B.C. to A.D. 1470, both before and during the time of the Incas, will continue for about seven months. The expedition is financed by a grant from the National Science Foundation.

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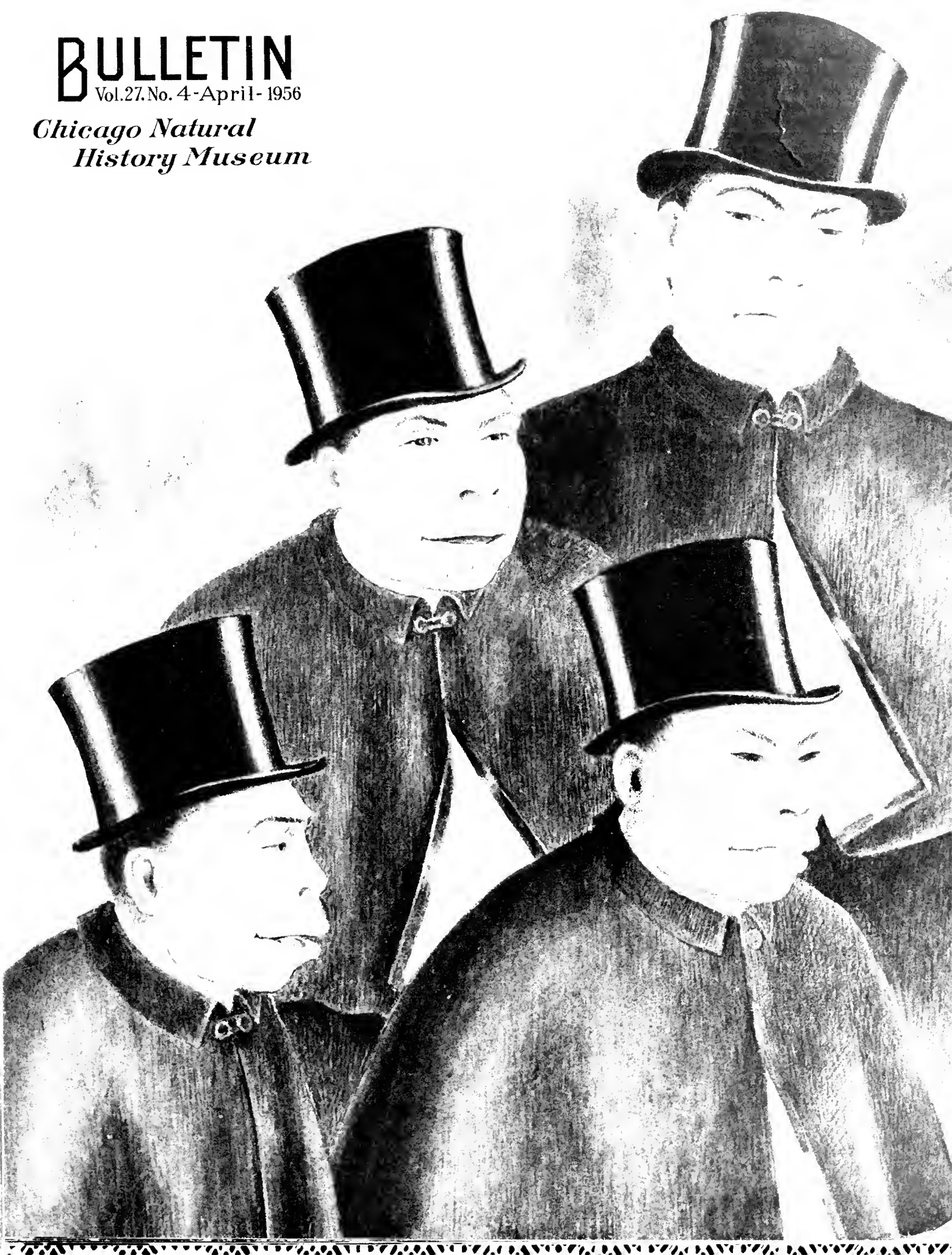

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

THE BULLETIN

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

EXHIBIT OF DINOSAURS INSPIRES VERSES

Dinosaur Night, held March 27 to give Members of the Museum a preview of the new exhibit of Gorgosaurus and Lambeosaurus skeletons in Stanley Field Hall, inspired a member of the Department of Geology staff to produce the following verses:

The World's First Self-Supporting Dinosaur
BY EUGENE S. RICHARDSON, JR.

Come and see the Gorgosaurus,
Tall as life, though somewhat thinner,
Standing in the hall before us,
Interrupted in his dinner.

Hundred million years ago, he
Found a Lambeosaur to munch on.
Something stopped his feast, and so he
Never had that final luncheon

Long ago (the date, Cretaceous)
Gorgosaurus roamed Alberta
Ever hungry, fierce, voracious,
Seeking smaller prey to murder.

Then he died, became a fossil
Buried near the Red Deer River;
Passed the years asleep and docile,
Giving not a jerk or quiver.

Found and shipped to the Museum
With that meal he never tasted,
Here he stands and here you see him;
Not a bone of him was wasted.

Other skeletons of his bulk
Must be held erect by crutches;
Not a post is seen on this hulk—
Just the floor is all he touches.

Engineers may well be baffled
By the structure we're reporting:
Here he stands without a scaffold;
Gorgosaur is self-supporting!

The new dinosaur group is now open to the public as a permanent exhibit. The Gorgosaurus specimen, extremely rare, is a gift to the Museum from the Trustees. The Lambeosaurus skeleton was collected in 1922 by an expedition sponsored by Marshall Field, now First Vice President of the Museum.

GORGOSAURUS STORY ON CHANNEL 11

The story of the Museum's new exhibit of the giant skeletons of Gorgosaurus and Lambeosaurus, and a brief survey of the subject of dinosaurs in general, will be presented by members of the Museum's scientific staff over WTTW, Chicago's educational television station (Channel 11) on Tuesday, April 3 at 9:30 P.M. The program is in the series given under the general title "The Curious One." Dr. Rainer Zangerl, Curator of Fossil Amphibians and Reptiles, who supervised the erection of the skeletons in the Museum, and Dr. Eugene S. Richardson, Jr., Curator of Fossil Invertebrates, will discuss dinosaurs, and demonstrate with models, motion pictures and other material. Orville L. Gilpin, Chief Preparator of Fossils, who was the principal technician in the actual assemblage of the skeletons, will appear with specimens of bones and demonstrate various stages of the work.

Audubon Sunday Lecture Set for April 22

"Rhapsody in Bluegrass" is the title of the final lecture in the Illinois Audubon Society's series for the current season at Chicago Natural History Museum. Walter H. Shackleton, naturalist of Louisville, Kentucky, is the lecturer. He will present a color film screen-tour of his native state. The lecture will be on Sunday afternoon, April 22, at 2:30 in the James Simpson Theatre of the Museum.

Seats in the reserved section of the Theatre are free to Members of the Museum and of the Illinois Audubon Society upon presentation of their membership cards.

Indochina Bronze Drum Presented to Museum

Dr. Karl P. Schmidt, Curator Emeritus of Zoology, and M. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology, recently accepted, for the Museum, a rare bronze fertility drum from Northern Laos, Indochina, presented by Oden Meeker, Mission Chief of Laos for CARE, on behalf of the CARE organization. Dr. Schmidt and Mr. Starr accepted the gift during a reception March 13 commemorating the tenth anniversary of CARE held in Chicago recently. Mr. Meeker served for several summers as a volunteer assistant to Dr. Schmidt in the Museum's Division of Reptiles.

THIS MONTH'S COVER

To anyone who suspects an April First prank in our cover, we quote the late Dr. Earnest A. Hooton of Harvard, a famed anthropologist, who said that if fossil man were dressed in contemporary clothing he might be passed on the street without being identified or attracting any unusual attention. In order that readers may draw their own conclusions on this point, Artist Gustaf Dalstrom of the Museum's Department of Anthropology has dressed four prehistoric types in opera capes and top hats. These fossil "men of distinction" are: *Pithecanthropus erectus* (lower left) who lived in Java perhaps 150,000 or 300,000 years ago; *Sinanthropus pekinensis* (lower right) who lived in China at about the same period; *Homo Neanderthalensis* (upper left) who lived in Europe about 30,000 or 50,000 years ago, and Cro-Magnon man, an European type of some 10,000 or 20,000 years ago. The drawings are based upon reconstructions: that of *Sinanthropus* made by the late Dr. Franz Weidenreich who was associated with the American Museum of Natural History, New York, and the other three by Professor J. H. McGregor, a Columbia University zoologist who was associated with the American Museum. These reconstructions are on exhibition in the Hall of the Stone Age of the Old World (Hall C). A further comment of Dr. Hooton's is pertinent: "We do not know anything of the minutiae of the appearance of the *Pithecanthropus* . . . . or Neanderthal types. We have no knowledge of their hair form, hair distribution, pigmentation . . . . You can with equal facility model on a Neanderthal skull the features of a chimpanzee or the lineaments of a philosopher."

PROBLEMS OF CONSERVATION IN THE GREAT LAKES

By LOREN P. WOODS
CURATOR OF FISHES

THERE EXIST, in Lake Michigan, and in the other Great Lakes, numerous complex problems of conservation as important as any in the United States today. The history of Lake Michigan fisheries reflects our lack of knowledge of the lake environment as a whole and the interactions of the whole assemblage of animals living here. The lake fisheries show effects of lack of proper use in the diminishing over-all catch and in the depletion to a point of non-profitable commercial exploitation of three of the most valuable Lake Michigan species: sturgeon, lake trout, and whitefish.

The total amount of fish produced by the United States waters of the Great Lakes fluctuates between 75 and 100 million pounds per year. In dollar value these fisheries are of considerable importance, averaging around fifteen million dollars—equivalent in value to that of the Pacific sardine industry when that fishery was at its peak. The lake trout, backbone of the lake fisheries, formerly yielded 10 million pounds annually. This was worth $4,000,000, equal to the dollar value of the U. S. codfish industry. The lake trout fishery is now gone from Lakes Huron and Michigan and is in a precarious state in Lake Superior.

It is obvious that extensive fisheries, near such concentrations of population as border the lakes, are of prime importance because of their food value as well as their dollar value. The decline or loss of part of this resource concerns us all. Numerous other benefits are derived from the lakes: their effect on the climate of the bordering states, their use as water supplies and as power sources for cities and industry, their value as shipping lanes, their advantages as sources of recreation for residents and tourists. Sound fishing policies need to be co-ordinated with these other uses.

CHARACTERISTICS OF LAKE MICHIGAN

The basin of Lake Michigan is a long, narrow trough scooped out by the action of ice during the last (Wisconsin) glaciation. In years it is not very ancient, probably only 10,000 or 11,000 years old, having been its present size for less than 4,000 years. Its surface area is 22,400 square miles (about the size of West Virginia) and the median depth is 258 feet. It is clear, deep, and cold.

The lake environment appears to be fairly uniform throughout the year. Changes of temperature and turbidity affect only the surface layers and waters near shore. Below 350 feet the temperature is only a few degrees above freezing at all times. The volume of the lake is relatively constant, the fluctuation level being only ½ to 1½ feet in the course of a year, with an extreme periodic fluctuation of 6 feet, 4 inches. The currents vary in strength between 4 and 90 miles per day. Winds affect the surface and shoals causing large upwellings of cold water from the bottom layers but only rarely is there more than a mild effect in the deeper waters. Two important effects of the wind are on shore erosion and in occasionally breaking up the summer temperature stratification.

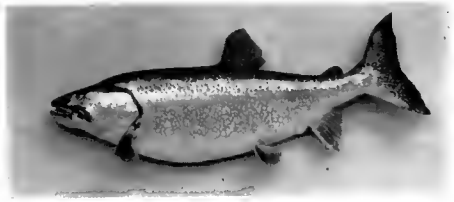
Lake Michigan has had the highest production per unit of area of the four deep members of the Great Lakes chain. This is due to the high production of Green Bay that formerly contributed between one-fourth and one-third, and now contributes from 60 to 70 per cent of the total Lake Michigan fishes caught commercially. Although it has maintained its second place position (Lake Erie is first) in commercial fish production, Lake Michigan suffered a decline of 45 per cent during the 50-year period from 1891 to 1940.

OTHER LAKES LESS DEPLETED

The per cent of decrease in production in the other lakes, though marked, has been much less (Erie 16, Huron 23, Superior 9). These figures are from years *before* the appearance of the sea lamprey and the disappearance of the lake trout or decline of the whitefish.

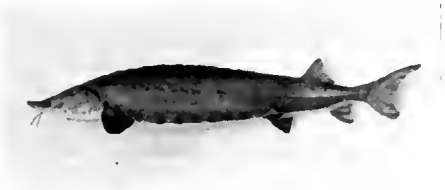
The problem is not one simply of overfishing if that ever were the reason, but also probably of selective fishing. Accounts by some early explorers of Indian fishing in the northern part of the lake and by settlers as late as 1835 indicate an unbelievable abundance of fishes. Prior to 1850 fishing was largely by gill nets and large seines along shore, principally for whitefish and lake trout. In the 1850's pound nets came into use, and as a result of a reported fall-off in production in 1871 the first survey of fisheries was made. The decrease in fisheries production during the years 1858 to 1872 was estimated to be 50 per cent, principally affecting the lake trout and whitefish. The decline was blamed on: (1) capture of immature fishes by pound nets; (2) lost gill nets; (3) practice of fishermen of throwing offal on fishing ground, and (4) pollution from sawdust, slabs, sidings, etc. floating widely over the lake.

The first to go was the lake sturgeon, regarded as a pest by the early fishermen because sturgeon frequently became entangled in the nets. They were removed from the lake and piled on the beaches or buried. The fishery for sturgeon began around 1870, taking 10,000 to 20,000 fish per year. In 1885, 8 million pounds were taken. Thereafter they declined rapidly and have not been commercially important during the 20th century.



LAKE TROUT

WHITEFISH



LAKE STURGEON

Probably millions of the people who have eaten these three fishes have never seen what they looked like before they reach the table.

BROAD FLUCTUATION

Since World War I, annual production of Lake Michigan has fluctuated widely: the least amount, 16 million (1923) and the most, 35 million (1929). In 1952, production reached 32 million pounds without the lake trout which formerly accounted for from 4 to 6 million pounds of the Lake Michigan production. Thus it would appear that production was holding up fairly well, that an over-all decline is only temporary, and that there is no need to worry about the disappearance of one species as another will rise to take its place. This is certainly what seems to have happened. There have been considerable changes in rank of most abundant species through the years as the following tabulation shows:

1893	*1942*	*1953*
Herring	Lake trout	Chubs
Lake trout	Smelt	Lake herring (cisco)
Perch	Perch	Smelt
Whitefish	Chubs	Perch
Chubs	Carp	Whitefish
	Lake herring (cisco)	Carp

We note that by 1942 two introduced fishes (smelt and carp) are among the six more important species. By 1953 the chubs

and cisco replaced the trout. These changes plus the widely fluctuating annual production are of considerable concern. What are the ecological factors that have occurred allowing the less desirable fishes to become more plentiful as the more desirable ones grew scarce?

SUSPECTED CAUSES

Many causes for these changes have been set forth by fishermen, and by interested observers. The truth is, no one knows. The reasons for this lack of knowledge will be discussed later. First we will examine some of the suspected causes.

1. **Climatic changes** have perhaps brought about hydrographic changes such as changes in volume. High lake levels, reaching 582 feet, are known in the years 1917 and 1918. Fish production was also high during those years, 29.3 million and 26.7 million pounds respectively. Lake levels decreased during the years 1920 to 1926 (to 577.35 feet, low record) and during all these years fish production was at an all-time low. As the lake level went up, fish production reached its peak for recent years in 1929 and again in 1952, both high level years. The trouble with this correlation is that it takes a varying number of years (2 to 6) for the different species leading the catch to reach commercial size so the causal relations are obscure. Changes in extreme range of temperature, seasons, and amounts of ice may have some effect on the survival of young.

2. Different types of **fishing gear,** regulations, and closed seasons have been tried. Here the fishery biologists have had the opportunity to actually test the type of gear and mesh size permitted and have done considerable checking on the effects of gear used. Their results did not indicate that the type of gear now in use is unduly wasteful or harmful to desirable species. However, the effect of selective fishing on the stock of the desired species and the effect on unexploited species or underexploited species of the same locality where the nets are set, has not been studied.

3. **Pollution** has often been stated as a major cause for deterioration of fishing. Quite possibly pollution has driven the whitefish from local areas of southern Lake Michigan and contributes to the fluctuation in available numbers of this species. Pollution in the form of sawdust, silt, and domestic and industrial sewage undoubtedly has influenced fish production, but to what extent is unknown. In southern Lake Michigan there was dumping of garbage, trash, and cinders, and large quantities of clay from excavations are still dumped. This material is carried in suspension so that it spreads over wide areas in the south basin of the lake covering the fishes' spawning and feeding grounds. The dumping of cinders from steamships and the pumping of oily bilge into the lake also have sometimes had local and temporary effects, but probably have not greatly changed the entire ecological complex in the lake. It is doubtful that the total biological production of the lake has ever declined significantly because of pollution or that total fish production has declined for this reason alone. Possibly certain species have been adversely affected by pollution but I know of no studies proving pollution has harmed fishing in the lake as a whole.

3. **Exotic species:** Since World War II there has been a great amount of publicity given to the *sea lamprey* and its detrimental effect on the lake trout and other species. The whitefish had already disappeared from

RESEARCH VESSEL 'CISCO'

In 1954 and 1955 this ship of the U. S. Fish and Wildlife Service made a number of cruises on Lake Michigan collecting materials and data for studies of fishery and hydrographic conditions.

Lake Huron by the time the lamprey appeared in large numbers. In the 1920's the cisco disappeared from Lake Erie. Very likely the sea lamprey is the principal cause for the disappearance of the trout, other factors being trap net fishing, rise and decline of smelt, appearance of the alewife, disease, etc. We are assured that means of controlling the sea lamprey are available and it is only a matter of time until this pest is no longer the destructive agent it was between 1940 and 1955.

Several other species of fishes are established that were not in Lake Michigan in any numbers before 1900. Probably the most abundant of these is the *smelt*, which became established throughout Lake Michigan by 1936 (see BULLETIN, March, 1954). By 1942 smelt production reached 3.5 million pounds and then the fish died out in 1943, gradually recovering until now more are taken annually than in the former peak year of 1942. Smelt were one of the principal foods of the lake trout. The effect of the decline of smelt on lake trout is not known. The presence of the *carp* is an unknown factor in the lake. Most likely its effect is important only in very shoal waters, bays, lagoons, and along shores.

The effect of the *rainbow trout*, introduced and established in the northern end of the lake, is unknown. Its numbers are not large and its effect, if any, probably small.

The *alewife* has recently invaded and become established in Lake Michigan but its numbers are unknown. It is considered to be a menace because it competes for food with the lake herring and with young fishes.

Two other exotic species, the eel and Atlantic shad, have been reported in Lake Michigan but very likely are not established here.

Enough has been said to delineate the gradual change in the fish fauna of Lake Michigan. Some kinds are reduced in numbers, some kinds, especially the smaller species (smelt, chubs), have become exceedingly abundant. Kinds new to the lake have entered the scene resulting in new predators (sea lamprey, rainbow trout), in new food sources for the fishes (smelt, alewife), and in new competitors for food (smelt, alewife).

OVER-ALL SURVEY NEEDED

The principal need of the fisheries is an over-all study of the lake, a complete limnological survey to determine total biological productivity. Such a study should analyze communities rather than individual species, and should include studies of the environment and its seasonal changes. Particularly there is a need to study the interactions among species—how each is affected by changing environmental conditions as well as by selective fishing pressure. Recently, a comprehensive survey was made by the U. S. Fish and Wildlife Service staff on their research vessel *Cisco*, working in the southern half of Lake Michigan in 1954 and the northern half in 1955. This work should be continued for a number of years. Such background studies are needed to learn the inner workings of the lake and the factors that influence the sudden abundance or scarcity of particular species. The central need in the lakes is for biological understanding based on adequate factual information. This can only be arrived at by a long-term biological survey.

There is an immediate need to develop an educational program that follows closely with the development of a research program. Particularly we need an *enlarged basic research program.* A backlog of basic information will help in meeting the problems that will arise with the completion of the St. Lawrence Seaway such as continuing invasion by lampreys, alewives and white perch, and the problems of increasing industrial expansion with its increased pollution.

The various states surrounding the lake have generally concerned themselves with their inland waters and only occasionally contributed staff and funds to Lake Michigan studies. The Fish and Wildlife Service has been restrained in its research program

by reduced and fluctuating budgets, a small staff and lack of oceanographic equipment. Recently however a beginning has been made by the Fish and Wildlife Service along several lines. In 1953 the Fish and Wildlife research vessel *Cisco* began work in Lake Superior on the lamprey and lake trout. In 1954 the *Cisco* was in Lake Michigan studying chubs to see if this species was becoming stunted or poor.

INSTITUTE ESTABLISHED

Recently, the Great Lakes Research Institute was established at the University of Michigan to promote basic research particularly in Lakes Erie, Huron, Michigan and Superior. Associated with the Great Lakes Research Institute is the Great Lakes Research Committee of Canada.

In January, 1956, the Great Lakes Commission was established by the states bordering the lakes "to promote the orderly, integrated and comprehensive development, use, and conservation of the water resources of the Great Lakes Basin."

In addition to the Great Lakes Commission consisting of the border states, there recently was established a Great Lakes Fishery Commission between the United States and Canada. The commission will have as one of its major activities the application of sea lamprey control. In addition it is expected that this Fishery Commission will co-ordinate many of the disjointed efforts to do research on the Great Lakes.

Previous attempts to carry on large-scale basic research on the lakes have failed largely because of a lack of strong, active, organized leadership. This need appears to have been met. Now the need is for support. To date only minimal amounts of money have been allotted to government agencies for research on the lakes and these allotments principally for investigation of some immediate critical problem such as sea lamprey control. The establishment of organizations devoted to research on the lakes should have as one function that of educating the public at large and thereby gaining support and funds for furthering basic research.

Effective conservation measures for the Great Lakes fisheries can be brought about only when there is international and interstate agreement regarding regulations, gathering of statistics, and co-ordinated research.

Acting Auditor Appointed

Miss Marion K. Hoffman has been appointed Acting Auditor of the Museum, due to the vacancy occurring with the recent resignation of Robert A. Krueger, Auditor.

Miss Hoffman joined the Museum staff in 1952 as Bookkeeper, and was promoted to Assistant Auditor in 1955. She was formerly employed in a similar capacity in a business concern.

Mr. Krueger left the Museum's employ to accept a commercial position.

LECTURES FOR ADULTS ON FOUR SATURDAYS

Four illustrated lectures on travel and science remain to be given on Saturday afternoons during April in the spring series provided by the Edward E. Ayer Lecture Foundation Fund. These lectures all begin at 2:30 P.M., and are presented in the James Simpson Theatre of the Museum. Admission is free, and no tickets are required. While only adults can be accommodated, the Raymond Foundation provides free entertainment for children on the mornings of the same Saturdays.

Members of the Museum are each entitled to two reserved seats at all lectures. Reservations may be made by telephone (WAbash 2-9410) or in writing. Seats will be held in the Member's name until 2:25 p.m.

Following are the dates, subjects, and lecturers in the adult series:

April 7—The Challenge of Everest
Norman G. Dyhrenfurth

April 14—Saga of the Swamplands
Earl L. Hilfiker

April 21—Penguin Summer
Olin Sewall Pettingill, Jr.

April 28—Blizzards to Blossoms
William Parsons

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. Requests for such service must be made at least one week in advance.

Venezuelan Botanist Here

Leandro Aristeguieta, botanist at the Instituto Botanico of the Ministerio de Agricultura y Cria in Caracas, Venezuela, has come to the United States for two years to study the Compositae (Sunflower Family) as represented in Venezuela.

Mr. Aristeguieta, after studies at the New York Botanical Garden and the Smithsonian Institution in Washington, is now engaged in work on collections at Chicago Natural History Museum, and consulting with Dr. Julian A. Steyermark, Curator of the Phanerogamic Herbarium.

EXHIBIT TELLS THE FACTS ABOUT CROCODILIANS

The Museum's program of exhibition of crocodilians—the group including alligators, caimans, crocodiles, and gavials—began in 1923 with the Marshall Field Expedition to Central America. One of the prime purposes of the field party, which consisted of Dr. Karl P. Schmidt, Curator Emeritus of Zoology, and former Taxidermist Leon Walters, was the gathering of materials for a habitat group of the American crocodile. The successful result of the trip was the excellent Lake Ticamaya habitat exhibit that has been on display in the Hall of Reptiles (Hall 18) since 1926.

Two years later Mr. Walters went to southeastern Georgia and collected the female alligator and nest, which he made into one of the fascinating exhibits of the Hall of Reptiles. In the intervening years, two models of small Central American crocodilians have been prepared.

A new screen on crocodilians, recently installed, rounds out our exhibition of this ancient and interesting order of reptiles. Prepared by Taxidermist Ronald J. Lambert according to plans developed by the Division of Reptiles, this screen emphasizes those aspects of the biology of crocodilians not covered by other exhibits. About one-third

SKULL OF MAN-EATER

This specimen, decorated by Filipino tribesmen who killed the crocodile, now is featured in the center section of new exhibits in Albert W. Harris Hall (Hall 18). The small cut-outs convey an idea of the size range of crocodiles and relatives.

of the screen is devoted to the basic adaptations of the order to its aquatic environment: propulsion by a flattened tail and exclusion of water from body openings by special valves. Another section presents some of the differences between crocodiles and alligators. Size, another topic that seems to interest the public, is also treated. And, finally, the question of man-eaters among the crocodiles is dealt with.

ROBERT F. INGER
Curator of Amphibians and Reptiles

EXPEDITION TO BORNEO GETS UNDER WAY

By ROBERT F. INGER
CURATOR OF AMPHIBIANS AND REPTILES

(Editor's Note: As part of the research program in the Department of Zoology, the Museum has launched its 1956 Borneo Zoological Expedition. The expedition is in charge of Dr. Inger, writer of the following article, who left Chicago by plane on March 23.)

THE MUSEUM sent its first expedition to North Borneo in 1950. The writer, who was a member of the earlier field party, will conduct the Borneo Zoological Expedition of 1956. The work will again be done in the tropical rain forest that covers Borneo, and it is hoped that certain problems arising from the study of the collections and

EVOLUTION OF HEAD-HUNTER'S 'ART'
Since human head hunting has been suppressed in Borneo, the Dyak tribesmen keep their art alive by using the skulls of gibbons. This one was given to the Museum's 1950 Expedition by a Dyak.

notes made in 1950 may now be solved. Operations will continue in North Borneo and Sarawak for approximately six months. The principal field activities will be the collecting and observing of reptiles, amphibians, and fishes, especially as these relate to an understanding of the rain forest environment. Equipment and supplies were sent ahead at the end of January in order to reach Borneo approximately at the same time operations were scheduled to begin.

A portable tape recorder is being used to record the calls of frogs and toads, because these sounds are significant in the classification of amphibians. An important segment of the equipment is that to establish a small weather station in the rain forest. A thermohumidigraph will make a continuous record of temperature and humidity. A maximum-minimum thermometer set half-way up the trees will show how conditions differ from those closer to the ground. Since the work will be done in the rain forest, a rain gauge rounds out the meteorological equipment.

But why this interest in tropical rain forests? For a biologist the answer is that this is the richest and most complex environment in the world, and therefore the most fascinating and challenging natural laboratory. For every human being a partial answer is a bit more difficult to state.

About one-half of the world's forest area is tropical rain forest, characterized by an almost solid roof or canopy formed by the crowns of tall trees, by a small amount of undergrowth, and by dense shade and high humidity near ground level. Prior to the coming of white men, the great forests of our own Southeast had the same characteristics. But two climatic factors, continuously warm temperatures throughout the year and abundant rainfall in every month, typical only of parts of the tropics, enable the rain forest trees to retain their leaves the year around. Individual leaves fall all the time in this tropical forest, but they are being replaced continuously so that any single tree is always fully clothed. In effect, the tropical rain forest is an evergreen forest, though it should not be confused with the evergreen forests of our West and North. The tropical forest contains no conifers—no pines, junipers, firs, etc.,—and its leaves are broad and not needle-like.

The amount of living plant material in either our Southeastern deciduous forests or in a tropical rain forest such as covers Borneo, is immense. One log may weigh four tons and, if we add to it all the branches and leaves that are not weighed and then multiply by the many millions of trees within these forests, we would come out with some astronomical number. To produce this mass of living matter the soil must be relatively rich in the minerals needed for good plant growth. We found that to be true when we cut down most of our Southeastern forests and planted regular farm crops. Similarly, whenever man cut the tropical rain forest and planted crops, the harvest was good, but only for one or at most two years. Then the unfortunate farmer—Bornean, African, or South American Indian—had to move on to cut another patch of forest where he planted crops for a year or so before moving on to cut and plant elsewhere.

RAPID SOIL DETERIORATION

Why should this shifting kind of agriculture be necessary? Is the tropical farmer incompetent? The answers lie in a natural process beyond man's control. The nutrient minerals are washed out of tropical soils by the heavy rains (more than 100 inches per year) and what remains is changed chemically—literally cooked out—by the intense heat of the sun after the forest is removed. The same processes go on in the soils here, but at a much slower pace. It took 50 to 80 years to exhaust the cotton lands in the South, a snail's pace compared to the rate in the tropics.

Africa and Southeast Asia are areas in which the needs of rapidly increasing human populations will exert more and more pressure on the neighboring rain forests. But, as we have just seen, traditional agricultural techniques are proven failures in such areas. Whether man will learn to use these forested countries in a way that will insure long-range productivity is still unknown.

Yet one thing seems certain: we will not master this problem without knowing a great deal more about tropical rain forests than we do at present. Whenever man has successfully adapted a culture to the climatic, geologic, and biological factors of a particular area, he has usually done so only after much trial and error, which in the long run means that he finally has accumulated a large body of information and has understood how all the facts fit together. In the tropics where the pace of erosion and soil deterioration is at least 25 times faster than in our country, man may not be allowed the luxury of trial and error. He had better have the information and comprehension first.

Chicago Natural History Museum, through its support of basic research in botany, geology, and zoology, contributes to man's knowledge and understanding of the world, including the rain forest. Offhand, it would seem that a study of the classification of insects or the study of the feeding habits of this or that frog have little relationship to the problems of men. But the history of science is characterized by the sudden emergence into usefulness of information discovered long before anyone had any ideas about its application. In fact, the scientists gathering the information most likely had no concern at all with the application of this knowledge. And, because they pursued knowledge for knowledge's sake, they were probably called "impractical," or referred to as "dreamers."

PRACTICAL USE FOLLOWS

In the long run, though, they turn out to be very practical men. For one of them studied the food habits of a little beetle that later was used to save California's citrus groves from destruction by the cottony cushion scale insect. Hundreds of biologists, the Museum's staff among them, have built up a framework of animal classification without which there could be no effective control of malaria, or plague, or any other animal-borne disease.

Exactly how the notes and collection of snakes, lizards, frogs, and fishes of the Borneo Zoological Expedition, 1956, will eventually fit into our understanding of the rain forest is impossible to say now. But the Museum, like all institutions of basic research, is confident that to know is better than not to know, and that, in the world of science, what seems the longest way around is often the shortest road home.

A 'HALL OF FAME' FOR FOSSIL MAN

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

FOSSIL MAN'S Hall of Fame is a new exhibit in Hall C (Stone Age of the Old World) showing four famous human fossils: Java man (*Pithecanthropus erectus*); Peking man (*Sinanthropus pekinensis*); Neanderthal man (*Homo neanderthalensis*); and Cro-Magnon man (*Homo sapiens*). The fossil human types illustrated in the new exhibit were selected as far as possible in terms of the ideal criteria advocated by Professor S. L. Washburn of the University of Chicago. He says in the *American Anthropologist* (Vol. 56, No. 3, 1954, p. 438): "Ideally, there should be three or four individuals, both skulls and the rest of the skeleton, together with artifacts in a datable geological layer." Except for Java man who was not found directly associated with artifacts (tools and weapons) the four famous fossils more than meet the criteria of selection.

JAVA MAN ONE OF OLDEST

Java man (*Pithecanthropus erectus*), one of the oldest known fossil human types is represented by at least three adult skulls in fair shape and parts of the upper and lower jaws with a number of teeth. These remains were found in water-laid deposits in north central Java. Animal remains in this geological deposit are at present believed to be of Middle Pleistocene age or slightly earlier. This would suggest that *Pithecanthropus* lived about 150,000 or 300,000 years ago, according to geological estimates.

An important physical characteristic of *Pithecanthropus* was the small brain estimated to have been from about 775 to a little over 900 cubic centimeters in volume.

Although no stone tools were found with the remains of *Pithecanthropus*, recognizable implements of an early style have come from other geological deposits considered to be of equal antiquity in Java.

FOUND IN CAVE DEPOSITS

Peking man (*Sinanthropus pekinensis*), also one of the oldest fossil human types, is represented by the fragmentary remains of about forty individuals including fifteen individual skulls and skull fragments. These remains were found in cave deposits near Peking, China, along with remains of animals that are believed to have been of middle Pleistocene age, perhaps 150,000 or 300,000 years ago, according to geological estimates.

An important physical characteristic of *Sinanthropus pekinensis* was the small brain estimated to have been from about 915 to 1,225 cubic centimeters in volume.

Evidence from the cave deposits suggests that *Sinanthropus* used fire, made squarish chopping tools and a variety of scrapers of flaked stone, and hunted such animals as deer, sheep, buffalo, bison, rhinoceros, horse, camel, elephant, and even the ostrich.

Neanderthal man (*Homo neanderthalensis*) is represented by remains ranging from nearly complete skeletons through skulls to jaw fragments and teeth. These skeletal remains have been found in about 20 burial sites in Europe or near Europe.

Primarily upon the basis of associated animal remains, the European Neanderthal people are believed to have lived during and after the last major glacial advance in the late Pleistocene age, perhaps 30,000 or 50,000 years ago, according to geological estimates.

An important physical charactistic of European Neanderthals was the large brain, about 1,200 to 1,600 cubic centimeters in volume. Neanderthal man in Europe is associated with the assemblage of stone tools and weapons that have been generally called "Mousterian." He lived in caves, used fire, buried his dead, and hunted big game animals now extinct.

LARGE BRAIN

Cro-Magnon man (*Homo sapiens*) is well represented by a number of skeletal remains found in cave dwellings and burial sites in western Europe. The Cro-Magnon remains have been found in geological associations 10,000 to 20,000 years old, according to recent geological estimates. An important physical characteristic of Cro-Magnon man was the large brain, estimated to have averaged 1,660 cubic centimeters in volume.

The remains of Cro-Magnon or of similar people have been found with stone tools and weapons typical of the Aurignacian, Solutrean, and Magdalenian industries and periods of the upper Paleolithic age in Europe.

MANY DOUBTS REMAIN

"In the study of human evolution," says Professor Washburn in the article already cited, "there will always be room for many differences of opinion and for doubt." At present there are so many differences of opinion and so many doubts that it seems almost impossible to make an unchallenged statement about the evolution of man. Even more difficult is human evolution, the development of man after he achieved human form.

The fossil record, as illustrated by the Museum's selection of human types for its fossil hall of fame exhibit, clearly demonstrates an increase in brain size over a relatively short span of time, less than 300,000 years, possibly less than 150,000 years. And it is most probable that human evolution is primarily if not solely the evolution of the brain which can be perceived in quantitative if not qualitative terms.

SATURDAY PROGRAMS FOR CHILDREN

Children are invited to three free programs of motion pictures and a puppet show at the Museum on the mornings of the four Saturdays in April. Explorers who made the films to be shown will be present to tell their stories on two of the programs. These shows are presented by the James Nelson and Anna Louise Raymond Foundation, and all will begin at 10:30 A.M., in the James Simpson Theatre of the Museum. Children may attend in groups from schools, clubs, and other centers, or they may come individually, with or without parents or other adults. No tickets are needed. Following are the titles and dates:

April 7—In the Circus Arena

A close-up view of the circus with all its exciting acts and animals

April 14—The Little House by the Creek

Living close to Mother Nature's children
Story told by Earl L. Hilfiker

April 21—Wild Animals in India

Story told by John Moyer

April 28—The Amazing Voyage of Nicky Noodle

Puppet stage production by Coleman Puppets, Maywood, Illinois

STAFF NOTES

George I. Quimby, Curator of North American Archaeology and Ethnology, spent a week in March at the Museum of Anthropology of the University of Michigan in Ann Arbor, in consultations with anthropologists and geologists on problems of culture and ecology of the Great Lakes Area in early Pleistocene and post-Pleistocene times .... **Dr. Karl P. Schmidt,** Curator Emeritus of Zoology, attended the recent meeting of the Committee on Systematic Biology of the National Science Foundation in Washington, D.C. He and **Dr. Rainer Zangerl,** Curator of Fossil Amphibians and Reptiles, were recent lecturers at the Museum of Comparative Zoology, Harvard University .... **D. Dwight Davis,** Curator of Vertebrate Anatomy, gave a graduate seminar lecture on "The Historical Background of the Human Tarsus" at the University of Illinois College of Medicine .... **Dr. Theodor Just,** Chief Curator of Botany, spoke before the taxonomy and morphology seminar of Iowa State College at Ames on "Biology and Society." He also gave a public lecture on "Natural History, Past and Future" .... **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, spoke before a seminar at Kansas State Teachers College, Pittsburg, on taxonomy and plant exploration.

FIGS OF SUBTROPICS GROW IN CHICAGO

By JOHN W. THIERET
CURATOR OF ECONOMIC BOTANY

FEW CHICAGOANS realize that figs—one of the best-known of the subtropical fruits—can be grown in the Windy City, hardly famed for its element weather. They not only can be but indeed they are grown by those who feel that a bland reward is sufficient payment for the performance of a not-too-easy task. These people and their friends enjoy the often prolific crop.

Despite this, it is unlikely that Chicago will ever become a fig-growing center. The

GROWS FIGS IN CHICAGO

Charles Cardella lowering one of his subtropical fruit trees into a trench in his garden at 6319 West Patterson Avenue. Covered with old rugs and soil, the tree is protected from winter cold. In spring it is dug up and replanted.

difficulty lies in the fact that the fig tree must be given adequate protection from cold during the winter. There are two general ways in which this may be accomplished: the first is to grow the tree in a large pot that can be moved indoors into a cool place with the

PAYS OFF IN SUMMER

A fruiting branch of one of the dark-skinned varieties of the common type of fig grown in Chicago by Mr. Cardella.

beginning of cold weather; the second involves growing the tree in a sheltered position and giving it various sorts of winter protection.

The second is the more challenging one and the one used by a local fig-grower whose garden I visited. He had tried for many years to grow figs but always lost them by freezing during the winter. Finally the idea—not a new one—occurred to him to try burying the entire tree in November, after its leaves had been shed, and digging it up again the following spring! This task is accomplished by undercutting and freeing the roots on one side, digging a trench a foot or two deep running out from the base of the trunk, and gently bending the tree over into the trench. The branches are wrapped with cloth, covered with old rugs and the like, and then heaped over with soil. One of the trees protected by this method developed a trunk over five inches in diameter and finally became too big to handle during the burying period.

The amount of cold that a dormant fig tree will withstand is determined by a number of factors, including variety, degree of dormancy, and condition of the plant. For example, certain fig trees in Texas were uninjured by a low of 11°F. Other varieties, in California, showed fruit-bud injury after a drop to 15°–18°F. At 10°–12°F some healthy mature plants were but slightly injured, whereas injury was severe to old and young bearing trees. In contrast, some varieties can withstand temperatures as low as 3°F without damage.

The growing of figs in the northern states has been known for many years. In New York, Philadelphia, and other cities many fig trees are said to grow out-of-doors, receiving winter protection of some sort. This practice is just another illustration of man's apparently insatiable desire to grow plants in areas not ideally suited to their growth. Other examples are to be seen in greenhouses and in the vast smudge-pot and citrus industry of Florida.

GIFTS TO THE MUSEUM

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

Department of Anthropology:

From: Cornelia Conger, Chicago—3 artifacts from Northern Plains Indians, Idaho

Department of Botany:

From: American Spice Trade Association, New York—16 photographic prints of spice plants; W. W. Hodge, Kennett Square, Pa.—photograph (*Myristica fragrans* fruits)

Department of Geology:

From: Rosiclare Lead & Fluorspar Mining Co., Rosiclare, Ill.—a specimen of fluorite; Miss Lillian Ross, Chicago—holotype of insect, Illinois

Department of Zoology:

From: Ismael Ceballos Bendezu, Cuzco, Peru—15 small rodents; H. R. Bullis, Pascagoula, Miss.—marine shell, Gulf of Mexico; Harry Hoogstraal, Cairo, Egypt—86 frogs, 191 lizards, 9 snakes; William E. Old, Jr., Norfolk, Va.—collection of land snails; Fraser Walsh, Formosa—birdskin

FIFTH 'MUSEUM JOURNEY' STUDIES BIBLE PLANTS

Plants of the Bible is the subject of the fifth Museum Travelers' Journey for boys and girls now in progress at the Museum. Presented by the Raymond Foundation, the journey is available through April to youngsters who wish to become Museum Travelers—which means that they must successfully complete four "journeys" after which they will receive special awards from Dr. Clifford C. Gregg, Director.

During their "travels" the youngsters, armed with instructions and questions concerning the exhibits, are transported to the shores of the Sea of Galilee, the mountains of Lebanon, the Nile River, and to Jerusalem. In the botany halls they learn of some of the food plants and other plants that were of great importance to the people of the Holy Land in biblical times.

A colorful Bible plant exhibit in Stanley Field hall introduces the journey to its young travelers and prepares them for their further travels in the museum. A journey to toys of ancient and modern times was offered in December and January.

NEW MEMBERS

(February 14 to March 14)

Associate Members

Miss Grace Bittrich, Robert C. Cross, Paul C. Fulton, David Bruce Glade, Bernhart Haugen, Henry Kenny, F. Chaloner McNair

Sustaining Member

R. S. Solinsky

Annual Members

Roy T. Anderson, Dr. Hugo C. Baum, Marshall L. Billings, Frank L. Bixby, E. Henry Blume, Hymen H. Bregar, Mrs. Robert F. Carr, Hayden F. Conway, George J. Cooper, James H. Cunningham, Herbert Daniels, Miss Phyllis Dockendorf, Mrs. Vivian Dockendorf, Robert J. Doucette, J. O. Epeneter, Francis A. Even, Miss Judith Fagan, Mitchel E. Farris, Edward J. Fey, Philip A. Fleischman, Dr. Aristotle T. Flessor, G. K. Franklin, Alfred E. Gallo, Arthur John Geng, Mrs. William Glassenberg, A. L. Goddard, Francis H. Gurney, Carl Gustafson, Edward W. Hill, A. C. Hoffman, L. C. Holloman, Jr., Richard H. Jay, Harry F. Keator, Jr., Russell W. Keegan, John Laidlaw, Willard C. Lighter, Donald E. Longwill, M. G. Luken, Jr., Richard W. Massey, W. R. Maxwell, Dr. William L. Maxwell, David N. McCarl, Samuel E. McTier, Dr. W. Harrison Mehn, R. H. Olson, Glenn R. Ostrander, Mrs. Fentress Ott, W. H. Pfarrer, Mrs. Mary S. Pfiffner, Robert E. Pflaumer, Mrs. R. Joseph Rich, A. W. Richart, Herbert J. Richmond, William E. Roberts, John M. Rolfe, Joseph K. Salomon, B. J. Schlicht, John G. Sevcik, William B. Smeeth, Herbert S. Sorock, Adolph F. Spiehler, Cheston F. Stafford, Richard W. Stafford, Mrs. F. H. Steinmann, Donald R. Stewart, John Svatik, Charles B. Tansley, Charles D. Turgrimson, Master David Vasalle, Pasquale Venetucci, Percy H. Waller, William F. Wrightson

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BULLETIN

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Chicago Natural History Museum

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

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EMILY MARSH WILCOXSON
(1864–1956)

The Museum's former Librarian, Mrs. Emily M. Wilcoxson, died on April 11. During her many years of service, Mrs. Wilcoxson was known and loved by the entire staff of the institution, and the news of her passing was received by her many friends with heartfelt sorrow.

Mrs. Emily M. Wilcoxson

Mrs. Wilcoxson faithfully served the Museum for almost forty-five years—forty-one years as Assistant Librarian and Librarian until her official retirement in 1946, and four additional years as Librarian Emerita until her "second retirement" in 1950. She was 91 years of age at the time of her death.

Mrs. Wilcoxson was born December 24, 1864, at Hadley, Massachusetts.

At a memorial service held April 22, John R. Millar, Deputy Director of the Museum, paid the following tribute to Mrs. Wilcoxson:

"We are here to honor the memory of a gentlewoman whose strength and sweetness of character will long be remembered by those who were privileged to know her. I am here, not only on my own behalf as one of those who knew her in her work as Librarian of Chicago Natural History Museum, but also as a representative of Dr. Clifford C. Gregg, Director of the Museum, and of all our fellow employees.

"In speaking of the Museum we tend to personify it as some kind of super-being with body, soul, and immortality. But as we all know, the soul and spirit of any organization is contributed by its employees and those who supervise its various functions.

"It is in this light that we recognize the great contribution that Mrs. Wilcoxson made to the life and personality of the Museum, first as Assistant Librarian for twenty-five years beginning in 1905, and then as Librarian for sixteen years until 1946. As Librarian Emerita she continued in daily attendance on her work until it became obvious to all that her physical strength could not match the strength of her will to continue. . . .

"We cannot mourn the passing of anyone who has lived more than a score of years beyond the usually allotted three score and ten. But we do regret that our own little world has lost a large contributor to its dignity and worth. Hardworking and devoted to her task, with a day not measured by the clock, Mrs. Wilcoxson always was willing to help those who needed her services. No illness or personal problem ever altered her smiling graciousness. . . .

"For her contribution to the growth of Chicago Natural History Museum into a great institution of its kind, and for the brightness and cheer that she brought into the lives of many, we who knew her are deeply grateful, and wish to express our sympathy to her family."

WHERE YOUTHFUL FANCY TURNS IN SPRING

We may be accused of a slight exaggeration, but outwardly, spring at Chicago Natural History Museum seems to belong exclusively to children.

In past seasons, the Museum has prepared for an onrush of school children beginning in April. But last year the hordes of youngsters began pouring in in March and this year they began in February. Ample proof for these statements lies in the fact that the total attendance of children participating in school tours and special programs at the Museum during recent months has broken all records. In February last year the figure was 2,569, while in February of this year it was 3,447. In March it was the same story: 4,899 in 1955, and 4,967 in 1956. Although April figures are not available at this writing, there is good indication that April will exceed last year's figure, and May, always the peak month of the year for children's activities, promises to do the same.

Miss Miriam Wood, Chief of the Raymond Foundation whose function it is to plan and set up children's activities such as tours, exhibits, movies, and special programs, attributes the record attendance and participation in children's activities in great part to an increasing awareness by schools and communities of the advantages of availing themselves of the resources of large cities. And distance is no barrier. School buses are transporting children to the Museum with ever-increasing regularity from our neighboring states of Michigan, Indiana, Wisconsin, and Iowa. Trains and buses also bring children from more far-flung points, including our neighboring country, Canada.

Another significant trend noted by Miss Wood is the increasing tendency to correlate classroom curricula with visits to the Museum. Since April 2, thousands of fifth, sixth, and seventh graders have attended special programs geared to their classroom studies on prehistoric man, prehistoric animals, ancient Egypt, and the natural wonders of North America. In May and June school groups will be participating in programs on the coming of spring to the Chicago region, birds of the Chicago area, and a rock and mineral workshop.

THIS MONTH'S COVER

Meet the 17-Year or Periodical Cicada—definitely the Insect of the Month. He is due to appear in the Chicago area, and nearby states, in May, 1956 for the first time since 1939. Like the "man who came to dinner" he will stay for several weeks, but finally will vanish, not to reappear in these parts until 1973. The cover picture is a photograph of part of a small habitat group included in a comprehensive special exhibit which may be seen in Stanley Field Hall from May 1 through the summer. It is enlarged to more than twice the insect's actual size. The special exhibit includes graphic material on the Periodical Cicada's distribution, life cycle, song, earliest historical records, and damage caused by it. On page 3 of this Bulletin is an article by Henry S. Dybas, Associate Curator of Insects, outlining the principal facts about the cicadas which are expected soon to be swarming here.

MILLIONS OF SEVENTEEN-YEAR CICADAS DUE HERE IN MAY

By HENRY S. DYBAS
ASSOCIATE CURATOR OF INSECTS

THIS IS THE YEAR of the 17-year cicada.

The Chicago area is in the heart of the region where these insects, commonly but improperly called "17-year locusts," may be expected to swarm most densely during the last weeks of May and in early June.

Photo courtesy of Lee Jenkins

'ATTACK' FROM UNDERGROUND
Periodical cicadas emerging from the soil in large numbers.

The sudden and noisy appearance periodically of enormous populations of cicadas, after years of apparent absence, has aroused wonder and occasionally alarm in this country since early colonial times. Seventeen years ago, "on schedule," these cicadas last appeared in northern Illinois and in adjacent regions. They emerged by the millions in late May and June of 1939 in Cook County Forest Preserves and in other woodlands around Chicago and filled the air with their shrill song. A few weeks later they were gone.

The offspring of these 1939 cicadas have been developing slowly underground during the intervening years and are expected to emerge this year . . . . in fact, in a very few weeks. This year's high school graduates were only a year old when these insects last appeared in our region. They and many other persons who have never seen the Periodical Cicada will have their first chance now to observe this remarkable natural phenomenon.

The seventeen-year cycle of the Periodical Cicada has been known for a long time. In 1758 Linnaeus named the insect *Cicada septendecim* in reference to the length of its cycle. This cycle is still the longest known for any insect and, indeed, is a remarkably long one for any animal. In the southern United States there is a 13-year race of the Periodical Cicada that otherwise has the same appearance and habits as the 17-year race. Because of this 13-year race, the name 17-Year Cicada is not as appropriate as the name Periodical Cicada which has been used by most writers for about a century. Even less appropriate is the name 17-Year Locust, because the term locust is properly applied only to grasshoppers. The confusion between cicadas and locusts appears to have occurred in early times. Perhaps the sudden appearence of great numbers of Periodical Cicadas suggested to our ancestors the swarms of Migratory Locusts of the Old World which are referred to in the Bible. The cicada itself belongs to the order Homoptera, a group that includes a number of familiar, though much smaller, insects such as plant lice and scale insects.

LIFE CYCLE

The life cycle of the Periodical Cicada is as follows: The eggs are laid in slits cut into twigs. They hatch in a few weeks and the young nymphs drop to the ground, where they burrow down into the soil and each nymph forms a little cell associated with a rootlet upon whose juices it feeds. Here each nymph remains in complete darkness in its solitary cell and grows slowly through the seasons—for seventeen years in the northern race and thirteen years in the southern. At the end of this period, in the early spring, the cicada returns to the surface of the ground, sometimes constructing a little turret. It may not emerge for several weeks. Then suddenly on a warm evening, usually in late May in our area, the mass exodus begins. As if on signal, great numbers of cicada nymphs crawl out of the ground and climb up on plants and trees. Each nymph rests for a while; then the skin splits down the back and the soft creamy-white adult emerges. The small wing pads expand, the insect hardens and darkens and in a few hours it is ready to begin the final phase of its life. In the next few weeks, the chorus of the males is heard while courtship, mating, and egg-laying take place. Gradually after a few weeks or so the cicadas disappear, prey to enemies or to old age and the long cycle is complete.

BROODS NOT SIMULTANEOUS

The 17-year race of the Periodical Cicada does not emerge simultaneously over its entire range in North America. Different broods appear in different years in various parts of the range, although each brood requires seventeen years to complete its development. Each of the broods has been designated by a number for purposes of record and reference. The brood that is expected to emerge this year in northern Illinois and adjacent areas, is Brood XIII. Records of its emergence, at seventeen-year intervals, go back to the middle of the 19th century. Other broods in eastern North America have been traced back even further. Where two or more of these broods overlap, the cicadas appear at less than seventeen-year intervals. The 13-year race, likewise, has a number of broods that emerge at different times over its range. To further complicate the situation, there is a broad zone in which broods of the northern 17-year race and broods of the southern 13-year race overlap and produce a complicated, seemingly irregular, pattern of emergence. Unraveling these complexities has not been

WHERE 1956 SWARMS ARE EXPECTED
The approximate range of Brood XIII of the Periodical Cicada, due to emerge this month.

easy for entomologists and many problems remain unsolved.

How the emergence years of the different broods got staggered with relation to each other is not known. It is known, however, that a few individuals may appear a year before or a year after the emergence of the main brood because their development has been accelerated or delayed. It has been suggested that the different broods could have originated from small groups of such individuals that had gotten out of schedule with their own brood.

Photo courtesy of Lee Jenkins

FINAL METAMORPHOSIS

The cicada emerging from its skin.

SONG BY VAST CHORUSES

One of the striking impressions of a mass cicada emergence is the sound produced by great numbers of cicadas. The buzzing of countless males results in a characteristic sound that can scarcely be described. They sing only during the day and the sound is loudest in hot, dry, and clear weather. The sound organs are on the first segment of the abdomen and consist of a pair of ribbed, crisp, convex membranes that are rapidly snapped in and out by powerful muscles to produce the sound. It has been suggested that this way of making sound is like pressing the bottom of a tin pan up and down. Associated with the sound organs are a large sound chamber and covering plate on each side. The cicada can modify the sound it produces by raising and lowering its abdomen to change the relative position of the covering plate over the sound chamber.

NUMBERS AND DAMAGE

Under certain circumstances the numbers of emerging cicadas can be enormous. Several thousand emergence holes have been counted under a single tree. But there seems to be no evidence that either the nymphs or the adults cause any appreciable damage to the trees by sucking the sap, even when they are present in such great numbers. The damage that does occur is caused by the egg-laying activities of the female. The female has an ovipositer with which she cuts longitudinal slits in the twigs of trees in which to lay her eggs. The leaves on the twigs often die as a result of these slits and the twigs may be weakened so that they break in the wind. A large brood can produce a conspicuous discoloration in a woodland by damaging leaves and twigs, but the damage is usually only temporary. Occasionally, fruit trees and nursery stock may be more severely damaged, especially when they are surrounded by or are adjacent to woodlands. Individual shrubs and small trees in such situations may be protected with cheese-cloth or other netting. Periodical Cicadas do not stray far from where they emerged and, ordinarily, special protective measures are not necessary unless there are many cicadas emerging in the immediate surroundings.

Some Obſervations of ſwarms of ſtrange Inſects, and the Miſchiefs done by them.

A great Obſerver, who hath lived long in *New England*, did upon occaſion, relate to a Friend of his in *London*, where he lately was, That ſome few Years ſince there was ſuch a ſwarm of a certain ſort of Inſects in that *Engliſh* Colony, that for the ſpace of 200 Miles they poyſon'd and deſtroyed all the Trees of that Country; there being found innumerable little holes in the ground, out of which thoſe Inſects broke forth in the form of *Maggots*, which turned into *Flyes* that had a kind of taile or ſting, which they ſtruck into the Tree, and thereby envenomed and killed it.

REPORTED IN 17th CENTURY

The earliest account of the Periodical Cicada. It was published in 1666 in the Philosophical Transactions of the Royal Society of London.

OTHER CICADAS

Many other kinds of cicadas are known, although no other American species is as noteworthy as the Periodical Cicada either in the length of its life cycle or in the huge numbers in which it emerges. One of the best known is the Dog-day Harvest-fly, whose shrill buzz-saw sound in the treetops is one of the most characteristic sounds of our hot summer days.

A leaflet on the Periodical Cicada is available at the Book Shop of the Museum. The leaflet was written following the emergence, in 1922, of the grandparents of the cicadas that are due this year. Will the emergence this year equal or surpass that of 1939? Only time will tell how many cicadas have managed to survive the vicissitudes of the last seventeen years.

The principal known facts about the fascinating migrations of birds are presented in an exhibit in Boardman Conover Hall.

MINERALOGIST APPOINTED TO MUSEUM STAFF

Norman Henry Suhr has been appointed to the staff of the Department of Geology as Associate Curator of Mineralogy and Petrology. He will begin his duties in May.

A native Chicagoan, Mr. Suhr earned both a B.A. and an M.S. (Geology) degree at the University of Chicago. He is at present completing requirements for a Ph.D. degree.

Mr. Suhr has been an industrial geologist, having been employed in mapping oil fields for The Texas Company, underground mapping for Amco Exploration of Toronto, Canada, and laboratory work in separation, analysis, and evaluation of heavy minerals for the Crane Company. For three years he was a research and teaching assistant at the University of Chicago and the University of Illinois.

STAFF NOTES

Dr. Karl P. Schmidt, Curator Emeritus of Zoology, flew to Europe late in March for a research project in connection with a large collection of frogs from the Belgian Congo deposited in the Museum by the Institut des Parcs Nationaux du Congo Belge. Dr. Schmidt will make studies at museums in Brussels, Paris, and London. He will return in May .... **George I. Quimby,** Curator of North American Archaeology and Ethnology, spent a week last month on a study trip to the University of Wisconsin and the Wisconsin State Historical Society Museum in Madison, and the Milwaukee Public Museum, in pursuance of his research project on problems of the Great Lakes area. He consulted with archaeologists, botanists, and geologists .... **Miss Elaine Bluhm,** Assistant in Archaeology, and Alden Liss, assistant in the Museum's Pacific Research Laboratory, attended the recent meetings of the Illinois Archaeological Survey at Springfield .... **Melvin A. Traylor,** Assistant Curator of Birds, recently made a field trip to the Florida Keys for a preliminary survey of the biology of the great white heron .... **Loren P. Woods,** Curator of Fishes, lectured on "The Flora and Fauna of the Galapagos" before the Barrington Natural History Club .... **D. Dwight Davis,** Curator of Vertebrate Anatomy, spoke on "Mammalian Taxonomy" in a symposium on Australopithecines at the Annual Meeting of the American Association of Physical Anthropologists .... **Dr. R. M. Strong,** Research Associate in Anatomy, attended the annual meetings of the Cajal Club and of the American Association of Anatomists in Milwaukee.

The world's largest meteorite collection is exhibited in Hall 35.

'IT'S DONE WITH MIRRORS' IN NEW BIRD EXHIBIT

BY EMMET R. BLAKE
CURATOR OF BIRDS

VISITORS to the hall of bird habitat groups (Hall 20) will almost certainly notice, at the east end of the penguin exhibit, a new installation in which the conspicuously distinctive summer and winter plumages of a willow ptarmigan are shown. Each of these seasonal plumages, brown in summer, white in winter, is displayed against a diorama of identical views in the Alaska mountains, but at different seasons.

Those who pause in front of the exhibit even briefly to admire the beauty of the single bird on display at any given moment are likely to question their vision, if not their sanity. For at intervals of a few seconds the ptarmigan, whether in the mottled brown plumage of summer or clothed in winter's white, appears instantaneously to assume the alternate livery, and the habitat changes its seasonal character.

PTARMIGAN—SUMMER PHASE

PTARMIGAN—WINTER PHASE

Pictures cannot quite tell the story the way the actual exhibit does. At the Museum, by clever use of a mirror and alternating lights, first one and then the other of the bird's seasonal plumages is displayed at intervals of a few seconds.

It is an optical illusion, accomplished with the aid of a slanting two-way mirror, concealed lights, and an automatic timing device. Under certain lighting conditions the mirror becomes transparent, permitting one to see the immaculate white ptarmigan in its wintry habitat. Soon the lights change, the winter bird and its diorama disappear and are replaced by the mirrored image *only* of a summer bird and diorama attached to the ceiling of the case.

The Museum's constant search for new and better techniques of display are nowhere better exemplified than in this exhibit which utilizes a recent technological development to demonstrate a striking biological phenomenon. Arctic birds react to the approach of severe winter conditions in various ways. Most birds, including all of the insect-eaters, migrate southward in the fall and some travel thousands of miles to winter in South America. A few hardy species are able to survive the northern winters, but may undergo plumage changes that increase their chances of survival.

Ptarmigans, the grouse of the Arctic, are typical of the latter group. They live in the tundra and have outposts both in the moorlands of the British Isles and above timberline in our western mountains where arctic conditions prevail. Three of the four quite similar species inhabit North America and molt from brown to white in winter. The fourth, the famed red grouse of the British Isles, is reddish brown throughout the year.

Visiting Hours Extended for Summer Season

Effective May 1 and continuing through September 3 (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.

NEW MEMBERS

(March 15 to April 13)

Life Member

Richard A. Waller

Associate Members

Charles Grosberg, Gerald Hollins, George N. Leighton, J. A. Middleton, Arthur Ryan, Samuel J. Sackett, E. Todd Wheeler

Sustaining Members

Clayton G. Ball, A. B. Dick III, John H. Johnson

Annual Members

Howard Adler, Donald R. Bonniwell, E. J. Braun, L. B. Buchanan, A. C. Buehler, Jr., Ernest W. Christener, Bernard J. Cogan, Francis D. Edes, Henry Fishman, Frank M. Fucik, A. E. Hibbs, Frank Gall, Gunnar E. Gunderson, Mrs. Dustin Grannis, William P. Hypes, Raymond L. Icely, Frank H. Ingram, Charles N. Jensen, Max Koenigsberg, Arthur M. Krensky, Raymond Kropp, Richard J. Ley, C. H. Lillienfield, Albert S. Long, Jr., William Ludvik, Nicholas P. Masse, Mrs. Douglas McDonald, Mrs. David H. Milne, Mark C. Morgan, Harold J. Nussbaum, J. W. O'Neill, William Ostermann, Paul J. Panuce, Andrew L. Pontius, Ralph G. Raymond, G. L. Ridenour, Samuel Rome, Theodore Rossman, Byron C. Staffeld, Mrs. John Stephens, J. H. Van Moss, Jr., S. L. Workman

A selection of typical albino birds and mammals is on exhibition in an alcove north of the entrance to Boardman Conover Hall (Hall 21).

YOUTH SCIENCE FAIR AT MUSEUM MAY 12

HOW AMERICA'S YOUTH is responding to the nation's acute need for scientists, engineers, and technicians, will be demonstrated at Chicago Natural History Museum on Saturday, May 12, when Stanley Field Hall, from 9 A.M to 5 P.M. will become the scene of the Chicago Area Science Fair.

Exhibitors in the fair will be Chicago-area elementary school pupils from the sixth grade up, and high school students from freshmen to seniors. The fair is sponsored by the Chicago Teachers Science Association. All the exhibits will be the creations of the children and students themselves, prepared outside of school hours, and without help from parents, teachers, or other adults in any of the actual work of production. The scope of the exhibits includes biology, physics, chemistry, electricity, electronics, astronomy, geology, mathematics, and miscellaneous scientific subjects.

Pupils of public, parochial, and private schools thoughout Chicago and its surrounding suburbs will participate. About 125 exhibits are expected to qualify for "the big show" in the Museum—these will include only those that have won top honors in local preliminary science fairs to be held at each of the individual schools. The boys and girls who prepared each exhibit will be present at the Museum with their creations to demonstrate, and to answer questions.

A committee of judges appointed by the Chicago Teachers Science Association will inspect each exhibit, and will also interview the boy and girl exhibitors to determine their knowledge and background in their subject. The results of these oral tests, as well as the skill and imagination revealed by the exhibits themselves, will be factors in selecting winners of the final awards. There will be awards for the best exhibits from each school grade level.

In previous years, exhibits from north, south, and west sections of the Chicago area were displayed at different institutions, on different dates, and there were divisions between grade and high school projects. This year for the first time all exhibits from the entire area will be assembled at one place and at one time. Because of the Museum's many activities for school children, high school and college students, and teachers, it was selected as a logical location for this year's comprehensive science fair.

During the morning of the same day, May 12, beginning at 9:30, a Chicago Area Science Conference will be held at the Museum. This will begin with a general assemblage, after which the delegates will split into groups to discuss specific subjects. Theme of the conference is "Today's Youth —Tomorrow's Scientists and Engineers."

NATURAL HISTORY EXHIBITS INSPIRE ART STUDENTS' CREATIVE EFFORTS

By EDITHE JANE CASSADY
HEAD OF THE JUNIOR SCHOOL, ART INSTITUTE OF CHICAGO

THE EXHIBITION of drawings and paintings by students of the School of the Art Institute of Chicago is an annual May event at Chicago Natural History Museum. Installed in Stanley Field Hall, it combines the work of the young students of the Junior School and the regular students enrolled in the Basic Course of the Professional Day School. The exhibit may be seen from May 1 to 31 inclusive.

AN ALLEGORY FROM NATURE

"Arrangement of Animal Symbols" is the title of this mural by Paul Banks of Chicago, first-year adult school student at the Art Institute. Banks' thought-provoking work, executed in vivid pastel chalks, is on display along with other art students' productions inspired by natural history exhibits.

Sketching trips to the Museum are regularly scheduled by the school throughout the year. The students look forward with great pleasure to their 'day' at the Museum —the fun of the trip over, the things they see en route, the interesting happenings of the ever-changing scene, then the Museum with its exciting collections. They discover and explore the wonders of the exhibits, then select their "favorites" and return again and again to "old favorites."

The work in this exhibition shows what and how these young people draw and paint —not to represent the exhibits as accurately as possible but to express themselves, their own experiences. They communicate these experiences in their work, which forms a record of their trip to the Museum and what was most inspiring and interesting to them. The drawings and paintings show how differently they interpret the same subject, for it is the individual who uses his media and his form of expression according to his personal experiences. Since these experiences change with the growth of the individual, the age span of the participating artists offers a unique opportunity to see the development of creative growth and to enjoy the work produced.

We in seeing, studying, and appreciating the drawings and paintings of these young people, see the world through the eyes of today's students, who are the artists of tomorrow.

SOUTHWEST INDIAN MASKS

Staff Artists Gustaf Dalstrom, left, and E. John Pfiffner with group-project mural by students of Junior School of the Art Institute. Dalstrom and Pfiffner selected students' work for special exhibit at this Museum during May.

Gustaf Dalstrom and E. John Pfiffner, artists on the staff of Chicago Natural History Museum, selected the work in this year's exhibition.

SCHOOLS AND SCOUTS AIDED BY MUSEUM

Special programs, ranging in interest from prehistoric man to the coming of spring to Chicago, were presented to thousands of young Museum visitors by the Raymond Foundation last month as part of the Museum's effort to work in conjunction with school and other organized groups during the busy spring season.

On display in the south entrance to Stanley Field Hall is a special exhibit prepared by the sixth-grade pupils of Armstrong School in Chicago based on a Museum program that the children attended several months ago. Exhibited are drawings, charts, written material, and a miniature diorama depicting the building of the pyramids. Special programs on ancient Egypt were given for Chicago-area school children beginning in April and extending through May 4.

A bird program for Cub Scouts of the Chicago region was held at the Museum on April 26. The junior Scouts (from ages eight to eleven) saw free color motion pictures and were able to utilize the Museum's bird halls to continue their studies being made in conjunction with the Cub Scouts' observance of April as "Bird Month." Other Museum activities given last month for school children included programs on prehistoric man, prehistoric animals, and the natural wonders of North America. This month and in June the Raymond Foundation school-group schedule will include programs on birds of the Chicago region for fifth and seventh graders; Trailside Adventures (the coming of spring to Chicago area) for fifth, sixth, and seventh graders; and a rock and mineral workshop available to small groups of upper grade-school students. Because of the popularity of the special programs, reservations must be made more than one week in advance or before quotas are filled.

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. Requests for such service must be made at least one week in advance.

A DEEP-SEA "BUG"

By FRITZ HAAS
CURATOR OF LOWER INVERTEBRATES

THE FISH AND WILDLIFE SERVICE at Pascagoula, Mississipi, recently sent to the Museum a shipment containing, among other things, a bottle of several rare and strange deep-sea creatures. They were dredged up from a depth of 500 fathoms (3,000 feet) in the ocean north of Cuba in the course of fishing studies.

These new specimens are one of the most valuable and welcome of recent accessions to our collections. Not only was the species hitherto unrepresented in our collections, but it is rarely found in any museum. The individuals we received are about 3½ inches long but are only half-grown. Despite this relatively small size they are giants among their relatives, the best known of which is the sow-bug.

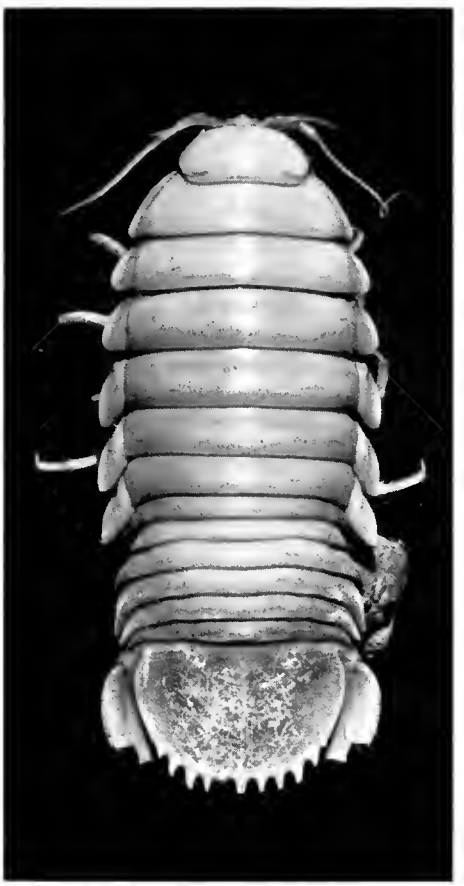
Almost everyone knows the little bug commonly called a sow-bug: an animal ⅛ to ½ inch in length, with a body consisting of a series of rings and with one pair of feet on the underside of each ring. It is found commonly in moist spots, under flat rocks, bark, boards, and even in cellars of houses. Kin of this terrestrial sow-bug are often found in ditches and creeks. However the vast majority of related forms live in the ocean.

There is no word in the English language that characterizes the entire group of sow-bug relatives, so we have to use their scientific name, "isopods." They are not insects, as often believed, but are akin to the crayfish of our waters. The claws of the first pair of feet on crayfish are enlarged to form the so-called pinchers, whereas in the isopods the feet are all alike, which is just what their name means.

HOW THEY LIVE

While the isopods of the land and of freshwater are mostly small animals hardly exceeding ¾ of an inch in length, those of the ocean have developed into larger beings often measuring 1¼ of an inch and even more. The great majority live in shallow water where they hide under rocks or in crevices and where they lead a predatory life preying on smaller or weaker animals or feeding, scavenger-like, on decomposing animal corpses; they even may attack living fishes for which there seems to be a predilection which has led to a basic change of life in some of the marine isopods.

Quite a number have acquired a parasitic way of life by clinging, with the help of the sharp claws of the forefeet, to the skin or the gills or even to the roof of the mouth of living fishes. There they nourish themselves, in a yet unknown way, on the body juices of the carrier-fish, apparently however not killing it or even damaging it severely. The sojourn on the fish may be temporary and the parasite can leave at will, swimming around until it infests a new host, or it may attach itself permanently to one fish. In this case, the body of the parasitic isopod, once it has settled on or in a fish, may change its shape to such an extent that it hardly can be recognized as an isopod. It may throw off the tentacles and the legs, the rings of its body may become irregular and very thin, the eyes may be lost: in short, all that remains of the organs is the mouth with the adjoining intestine and the organs of reproduction. This, the highest degree of adaptation to parasitic life, is found almost exclusively on the isopods living as parasites in the gills or the mouth of fishes.



DEEP-SEA ISOPOD
Specimen of a rare marine relative of the common terrestrial sow-bug.

A few marine isopods have taken to the habit of boring and hence are among the most active destroyers of harbor pilework.

EYES CONTRADICT ENVIRONMENT

In contrast to the shore line and the surface layer of the ocean which are so rich in isopods, the deeper waters almost entirely lack them. Up to the present, only one kind of isopod has come to our knowledge, and this is a giant, attaining lengths up to 8½ inches! It has been found thus far only in the deep, lightless layers of water of warm oceans, beneath the 350-fathom line, in an environment that would make the use of eyes unnecessary. Strangely enough this deepsea isopod, whose scientific name is *Bathynomus giganteus*, has very large eyes, larger even relatively than those of its shallow-water relatives. The possession of enlarged eyes in animals in general is related to the dim light of their environments. Mammals and birds with enlarged eyes are nocturnal; insects or spiders with this characteristic live in the twilight near the entrance of caves. These enlarged organs of vision enable them to collect as many as possible of the feeble rays of light that penetrate to them. What does this mean as to the very big eyes of our deepsea isopod? It can only mean that it originated in the dimly lit waters above the abyssal zone and that it has immigrated into these lightless depths only comparatively recently, not long enough to get rid of the eyes that have become useless in the animal's present abodes.

Nothing is known about the life habits of this deepsea giant which is shown, in natural size, in the accompanying illustration. The shape of the claws, however, seems to indicate that the species leads a predatory life on the sea bottom without having become a parasite.

TECHNICAL PUBLICATIONS

The following technical publications were issued recently by the Museum:

Fieldiana: Anthropology, Vol. 43. *Cultural Chronology and Change as Reflected in the Ceramics of the Virú Valley, Peru.* By Donald Collier. December 16, 1955. 226 pages, 72 illustrations. $6.

Fieldiana: Geology, Vol. 10, No. 22. *The Carboniferous Gastropod Genus Glabricingulum Thomas.* By Robert E. Sloan. December 20, 1955. 7 pages. 5 illustrations. 35c.

Fieldiana: Geology, Vol. 10, No. 23. *The Paragould Meteorite.* By Sharat Kumar Roy and Robert Kriss Wyant. December 29, 1955. 22 pages, 19 illustrations. 75c.

Fieldiana: Zoology, Vol. 34, No. 34. *Coral Snakes of the Genus Micrurus in Colombia.* By Karl P. Schmidt. December 29, 1955. 23 pages, 5 illustrations. 35c.

Fieldiana: Zoology, Vol. 34, No. 35. *On Some Small Collections of Inland Shells from South America.* By Fritz Haas, December 29, 1955. 27 pages, 15 illustrations. $1.

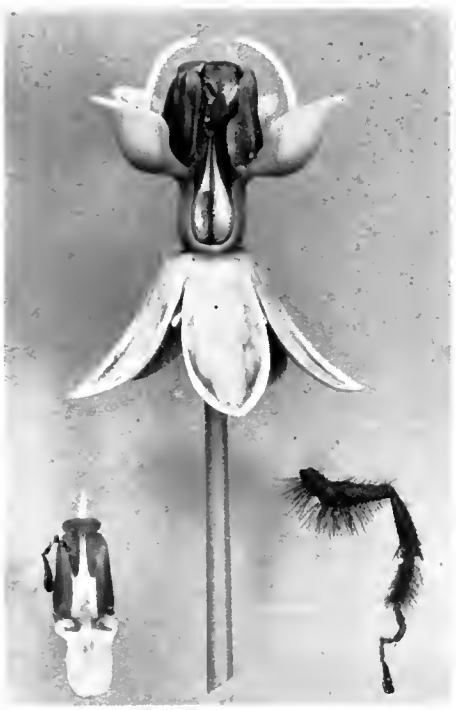
Fieldiana: Anthropology, Vol. 36, No. 7. *Late Mogollon Pottery Types of the Reserve Area.* By John B. Rinaldo and Elaine A. Bluhm. January 10, 1956. 39 pages, 34 illustrations. $1.25

Fieldiana: Geology, Vol. 12, *Pennsylvanian Invertebrates of the Mazon Creek Area, Illinois.* By Eugene S. Richardson, Jr. January 25, 1956. 76 pages, 41 illustrations. $2.

MILKWEED INSECT TRAP

By JULIAN A. STEYERMARK
CURATOR OF THE PHANEROGAMIC HERBARIUM

THE COMMON MILKWEED (*Asclepias syriaca*) of the eastern half of the United States and Canada readily attracts numerous insects to its masses of brownish-lilac flowers. However, occasionally the innocent-looking flowers of this plant act as traps for visiting insects. Last summer while returning from a weekend trip to northern Wisconsin, I stopped along the highway for a brief rest. Meanwhile my wife looked around in a nearby field and noticed several otherwise normal milkweed flower-clusters from which dead insects were hanging. Never having seen this phenomenon before, I brought the flower-clusters back to the Museum and had them photographed. The following week I stopped in many fields and examined hundreds of milkweed, but did not find any with dead insects caught in the flowers. In one instance a honeybee had caught one of its legs in a flower and could not extricate itself immediately. Finally, after a few minutes of desperate struggle, it managed to free itself and fly away safely.



MODEL OF MILKWEED STRUCTURE

The milkweed flower (center) is peculiarly specialized for insect pollination, as shown in cutaway model exhibited in Hall 29. The cutaway section shows the translator, with pollen sacks in position. At left is a single stamen with hood and a pair of pollen masses. At right is a translator with pollen masses, borne on the leg of a bee serving as the insect pollinating agent.

Like all other members of the milkweed family, the common milkweed possesses highly specialized reproductive organs. The pistil (or female) portion of the flower is located in the center of the flower. Surrounding its upper pentagonal portion (stigmatic disk) and connected with it are the five highly modified stamens. Opposite the stamens are hollow fleshy organs that secrete large amounts of nectar that attract insects. The two pouches of the anthers contain pollen masses. Each pollen mass on one side of a given anther is connected with a pollen mass of adjacent anther. These two pollen masses (*pollinia*) are joined to a central knob by slender arms, known as translators or caudicles, the whole structure appearing like an inverted "V." These pairs of pollen masses hang suspended from five cleft glands that appear in the angles of the stigmatic portion.

As insects approach milkweed flowers, they attempt to get the nectar that is lodged in the hollow organs connected with the anthers. As their claws enter the slit or cleft leading to the nectar, they pick up the two pollen masses and, on withdrawal, lift them out of the pouches of the anther.

The list of insects known to visit the common milkweed includes several kinds of flies, bees, wasps, and ants. In most cases the insects visiting the flowers of the common milkweed procure their nectar and fly away. In rare instances such as I had occasion to observe, they are trapped for no apparent reason and eventually die.

ACCIDENT CASUALTIES

Dead flies suspended from cluster of milkweed flowers in which they were caught. Normally this plant is not one of those known as insect traps.

Football in Pacific Islands

Football is a popular sport in the Society and Gilbert Islands although the rules aren't as complicated as those of our own American game. A cube of matting stuffed with leaves serves as a ball, and the object is simply to get the ball over the enemy's goal line. Whole districts sometimes engage in this popular pastime. Visit Hall F (Peoples of Polynesia and Micronesia).

GIFTS TO THE MUSEUM

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

Department of Anthropology:

From: L. E. Frederick, Tacoma, Wash. —a wood block, Lhasa, Tibet; Mrs. Corinne Hodel, Chicago—a lady's robe, China; Oden Meeker, New York—a bronze drum, Indochina; Mr. and Mrs. William Nuerenberg, Santa Monica, Calif.—a set of 8 small vases, China; E. D. Hester, Jeffersonville, Ind.—134 pieces from Hester collection of Philippine ceramic recoveries

Department of Botany:

From: Dr. W. M. Banfield, Amherst, Mass.—5 photographs of *Ceratocystis ulmi;* Bernice P. Bishop Museum, Honolulu, Hawaii—a photograph of *Broussonetia papyrifera;* Grenada Co-operative Nutmeg Association, British West Indies—fruits and foliage of *Myristica fragrans;* Iowa State College, Ames, Iowa—2 seed samples of hybrid *Zea mays;* Missouri Botanical Garden, St. Louis—a *Veronica latifolia;* Pioneer Hi-Bred Corn Co., Des Moines—19 samples of hybrid seed of *Zea mays;* Dr. John W. Thieret, Homewood, Ill.—specimens of gum of *Cycas circinalis;* Vaughan's Seed Store, Chicago— 44 seed samples of *Zea mays,* Phaseolus and Vigna; Institut National pour l'Etude Agronomique du Congo Belge, Yangambi, Belgian Congo—56 legume seed samples; Mrs. Omie McCarthy and Mrs. Linda Kennedy, Nome, Alaska—147 plants; State College of Agriculture, Ithaca, N.Y.—photograph (*Ceratocystis ulmi* coremia); Botanic Gardens of Indonesia, Java—6 photographs; Mrs. Julia Free, Sedonia, Ariz.—a sample of seeds and 2 samples of wood, Texas and Arizona; U. S. Department of Agriculture, Beltsville, Md.—11 photographs of plants

Department of Zoology:

From: Dr. Joseph Camin, Chicago—2 paratypes of a mite, Madagascar; Dr. Carl Drake, Ames, Iowa—62 beetles, New Caledonia and United States; Cameron Gifford, Valparaiso, Ind.—a frog; Harry Hoogstraal, Cairo, Egypt—80 fishes, 13 mammals, 3 paratypes of a tick, Sudan; Seymour H. Levy, Chicago Heights, Ill.—a bird skin, Texas; Loren P. Woods, Homewood, Ill. —3 cave fish, Indiana; William J. Gerhard, Chicago—250 bees, wasps and allies, Colorado; Dr. Carl Krekeler, Valparaiso, Ind.—20 cave beetles, Indiana and Kentucky; Lt. Comdr. D. C. Lowrie, San Francisco—41 reptiles and amphibians, 5 bats, Riu Kiu Islands and Ganiko, Okinawa; University of Michigan, Ann Arbor —collection of fresh water mollusks and shells, Canada; Jack Moyer, Hamilton, N.Y. —193 bird skins, Japan and Korea; Dillwyn Paxson, Fort Smith, Ark.—2 sturgeon fry, Wisconsin; U. S. Fish and Wildlife Service, Pascagoula, Miss.—82 lots of fishes, collection of various lower invertebrates

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Diagnostic characters considered by physical anthropologists in differentiating racial types are illustrated by an exhibit in Chauncey Keep Memorial Hall (Hall 3).

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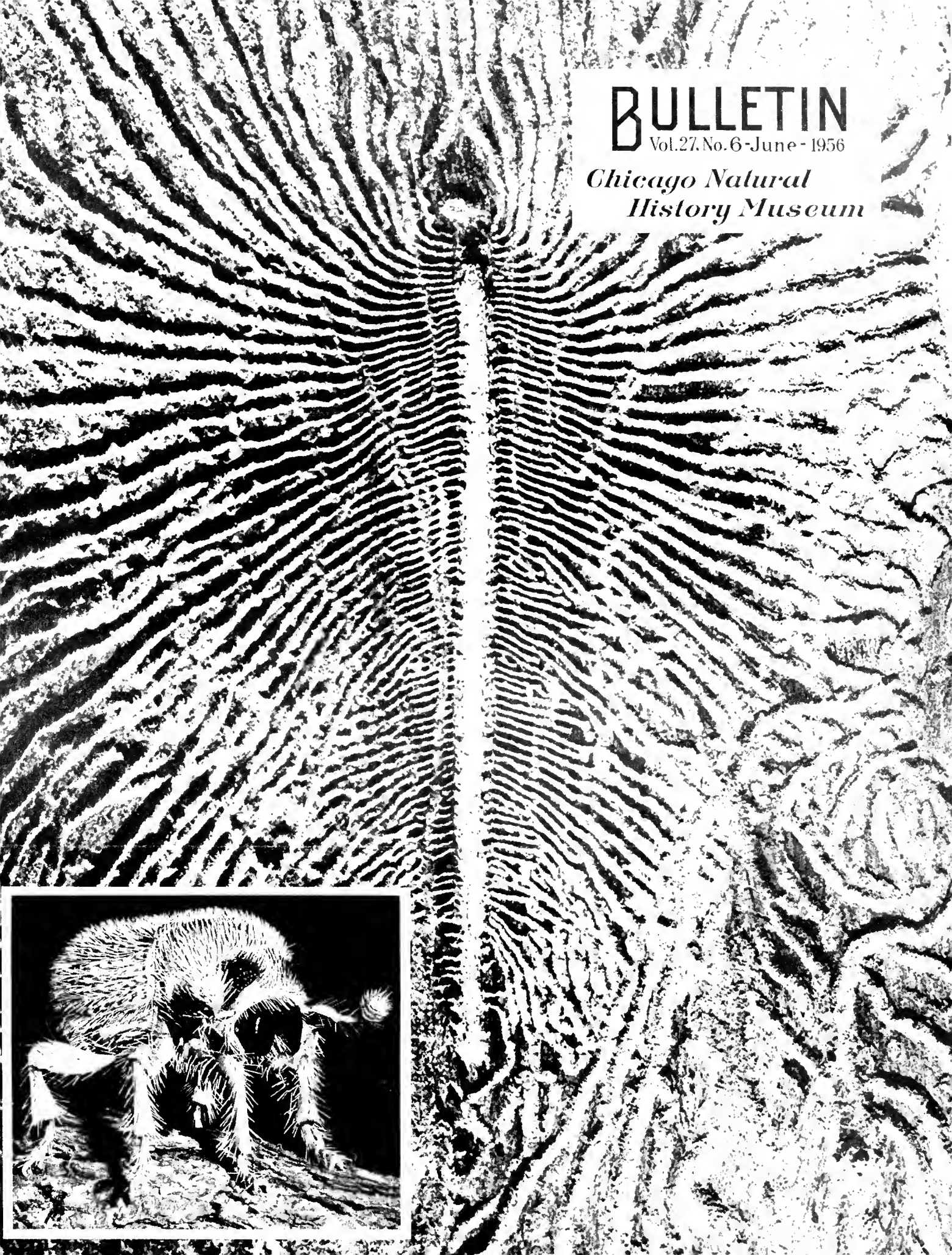

Chicago Natural History Museum
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Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

BOOKS ON PLANTS OF ILLINOIS

Reviewed by THEODOR JUST
CHIEF CURATOR OF BOTANY

VASCULAR PLANTS OF ILLINOIS. By George Neville Jones and George Damon Fuller. Prepared with the collaboration of Glen S. Winterringer, Harry E. Ahles, and Alice A. Flynn. The University of Illinois Press, Urbana, and the Illinois State Museum, Springfield (Museum Scientific Series, Vol. VI). xii+593 pages, 1,375 maps. Cloth. $10.

Students of our local flora will welcome this addition to their libraries and use it profitably in conjunction with the senior author's *Flora of Illinois* (second edition, 1950). *Vascular Plants of Illinois* contains a wealth of information about the nearly 2,500 native and introduced species of ferns and fern allies and seed plants definitely known to occur in the state, their distribution by county, scientific and common names, synonyms, subspecific entities, range, habitat, and type locality. While the families and orders are essentially arranged according to the well-known and widely used Englerian system of classification, the genera and species follow alphabetical sequences for ease of reference. The symbols shown on the distribution maps are backed up by some 200,000 herbarium specimens. The general features of the flora and vegetation of Illinois are described (pages 4–7) and illustrated by a vegetation map (page 8). Three endemic species are known from Illinois, namely the Kankakee mallow (*Iliamna remota*), the saprophytic annual *Thismia americana*, probably the rarest plant in the United States because it has never been found again after its original discovery, and the composite *Aster chasei*, limited to a small area near Peoria. An annotated list of principal collectors, covering the period from 1795 to 1950, a detailed bibliography, a list of new nomenclatural combinations, addenda, and an excellent index conclude this useful book. But the authors are convinced that "the age of discovery and exploration of our flora is as yet apparently far from ended."

FLORA OF WINNEBAGO COUNTY, ILLINOIS. An Annotated List of the Vascular Plants. By Egbert W. Fell. Collaborators: George D. Fuller and George B. Fell. Published by Nature Conservancy, Washington, D.C., in cooperation with Rockford Natural History Museum and Nature Study Society of Rockford. viii+207 pages. Illustrated by the author. Paperbound. $2.75.

Situated half-way across the state along the Illinois-Wisconsin line, Winnebago County is 24 miles square, about the average size of counties in Illinois. Originally covered mostly by prairie, the county includes other important habitats such as woods, sand areas (the largest in Illinois), and wet areas. The flora as presented in this pocket-size manual consists of 1,013 native species and 97 introduced ones, but it has a definite northern-prairie aspect because it includes 202 northern species and 473 "more likely to be found in prairie habitats." All relevant details regarding the environment, pertaining to cultural features, climate, geology and physical features, types of habitats, distribution of species, and plant refuges, are treated in the introduction. The annotated list of the plants is replete with observations and comments by the author, attesting his intimate knowledge of this area and its plant life. In addition, he pays appropriate tribute to the distinguished botanist Michael Schuck Bebb, long a resident of the county and its first ardent collector of plants. With a few exceptions (photographs of principal habitats), the 34 illustrations are full-page drawings of selected species by the author. This Flora is eloquent evidence of the wise use made of time and enthusiasm by the author, a retired physician, whose aim is "to picture the plant life of our county as it is now."

How color, shape, and pattern help to camouflage and protect birds is illustrated in the adaptive-coloration exhibit in Boardman Conover Hall (Hall 21).

THIS MONTH'S COVER

Our cover shows a view of an egg-gallery and many larval tunnels made in the outer wood of an American elm by elm bark-beetles. These insects spread the fungus that causes the Dutch elm disease currently threatening thousands of trees in the Chicago area and already epidemic in many parts of the United States. A model of one of the villains—an elm bark-beetle—is shown in the photograph inset in the lower left-hand corner of the cover.

The Museum has placed an exhibit in Stanley Field Hall to illustrate the principal facts about the Dutch elm disease—what it is, how it is spread, and what is necessary to combat it. The model of an elm bark-beetle, 80 times life-size, was made for the exhibit by Samuel H. Grove, Jr., Artist-Preparator, and is shown about 30 times life-size in our cover picture. An article by Dr. John W. Thieret, Curator of Economic Botany, about the threat to Chicago's elms appears on page 3.

NEW MEMBERS

(April 16 to May 15)

Associate Members

Miss Lucile M. Beckstrom, Dr. Vincent A. Costanzo, Jr., Victor E. Gidwitz, Kenneth G. Hecht, Thomas A. Patterson, Keith P. Rindfleisch, Vernon L. Wesby, Russell M. Wicks, John S. Woolman

Annual Members

E. E. Ballard, Dr. Paul S. Barclay, James B. Blaine, Dr. Walter Briehl, W. E. Cairnes, Albert J. Carr, J. B. Carroll, Dr. John A. Caserta, Richard S. Claire, James P. Cody, Charles B. Coursen, Richard W. Douglass, Tolman G. Everett, Ralph Falk II, Harry Fishman, E. Montford Fucik, Lincoln O. Gatter, William N. Genematas, Edward E. Grosscup, R. Emmett Hanley, Arthur C. Harrison, Emmett C. Harvey, William O. Heath, M. E. Hellman, Alfred G. Hewitt, Hoyt S. Hill, William N. Hoelzel, M. J. Holland, Paul W. Holtz, Robert B. Jarchow, John P. Jurgatis, John Laidlaw, Jr., Merwin Q. Lytle, F. O. Marion, Dr. Erich R. Maschgan, A. K. Maxwell, Jr., Harold M. Mayer, Arthur F. Mohl, William A. Noonan, Jr., George A. Rink, Leo H. Schoenhofen, Richard H. Schweers, Karl P. Shuart, Anton E. Svec, H. B. Tellschow, R. E. Towns, Norman H. Tracy, Paul Weir, Allen Wilson, Mrs. William J. Wood, LaGrange Worthington, Dr. Ernest B. Zeisler

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An exhibit of selected butterflies and moths occupies four cases in Albert W. Harris Hall (Hall 18).

FACTS ABOUT DUTCH ELM DISEASE TOLD IN NEW EXHIBIT

By JOHN W. THIERET
CURATOR OF ECONOMIC BOTANY

IN THE UNITED STATES ALONE, plant diseases cause an estimated loss of three billion dollars a year. In spite of the importance of phytopathology (the study of plant ills) and the logic of including this science under economic botany (a subject to which four halls of Chicago Natural History Museum are dedicated), the Museum, until now, has never devoted an exhibit to any phase of pathology. Appropriately enough, our initial venture in this field is concerned with the Dutch elm disease, a malady much in public notice and for which public education has been called "the key to adequate control."

The clouds of World War I had scarcely lifted from western Europe when, almost simultaneously in the Netherlands, Belgium, and France, a wilt disease began to ravage elms. Dr. Bea Schwarz, of the plant pathology laboratory at Baarn, Netherlands, studied the disease and concluded that a fungus was the cause of the trouble. This newly recognized organism she named *Graphium ulmi*. Soon thereafter, a German investigator of the disease claimed that a certain bacterium was to blame. The pros and cons of the two viewpoints occupied pathologists for some time, but eventually Dr. Schwarz and *Graphium ulmi* won out. Now that the complete life-history of the causative fungus is understood, this organism is referred to the Ascomycete genus *Ceratocystis* as *C. ulmi*. The threadlike filaments of this pathogen grow in the conducting cells of the young sapwood of the elm and damage the functional wood of the current season, interfering with the movement of water.

The Dutch elm disease was so named, to the chagrin of Dutchmen, by a British pathologist because Dutch scientists were the first to study it and also because the assumption was that it started in the Netherlands (some think, though, that it was noticed first in France). Whatever the country of its origin, it eventually spread elsewhere in Europe and is now known over almost all the continent and in Great Britain. Some twenty years ago certain European scientists were asserting that the disease spelled the doom of the elms of western and central Europe. While their pessimistic prophecies have not been literally fulfilled, myriads of trees have succumbed, and many areas, both urban and rural, have lost all or nearly all their elms.

DISEASE ENTERS UNITED STATES

Carpathian-elm burls from France are prized for veneers, and large quantities of the logs used to be imported annually into the United States. It was in such logs that the Dutch-elm-disease fungus was introduced into the New World. The disease was first reported here in Ohio in 1930. Three years later a new and abundant infection was found around New York City. Soon thereafter, the source of the infection was traced to Carpathian-elm logs at the port of New York. From these logs the causative fungus was isolated and specimens of two species of beetles that spread the fungus were obtained. So close was the relationship between the logs and the introduction of the disease that, in 1934, it was possible to make the following statement: "Every Dutch-elm-disease infection yet discovered in America is related geographically to entry piers where imported elm-logs were unloaded or to railroads which hauled them."

Now that the horse had been stolen, the barn door was locked: the United States Department of Agriculture issued a quarantine directive, effective October 21, 1933, regulating importation of elm logs in order to prevent further introduction of the fungus. But the parasite had already become quite well established and its spread by its coleopterous carriers was gaining momentum. Twenty-seven thousand elms were destroyed in the first five years after the disease was introduced into the New York area. By 1937 it had reached into Maryland, Virginia, West Virginia, and Indiana. A federal control-program made definite progress against the disease until 1940, when adequate funds and labor could no longer be mustered. The elm killer was not eradicated, true enough, but intensity of infection in several states was substantially reduced.

After 1940 the disease spread rapidly through the northeastern states and beyond. Today it is known to occur in all states from Tennessee northward and from Missouri and Illinois eastward and in the provinces of Quebec and Ontario. Outlying infections have occurred in Colorado. In Illinois the first case of Dutch elm disease was found in 1950 near Mattoon. One case was known in that year. In each succeeding year the number of cases and counties represented increased until, in 1954, 2,067 new cases were reported from 55 counties and, in 1955, an estimated 5,000 new cases from 75 counties. In Champaign-Urbana alone more than 2,500 trees have been killed in but three years.

WILTING AND DISCOLORATION

The first symptom that attracts notice in Dutch elm disease is wilting and discoloration of leaves of one or more branches of the tree. This is called "flagging" because the infected branch stands out like a flag

DUTCH ELM DISEASE: PART OF EXHIBIT EXPLAINING ITS CAUSE, EFFECT, AND CONTROL

from the rest of the tree that, at this stage, is a normal healthy green. Eventually many branches show this wilting and discoloration as the disease spreads. Infected elms may die within a few weeks or live for several years. Positive diagnosis of Dutch elm disease can be made only by laboratory culture of the fungus from infected wood because other fungus diseases cause symptoms similar to those of Dutch elm disease. Specimens for culture should be 8 to 10 inches long and at least one-half inch in diameter and should be taken from a live wilting branch that shows brown streaking or discoloration on the surface of the wood under the bark or in the outermost ring of wood. Such a symptom is typical of several fungus diseases of elm.

Specimens to be submitted for diagnosis of Dutch elm disease should be wrapped in waxed paper before mailing to the laboratory. In Illinois send them to the Natural History Survey in Urbana; in most other states, to the agricultural experiment station. Under sterile conditions in the laboratory, chips of the discolored wood are removed and placed on a plate of nutrient jelly. If the fungus is present in the wood it will, in five days at room temperature, grow out into the jelly and form characteristic colonies encircling the chips. Through microscopic examination, the fungus can be positively identified. The sender of the specimens will then, of course, be notified of the results of the diagnosis.

The Dutch elm disease provides a most instructive example of the intimate relationship that can exist between a plant pathogen and its vector, a biological agent of dissemination. In the United States three organisms play the role of villains in the elm-disease story: the causative fungus (*Ceratocystis ulmi*) and two insects, tiny creatures with big names—the smaller European elm bark-beetle (*Scolytus multistriatus*) and the native elm bark-beetle (*Hylurgopinus rufipes*). The fungus alone—without the insects— would probably be of no consequence as a decimator of elms because it is dependent upon its vectors to transport it from tree to tree. The beetles alone may possibly hasten the death of weakened or dying elms by tunneling between the bark and the wood, but these insects were in the United States long before the fungus was brought in and they did not cause much concern. However, the combination of the fungus *and* the beetles has proved catastrophic for our elms.

HOW DISEASE IS SPREAD

The elm bark-beetles (and here we are referring specifically to the smaller European elm bark-beetle, a more efficient vector than the native species whose habits, though rather similar, differ in several important respects) breed in weakened or dying elms or in freshly cut elm wood and feed on healthy elms. These facts are the crux of the story. Weakened or dying elms or recently-cut elm trunks and branches with the bark intact are sought out by the beetles for a breeding place. Dutch-elm-diseased trees offer a particularly inviting site. The female beetle penetrates the bark and lays her eggs in a gallery that she digs between the bark and the wood. The larvae hatched from the eggs excavate feeding-tunnels that radiate from the egg-gallery.

In Dutch-elm-diseased wood, the fungus grows and fruits abundantly in these tunnels and galleries. The mature beetles cut their way out of the bark and emerge. If they are leaving Dutch-elm-diseased wood, spores of the fungus are likely to be clinging to their bodies. The beetles fly immediately to *healthy* trees, where they feed on bark and wood, principally in the crotches of twigs. It is through the feeding wounds made by the beetles that Dutch-elm-disease fungus is introduced into the tree. While the beetles feed, fungus spores clinging to their bodies may become dislodged and get into the sap stream of the tree. The fungus then develops and rapidly spreads, and eventual death of the tree results.

It is upon the close relationship between the bark beetles and the disease that control measures are based. At the present time, no treatment is known that can cure a tree once it is diseased (*exception:* sometimes immediate removal of a flagging branch will eliminate the infection), and no method of immunizing trees against the fungus has proved effective. Therefore control measures are aimed at the bark beetles in an attempt to prevent the insects from carrying the fungus from infected to healthy trees. In the struggle toward this goal, two objectives are paramount: (1) to prevent the beetles from feeding on healthy trees and (2) to reduce beetle populations through elimination of breeding sites.

Bark beetles may be prevented from feeding on trees by spraying the trees with DDT in the form of an emulsion before the insects become active in the spring. Actually, because of the long residual effectiveness of such DDT sprays, the spraying can be done any time between leaf drop in the fall and the appearance of new leaves in the spring. A second spraying may be given in July to prevent feeding by the second brood of beetles. These sprays must be so applied that *all* bark surfaces are thoroughly covered with the emulsion. For continuous protection, trees must be sprayed every year. Each spraying increases the amount of DDT on the bark and covers all new branches.

'SANITATION' MEASURES

The destruction of all dead and dying elm wood that can be used by bark beetles as breeding grounds is called "sanitation." By thorough sanitation, which should extend over as wide an area as possible, bark-beetle populations can be considerably reduced, and thereby the chances of the transfer of the fungus from diseased to healthy trees become less. In addition, the destruction of such elm wood removes a possible source of build-up of the fungus.

Two additional aspects of the Dutch-elm-disease problem should be mentioned: the attempts to breed and select elms that are resistant to the fungus, and the need for public education about the disease.

All members of the genus *Ulmus*—the elms—appear to be susceptible to the disease. Some, however, are considerably more resistant than others. Our American elm (*U. americana*) is, unfortunately, one of the most susceptible. Quite resistant species are the frequently cultivated Chinese elm (*U. parvifolia*) and the Siberian elm (*U. pumila*). The attempts to breed and select strains of various elms that are highly resistant to the disease (such attempts have been made principally by the Dutch) have so far produced at least two strains that are almost immune, the "Christine Buisman" and "Bea Schwartz" elms. Already these trees have been set out in many areas in Europe and America to replace elms destroyed by the disease. Further work can be expected to produce additional resistant strains.

COMPLETE DESTRUCTION

The Dutch elm disease is capable of almost complete destruction of our American elms. This sobering fact should be more generally known than it appears to be. The disease is too often regarded by Mr. John Q. Public as something that "can't happen here" in his community. But it can—and perhaps will—spread to wherever elms are planted and wherever the insect vectors are able to thrive. Along with the realization of the appalling possibilities of the disease should go the assurance that adequate control is possible and, indeed, has been achieved in many areas. Here, then, enters the important role of public education. In areas to which the disease has not yet spread and even in those where the disease is present, one finds too frequently apathy or resignation to loss of elms. Such apathy and resignation are the result of ignorance of the facts. How many times I have heard statements such as: "The Dutch elm disease? Oh, there's nothing we can do against it," and "Yes, a control program would be fine, but sanitation and spraying are too costly for our community."

To the first statement the reply, as indicated before, is that adequate control *is* possible by means of programs of sanitation and spraying. If the responsible officials and the other citizens of a community are aware of this, control programs can be organized and carried out. The alternative to control might well be the task of removing

(*Continued on page 5, column 3*)

SOUTHWEST EXPEDITION BREAKS NEW TRAILS

By PAUL S. MARTIN
CHIEF CURATOR OF ANTHROPOLOGY

THIS SEASON the 1956 Southwest Archaeological Expedition will move headquarters about 130 miles westward from Pine Lawn, New Mexico, into eastern Arizona. The "new" area fits in a triangle roughly bounded by the towns of Show Low, St. Johns, and Springerville, Arizona. The area is "new" in the sense that it has never before been worked archaeologically.

In a sense, we are "pursuing" the Mogollon Indians, for our present hypothesis is that when they abandoned the Pine Lawn–Reserve area they moved first northwestward and then northward. Therefore our project may be considered in one sense a continuation of our old one, and in another sense a new task.

The new area is separated from the old by three mountain ranges that may have had important ecological influences on the culture in its "new" home. It is quite likely, also, that we shall find some early (pre-A.D. 1000) or even very early (pre-Christian era) evidences of occupation; and if so, it will be interesting to find what happened when the indigenous inhabitants met the Mogollon Indians from the Pine Lawn–Reserve area.

TRIBES MAY HAVE MERGED

We feel that the late efflorescence of the Hopi and Zuni cultures in A.D. 1300–1400 may be largely the result of inspirations and innovations transmitted to these people by the Mogollon Indians. In fact, it is quite probable that the Mogollon Indians eventually moved into Hopi and Zuni towns or merged with them in some manner. We may have had then the mingling of two cultures and peoples. In fact, I am making the wild guess that the Zuni language—a language that cannot as yet surely be fitted into any linguistic grouping and thus appears to stand alone—may be the Mogollon language! This is certainly going out on a limb, and someone may saw it off from under me, for it is a guess merely based on hunches and probabilities.

Certainly none of these hypotheses and wild guesses will be confirmed or even partly substantiated by our expedition this summer. Our first task is to ready our camp for future work—the cataloguing, photographing, and classification of objects to be dug up.

If we have time and money left, we shall probably not dig during this season but instead devote our efforts to reconnaissance work—that is, to searching for and making notes about ancient ruins in an area embracing approximately 700 square miles. This is no small task, indeed, and we shall certainly not complete it all this summer; but we may be helped in this work by a student from the University of Arizona.

The scope of our aims in the new area may be illustrated by listing some of our accomplishments in twelve seasons of digging in the Pine Lawn–Reserve area:

1. We obtained and published data on population growth and decline, on the changing of a method of subsistence from gathering wild foods to farming, on interrelationships between settlement patterns, economic activities, and on certain aspects of the social and religious life in this previously unstudied area.

2. The concept was gradually developed that the major subcultures of the Southwest were not separate isolated developments but were all derived from a primitive common Inter-Mountain culture that extended from Oregon and Idaho southward to the northern parts of Mexico and probably flourished as early as 11,000 years ago.

EXAMPLE OF MOGOLLON POTTERY

This bowl, believed to have been made about A.D. 1300, was brought to light in the Foote Canyon Pueblo dig in New Mexico by the 1955 Southwest Archaeological Expedition. The 1956 expedition will seek for both earlier and later types of prehistoric pottery.

3. We uncovered about 5,000 years of continuous history—the longest established and best worked-out sequence in the Southwest (this history throws light on the incipient stages in the growth of civilizations and on what causes a civilization to grow).

4. The earliest pottery in the Southwest was found.

5. We discovered an unusually primitive variety of corn believed to be the oldest or one of the oldest yet discovered in the Southwest (this has brought about revolutionary changes in archaeological hypotheses and interpretations).

6. We recovered the largest and most diverse collection of ancient food plants ever found in North America.

Many other details could be listed, but enough has been said, I think, to indicate that the twelve seasons in Pine Lawn–Reserve area (1939–55, except the war years) were successful. But far beyond this aspect lies another deeper appeal and satisfaction in our work. We have been fascinated by the beauty and compelling orderliness of the development of human societies, and we have been able to pass this on to thousands of others by lectures, popular articles, and monographs. The society we were studying was just one cell in the Organism of Society and the development of this cell that was revealed to us by our sweat and shovels was a powerful confirmation of our belief that man, unaided, except by his Creator, will attain great heights.

The technical aspects of our 1955 season now are being written up by my colleague, Dr. John B. Rinaldo; while I, in between visitors, telephone calls, and other duties, have been slowly writing a popular book on the history of the Mogollon Indians. Just what it will be called is not settled, but this book is intended for the layman interested in this subject, be he sixteen years of age or sixty.

DUTCH ELM DISEASE EXHIBIT OPENED

(Continued from page 4)

and disposing of scores, hundreds, or thousands of dead elms. And here a reply to the second statement can be made by recalling the words of a speaker at a recent conference on the disease: "I have heard the statement 'We should let them [elms] all die and be rid of the problem.' Let such a statement be challenged by the fact that the cost of removing one large city elm would take care of that same tree for the lifetime of the individual that made the statement, if not more." And, remember, after a community spends money to protect elms from the disease, the trees will still be there but when a community spends money to remove dead trees, denuded streets and lowered property values are the result. If people are made aware of the facts concerning Dutch elm disease and if they act on the knowledge that they will then have, the American elm will not need to go the way of the American chestnut.

The Museum's Dutch-elm-disease exhibit, now on view in Stanley Field Hall, was produced by Dr. John W. Thieret, Curator of Economic Botany, and Samuel H. Grove, Jr., Artist-Preparator. Materials used in the preparation of the exhibit were supplied by Dr. Richard J. Campana, Section of Applied Botany and Plant Pathology, Natural History Survey, Urbana, Illinois; Instituut voor Toegepast Biologisch Onderzoek in de Natuur, Baarn, Netherlands; United States Department of Agriculture, Beltsville, Maryland; The Oliver Corporation, Chicago; Standard Oil Company, Chicago; and Department of Plant Pathology, New York State College of Agriculture, Cornell University, Ithaca, New York.

HOW FISHES FLOAT WHILE SUBMERGED

By EDWARD M. NELSON
ASSOCIATE, DIVISION OF FISHES

HOW OFTEN have you stood in front of an aquarium and wondered how the fishes could remain motionless, apparently freely suspended in the water? We know that the "higher" fishes are among the few animals capable of being so suspended in the medium in which they live. Flying, gliding, and jumping animals must return immediately to the surface of the earth when their energy of locomotion is used up. Most bottom-living fishes and the sharks likewise must rest upon the bottom when they stop moving.

AN ILLUSTRATIVE EXAMPLE

How is it possible for certain fishes to remain suspended in the open water? Let us digress from fishes and consider a very interesting physical experiment, the Cartesian Diver.

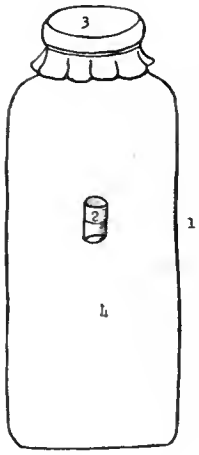


Fig. 1. The Cartesian-Diver Experiment.

This experiment can be performed with simple materials found at home (*see figure 1*). We need: (1) a tall bottle—a quart milk-bottle will do, (2) a "diver"—any small vial or bottle, (3) a diaphragm, such as a flattened balloon, and (4) water. Fill the bottle to the top with water. Pour enough water into the "diver" so that it will *just* float when placed open-end down in a sink full of water, and then transfer the "diver" to the bottle (this is the trickiest part of the entire procedure and may require several trials before it is properly done). After the "diver" has been placed in the bottle, open-end down, and is *just* floating at the top, place the diaphragm across the top of the bottle, stretching it tightly and securing it about the neck of the bottle with a rubber band.

Now we are ready to perform the Cartesian-Diver experiment. Apply pressure to the diaphragm by pushing down on the center with your fingers. The "diver" will thereupon descend in the water, even to the bottom. With practice you can make the "diver" stay at any particular level you desire. Note how the water-level within the "diver" rises when pressure is applied to the diaphragm (the volume of air contained inside the "diver" is reduced).

The explanation of this experiment requires the use of several laws of physics:

1. Water (a liquid) is for ordinary purposes noncompressible.

2. Air (a mixture of gases) is compressible within the limits of pressure and temperature.

3. Charles' Law—the volume of a gas varies directly with changes in temperature.

4. Boyle's Law—the volume of a gas varies inversely with changes in pressure (the greater the pressure, the less the gas volume).

5. Pascal's Law—pressure applied to an enclosed system (liquid and/or gaseous) is transmitted equally in all directions.

6. Archimedes' Principle—an equilibrium is reached in water when the weight of the immersed body exactly equals the weight of the volume of water displaced (the weight-volume relationships of each are equal to one another). If the weight of the immersed body is less, the body floats upwards. If the weight is more, the body sinks.

Since our experiment is of such a short time-duration, we can dispense with the effects of Charles' Law in our considerations. When pressure is applied to the diaphragm, pressure is automatically applied to the water filling the bottle. Through the action of Pascal's Law this pressure is transmitted equally to all surfaces within the bottle. The water, however, is noncompressible and will resist the applied pressure. The air inside the "diver," on the other hand, *is* compressible and the pressure applied to its surface through the open end of the "diver" will cause the volume to be reduced (Boyle's Law). We arranged that the amount of air in the "diver" was *just* enough to float it, but now, with the volume of air reduced by added pressure, it is no longer sufficient to float the "diver" and hence the "diver" sinks. We can make the "diver" remain at any particular level through the action of the Archimedean Principle because the actual total pressure (weight of the column of water plus the applied pressure) varies with the depth of the water.

BUOYANCY IN TELEOST FISHES

The "higher" fishes, called teleost fishes, are the most numerous fishes in our present geological age and hence most familiar to us. These teleost fishes usually possess within their bodies a gas-filled sac known as the swim bladder (*see figure 2*). Most bottom-living and torrential-stream-living members of this group have secondarily lost their swim bladders as part of their adaptation to their special habitats and habits.

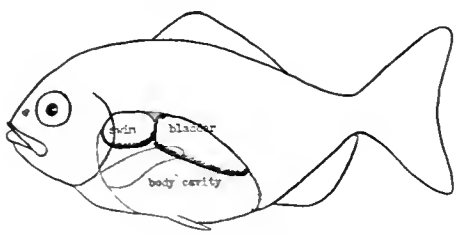


Fig. 2. Diagram of a fish showing swim bladder.

The swim bladder of the teleost fishes serves varied functions, but we are concerned here only with its function of buoyancy, which has two phases: (1) balance and (2) space-position. As far as balance is concerned, the swim bladder is of such a shape and is so situated in the body of the fish that the normal posture of the fish is horizontal. An interesting special condition is that to be seen in the sea-horse, whose posture is vertical rather than horizontal. While this fish is feeding, however, it frequently changes to a horizontal position. The swim bladder of the sea-horse is of the two-chambered variety, with upper and lower chambers. When the upper chamber is expanded with gas, the posture is upright. When the musculature of the upper chamber contracts, the gas is forced into the lower chamber, thus altering the center of gravity of the sea-horse to the extent that its body "falls" forward and the fish becomes horizontal.

When considering space-position we must remember that for every 32 vertical feet of water an additional weight equivalent to one atmosphere of air pressure (at sea level, 14.7 pounds per square inch of body surface) is added to the weight of the column of water. Thus, as one descends in the aquatic environment, the pressure upon the surfaces of the body increases rapidly. It can readily be seen from this that there is actually a different total pressure at every different level in the water.

FISH HAS CONTROL

The teleost fish with a gas-filled swim bladder is essentially an animated Cartesian Diver. One main difference, however, is that, within limits, the teleost fish is apparently capable of controlling the volume of gas and thus the activation of the system comes from *within* the "diver" rather than as the result of applied external pressures.

Exactly how this control is brought about in the fish's body is not yet entirely understood and more study is required to complete our knowledge of this subject. In some fishes the swim bladder is connected with the gut by an open tube. Here the excess gas can be readily eliminated through the tube and gut. When at the surface of the water these fishes can, and do, gulp air directly. How the gas volume is increased otherwise is unknown. Other fishes have special glandular areas in the swim-bladder wall. Some of these areas secrete gases while others absorb them, thereby increasing or decreasing the volume of the gases in the swim bladder. Still another possibility is the actual compression of the gas in the swim bladder by active muscular contractions, either of the entire body-wall

(*Continued on page 8, column 3*)

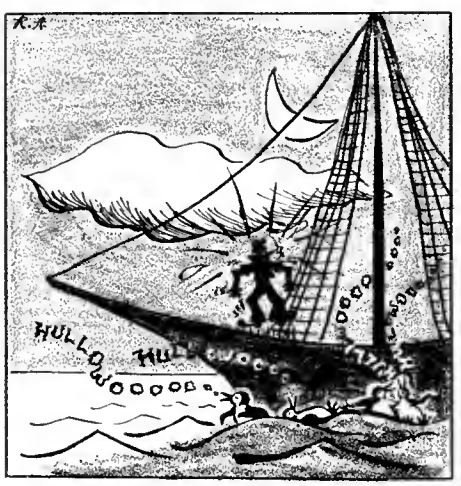
COMMUNITY SINGING BY BIRD CHOIRS

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

THE OTHER DAY a friend of mine was telling of the community singing that was popular before the days of radio and television. For a time, years ago, he had eked out a meager salary with a pittance earned by leading the singing in a mid-western village. For an hour in the evening, by exhortation and example in the village park, he had the villagers singing. I thought as I listened, "Why, that's not too unlike what some birds do."

The voice of the greater shearwater is used in a communal courtship. The sound is "Ma-ma-ma . . . " or "Ha-ha-ha . . ." It is described by the few who have heard it as having a peculiar, strident, breathless quality with an effect, when many birds perform at once, of "screaming cacophony." Nevertheless, it is music to shearwater ears, and it is actually their song.

These far-ranging sea birds, smaller relatives of the albatross, roam over the whole



Atlantic from Cape Horn to South Africa and north to Newfoundland and Norway. But when it is time for nesting they all return to the tiny, lonely Tristan da Cunha Islands in mid-South Atlantic, their only breeding grounds. Here they go ashore and form dense colonies. M. K. Rowan, stationed on Tristan, studied them in detail.

HUNDREDS JOIN IN

He found, in the close-packed colonies, when one pair of birds started to sing, others joined in at once until the voices of hundreds of birds were swelling the strident din. Then just as suddenly they stopped and all was quiet for a time. It was, he writes, especially impressive at night when in the darkness the "enormous volume of sound ebbs and flows," coming now from one direction, now from another.

The jackass penguin gets its name from the likeness of its melancholy call to the bray of the donkey. On the Falkland Islands, near the southern tip of South America, A. F. Cobb writes that when one of these penguins starts its doleful bray others answer until the whole district is moaning in chorus. Sometimes the birds call on land, sometimes when they are at sea. Possibly, Cobb suggests, the reported wails of ghosts of drowned sailors were in reality the woebegone "hullooow's" of jackass penguins.

A concert of bird voices can travel far, like a wave through the West African forests, as Harry A. Beatty found in Liberia when he was collecting birds for Chicago Natural History Museum. Especially is this true of the plantain eater, a large greenish relative of the cuckoos, which lives there. Beatty writes me that when an impulsive bird strikes the first clarion note, at once others take it up. The chorus swells. The first birds soon stop but others, farther off, are taking it up, and long after the first birds are quiet you can hear birds in the far distance. Possibly the notes are relayed a long distance.

It is not always the call of one of their own kind that sets off a bird chorus, as E. A. Preble found when he was traveling on the barrens east of Hudson Bay. The arctic loon was noisy there. It is noted for its peculiar loud, weird, and prolonged shrill scream. A lone bird, it is said, may howl like a fiend for up to a half-hour at a time, and a howl of a timber wolf or some other sound may set off a chorus of the wild cries.

STAFF NOTES

George I. Quimby, Curator of North American Archaeology and Ethnology, attended a field meeting of the Friends of the Pleistocene in northern Michigan last month. The organization is composed of glacial geologists, soil scientists, archaeologists, foresters, botanists, and zoologists. On this trip the group examined glacial and late glacial phenomena between Traverse City and the Straits of Mackinac . . . . **George Langford,** Curator of Fossil Plants, and **Orville L. Gilpin,** Chief Preparator of Fossils, collected specimens of fossil plants during a recent field trip to Alabama, Tennessee, and Kentucky. **Dr. Rainer Zangerl,** Curator of Fossil Reptiles, **Dr. Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, **Dr. Robert H. Denison,** Curator of Fossil Fishes, and Preparator Gilpin were interviewed about dinosaurs on television over WTTW . . . . **Henry S. Dybas,** Associate Curator of Insects, recently lectured on the seventeen-year cicada before the Chicago Entomological Society and the Barrington Natural History Society. He lectured on other subjects for the Department of Zoology of the University of Chicago.

LAPIDARIES DISPLAY ART AT MUSEUM IN JUNE

AN ART practiced by a comparatively small number of people the world over and by few amateurs will be the subject of a special exhibit during June in Stanley Field Hall at Chicago Natural History Museum. This is the lapidary's art—the cutting and polishing of gems and the creation of jewelry.

The Chicago Lapidary Club is the nucleus in the Chicago area of a small but devoted band of "rockhounds," as they call themselves, who range abroad in the field to collect gem material for their creative work. For the sixth successive year, the lapidary club will hold its Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition at the Museum. Formal presentations of awards were made at the Hamilton Park Field House during a three-day preview in May.

All those participating in the contest live in Chicago and suburbs within a 50-mile radius of the city. Included are not only members of the Chicago Lapidary Club but also other amateur lapidary and jewelry craftsmen of the area. Many of the contestants have received instruction through facilities offered by the Chicago Park District in the field houses maintained in small parks in many parts of the city and have done much of their work there. Those entrants in the contest who offer jewelry creations not only must cut their gems but also must prepare the gold and silver mountings and carry out the design-work.

Those who competed and whose creations were judged worthy of exhibition are divided into two classifications—novices and advanced workers. In each classification the exhibits are divided into ten specialized craft divisions: cabochon-cut individual gems, faceted individual gems, collections of specific gems, general gem collections, individual jewelry, jewelry sets, special pieces, collections of polished specimens or slabs, enameled jewelry, and enameled special pieces. Trophy cups, medals, and ribbons have been awarded in each division.

In addition to the individual awards, there are three special trophies for top winners. One is the Dalzell Trophy, awarded to the best of show. Another is the Presidents' Trophy, which goes to the outstanding first-prize winner among lapidary exhibits. Third is the Councilmen's Trophy, awarded to the outstanding jewelry.

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.

CERTIFICATES AWARDED TO 'MUSEUM TRAVELERS'

Thirteen children who successfully completed four Museum "journeys" each and demonstrated the knowledge they gained by correctly answering questionnaires about each trip were awarded official "Museum Traveler" certificates last month. Eight of the children are shown in the photograph with Miss Miriam Wood, Chief of the James Nelson and Anna Louise Raymond Foundation, who has charge of this and the Museum's many other programs for children, and with John R. Millar, Deputy Director of the Museum, who presented the certificates. Marie Mangold (front row, second from left) and Konrad Banasak (not in photograph) successfully completed five journeys each, more than meeting the requirements. Others in the photograph are: (front row, left to right) Jeanne-Marie Hansen, Alan Chill, and Sarah Strandjord; (back row) John Robinson, Lucinda Woods, Bill Heilig, and David Strandjord. Also awarded certificates were Boyce and Carol Brunson and James and Ronald Molnar.

Artist Appointed in Zoology

Miss Marion Pahl, of Berwyn, Illinois, has been appointed Artist in the Department of Zoology. Miss Pahl studied at the School of the Art Institute of Chicago, where she earned degrees of Bachelor of Fine Arts and Bachelor of Art Education. She has taught art in the St. Francis School of Art, Lafayette, Indiana, and in the Berwyn public schools. Before coming to the Museum she was employed at the Art Institute in the Burnham Library of Architecture and in the Slide and Photograph Department.

Karl P. Schmidt Elected to National Academy

Dr. Karl P. Schmidt, Curator Emeritus of Zoology, has been elected to membership in the National Academy of Sciences, Washinton, D.C. This is one of the outstanding honors attainable by a scientist. Dr. Schmidt's election was in recognition of his long career as a zoologist, during thirty-three years of which he was a member of the staff of this Museum, as Curator of Reptiles and Amphibians until 1941 and as Chief Curator of Zoology from that year until 1955. He has gained world renown for his achievements in his special field of herpetological research, and he is continuing his investigations at the Museum since his retirement last year.

Dr. Schmidt recently returned from Europe, where he was engaged in a research project at museums in Brussels, Paris, and London.

Gifts to the Museum

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

Department of Anthropology:

From: Col. Richard B. Stith, Lacon, Ill. —Japanese documents relating to the Point Barrow expedition, Japan

Department of Geology:

From: Gemological Institute of America, New York—natural pearl and cultured pearl

Department of Zoology:

From: Bernard Benesh, Burrville, Tenn. —456 beetles; D. G. Constantine, Atlanta, Ga.—21 bats, California

Museum Members to Receive Director's Annual Report

The Annual Report of the Director to the Museum's Board of Trustees, a book of 151 pages with 24 illustrations, was published in May, and copies will soon be sent to every Member of the Museum. In the book, printed by the Museum's own press, Director Clifford C. Gregg presents details of the work of 13 expeditions and numerous smaller field trips that added to the exhibition and research collections. The areas explored range from Africa to "the lost world" of Venezuela. The report covers additions to the exhibits, educational activities of the N. W. Harris Public School Extension, the James Nelson and Anna Louise Raymond Foundation, and the Edward E. Ayer Lecture Foundation. Also outlined are progress in research, the growth and operation of the Library, and the work of all divisions of the Museum, as well as the institution's financial condition.

HOW FISHES FLOAT—

(*Continued from page 6*)

or of special muscles associated with the wall of the swim bladder.

Whatever the method, it seems certain that the teleost fish does control the gas volume in the swim bladder because: (1) the fish does move about from one pressure level to another, apparently freely, and (2) it does not, while alive, react passively, like the Cartesian Diver, but resists actively changes in pressure when applied under experimental conditions. Thus we see that the teleost fish, which possesses a swim bladder, is capable of adjusting its weight-volume relationships so as to come into an equilibrium with the water at any desired depth and remain there motionless.

OTHER BUOYANT FORMS

Like the teleost fishes, some man-made objects function as animated Cartesian Divers. These objects are the submarine and the lighter-than-air craft. Here the weight-volume relationships are adjusted by controls within the object in order to effect rising, sinking, or remaining at any desired level.

The submarine is a large-scale Cartesian Diver. The volume of air in the ship is increased by "blowing out" the water ballast and is decreased by taking on additional water. For lighter-than-air craft (balloons, blimps, dirigibles, etc.) the weight-volume relationship is altered by throwing off the sand ballast or by allowing some of the gases to escape. The great difference in the relative weights of the water and air (770:1) necessitates much more delicate manipulation to control the lighter-than-air craft than the submarine.

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CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Volume 27 No. 7
July 1956

Chicago Natural History Museum
FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WABASH 2-9410

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

LEON L. WALTERS

1888–1956

Leon L. Walters, Taxidermist at Chicago Natural History Museum for 43 years, died suddenly on June 7, 1956, of a coronary thrombosis. He was born on May 1, 1888, in Portland, Jay County, Indiana. Mr. Walters was the inventor of the "Walters Process" for making plastic models of amphibians and reptiles, a process that has applications also in the taxidermy of birds and mammals. This introduced a wholly new lifelike quality in the Museum representation of animals wherever surface detail and translucence are required. He began work in 1911 at the then Field Museum in the old building in Jackson Park and retired in 1954, continuing to work and experiment with plastics at his home.

Leon L. Walters

Mr. Walters grew up on his father's farm near Salamonia. A born naturalist, with an Indiana farm-boy's interest in squirrel hunting, he was directed to museum collecting and to mounting birds and mammals by a farm neighbor, Nicholas J. Money, who encouraged him to apprentice himself to John Dell Allen, at Mandan, South Dakota, a taxidermist with a national reputation. Three years with Allen confirmed Mr. Walter's interest in museum work, with thoughtful attention to the defects of existing processes in taxidermy.

When the young Leon Walters came to the Museum in 1911, he served first as assistant to Dr. Wilfred H. Osgood, Curator of Mammals (later Chief Curator of Zoology), but when opportunity came, he transferred to the newly founded school-service department, the N. W. Harris Public School Extension. There he had scope for his interest in museum techniques and there also was demand for the collecting of local material. Collecting associated him with H. L. Stoddard, the bird taxidermist of the same department, and the two formed one of those deeply congenial friendships of men. Every weekend was spent in the field with shotgun in hand, especially in the marshland that surrounded Chicago before the city came, of which some fine remnants persisted up to World War I. The wealth of bird life in these marshes is notable even to the present day. I have heard Mr. Walters say that it was the draining of the Worth marshes that led him to leave the Museum and Chicago to homestead land in eastern Montana.

Mr. Walter's stay in Montana was fortunately not a long one. On his return, in the great expansion of the whole Museum program preceding and after the move to the new building in Grant Park, he found adequate scope and opportunity for his talents as artist, technician, and inventor, as well as for travel and collecting. Within the Department of Zoology a Museum romance presently developed between the young assistant in mammalogy and the departmental secretary, Miss Ethel Dow, who as Mrs. Walters continued to work in the Museum for many years, serving as an all but indispensable administrative assistant in the Director's office.

Little needs to be added to the account of Mr. Walters' work that appeared in the Museum BULLETIN of April, 1954, written on the occasion of his retirement. His monuments are notable exhibits in the halls of the Museum—the crocodile and sea-turtle groups and many fine individual reptile-models in the Hall of Reptiles and the white rhinoceros, the hippopotamus, and the great gorilla, Bushman, in the Hall of African Mammals.

Mr. Walters is survived by his widow and two sons, Allen Dow, born in 1927, and David William, born in 1926. The Walters home was a center of interesting activities, for Mr. Walters carried on much of his experimental work there. There one might see a plastic boat in process of construction, the famous horse's head with the hair transferred to a celluloid skin, and various experiments with artificial arms and hands. After his retirement there were also the remarkable plastic models of the several grades of eggs, used by egg-inspectors as their standards for grading.

Leon L. Walters lived a remarkably full and happy life, for he was exactly fitted for the unique environment afforded by a natural history museum.

KARL P. SCHMIDT
Curator Emeritus of Zoology

THIS MONTH'S COVER

"It's all in the day's work" at the Museum as one man faces the task of unpacking, sorting, classifying, and studying 20,600 birds of Asia that have just arrived. But the days at this task will run into many months or several years for Melvin A. Traylor, Jr., Assistant Curator of Birds, who nevertheless is seen enthusiastically seeking out treasured specimens of rare kinds. The story of this large and important new acquisition is told on page 3.

NEW MEMBERS

(May 16 to June 15)

Contributor

Miss LaVerne Hand

Associate Members

Dr. David G. Berens, Mrs. Clarence W. Bowen, J. Lester Cunningham, Harold English, R. Rea Esgar, Robert F. Grohe, Rolwood R. Hill, Howard Knight, Mrs. Lawrence E. Norem, Calvin P. Sawyier, William A. Singer, Mrs. Jack A. Williamson

Annual Members

John W. Batey, Jr., Edward C. Becker, Clinton C. Bennett, A. R. Boe, John A. Brandenburg, Robert Buchbinder, B. H. Bunn, C. M. Bunn, Harry Burg, Clyde B. Colwell, Jr., G. R. Cox, W. E. DeCamp, Edward W. Dobek, Francis M. Doan, James V. Donoghue, Joseph E. Eschbach, Harold R. Fagerson, Mrs. C. B. Falk, M. S. Firth, Kenyon S. Fletcher, V. J. Fletcher, D. G. Ford, Harry E. Gurvey, Cornelius J. Hauck, Hugh J. Helmer, George R. Hornkohl, William B. Hummer, G. Allan Julin, Jr., Ernest W. Kilgore, Willard K. Lasher, Philip A. Lieber, Endicott R. Lovell, William H. Lowe, Donald MacArthur, Dr. Paul J. Patchen, Waldo Mauritz, Thomas E. McDowell, James D. McElroy, Aldo L. Moroni, Miss Emmy Lou Packard, William J. Quinn, Milton D. Robinson, Justin A. Rollman, John B. Simpson, Alexander Sklar, Joseph J. Stefan, Albert P. Strietmann, John R. Waterfield, Warren J. Weber, Kenneth V. Zwiener

The Hall of Whales (Hall N-1) contains an exhibit illustrating the anatomy of these giant creatures, the largest of all mammals.

TWENTY THOUSAND BIRDS OF SOUTHERN ASIA RECEIVED

By MELVIN A. TRAYLOR, Jr.
ASSISTANT CURATOR OF BIRDS

SOME 20,600 birds of Asia arrived at the Museum last month. This huge assemblage of specimens, known to ornithologists as the Koelz Collection, is probably the last of the great private collections of birds, and the Museum was indeed fortunate in having

THRILLS FOR ORNITHOLOGISTS

Discovery of a new snow partridge from Afghanistan in newly arrived collection of birds from Asia brings elation to Melvin A. Traylor, Jr., Assistant Curator of Birds (left), and Emmet R. Blake, Curator of Birds. The partridge is one of 68 type specimens found in the shipment of more than 20,000 birds.

the opportunity to purchase it. This large collection was gathered over the years on expeditions to Iran, Afghanistan, India, Nepal, and Assam by Dr. Walter N. Koelz, of Waterloo, Michigan. With the acquisition of this collection a new and most important area for research has been opened for the Division of Birds. Gaps in our collections of birds of Asia will be filled, and the study of many forms peculiar to this region will now be possible.

The high mountains of the Himalayas, rising abruptly from the plains of India, form, with adjacent ranges, a massive barrier across southern Asia from Afghanistan east to Szechwan and Indochina. The southern slopes of the mountains are the meeting-ground of the palearctic fauna from the north and the tropical Indo-Malayan fauna from the south, and here is found the Himalayan fauna, which is particularly rich and varied. The Museum had several excellent collections from Indochina, Szechwan, Nepal, and Kashmir, but their usefulness was hampered by gaps that existed between them (see accompanying map). Now that these gaps have been closed, it will be possible to study the variation and relationships of Himalayan birds throughout their whole range and to clarify the problems that arose when they were studied piecemeal.

In a collection of more than 20,000 birds from the Himalayas there is naturally an abundance of forms to illustrate this varied and complex fauna. Mingled with the ravens, crows, chickadees, nuthatches, creepers, and wrens that would not appear out of place in Europe and North America are the brilliantly colored parakeets, sunbirds, bee-eaters, and flower-peckers associated with the tropics. Along with these are the numerous groups found only in this montane fauna—brightly colored tree-pies, rose finches, and pheasants and the contrastingly more somber laughing thrushes and scimitar babblers.

COMPARISONS NOW POSSIBLE

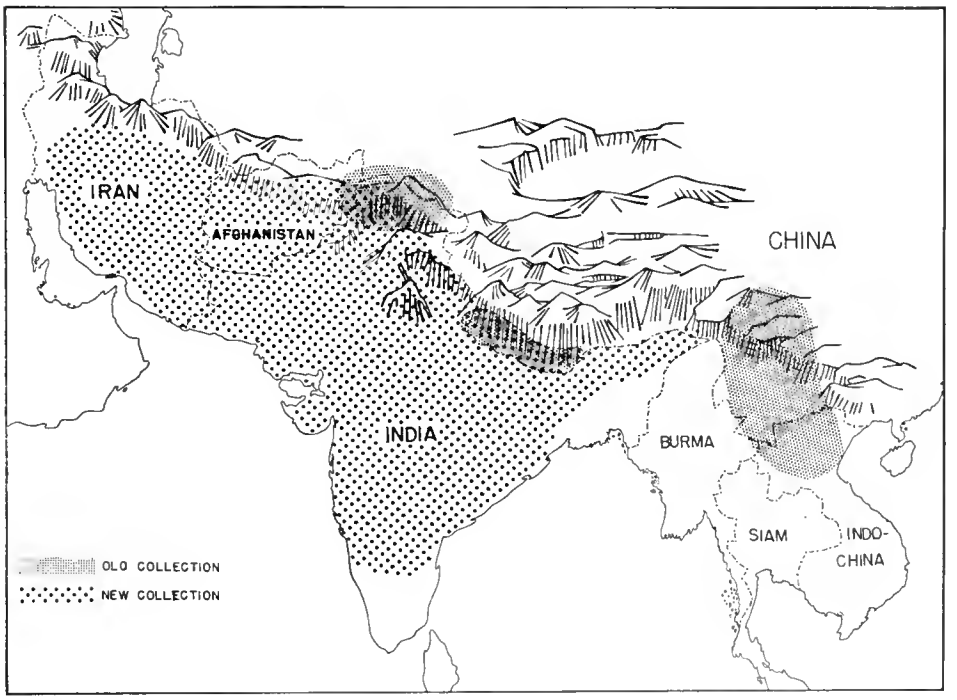
Of greater importance than the variety are the long series available of each form. Dr. Koelz took particular care to collect a series of each form wherever time permitted. There are many groups, such as the warblers, where there are numerous species that are closely similar. Without adequate series of all forms available for direct comparison to determine the key characters of each species, it has sometimes been impossible to identify single specimens properly. Now, however, with this wealth of new material, these problems will be minimized.

Other problems that can be resolved with our now adequate material have to do with species exhibiting color phases and seasonal changes in plumage. With only single specimens from scattered localities showing different plumages, it is difficult to know whether one or more species are involved. However, long series representing different regions and all seasons permit these problems to be settled. Fortunately Dr. Koelz made a special effort to get thorough representation of the larger birds such as hawks and owls, and the collection is particularly rich in these often-neglected families.

Much of the material in the collection is unworked. Some of the palearctic families have been studied, and Koelz himself has described many new forms. Sixty-eight type specimens, the individual birds from which the new forms were described, are included with the collection and add much to its usefulness. Completing the identification of the collection is an opportunity for many fruitful years of study.

'SPARE TIME' TASK

Among the noteworthy aspects of this collection, assemblage of which is only a part of Koelz's accomplishment, probably none is more remarkable than the career of the collector himself. It is hard to conceive of a man who could collect such numbers of birds in twenty-five years of travel in Asia as anything but a most energetic bird-collector. Yet Dr. Koelz, who accomplished this, was



NEW REGIONS REPRESENTED IN BIRD COLLECTION

Map of southern Asia shows how the new Koelz Collection (dotted) fills the gaps between the areas represented in other Museum collections (stippled) along the mountain massif of the Himalayas and adjacent ranges.

primarily a plant explorer and botanical collector and accumulated the bird collections in his "spare time."

The story of Dr. Koelz's amazing career can best be told in his own words, although they give but a small hint of the tremendous energy involved in his accomplishments:

"As for my personal history, I was trained as a linguist but on graduating from college was offered an assistantship with Professor Redford in Ann Arbor, who couldn't find a zoology graduate to help with a course in field zoology. The U. S. Bureau of Fisheries wanted someone to study the scales of the Great Lakes whitefishes and I undertook it for a doctor's thesis. It turned into a long job of determining the systematic status of the numerous forms and of recording life-history data on them. The work was interrupted by the illness of a friend that took me to New Mexico for a year or so and ended my connection with U. S. Bureau of Fisheries. On returning to Ann Arbor I continued with fish for the University and then for the State of Michigan. I had gone one summer with Byrd and MacMillan on the first attempt to fly to the North Pole and had attracted the attention of botanists by the plant collection made then, so that when [Dr. Elmer D.] Merrill, then of the New York Botanical Garden, was looking for a field botanist for work in the Himalayas I was given the job. It was a temporary affair but who would turn down a chance to see the Himalayas? I made a collection of plants and birds there; the former went to New York Botanical Garden and Kew and the birds, some 3,000, were mostly moth-eaten or are in the American Museum of Natural History. A collection of seeds sent to the U. S. Department of Agriculture turned out to have some interesting items and a collection of Tibetan and Indian paintings brought back got me a Freer fellowship in Asiatic art that sent me back to India. The university got, in addition to one of the finest collections of Tibetan paintings and Kashmir shawls, a large amount of herbarium material and 8,000 birds. The university had no other job for me so I took an offer from the U. S. Department of Agriculture to get seeds for them in India, and since then I have had only an honorary connection with the University of Michigan. The U. S. Department of Agriculture assignments ended around 1950 and I moved then to Assam to round out the Indian bird-collection.

"As for the motives of my activity, one has to do something and I find there is usually time for anything one wants to do. Moreover, I did a better job of seed collection when I had the additional incentive to collect herbarium and zoological specimens. The main difficulty is caring for what you get. But there I had the Thakur RupChand and his Tibetan friends, who were always with me. (RupChand is now here in Waterloo with me.) What such help was you can see from one of the Tibetan's remarks. He said other workers wait for the sun to go down but we hope it won't so we can finish our work. And we often needed an overtime sun when after a 15-mile march we had 30 birds to make up."

The last sentence alone suggests the labors involved, year after year, in accumulating his vast collections. As MacMillan truly said on his return from the Arctic, "Dr. Koelz is the most energetic naturalist I have ever known." His most recent honor was the award of the Frank N. Meyer medal from the American Genetic Association, a medal bestowed on only four other Americans. Dr. Koelz is now living in his boyhood home in Waterloo, Michigan, and we trust he is enjoying his well-earned vacation.

The Division of Birds is indeed fortunate in securing this collection. Not only is its value as research material unsurpassed, but it is a collection impossible to duplicate under present political conditions in Asia.

GEM AND JEWELRY SHOW WINNERS LISTED

Gold and silver trophy cups, medals, and medallions as well as many blue, red, and gold ribbons were awarded by the Chicago Lapidary Club to prize-winners in the club's annual show held at the Museum last month. This year's event was the Sixth Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition.

The Dalzell Trophy, gold cup for the best exhibit in the show, was awarded to J. Lester Cunningham. He also won the Councilmen's Trophy, third of the grand prizes, and three divisional cups in various sections of the show. The second grand prize, the President's Cup, and a divisional first-prize were awarded to Lucille Statkus. Winners of other divisional first-prizes were: Marjorie Oliver, Frank Swisher, Margaret F. Cunningham, Louis and Lucille Statkus (jointly), Beatrice Raymond, Alvin Ericson, J. O. Bourdeaux, Tom Priest, Earl Christensen, Paul Novak, Mrs. N. H. Maas, J. Keslin, and Marion Meers.

PRESS CONFERENCE
Newspaper photographer poses models in Museum.

Contributors to the success of the show were the young ladies shown in the accompanying photograph—Miss Joan Atchley (left) and Miss Lonnie Johnson (right), models assigned through the courtesy of Patricia Stevens, Inc., to pose with selected exhibits for photographers from the newspapers.

WILDLIFE PAINTINGS BY CHICAGO ARTIST

A one-man show of forty-five wildlife paintings by Tom Dolan, Chicago free-lance artist, will be held in Stanley Field Hall of the Museum from July 1 through July 31. Birds, fishes, mammals, and insects in the Museum collections were studied and used as models by Dolan, and some of the specimens will be displayed with the paintings.

Also to be shown are published illustrations made from Dolan's paintings that have been used in books and magazines (among them *Encyclopaedia Britannica* and *Chicago Tribune Sunday Magazine*), on calendars, and in advertising. The combination in the display of the original materials, the artist's creations, and the published reproductions will make this special exhibit notably different from the usual art exhibit—ordinarily no one but the artist sees all three phases. In addition, the exhibit is an example of a little-known Museum service: that of making material available for a variety of practical uses other than research and education.

Dolan during the past two years has been working for several months at a time as a volunteer in the Museum's Department of Zoology in co-operation with Dr. Karl P. Schmidt, Curator Emeritus of Zoology, Loren P. Woods, Curator of Fishes, Rupert L. Wenzel, Curator of Insects, Dr. Robert F. Inger, Curator of Amphibians and Reptiles, and Philip Hershkovitz, Curator of Mammals. In his paintings Dolan has developed an individual style that combines a use of colors in various media on an engraved scratchboard surface to produce sharply detailed and naturalistic results. Preparation of the scratchboard by special coating was required for certain of the paintings. In addition to the paintings, Dolan's exhibit will include drawings made for scientific publications of various divisions of the Department of Zoology.

Sponges, sea urchins, sea stars, corals, and other marine invertebrates are displayed in Hall M.

EXPEDITION TO BORNEO REPORTS PROGRESS

THE FIRST REPORT from the Museum's 1956 Borneo Zoological Expedition was a letter from its leader, Dr. Robert F. Inger, Curator of Amphibians and Reptiles, written May 7, at a camp four days' travel by launch up the Kinabatagan River in North Borneo. Thanks to United Timbers, Ltd., his headquarters are in a new lumber camp on a 40-foot bank above the river. At least it was a 40-foot bank on April 22, when he arrived, but floods had raised the water 20 feet, although this is the dry season, when the river may rise or fall five to eight feet in a night. In the wet season, they tell Inger, the river can rise 40 feet in one night's flood.

This is forest country, which is why the lumber company is starting operations here, and the great trees tower so high that their lowest branches are hidden from view from the ground by second-story trees and saplings. On the low hills, clear sparkling streams tumble over mossy rocks from pool to pool, while in the low flat swamp-forests the streams are muddy and sluggish. From one clear stream, only five feet wide and three feet deep at most, Inger got twenty-seven species of fishes and ten species of frogs. As of the time of writing he also had a fine torrent tadpole completely unknown to him and not belonging to any species of frog he had collected. He was still hoping to find the adult frog. The muddy streams hold different fishes and most of the frogs are different, too. It is almost like collecting on quite different islands, instead of on different streams from the same camp.

Inger writes that the most exciting catch so far has been a big green-and-yellow tree-frog with tremendous hands and feet that are completely webbed. The story goes that it can fly. Curator Inger thinks that possibly it can glide, like "flying" squirrels and "flying" lizards. At least, when he tossed one into the air, it spread its webbed fingers and toes wide, which probably doubled the surface area of the frog as it came down.

Snakes, Inger has found, are almost unobtainable. He knew that daytime hunting was unproductive, from his previous Borneo expedition in 1950, but he had hopes of night hunting. But it produced nothing. So far, Inger reports, he's seen only three snakes. Inger and the members of his party go out every day. They have turned over literally hundreds of logs, looking for burrowing snakes and so far have found just one specimen.

In addition to P. K. Chin of the North Borneo Department of Agriculture, who is spending a month with Inger, his party includes a Dyak hunter who was with him on an earlier expedition, a Dusun cook, and a couple of "Orang Sungei" (literally, people of the river). The North Borneo Forestry Department was interested in obtaining botanical specimens from this area and attached three collectors to Inger's party. They work independently but helped build the field laboratory, a structure made of poles from the forest and of palm thatch.

Dr. Inger hopes next to go to an area on the North Borneo–Indonesian Borneo border and then on to Sarawak.

Books

HOW TO COLLECT SHELLS. A symposium. A publication of the American Malacological Union, Buffalo Museum of Science, Buffalo, N.Y., 75 pages. $1.

Almost every visitor to an ocean beach becomes a beachcomber despite any initial resistance, because the strangely shaped and brilliantly colored shells he finds there are too attractive and too fascinating to be overlooked. However, after the first enthusiasm over this newly discovered field of activity subsides, the collector becomes aware of the fact that the beach is just a vast mortuary where few shells containing living creatures can be found. Where does he have to look for inhabited shells? A great deal of trying in unprofitable localities and the expenditure of much time are required before the novice shell-collector learns where to seek, unless he has an experienced person to guide him or a good book to advise him. Such a book, and a very inexpensive one, too, is the one named above. Its various chapters, all of them written by persons known for their expertness in the field of shell collecting, introduce the would-be malacologist to the many different environments in which mollusks, the animals which produce the shells, live, such as sandy or muddy areas, lagoons, inlets, rocky shores, etc. The various implements needed for collecting in each individual environment are described and hints for very unusual, special cases are offered. One chapter deals with the cleaning of the collected animals and how to prepare them for the shell collection. A list of outstanding books on shells is given, and so is a list of the national and local shell clubs the collector may join in order to meet people who share his interests. For its wealth of manifold information in this field, as well as for its inexpensiveness, this book is recommended.

FRITZ HAAS
Curator of Lower Invertebrates

The Stone Age type of culture still prevalent among native tribes of Australia may be studied in the exhibits in Hall A-1.

PHONOGRAPH RECORDS OF NATURE'S MUSIC

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

AMERICAN BIRD SONGS. Vol. I, second issue, 33⅓ r.p.m. Recorded by P. P. Kellogg and A. A. Allen. Cornell University Records, Ithaca, New York. $7.75.

This is a revised and re-edited long-playing edition of the earlier Volume I and contains most of the species heard in the Volume I (78 r.p.m.) album. The continued demand for these records is evidence of the multitude of bird-lovers whose interest has been aroused and is maintained by material such as this.

The continuity remains loosely ecological: birds of the north woods, of northern and of southern gardens and shade trees, of fields and prairies, and American game-birds, with about 60 voices featured and 28 background voices.

One of the innovations in this recording is to have a bird start singing before it is announced. This I found a bit disconcerting at first, not realizing that the preceding bird had ceased to sing and was not trying to imitate something else. But I soon found myself waiting for the next song so I could identify the new song before it was announced.

My ear is not too good on bird songs, but I found that I had to keep changing the volume control to make the recorded songs sound like I remembered them. Probably this is because the songs have been recorded as close to the birds as possible, while in the field the songs ordinarily are heard from various distances. This should be remembered in learning the songs from records and then listening outdoors.

Basically, this is a series of songs with the identifications, "This is the song of . . . " I wonder if it isn't time to use widely other such varied approaches as have been started by J. H. Fassett, for one. Breaking a song down, for instance, building it up again, modifying speed, pitch, and volume, and then comparing this song with the songs of other birds, near relatives and distant ones. Or recording the vocabulary of a single species, from the nestling peep to the varied repertory of the adults—in courtship, fighting, and fleeing, alone and in company.

AUSTIN L. RAND
Chief Curator of Zoology

How Big?

Queries are frequently made about the area occupied by Museum exhibits. The 48 exhibition halls provide 530,172 square feet of floor space, or the equivalent of 12.17 acres.

'SUN DRUMS' OF ASIA

By M. KENNETH STARR
CURATOR OF ASIATIC ARCHAEOLOGY AND ETHNOLOGY

AN EXCELLENT EXAMPLE of a bronze drum belonging to a general type known in parts of eastern and southeastern Asia during the past 2,000 years was recently received by the Museum as a gift. The donor is Oden Meeker, author, traveler, and now Mission Chief for the CARE organization in Laos, Indochina. This drum, highly valued as an addition to the collections of the Department of Anthropology, is notable for its skillfully executed decorative and symbolic designs in high and low relief from which it derives anthropological, artistic, and technical interest.

The drum comes form Namtha, capital of an isolated province in mountainous northwest Laos. Namtha, which lies in the uppermost reaches of the Mekong River, is in the heart of the anthropologically complex region where China, Indochina, Thailand (Siam), and Burma meet.

The drum is of lightly patinated cast bronze. Its general shape is that of a hollow cylinder with open bottom and closed top, about one and one-half feet high. The circular drumhead is nearly two feet in diameter, and its surface bears strongly executed decorative and symbolic designs. The center is marked by a circle that holds a stylized twelve-rayed sun figure cast in low relief. Outward from this are twenty-one concentric zones marked off by fine ridges in low relief. With the exception of the outermost one, these zones bear geometric and zoomorphic designs in the negative. The geometric designs include circles, lozenges, and squares. The zoomorphic designs include representations of two kinds of birds. Astride the two outermost zones and spaced equally around the periphery of the drumhead in high relief stand four highly though deftly stylized frog figures. The body of the drum bears geometric designs. The Meeker drum has a striking resemblance to a Thai bronze drum that was presented to Queen Victoria and that, from its placement in Windsor Castle, is known as the Windsor Drum.

RECORDS ARE MEAGER

Despite the twenty centuries during which this general type of bronze drum has existed, the wide range over which it has been found, and the not inconsiderable number of specimens that have been collected, there is relatively little known about time and place of origin, people responsible, manner of diffusion, evolution in various areas, and symbolism and functions. This paucity of information results from a series of historical circumstances: (1) many of the peoples who made and used these drums have lived in remote areas of Asia not studied scientifically until recent decades; (2) even Chinese scholars until very recently paid scant attention to the drums, partly because of lack of inscriptions and partly because the drums traditionally have been associated with the peoples of northern Indochina and with the non-Chinese peoples of south and southwest China whose cultures long were considered unworthy of attention; and (3) the majority of the peoples who used these drums maintained no written record.

The earliest known examples of these drums have been uncovered in presumably non-Chinese burials in Tonkin, the portion

'SUN DRUM' FROM LAOS

Made of bronze, it is typical of drums known for the past 2,000 years in many parts of east Asia. It is a gift to the Museum from Oden Meeker.

of northeastern Indochina contiguous to China. Although the precise dates of the Dongson culture represented by these burials is not yet fixed, it would seem that these early bronze drums, to judge from Chinese influence evident in various of the grave materials, are from about the beginning of the Christian era or perhaps slightly earlier. At that time peoples of non-Chinese culture were dominant not only in northern Indochina but seem also to have been an important if not dominant element in the southern half of what is now "China proper." Since then the drums in variant forms have been manufactured and used continuously to the present day.

To judge from such factors as (1) the past and present geographic distribution of the drums, (2) their water-oriented symbolism (boats, frogs, fish, and water birds), and (3) the tendency of the Chinese to associate the drums with the southern non-Chinese peoples, the drums might be assigned to a more southerly origin, as for example the region encompassing littoral northern Indochina and extreme southern China, and to peoples of non-Chinese culture. The distribution in central, south, and southwest China of place-names having the characters *t'ung-ku* (bronze drum) as a component is of possible historic significance. Locations including the words *t'ung-ku* occur in Hupei province (T'ungku-shan, T'ungku-pao), in Kiangsi province (T'ungku-hsien), in Kuangtung province (T'ungku-shan, T'ungku-hsü, T'ungku-wan), in Kuangsi province (T'ungku-t'an), in Kueichou province (T'ungku-yai, T'ungku-wei), and in Ssŭch'uan province (T'ungku-shan). A majority of these locations lie in the three extreme southern provinces of Kuangtung (including one location on Hainan Island), Kuangsi, and Kueichou. The history of a number of these locations includes references to the non-Chinese aborigines and to legends associated with the bronze drums.

A WIDE RANGE

These bronze drums in various forms have been reported from such widely separated proveniences as Inner Mongolia and the Indonesian islands of Java and Borneo. Seeming not to occur in this form in India, the drums are particularly well represented in the large region comprised of south and southwest China, northern Indochina, northern Thailand, and west-central Burma. The Museum collections include examples from south and southwest China, two of which are tentatively dated as being Later Han (A.D. 25–206), and from northern Thailand. The bronze drums are assumed to have had as their prototype wooden drums with heads of rawhide. Such an assumption in part is based upon the presence of such skeuomorphic vestiges as (1) handles ribbed in imitation of rope, (2) studs on the shoulder in possible imitation of nails, and (3) braidlike edging on the periphery of the drumhead and at the points of handle attachment. The drums vary in size, shape, and type of decoration, all of which bear relation to date and provenience. Despite the variations, however, these drums are unmistakably members of a single general group. Characterized as they commonly are by a central sun figure, they might be well called "sun drums."

The meaning of the symbolism in the wide variety of geometric, zoomorphic, and other designs on the head and body of the drums is difficult and, in some instances, impossible to ascertain. Attempts have been made to explain it in terms of magic and myth, and relationships with similar symbolisms from various times and areas have been suggested. Whatever its meanings, the symbolism would seem to bear a relation to a function of the drums, but the function is also open to question and a number of explanations have been put forward.

One group of Chinese legends associates the drums with Ma Yüan, a Chinese general of the Han period who carried out military expeditions against the non-Chinese peoples of the south. It is recorded in the history of the Later Han that Ma brought bronze drums back from northern Indochina in A.D. 44, and it is noted that the drums were cast in the form of a horse. One fanciful tale relates that the drums were placed under

mountain waterfalls so that the thunder of the water falling on them would deceive the rebellious natives into believing that the Chinese armies were near. Another recounts that the innovation of the drums was occasioned by the rotting of the traditional hide-drumheads under moist climatic conditions in south China. One legend is tied to another famous Chinese general and statesman, Chu-Ko Liang (A.D. 181–234), who also carried out expeditions against the southerners and whose name the Chinese sometimes give to the type of drum, the "Chu-Ko drum."

USED IN RAIN RITUALS

Miscellaneous explanations, of varying proportions of fact and fancy, cover a wide range. One, the most plausible and certainly the most common, ascribes to these drums the function of bringing rain. By the mechanism of sympathetic magic the drum, with its thunderlike sound and its water-oriented symbolism, especially the frogs, functioned to call down rain. Drums, though not specifically of bronze, were used in ancient Han China for such a purpose. Descriptions in the history of the Later Han of traditional rain-ceremonies refer to beating drums and placing five frogs in a carefully prescribed artificial pond. Bronze drums also have been used in Chinese rain-ceremonials during more recent centuries, and, according to U Lu Pe Win, Director of the Archaeological Survey of Burma, the Karenni, or Red Karen, of east central Burma still carry out annual rain ceremonies with such drums. Each tribe possesses such a "frog drum," some dating back to the 12th century, and when not in ceremonial use the drums are stored away in a sacred place.

Various other functions have been attributed to these bronze drums, as for example, that they were presented to non-Chinese chiefs as symbols of investiture and that they were used to summon the people in time of war or emergency. The drums have also been considered as emblems of wealth and power, stemming back to a time when bronze was a metal of great value, available only to the privileged. Finally, the drums are reported as having served a wide variety of commonplace functions: as temple drums, as drums to make known deaths, and as drums to herald the coming of night.

In dealing with both symbolism and function, not only must fact be distinguished from fancy but also the original symbolisms and functions from the more recent. Caution is particularly necessary with respect to function, for some of the functions attributed to the drums are purely imaginary. Furthermore, it is highly possible that in more recent times the drums have become diverse in function, having one function in one area and other possibly unrelated functions elsewhere.

The Museum is grateful to Mr. Meeker for his gift of the drum. In the natural and physical sciences, the social sciences, and the humanities, research is dependent upon the accumulation, over years and centuries, of data and of the materials that provide data. It is in such a context, as well as in its more obvious aesthetic sense, that this Laotian drum should be thought of, for when the drum is so considered, its value is enhanced manyfold.

JUNIOR 'ROCKHOUNDS'

Busily identifying specimens during a recent rock and mineral workshop for children at the Museum are (left to right): Eileen Marszalik, Gary Gilbert, Diane Kelly, Steven Nestor, John Kozlowski, and Dennis Szymanski, all seventh graders from the Hurley School in Chicago. Twenty-four groups of upper-grade school students attended the sessions, which were held during May and June by the Museum's Raymond Foundation.

'Postage-Stamp Safari' for Boys and Girls

Museum Journey No. 6, open to boys and girls during visiting hours any day in July and August, is the "Postage-Stamp Safari." Children participating will receive travel instructions at the Museum entrances to aid them in hunting out the animals pictured on the postage stamps of many countries all over the world. Children who have completed this and three other journeys successfully will be given the title Museum Traveler and presented with an award by the Director of the Museum. After eight journeys the Travelers become Museum Adventurers and a special seal is attached to their original award. The five previous journeys were "Africa," "China," "Animals Around the World," "Toys," and "Bible Plants." Other journeys will be announced later, and boys and girls may start their series with any one of them.

PROGRAMS FOR CHILDREN IN JULY AND AUGUST

Motion pictures and a puppet show on the stage of the Museum's James Simpson Theatre will be given free for children on Thursday mornings in July and August by the James Nelson and Anna Louise Raymond Foundation. The first of the six programs will be presented on July 5. There will be two performances of each show, one at 10 A.M. and one at 11 A.M. (*because of an extra-long film on August 9, the second show on that date will begin about 11:30 a.m.*). No tickets are required. Children may come alone, accompanied by parents or other adults, or in organized groups. Following are the dates and titles:

July 5—ANIMAL PETS
Also a cartoon

July 12—TWO FAVORITE ANIMAL PICTURES
Also a cartoon

July 19—THE THREE BEARS
(Puppet production on stage, by Apple Tree Workshop of Chicago Heights)

July 26—FOLKTALES
(Also a cartoon)

August 2—NATURE'S CHILDREN (*repeated by request*)
Also a cartoon

August 9—ELEPHANT BOY (*repeated by request*)
Based on Rudyard Kipling's *Jungle Book* story of "Toomai of the Elephants" in India

'Buffalo Hunts' at Museum for YMCA Children

A new summer program, "A Buffalo Hunt," especially for groups of boys and girls from YMCA's, will be given at the Museum during the summer. The program includes two motion-pictures and the distribution of direction sheets for the children to use in exploring Indian halls with exhibits pertaining to buffalo hunting. YMCA group leaders may arrange to participate by telephoning the Raymond Foundation at the Museum (WAbash 2-9410) at least one week in advance and making reservations for a definite date and hour.

Afro-Asian Link

The natives of Madagascar are of mixed Asiatic and African origin, and their culture forms a link between cultures of Africa and those of Polynesia and Malaya. The Museum possesses in Hall E the only important Madagascar collection in the United States, and it is believed to be one of the most complete in existence.

SUMMER LECTURE-TOURS GIVEN TWICE DAILY

During July and August, guide-lecture tours of Museum exhibits will be offered in both the mornings and the afternoons of weekdays, Mondays through Fridays inclusive. There will be no tours on Saturdays and Sundays or on July 4, but the Museum will be open during regular visiting hours, 9 A.M. to 6 P.M. on those days.

Except on Thursdays, the morning tours will be devoted to the exhibits in one department of the Museum. All afternoon tours (and also the tour on Thursday morning) will be comprehensive in scope, including outstanding exhibits in all departments. Tours are conducted by lecturers of the Raymond Foundation staff. Below is the schedule that will be followed weekly in July and August:

Mondays: 11 A.M.—Records from the Rocks
2 P.M.—Highlights of the Exhibits

Tuesdays: 11 A.M.—Animals Around the World
2 P.M.—Highlights of the Exhibits

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

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

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

STAFF NOTES

The film "Yellowstone," prepared by **John Moyer**, head of the Museum's Division of Motion Pictures, received a certificate of merit at the recent Fourth Annual Columbus Film Festival .... **Bryan Patterson**, Curator of Vertebrate Fossils until he recently left the Museum to join the faculty of Harvard University, has accepted an honorary appointment as Research Associate in Fossil Vertebrates, to which he was elected by the Museum's Board of Trustees .... **Mrs. Maryl André**, formerly of the Museum Library staff, has been transferred to the lecture staff of the Raymond Foundation .... **Dr. Theodor Just**, Chief Curator of Botany, has been appointed a member of the Subcommittee of Paleobotany, Ninth International Botanical Congress, to be held in Montreal in 1959 .... **Dr. Julian A. Steyermark**, Curator of the Phanerogamic Herbarium, attended the meeting of the Central States Section of the Botanical Society of America in June. He also made field trips in southwestern Wisconsin and northeastern Iowa, where he collected material for the Herbarium .... **Dr. Robert H. Denison**, Curator of Fossil Fishes, is in northern Michigan collecting material for his division .... **Dr. Sharat K. Roy**, Chief Curator of Geology, and **Norman H. Suhr**, Associate Curator of Mineralogy and Petrology, attended a recent X-ray diffraction lecture-course .... **Philip Hershkovitz**, Curator of Mammals, attended the annual meetings of the American Society of Mammalogists at Higgins Lake, Roscommon, Michigan, as did **Mrs. Sophie Kalinowski**, Osteologist, and **Luis de la Torre**, Associate, Mammals .... **Loren P. Woods**, Curator of Fishes, spoke on Lake Michigan conservation problems before the Isaac Walton League, Chapter No. 1, Chicago. He and **Miss Laura Brodie**, Assistant in Zoology, were delegates to the annual meetings of the American Society of Ichthyologists and Herpetologists at Higgins Lake in Michigan .... **Miss Marilyn Jaskiewicz**, a graduate of the secretarial school of De Paul University, has been appointed Secretary for the Department of Botany. She replaces Miss M. Dianne Maurer who has left to resume studies at the University of Illinois.

Zoo Directors Visit Museum

Dr. Karl P. Schmidt, Curator Emeritus of Zoology (far right), holds up a portion of elephant hide as he explains taxidermic processes to delegates to the annual convention of the International Union of Directors of Zoological Gardens held in Chicago from June 3 to June 8. Dr. Rainer Zangerl (far left), Curator of Fossil Reptiles, listens along with delegates and their wives who visited the Museum during the convention. Left to right are Mrs. Ernest Lang and Dr. Lang, Director of Zoological Garden at Basel, Switzerland; Dr. H. Hediger, Director of Zurich Zoological Garden; and Mrs. Walter Van den Bergh, wife of the Director of Societé Royale de Zoologique at Antwerp, Belgium.

Hosts to the convention were Robert Bean, Director of Brookfield Zoo, and R. Marlin Perkins, Director of Lincoln Park Zoo.

AMERICANIZATION GROUP CEREMONY AT MUSEUM

Graduating exercises for men and women who have arrived in this country as immigrants from many lands during the past few years were held in the James Simpson Theatre of the Museum on June 14 by the Division of Americanization of the Chicago Public Schools.

This ceremony, for many years an annual event in the Museum and always a moving one because of the gratitude expressed by these newcomers, sent forth about 1,200 adults (out of a class totaling some 3,000) better prepared to take their place in the American social and economic structure. Many of them were people who had escaped from the dangers of iron-curtain regimes.

The main address was given by Richard J. Daley, Mayor of Chicago, after Dr. Clifford C. Gregg, Director of the Museum, had welcomed them to the Theatre. Helen G. Lynch, Supervisor of the Division of Americanization, was chairman. Present were ninety-seven teachers and also representatives of the U. S. Immigration and Naturalization Service, Illinois Society of Colonial Dames and Board of Education of Chicago. Diplomas and certificates were presented to those who had finished courses, and awards were made to winners of an essay contest conducted for the class by the Illinois Society of Colonial Dames.

Latin-American Visitors

A group of twenty distinguished educators, both men and women, from Peru, Paraguay, Panama, and Nicaragua, touring this country under the auspices of the State Department, were visitors at the Museum on June 17. John R. Millar, Deputy Director, conducted them on a survey of the Museum's outstanding exhibits. Their Chicago hostess was Mrs. Howard R. Peterson, a Member of the Museum.

Gifts to the Museum

Department of Zoology:

Dr. C. J. Drake, Ames, Iowa—wingless aradid bug, Puerto Rico; Cameron E. Gifford, Valparaiso, Ind.—snake; Richard T. Gregg, Baton Rouge, La.—4 lots of fishes, Mexico; Grove Avenue School, Barrington, Ill.—barn owl; Harry Hoogstraal, Cairo, Egypt—34 mammals, 4 frogs, 12 lizards, 6 snakes, Egypt and Uganda; Mrs. Harry C. Pearson, Indianola, Iowa—African elephant hide; Dr. Charles A. Reed, Chicago—mammal skull, Washington; Simon Segal, Chesterton, Ind.—mammal, Illinois; Dr. Richard B. Selander, Urbana, Ill.—350 Mordellid beetles, western United States; Dr. Katsuyki Yokoyama, Chicago—5 salamanders; Jack Moyer, Hamilton, N.Y.—82 birdskins, Japan and Korea; Dr. J. S. Schwengel, Scarsdale, N.Y.—collection of 27 species of marine shells, worldwide; Roland von Hentig, Chicago—lizard, snake, Indonesian Borneo

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Bulletin

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Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

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

ANTIOCH COLLEGE HONORS MUSEUM

Chicago Natural History Museum has received a citation from Antioch College, of Yellow Springs, Ohio, for outstanding service to students during the past eleven years. The citation was received on behalf of the Museum at the college's commencement excercises, held June 23, by Dr. Clifford C. Gregg, Director. Samuel B. Gould, President of Antioch, made the presentation, which was in recognition of the Museum's collaboration in the Antioch College Co-operative Work Plan. Under this plan the Museum has given, to date, employment to 107 students as part-time assistants in its scientific departments. The citation reads as follows:

"In 1946, the Director of Chicago Natural History Museum affiliated the Museum with the Antioch educational program by employing students as assistants to its curators. Since that time more than a hundred Antioch students have known personally the devotion and patience of the naturalist and scientist. These students have learned to appreciate the necessity for accuracy of observation, the value of objectivity in analysis. They have cleaned skulls, split shale, prepared fish skeletons, made card catalogues, mounted plants, sorted pieces of pottery, pinned insects, catalogued geologic maps, prepared albums of pictures, reconstructed fossils, and done many of the chores required for the maintenance of a large museum whose primary purpose is education. After observing and participating in this activity, they have learned the appropriateness of consulting a library to find out whether the information printed in a book is accurate.

"Antioch College is proud of its association with Chicago Natural History Museum and is happy to acknowledge its debt of gratitude to the Museum's superb staff through this citation."

Citations were received also by the *Toledo Blade*, represented by Paul A. Schrader, Director of News, and the YMCA Vocational Center, New York, represented by J. Lawrence Broderick, Executive Director.

CURATOR APPOINTED TO OCEANIC POST

Roland W. Force, formerly of Palo Alto, California, has been appointed to the staff of the Department of Anthropology as Curator of Oceanic Archaeology and Ethnology. Mr. Force recently returned to the United States after eighteen months of field work in Micronesia where with Mrs. (Maryanne) Force, he conducted studies among the people of the Palau Islands (Western Carolines, in the Trust Territory of the United Nations). The project was for the Tri-Institutional Pacific Program jointly sponsored by Yale University, the University of Hawaii, and the Bishop Museum in Honolulu. Mr. Force was an associate in ethnology on the staff of the Bishop Museum. Prior to that he taught in the department of sociology and anthropology of Stanford University, of which he is a graduate and where he earned his master of arts degree. He is currently completing the requirements for a doctorate at Stanford.

The Museum position to which Mr. Force has been appointed has been vacant since the end of 1952 when Dr. Alexander Spoehr, the former curator, resigned to accept an appointment as Director of the Bishop Museum in Honolulu.

Show of Dolan Paintings Extended to August 26

The one-man show of forty-five wildlife paintings by Tom Dolan of Berwyn, Illinois, originally scheduled only for the month of July, has been extended through August 26 because of the unusual interest evinced by the public. This special exhibit is in Stanley Field Hall. It includes original paintings together with published reproductions of many of them and the actual Museum specimens of birds and other mammals used as models.

THIS MONTH'S COVER

The strange and little-known giant bromeliad *Puya raimondii* of the Bolivian and Peruvian Andes is the subject of our cover. Called "a sort of dinosaur among plants" by Dr. Lyman B. Smith of the U. S. National Museum (in his article on page 5), because it seems on the verge of extinction, the plant is found at high altitudes, and grows as tall as 30 feet. The illustration shows a section of a new mural in Hall 29 by E. John Pfiffner, Museum Staff Artist.

Death of Margaret M. Cornell, Former Museum Lecturer

Word has been received of the death, on June 26, of Miss Margaret M. Cornell, former Chief of the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures. Miss Cornell joined the staff of the Museum as a guide-lecturer in 1926 and became head of the division in 1929. She retired on pension in 1939. Before coming to the Museum she had been a schoolteacher in Ohio, Kentucky, and Illinois. She was an alumna of Kent Teachers College, the University of Chicago, and Northwestern University. Since her retirement she had lived with relatives in Mountain Lakes, New Jersey.

NEW MEMBERS

(June 18 to July 13)

Life Member

Mrs. Carl A. Birdsall

Associate Members

Mrs. Dorothy Mylrea Ebin, Mrs. L. Martin Hardy, F. L. Majka, William O. Petersen, Bert R. Prall, Kenneth Alan Rubinson, C. Radford Van Ness

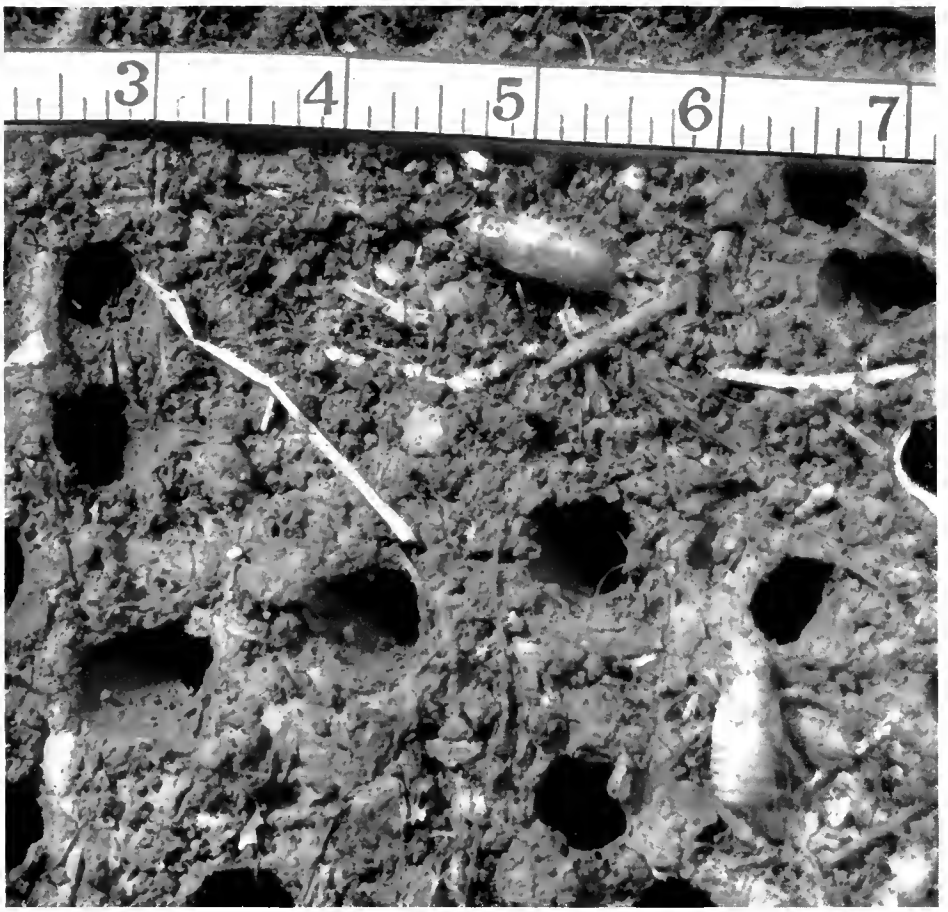
Annual Members

Richard A. Aishton, William J. Burns, Mrs. C. N. Cahill, Clayton G. Cassidy, Mrs. Thomas R. Cravens, Wallace L. Crawford, James L. Curry, James G. Dern, Herman C. Edwards, Ralph Edmund Ernst, William E. Ferguson, Harry P. Gaughan, Howard D. Geter, Sr., Arthur Gettleman, Gregory J. Gyann, William G. Hart, Emil Holzwart, Eugene X. Humphrey, Theodore E. Jelm, George T. Jengel, Horace W. Jordon, Harry C. Kinne, Sr., Lester B. Knight, Michael H. Lyons, Edward E. Mack, Jr., Miss Mary F. Maier, James J. Mertz, Harry E. Moroni, Jr., James D. Stearns, H. W. Tenney, Master David R. Trace, Master Edward R. Trace, Master Peter A. Trace, George P. Treadwell, Dr. John T. Wegrzyn, Joseph Wegrzyn, Harry J. Williams

MUSEUM MEN TAKE CICADA CENSUS, TAPE-RECORD SONGS

By HENRY S. DYBAS
ASSOCIATE CURATOR OF INSECTS

IN THE BULLETIN (May issue) we called attention to the scheduled appearance this year in northern Illinois and adjacent areas of Brood XIII of the Seventeen-year Cicadas and briefly reviewed some of the facts about the life of this most unusual insect. Since then the cicadas have made their "dramatic and noisy debut" and vanished for another seventeen years. But they have left conspicuous evidence of their short visit in the browned twigs killed by their egg slits. A drive through the suburbs and forest preserves around Chicago gives one a good idea of the abundance of these insects a few weeks ago. Many trees have lost an appreciable number of their terminal twigs and some large groves appear extensively scorched. The large trees soon will recover from this extensive "pruning," judging by past experience, but some small trees—especially newly planted ones—may be severely injured.



CICADA NYMPHS, LIFE-SIZE

Photograph in actual size of a small section of forest floor, only a few inches across, shows individual emergence holes of the cicada nymphs. Two of the nymphs are crawling on the surface.

At the peak of their activity, the cicadas aroused a great deal of interest— more than I can remember for any other natural-history phenomenon in our region. We had an unusual number of calls at the Museum about these insects. A certain number of calls, as could be expected, concerned possible damage to fruit trees and ornamental trees and shrubs. In this connection, it was apparent that the name "locust," often applied incorrectly to these insects, was in itself a source of confusion. We had to assure a number of people that cicadas do not devour flowers and crops as do the true locusts although they do damage twigs with their egg-laying activities. Some people found the song of the cicada annoying and even oppressive after a time; others enjoyed the chorus of sound. I had a phone call from a woman who wanted to know the exact distribution of the cicadas so that she could plan her vacation trip to avoid areas where they occurred.

On the other hand, there was a great deal of genuine interest in the cicadas themselves—in their appearance and behavior and in the odd facts of their unusual life. Still another area of interest was in the field of nature photography. Photographers looking for unusual subjects found the Periodical Cicadas remarkably photogenic and "co-operative," with many interesting activities and postures. We have already seen some unusually fine still and motion pictures at the Museum that were taken by amateur as well as professional photographers during the recent cicada emergence.

MANY PATHS IN RESEARCH

In addition to their exceptional popular interest, Periodical Cicadas have interested entomologists and biologists in general for a long time. Hundreds of technical papers have been written on various aspects of their life, yet many intriguing questions remain unanswered. Why, for example, the extraordinary length of the life cycle? Why does each brood emerge in one great swarm instead of being spread out more evenly over several years? What goes on underground in the long years between each emergence? The number of such questions could be multiplied indefinitely.

This region has only one brood of Periodical Cicadas and thus there is only one short period of a few weeks in every seventeen years when we have the chance to study these fascinating insects in the field. Clearly, these are not the most favorable conditions for field investigations. Yet there were several problems dealing with cicada biology that we wished to investigate and the 1956 cicada emergence gave us one of our infrequent opportunities to do so. We could only try to fit our studies into the rapid tempo of the cicada drama and hope to obtain some useful data before the curtain went down for another seventeen years.

One area of our studies, which we can only mention briefly here, was the song of the cicadas. It appears that there are two different forms of the Periodical Cicada, one large and the other dwarf, which differ in song as well as in some other respects. The chorus of the large form is a low pleasing trill, like that of toads in the distance, while that of the dwarf form is loud and shrill. When large numbers of the dwarf form are singing together, the sound can be overwhelming. Why there are two forms of cicadas living side by side and what their relation is to each other is a puzzling problem. But the two different songs clearly merited investigation and we spent some interesting days in the field making sound recordings of individual and group songs for a later detailed analysis in the laboratory.

Another problem that we were most interested in studying was that of numbers. Enormous numbers of individuals are a characteristic feature of the appearance of Periodical Cicadas in an area, but there is no really good information on their numbers. D. Dwight Davis, Curator of Vertebrate Anatomy at the Museum, and I felt

that a more accurate knowledge of cicada numbers under different conditions would permit us to refine our knowledge of these insects in many significant aspects. We hoped also that a study of this kind would have some broader applications and implications as well. Techniques for arriving at reliable estimates of numbers of particular animals are a basic tool for studying many theoretical aspects of biology as well as many practical problems in fields such as economic entomology and game management.

RECORDING CICADA SONGS

Henry S. Dybas (right) is holding the microphone near a singing male cicada while D. Dwight Davis, Curator of Vertebrate Anatomy (with earphones), is monitoring and regulating the controls.

A CENSUS OF CICADAS

Periodical Cicadas lend themselves to census procedures. The nymph is a large insect that makes a conspicuous and distinctive emergence hole in the ground. The walls of the hole are so solidly compacted by these little masons that they remain intact through rains and other vicissitudes long after the insect has left the burrow. Moreover, the holes occur in sufficient numbers in woodlands with moderate cicada densities to make a count practical. Finally, emergence burrows are prepared long before the insects emerge and can be uncovered just beneath the surface of the soil. This is important because it permits a valid count to be made over an extended period of time. All of these features make it inevitable that any census of Periodical Cicadas should use the number of nymph burrows as an index to the number of adults rather than of some other stage.

We were able to test the assumption that the number of burrows corresponds to the number of cicadas by setting a screened cage on the ground to capture emerging cicadas in the forest where we conducted our studies. Our cage covered a half of a square yard of forest floor. In this area we located 66 burrows. We found that from these 66 holes a total of 62 cicada adults had emerged successfully and another had emerged partly but died in its nymphal skin. Two nymphs failed to emerge at all and were still in the tops of their burrows, covered with a white fungus. Thus we were able to account for 65 out of 66 holes, a correspondence so close that it more than satisfied us with the reliability of the index.

The final step was to decide on the sampling procedure to use in the woodland plot that we selected for our study area. Davis and I discussed this problem with members of our staff and the Department of Zoology at the University of Chicago and arrived at a sampling method that was designed to eliminate conscious or unconscious bias in the selection of the squares to be counted. The designated squares were selected on a map by a mathematical random-number technique and the corresponding square yards were then located in the woods.

All of this is a plain straightforward method—on paper. Inevitably a field investigation runs into things that are of little or no theoretical interest but may be highly pertinent to the investigator—factors such as mosquitoes, nettles, rain, brambles, and poison ivy. Moreover, picking a square on a map in an office is one thing, but transferring this point to one in a dense woods is something quite different. We were fortunate in getting much volunteer help from the Department of Geology at the Museum on the essential steps of mapping the area and locating the random squares in the woods.

Our study area was a representative woodland about 58 acres in extent, south of Chicago. It contains an intermittent creek that flows through a low flat woods subject to annual flooding. We decided that the upland forest and the low floodplain forest should be sampled separately because of the obvious difference in these two areas. Our early assumption was that conditions in the annually flooded area would be less favorable to soil-inhabiting insects like cicada nymphs. We began to find out very soon that this was far from being the case. Cicada nymphs not only survived the annual flooding somehow, but they did so in spectacular numbers.

MILLION AND A HALF TO AN ACRE

When we finished our counts of both the upland area and the low area, we had some most interesting figures. The counts of burrows in the random samples in the upland forest ranged from a low of 2 per square yard to a high of 92 and averaged about 27 per square yard. This is equivalent to about 130,000 cicadas per acre. The low floodplain forest samples, on the other hand, were very conspicuously different. The counts ranged from a low of 106 to a high of 698 per square yard and averaged about 297 per square yard—more than ten times the density of the upland area, or nearly a million and a half cicadas per acre! At this rate, an average city block in Chicago would contain more than 4,000,000 cicadas!

SPOT CENSUS

A square yard of forest floor marked off and partly cleared for counting the emergence holes of the cicadas to estimate the population.

Impressive as these numbers are, we did not fully appreciate the biological produc-

(*Continued on page 7, column 2*)

'DINOSAUR OF PLANTS' SHOWN IN MURAL

By LYMAN B. SMITH*

THE LATEST MURAL prepared for Martin A. and Carrie Ryerson Hall (Hall 29—Plant Life), by Museum Staff Artist E. John Pfiffner, shows the giant bromeliad *Puya raimondii* in its home high in the Bolivian Andes. This member of the pineapple family bears slight resemblance to a pineapple plant beyond its coarse spiny leaves, and it is very difficult to believe that it is also related to the Spanish moss.

However, *Puya raimondii* is a sort of dinosaur among plants, its thirty-foot members fighting a losing battle against extinction while more adaptable bromeliads are conquering new territory. Its three remaining areas, two in Peru and one in Bolivia, are now widely separated but indicate a once continuous range of a thousand miles. Incredible as it may seem, this highly conspicuous species was unknown except to a few Indians until the Peruvian botanist, Raimondi, discovered it in 1867. Only a handful of people have seen it since then, and the first color-photographs of it were taken as recently as 1948 by Mulford Foster. His pictures, published in the October, 1950, number of *The National Geographic Magazine*, have been the inspiration of the new mural.

It is easy to understand the perilous situation of *Puya raimondii* when we consider its life history. The span of a generation from seed to flowering has been estimated at 150 years, which certainly is an extremely long time for a plant that must be classified as an herb and that dies after a single flowering. This has been balanced by the plant's ability to withstand the cold and aridity of the mountain tops and its astronomical production of seed, some six and a half million each. However, it has earned the enmity of Indian herders by entangling their sheep with its spiny leaves and thus has sealed its doom unless prompt measures for protection are taken.

The above notes are largely drawn from Professor Hans Kinzl's excellent article "Die Puya Raimondii—ein Wahrzeichen der tropischen Anden" in *Jahrbuch des Oesterreichischen Alpenvereins*, Volume 74, No. 5, pp. 59–66, 1949.

*Dr. Smith is Associate Curator in the Division of Phanerogams at the United States National Museum, Washington, D.C.

Expedition to Wyoming Seeks Eocene Fossils

An expedition to collect a broad faunal representation of fossils of the Eocene epoch (40 to 60 million years ago) will be dispatched by the Museum to the Washakie Basin in Wyoming about August 1. The expedition will be conducted by William D. Turnbull, Assistant Curator of Fossil Mammals, and Orville L. Gilpin, Chief Preparator of Fossils.

The area selected for reconnaissance and excavations appears promising from the indications obtained by preliminary investigation in other years. It is situated at an elevation of about 6,500 to 7,500 feet in the Rockies, north of the Colorado border, south and east of the Grand Tetons.

The Eocene is at present inadequately represented in the Museum's paleontological collections, and it is hoped that several months' work by the 1956 expedition will remedy this situation. The collecting of fossil mammals will be a primary objective, but it is expected that specimens of reptiles will also be obtained. The Eocene was the age of the "dawn horse" Eohippus, a creature about the size of a collie dog, that had five toes on each foot instead of the hoofed and single-toed foot of its larger descendants.

'HOW ABOUT THIS ONE'

Judy Wilhite of Des Moines, Iowa, and her cousins Vicki and Jeannean of Montrose, Pennsylvania, puzzle over the identification of a stamp selected by Tim Wilhite, also of Montrose, as the youngsters begin a "Postage-Stamp Safari" through the Museum. Sixth in a series of Museum Journeys given over the past 15 months, the safari may be taken at any time until August 31. Youngsters wishing to participate in the safari are presented with questionnaires asking for identification, in the Museum, of animals imprinted on stamps from all parts of the world. Four successful Journeys entitle the youngster to an award designating him as an official Museum Traveler; eight successful Journeys qualify him as a Museum Adventurer. Boys and girls may take their postage-stamp safari at any time of the day during Museum hours (9 A.M. to 6 P.M.).

EXPLORATION BY CANOE ON BORNEO RIVERS

DR. ROBERT F. INGER, Curator of Amphibians and Reptiles, who is conducting the Borneo Zoological Expedition, has moved his camp down to extreme southeastern North Borneo and is encamped on a river called the Kalabakan, according to his latest report (dated June 14).

The day before writing he spent eleven hours in a native dugout—a *prau* it is called locally—exploring the river. With two Dusuns and his Dyak hunter Guan, he went upstream by daylight, prospecting for collecting sites for fishes and frogs. Fishing on a big river is difficult, but the big rivers may have special species in them. Using a cast net, Inger caught a number of species new to him that evidently live only in large rivers, for he hadn't found them in the smaller streams he had fished so far.

Moving silently in a *prau* along the Kalabakan River at dusk is a wonderful experience, Inger writes. Mammals and birds are conspicuous and active. Red monkeys, long-tailed monkeys, and gibbons stare at you from the trees along the shoreline. The gibbons, he says, are the finest mammals in Borneo with their graceful leaps—swings, rather—for incredible distances through the trees; and no forest sound can compare with their wonderful yodeling. At dark, fruit bats, the so-called flying foxes, circle over the trees by the dozens, and after dark their incessant quarreling screams and barks come from the treetops.

When traveling by *prau* the almost incessant chatter of the Dusuns is troublesome and Inger continually has to remind them that the only sounds he wants to hear are frog sounds. But one night they were as silent as possible, for there were said to be pigs on the banks, and sure enough Guan shot not only a pig, but also a mouse deer.

The new camp is near the coast, and the abundant tree frogs Inger finds are not the same species that he found at last month's camp in the interior on the Kinabatangan River but are more like those he found at other coastal localities; and similar ecological data is accumulating on other groups. So far Inger has collected 28 species of frogs. He had hoped to get half the species known for Borneo, but to do this he must get 12 more, and he writes it's harder and harder to get species new for the collection.

The Bombay-Burmah Company, Inger's host for two months of his earlier 1950 expedition, also has the timber concession for the entire river basin in which he is working now. The company's personnel is doing everything they can to help him. To his thanks the manager replied that the more that was known about Borneo, the better off the Bombay-Burmah Company would be. Such hospitality and farsighted appreciation of a naturalists' labors is rare enough to be heartwarming.

EVERYTHING FROM 'HOPPERS TO HIPPOS IN MUSEUM GIFTS

By JANE ROCKWELL

TEN GRASSHOPPERS, 2 human skeletons, 1 alligator, 19 slides of fleas, 10 pounds of raw uranium ore, 29 seed samples . . .

The above isn't a list of items for a playful scavenger hunt—it's only a partial enumeration of typical gifts received and recorded at the Museum each month. Most people, we imagine, would be rather hesitant to look upon these items as "gifts," but to the Museum they are welcome acquisitions, eagerly anticipated and gratefully received. Bizarre as they may seem to the layman, to Museum staff members who deal constantly in study and research with thousands of similar articles every year, they are quite commonplace. However, in the long gift-receiving history of the Museum there have been many gifts that have, for one reason or another, stood apart from the usual acquisitions.

One such gift was an elephant seal whose arrival in 1929 was made all too evident by the fact that it was in an advanced state of decay. The seal, which had been shipped to St. Louis by a dealer in circus and zoo animals, died while en route, after which it was sent to this Museum. Upon unpacking the crate containing the carcass, our taxidermists discovered that the dead animal had not been packed with sufficient ice. An unbearable stench permeated the entire Museum while frantic efforts were successfully made to salvage the skeleton. The herculean task of disposing of the remainder of the beast was solved by cremation in the Museum incinerator. Memories of that unwelcome gift are likely to remain vivid to staff members for a long time.

Few gifts are received so unenthusiastically, however. The Department of Botany was jubilant at the arrival, seven years ago, of a specimen of the dawn redwood, taken from the "discovery" tree found in Szechwan province in southeastern China. The tree, still the largest of this species known to exist, is 98 feet high and is 68 inches in diameter. Collected at the close of World War II, the herbarium specimen was sent to the Museum by the Arnold Arboretum of Harvard University and the wood sample was sent by a private collector. Botanists also rejoiced at the arrival of a massive board of the wood of the Norfolk Pine, which is native only to Norfolk Island, located off the coast of Australia.

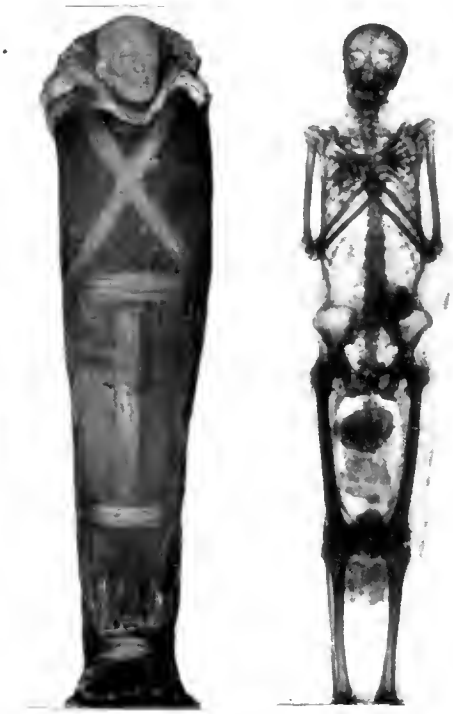
ZOO CELEBRITIES

One of the most popular Museum exhibits is Bushman, the famed gorilla who was sent to the Museum from Lincoln Park Zoo after his death in 1951. Born in 1928, Bushman in his prime attained a height of 6 feet 2 inches and a weight of approximately 550 pounds. A few steps from Bushman in Carl E. Akeley Memorial Hall (Hall 22) is another former zoo celebrity—a hippopotamus who basked in the admiration of visitors to the Cincinnati Zoo until a small boy brought about the hippo's death by throwing a ball into his mouth. Unusually large and well-proportioned, the hippo's own skin was used for a mold by Museum taxidermists. A close second to Bushman in popularity is Su-lin, a giant panda in nearby Hall 15 (Mammals in Systematic Arrangement). At his death in 1938 Su-lin came to the Museum from Brookfield Zoo, where he had led a highly publicized existence. While the animal's body was under study at the Museum preparatory to mounting, it was discovered that Su-lin was a male and not a female as had been supposed. Offhand it may seem strange that this fact was unknown during the animal's life, but it happens that in quite a few animals the reproductive organs are not evident.

Harwa, the hero of our "See a Mummy X-Rayed" exhibit which few people fail to inspect while at the Museum, was himself a gift, and the fluoroscopic apparatus that has insured his popularity with the public is another gift. Harwa remained for years in almost total obscurity in Museum storerooms while more glamorous mummies were exhibited in the Hall of Egypt (Hall J). Finally the General Electric X-Ray Corporation of Chicago arranged to build an X-ray apparatus for him so that he could be exhibited at the New York World's Fair (1939–40). After the fair the General Electric Company gave the mechanical equipment to the Museum and Harwa was housed in a special chamber in the Hall of Egyptian Archaeology where he became the only man living or dead who is X-rayed publicly every day. Visitors entering Harwa's home see him first in his mummy wrappings and then a flip of a switch enables them to see his ancient skeleton projected before them.

ZOO PERSONALITY PERPETUATED

A great favorite with children and adults alike at the Cincinnati Zoo, this outstanding hippo came to an untimely death when a small boy threw a rubber ball into his mouth. He is now immortalized in the Museum.



PUSHBUTTON MUMMY

Harwa, the most X-rayed man, living or dead, in all history. First you see him in his mummy wrappings (as at left), and then only "in his skeleton" on the fluoroscopic screen in a special chamber in the Hall of Egypt (Hall J).

Two Museum acquisitions have an especially grim history behind them. They are the Man-eaters of Tsavo, two lions so-called because they killed and ate 135 workers and injured many others who were

building the Uganda Railway in East Africa in 1898. The infamous lions were finally killed by Colonel J.H. Patterson, who sold the skins in 1924 to President Stanley Field of the Museum, after which President Field gave the skins to the Museum. The lions now can be seen in Hall 22 (Carl E. Akeley Memorial Hall).

Two gifts that have excited comment because of their respective size and quantity are recent arrivals. One, a 65-foot skeleton of a California fin-back whale (described in the February, 1956, BULLETIN), was received from the Wistar Institute of Philadelphia. The huge skeleton, now stored in the Museum's Division of Taxidermy, is 15 feet longer than the right-whale skeleton it will replace in Hall 19 (Skeletons of Vertebrate Animals). The second gift, purchased by the Board of Trustees from the American Museum of Natural History in New York and given to the Museum, probably has occasioned more public interest than any other single gift in the Museum's history. It is the impressive skeleton of Gorgosaurus, a 75,000,000-year-old carnivorous dinosaur now permanently quartered in Stanley Field Hall with its prey Lambeosaurus, a plant-eating dinosaur. Dramatically shown in a life-like drama which might have occurred while the two giant reptiles were roaming Alberta, Canada, the two dinosaurs already are great favorites of Museum visitors.

COMPLICATED BIRD

The gift of a Congo peacock, a rare African peacock identified only as recently as 1936, had its complications. The bird was discovered to have come from the Belgian Congo when Dr. J. P. Chapin of the American Museum of Natural History saw two mounted pheasants in the Congo Museum near Brussels that were identified only as two peacocks. Dr. Chapin recalled a pheasant feather that he had found in the Belgian Congo during an expedition in 1913 and had kept in his possession although he was unable to identify it. The feather matched those of the two birds mounted in the Congo Museum and Dr. Chapin was able to establish that the birds were of a new genus and species from the Belgian Congo. In 1949 Dr. Charles Cordier collected for the New York Zoological Society several Congo peacocks that were sent to the Bronx Zoo. One, a male, died a natural death at the zoo, and was dispatched to this Museum by parcel post as a gift from the New York Zoological Society. It arrived in Chicago, but somehow through a postal mixup it was sent back to New York. Then a period of memos, telegrams, and letters followed until the peacock was finally located and sent to this Museum. The long delay in the mail did not aggravate the bird's decomposition to any significant degree, and the splendid specimen now occupies a place in the Museum's research collections. But the Congo peacock underwent quite a struggle before it took its rightful place in natural science and in this Museum.

These gifts are only a few of the many that have attracted both scientific and public fame, but it must be remembered that they form only an infinitesimal part of the thousands of gifts that annually pour into the Museum from all parts of the world. The majority of these thousands of gifts come from laymen whose interest in natural history prompts them to devote time, money, and effort to collecting specimens for the Museum. Many Museum gifts also come from other institutions, and many come from our own staff members. Without the interest of these donors whose services are of invaluable aid to the introduction, maintenance, and improvement of Museum exhibits and research collections, the Museum's functioning would be greatly impaired.

CICADAS—

(*Continued from page 4*)

tivity of our woodland in terms of cicadas alone until we had calculated the weight of the cicadas being produced. As insects go, cicadas are relatively large. The average live weight of a full-grown nymph, based on a sample of more than a hundred nymphs from the floodplain forest, was .73 grams. This gave us a total of 1,046,408 grams of cicadas per acre (2,306.9 pounds)—or more than a ton of cicadas per acre.

Comparable figures on other animals are very difficult to obtain. It is interesting to note, however, that one study on the raising of beef cattle on managed pasture in the eastern United States cites an annual beef production of 145 pounds and 195 pounds per acre depending on the degree of grazing of the pasture. Our figure of 2,307 pounds of cicadas is a total for seventeen years of growth. An annual average would be 136 pounds per acre—a figure that is in the general range of that for beef production in the study referred to. But we should not stretch the comparison too far. The whole field of study of biological productivity and the relative biological efficiency of different kinds of habitats is in its earliest beginnings, and it is clear that we are dealing with a very difficult kind of problem.

These, then, are some of the things that we learned about Periodical Cicadas during their recent emergence in our area. Seventeen years from now we may be able to contribute a few more facts to our knowledge of these distinguished insects.

Fossil Flower Reconstructed

Added to the exhibits in Martin A. and Carrie Ryerson Hall (Hall 29, Plant Life) is a reconstruction of a fossil cycadeoid "flower" that grew about 100 million years ago in South Dakota.

TWO MORE FREE MOVIES FOR CHILDREN

The last two free programs of motion pictures in the summer series for children will be given on the first two Thursday mornings in August. There will be two showings of each, the first beginning at 10 A.M. On August 2 the second showing will begin at 11 A.M.; on August 9, because of an extra-long film, the second showing will be about 11:30 A.M. The programs are presented in the James Simpson Theatre under the auspices of the James Nelson and Anna Louise Raymond Foundation. No tickets are required. Children may come alone, accompanied by parents or other adults, or in organized groups. Following are the programs:

August 2—NATURE'S CHILDREN (*repeated by request*)

Also a cartoon

August 9—ELEPHANT BOY (*repeated by request*)

Based on Rudyard Kipling's *Jungle Book* story of "Toomai of the Elephants" in India

STAFF NOTES

George I. Quimby, Curator of North American Archaeology and Ethnology, participated last month in a two-week archaeological survey of the east shore of Lake Superior. The survey was a co-operative undertaking of the University of Michigan and this Museum .... **Miss Elaine Bluhm,** Assistant in Archaeology, recently spoke on "Digging in the Chicago Area" before the Barrington Natural History Society .... **Mrs. Marion Grey,** Associate in the Division of Fishes, recently studied deep-sea fishes at the California Academy of Sciences in San Francisco and the Natural History Museum of Stanford University .... **Loren P. Woods,** Curator of Fishes, was elected vice-president in charge of conservation at the recent meeting of the American Society of Ichthyologists and Herpetologists at Higgins Lake, Michigan. **Dr. Edward M. Nelson,** Associate in the Division of Fishes, who presented two papers, and **Robert Hass,** volunteer worker, were delegates .... **Luis de la Torre,** Associate in the Division of Mammals, has been elected a member of the University of Illinois chapter of Sigma Xi, honor society in science .... **Dr. Rainer Zangerl,** Curator of Fossil Reptiles, and **Dr. Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, are engaged in field work along the Gulf Coast of Louisiana .... **Bryan Patterson,** former Curator of Fossil Mammals and a Museum Research Associate since he accepted a professorship at Harvard University, is spending several months in research in the paleontology laboratories here.

RAIN-PLAGUED TRIBE BLAMES EXPLORERS

Dr. D. S. Rabor, leader of the 1956 Zoological Expedition in the Philippines, reports a successful completion of the year's work. During Dr. Rabor's vacation from teaching in Silliman University he led a party of assistants and student helpers to Mt. Malindang in Zamboanga, which had been visited by a zoological collector only once before, nearly fifty years ago.

It is an isolated mountain in far western Mindanao, rising to about 8,000 feet above sea level and with a beautiful forest on its upper slopes. Dr. Rabor's party established camp well up on the mountain and was able to collect to its summit.

The season was especially rainy; Rabor and his associates had only four sunny days during their two months on the mountain. The pagan people of the mountains, the Suhaños, were not able to burn their clearings to prepare them for rice planting because of the wet weather. These superstitious people blamed this on the Museum collecting party's presence in the mountains. Later, when there is no crop and starvation threatens them, they will again blame the Museum's party. Such are the ramifications of our activities. Yet all the time lumber companies are eating away at this isolated forest. When Dr. Rabor and Dr. Austin L. Rand, Chief Curator of Zoology, visited the area two years ago on a reconnaissance, high-line logging was taking the trees out of the rough mountain valleys. In time only a remnant of battered tree-growth will be left. Thus, a collecting trip now, to record what animal life is there, is timely.

Dr. Rabor sent to the Museum an imposing list of rare and unusual birds he has secured. There are two monkey-eating eagles, series of fairy bluebirds, tailor birds, and sunbirds. Many of the interesting mountain species have never been found in this part of the Philippines, such as the brush-tongued lorries and the red-capped flowerpecker. Several of them will almost surely be new to science.

Expedition to Bahamas

Dr. Fritz Haas, Curator of Lower Invertebrates, left on July 7 for Bimini, Bahamas, where, as a guest of the American Museum of Natural History, in its Marine Laboratory on Bimini, he will continue his studies on coral reefs in the Caribbean. On his way, he made brief stopovers both in Washington, D.C., and in Miami, Fla., where he visited his colleagues in museums and in marine biological laboratories. He is expected to return in August.

Specimens illustrating contrasting color phases of red and arctic foxes are displayed in Hall 15.

Books

THE NATURAL HISTORY OF NORTH AMERICAN AMPHIBIANS AND REPTILES. By James A. Oliver. D. Van Nostrand Company, Princeton, New Jersey, 359 pages, 72 figures, 12 plates. $6.95.

Curators in the Department of Zoology receive many telephone calls and letters from the general public asking for information on this or that animal. Some questions are easy to answer. Either the answer is in our minds or it can be found quickly in one of the reference books we keep on our desks close to the telephone. On the other hand, certain kinds of questions take hours to answer. To tell someone how fast a blacksnake can travel or how long the American chameleon lives may require several hours of searching through the technical literature.

But now, thanks to *The Natural History of North American Amphibians and Reptiles* by James A. Oliver, all that is known about these animals has been summarized in a well-written and interesting book. Starting with a chapter on folklore, in which Dr. Oliver recalls Tom Sawyer's remedy for warts supposedly caused by toads, "Barley-corn, barley-corn, Injun-meal shorts, Spunk water, spunk water, swaller these warts," the book takes up the economic value, occurrence, locomotion, activities, food and feeding, reproduction, and growth and longevity of our reptiles and amphibians. An additional section dealing with classification has a brief but effective survey of the families of North American turtles, snakes, lizards, frogs and toads, and salamanders. The final section discusses reptiles and amphibians as pets.

The book is well supplied with drawings and photographs that facilitate understanding of the habits or activities that Dr. Oliver describes in words. The drawings illustrating the peculiar locomotion of the sidewinder rattlesnake are the best of this category in my opinion. The photograph of a tree frog perched on a branch and stuffing a grasshopper half his own size down his throat with one hand is tops in its class. Equally remarkable, the photograph of the "combat dance" of two male red diamond rattlesnakes is unmatched for showing one of the little-known and poorly understood habits of animals.

Dr. Oliver, who is Curator of Reptiles at the New York Zoological Society, has written a book that fits as easily into the library of a professional herpetologist as into the library of a high-school boy who keeps live snakes or into that of an adult who has a general interest in the out-of-doors.

ROBERT F. INGER
Curator of Amphibians and Reptiles

2 LECTURE-TOURS A DAY OFFERED IN AUGUST

During August, guide-lecture tours of Museum exhibits will be offered in both the mornings and the afternoons of weekdays, Mondays through Fridays. Although there will be no tours on Saturdays and Sundays, the Museum will be open during regular visiting hours, 9 A.M. to 6 P.M. on those days.

Except on Thursdays, the morning tours will be devoted to the exhibits in one department of the Museum. All afternoon tours (and also the tours on Thursday mornings) will be comprehensive in scope, including outstanding exhibits in all departments. Tours are conducted by lecturers of the Raymond Foundation staff. Following is the schedule:

Mondays: 11 A.M.—Records from the Rocks
2 P.M.—Highlights of the Exhibits

Tuesdays: 11 A.M.—Animals Around the World
2 P.M.—Highlights of the Exhibits

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

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

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

GIFTS TO THE MUSEUM

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

Department of Anthropology:

From: Miss Elizabeth M. Goodland, Chicago—2 baskets, Philippines; E. D. Hester, Jeffersonville, Ind.—Oriental ceramics, Philippines; Robert Trier, Chicago—3 fire pistons, Malay Peninsula; Wenner-Gren Foundation for Anthropological Research, New York—a dictation wire recorder

Department of Botany:

From: Agricultural Experiment Station, Urbana, Ill.—3 hybrid seed-corn samples; Dr. Leandro Aristiguieta, Caracas, Venezuela—a *Rhynchospora aristata;* Dr. José Cuatrecasas, Washington, D. C.—14 plants, Colombia; Department of Tourists and Publicity, Wellington, New Zealand— 22 photographs of New Zealand flax industry

Department of Geology:

From: Henry Horback, Chicago—2 specimens of marcasite nodules; Dr. Ernest Lundelius, Pasadena, Calif.—collection of fossil mammals, western Australia; David Techter, Chicago—a fossil spider; Transvaal Museum, Transvaal, South Africa—15 casts of fossil hominoids

Department of Zoology:

From: Bernard Benesh, Burrville, Tenn.—11 wasps, 10 beetles, Tennessee and Chile; Chicago Zoological Society, Brookfield, Ill.—a mammal head, North America; Mrs. Emmett Reid Dunn, Bryn Mawr, Pa.—458 reptiles and amphibians

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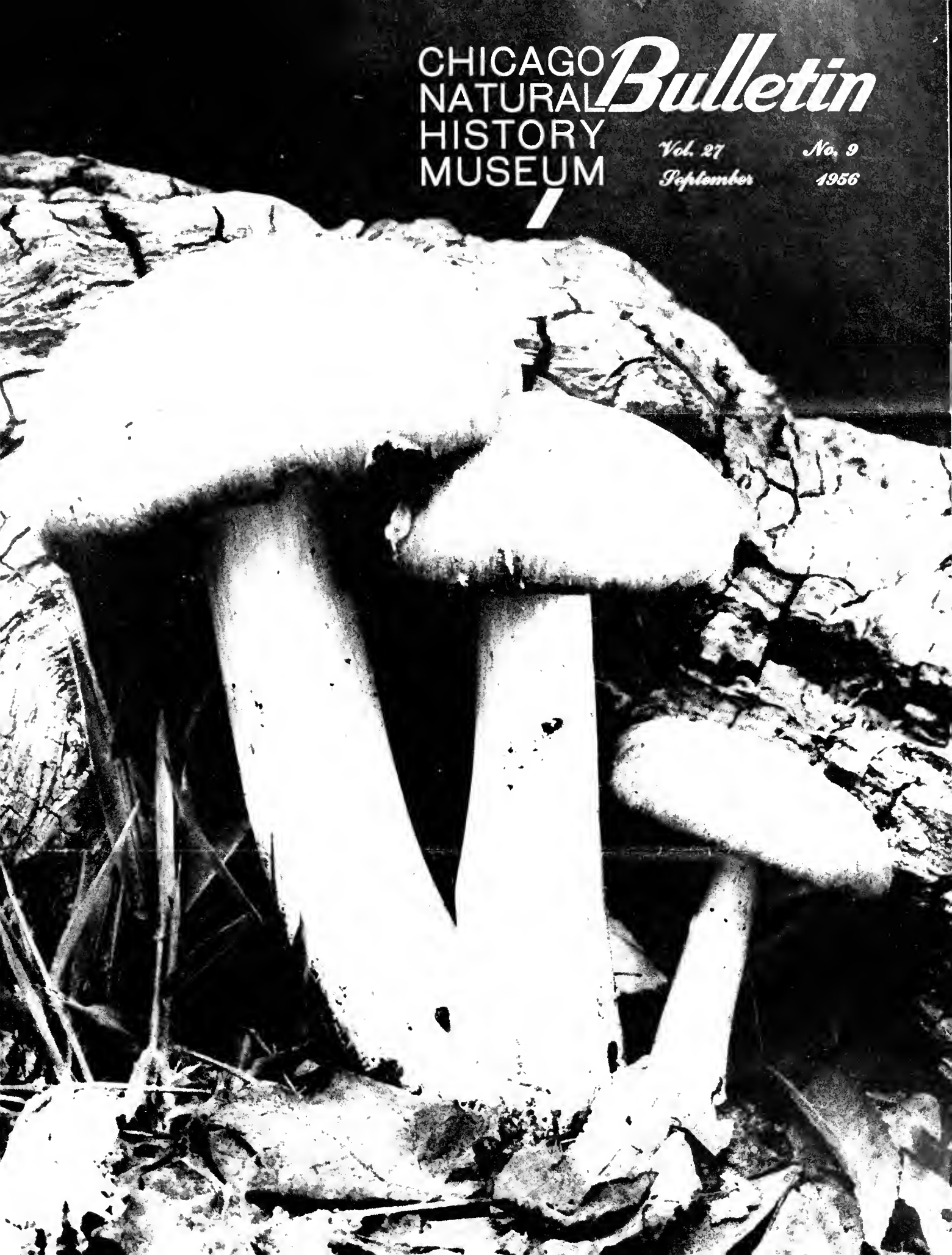

Chicago Natural History Museum

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Roosevelt Road and Lake Shore Drive, Chicago 5

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Schooldays Are Here . . .

A SCIENTIST ADMONISHES TEACHERS AND PUPILS

BY AUSTIN L. RAND

CHIEF CURATOR OF ZOOLOGY

IN THE COMMUNITY outside Chicago where I live, my wife and I are called on often each year by pupils of the local schools to advise and help in biology projects. Mrs. Rand keeps a few books handy to lend to children for this purpose, and within the year I've lent a dog skull from the miscellaneous collection in our garage, helped trace out the hearing apparatus in a freshly butchered cow's head, and suggested an arrangement for making a heterogeneous assortment of bones into a science display. This is, of course, unofficial aid.

Chicago Natural History Museum also takes an official interest in Science Fairs. In the spring of 1955 it exhibited projects undertaken by upper elementary and high-school students sponsored by the Chicago Teachers Science Association. These were shown in Stanley Field Hall, central hall of the Museum, between the main entrance and the elephants that so dominate the hall they are practically a trade mark of the Museum. This year, on May 12, the entire Science Fair was held at the Museum instead of being split, as in the past, among several institutions, by age and grade groups and on several different dates. I've pointed out these activities of ours to show that both officially and unofficially we help and encourage science fairs and school projects, at two widely different levels.

SOME REQUESTS UNREASONABLE

However much we believe in helping and encouraging school science-projects, we get some types of requests of which we disapprove. The following is an example, quoted in its entirety:

Dear Gentlemen

I would like to request all the information you can give me on animals. Information on the classification of animals such as fish, reptiles, and so on will be appreciated. I would like this information for a ninth-grade science project. Please include some picture if possible. Also some on prehistoric animals. Thank you.

Sincerely

Three other similar letters came to my desk, all the same day in January, the beginning of the "science-project season." They contain such requests as: "I am working on a science project concerning . . . . bird feathers . . . . would like pictures . . . . to use in my project . . . ."

"I go to . . . . school [this one in Chicago] and in science I have to make a notebook on . . . . birds that stay all year round in Illinois . . . . give me a list . . . . and any information that you have on them . . . . must have this information by the 15th of of this month . . . . if you have any feathers please may I have some."

". . . . I am . . . . a sophomore . . . . participating in a biology contest . . . . I wish to inquire whether you have any information and specimens on the butterflies of Illinois. If so, will you kindly mail them to me. I am willing to absorb mailing costs, and any other expenses."

Letters received on other days asked for bird feathers or all about parakeets.

WOULD NULLIFY PROJECT'S VALUE

They are polite, well-written letters. But compliance by us would nullify the object of the science project, which is to teach something about science, where to find material, and where to get information at a level the students can understand.

These letters are not from children interested in science, craving information. They are from children interested in a short cut to a project. Just suppose they were to write to an English or a history professor saying they were doing a project in one of those subjects and would the professor please send them a few suitable themes including one on spring and another on culture, or an outline of the American revolution, with a few maps and pictures, and if they have them a few pieces of armor, of course offering to pay mailing and other expenses.

A point these letters have in common is that they all seem to be teacher-inspired. They all ask help with school work—not collateral material, but the project itself.

Science projects have as their aim, the education of pupils. In any school with biology projects there is obviously a biology teacher and an abundance of material near at hand. And for information, as some of my correspondents seem to forget, there is the dictionary, the encyclopedia, the biology texts that any school teaching biology must surely have, and there is often a local library. For ideas there are the science and the nature journals, which contain ad-

(Continued on page 7, column 1)

THIS MONTH'S COVER

Buy your mushrooms—don't gather them!

This is the advice of the scientists in the Museum's Department of Botany. The principal season when mushrooms are gathered by enthusiastic epicures is at hand, and many courageous souls with confidence in their own ability to distinguish between edible and poisonous varieties will be out seeking delicacies for their dining tables.

Mushrooms and related fungi appear in many shapes and colors besides those most familiar to gourmets. Many varieties, some edible, some poisonous, are shown in a special exhibit of large hand-colored photographs to be on view in Stanley Field Hall from September 1 until October 1. The Museum exhibit is *not* intended to be used as a guide in distinguishing between safe and dangerous kinds of mushrooms, however. Because of the dangers of a mistake even by many who think they are experts, Museum botanists distinctly warn against the practice of gathering wild mushrooms for food by laymen (when they want mushrooms, the botanists themselves buy them in grocery stores, which obtain them from commercial cultivators).

The 48 photographs on exhibition are the work of Herbert T. Tweedie, a retired portrait-photographer of Dayton, Ohio.

MEMBERS' NIGHT WILL SPOTLIGHT AFRICA AND OCEANIA

MEMBERS' NIGHT this year will be on **Friday, October 12.**

A feature of the evening will be the unveiling of an elaborate new exhibit—the home of an African tribal king. Occupying some 450 square feet in Hall E on the Ground Floor, this is a full-size reproduction of the royal dwelling-place of a chieftain who ruled over several thousand subjects in the Cameroons region of West Africa in the early part of this century. The exhibit is a faithful replica, although to meet the practical requirements of the Museum more durable materials are used to simulate those of which the original in Africa was built. In an actual house the walls would be of mud plastered over a framework of latticed bamboo, and the enclosure would be covered by a grass-thatched roof. Apart from materials, the only architectural licence taken is in building into the replica several viewing windows in the walls so that Museum visitors may look into the interior of the house.

For some fifty years the Museum has possessed one of the finest collections of Cameroons artifacts in existence, and the king's house provides a setting in which to display these in context, showing them as they would be used instead of merely in rows in glass-fronted exhibition cases. Like many of the sovereigns of the royal houses of Europe over the centuries, the Cameroons kings were the patrons of the arts in their own world. The finest furnishings, sculptures, charms, fetishes, ancestor figures, and other creations of their people came to the kings as tribute. So the royal residence in the Museum has been furnished with more than 100 of the best objects in our Cameroons collection, placed just as they would be found in the original house, for decorative, functional, and ceremonial purposes.

Entrance to the house is by two doorways flanked with strikingly carved tall poles, in which a single human figure supports aloft a host of other human figures mounted on each other's shoulders in much the manner of a troupe of acrobats. Figures of animals are also carved on these portal posts.

Among the articles inside the house are several crowns, some of colorful beadwork, others of carved wood; royal stools equivalent to thrones; masks of religious and magical significance; ceremonial drums; flasks of two kinds—some used for wine, some for preserving the remains of revered ancestors; tobacco-pipes over five feet long; spears and other weapons; ancestor figures; sleeping mats for the wife of the day, chosen from a harem that often numbered eighty or more women; and the king's bed. The last, a most elaborately carved wooden couch presents in symbol a social commentary on the absoluteness of the king's rule —it is supported on the heads of rows of carved figures of his subjects.

Members' Night could also be called "South Pacific Night." It will mark the reopening of three exhibition halls containing completely refurbished and improved exhibits of the excitingly colorful primitive arts and industries of the various island-groups forming Oceania. The halls, all adjacent to each other on the Ground Floor, are Hall A (Peoples of Melanesia and the Philippines) with its adjunct, Hall A-1 (Aboriginal Peoples of Australia), Hall F (Peoples of Polynesia and Micronesia—Central and South Pacific), and Hall G (Peoples of the Malay Peninsula and Indonesia).

The Museum's collections from these areas, particularly Melanesia, rank among the most complete in number and variety and the most superb in quality of any ever assembled anywhere in the world. The exhibition cases containing this material have been rearranged in a new and more attractive fashion that highlights the fascinating imaginative creations of the primitive artists and craftsmen.

As usual, Members' Night will include an open house for the guests to visit "behind the scenes" in the laboratories, studios, workshops, and offices of the Museum, where they will meet the scientists and technicians of the staff and see and hear how the work of the institution is carried on.

At 9:15 P.M. a special program will be presented in the James Simpson Theatre. Details of this will be announced in the October BULLETIN.

Members' Night schedule runs from 7 to 10:30 P.M. (the doors of the building will be open from 6 P.M. to accommodate those who wish to dine at the Museum Cafeteria, which will serve dinner at its regular prices from 6 to 8).

Extensive free parking space will be available to guests at the north of the Museum building. Special free motor-bus service has been arranged for those 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.

'BUFFALO HUNTERS' STALK PREY IN MUSEUM

Boys and girls from the West Community YMCA summer day-camp of Chicago are transformed into determined hunters as they participate in a Buffalo Hunt given for summer day-camps of the YMCA by the Museum's Raymond Foundation. Having spotted the "herd" in the Hall of American Mammals (Hall 16), they listen to instructions given by Edith Fleming, Raymond Foundation lecturer in charge of the program, before answering written questions about buffaloes and continuing on their hunt through the Museum's halls. "Training" for the hunt begins with two films: one on the Sioux Indians and another on Indian animal-dances, including a buffalo dance. The buffalo hunts, which began July 1, will continue throughout this month.

THE FOXGLOVE: MEDICINAL AND ORNAMENTAL PLANT

By JOHN W. THIERET
CURATOR OF ECONOMIC BOTANY

AN OLD WELSH WOMAN of Shropshire, using a concoction of herbs she had brewed, cured a number of cases of dropsy nearly 200 years ago after even the most able physicians had failed. Hearing of this, Dr. William Withering, a junior staff-member in the Birmingham Hospital, visited the woman in 1775 and, after much persuasion, obtained a handful of her herbs. After long analysis, Dr. Withering concluded that of all the plants represented in the mixture, only one—foxglove—was of any value. His curiosity about this common plant was aroused, and he soon learned that in other English and Welsh communities foxglove was a major ingredient in medicines for dropsy. Then Dr. Withering began a long series of experiments, using foxglove to treat numerous cases of dropsy with apparently great success.

The medicine soon began to attract the attention of other physicians, and its use spread. In 1785 Dr. Withering published the results of his long research in his classic book *An Account of the Foxglove, and some of its medical Uses; with practical Remarks on Dropsy, and other Diseases.* Although his main concern was with foxglove as a remedy for dropsy, Dr. Withering made the following prophetic statement concerning the herb: "It has a power over the motion of the heart, to a degree yet unobserved in any other medicine, and this power may be converted to salutary ends." And how right he was, for today foxglove is one of the most important drugs in the treatment of heart diseases.

Although the foxglove was introduced into modern medicine through the careful work of Dr. Withering, it was used to treat various ills long before the 18th century, though it is not one of the oldest drugs. The ancient herbalists such as Theophrastus, Dioscorides, and others of the time just before and during the beginning of the Christian era did not know of the plant. The earliest record of its utilization is during the 5th century when the Irish used it in cases of childbed fever. "Foxes Glofe" is mentioned in the *Saxon Herbarium*, a manuscript of A.D. 1000. In the Welsh *Meddygon Myddfai*, a collection of medical recipes compiled in the 13th century, foxglove found use in the treatment of abdominal swellings, abscesses, and headaches.

CONTENTION OVER EARLY USE

Between 1600 and the latter part of the 18th century, foxglove had its ups and downs as a medicinal plant. Some writers considered it poisonous or too acrid for internal use and maintained that it had no therapeutic value anyway. Others thought it to be "efficacious as any drug the Indies produce" and recommended it for a myriad of ills, including consumption, scrofula, wounds, old sores, running ulcers, epilepsy, scabby head, and to "cleanse and purge the body both upwards and downwards, sometimes of tough phlegm and clammy humours; and to open obstructions of the liver and spleen." Finally Dr. Withering appeared on the scene, and the careful study of foxglove and its uses began.

Leonard Fuchs, in his *De Historia Stirpium* (1542), presented the first exact description of the plant and also a good woodcut of it. Noting that there was no Latin name for the foxglove, he coined one, "Digitalis," meaning of or belonging to the finger, in reference to the flowers, which are shaped like thimbles or the fingers of a glove. This name is now used for the genus to which the foxglove belongs, and the foxglove itself is called *Digitalis purpurea* (purple). The name foxglove appears to be a corruption of the old English name of the plant, Folks' Glove, which can be traced back about ten centuries. It has been suggested that the "fox" refers to the fact that the plant grows in the haunts of foxes. Actually, while foxglove *does* occur where foxes may be found, it also occurs in the haunts of a great many other animals. This suggestion as to the origin of the name might best be called improbable.

DIGITALIS PURPUREA
Woodcut from Matthias de Lobel's "Kruydtboeck," published at Antwerp, Belgium, in 1581.

The *United States Pharmacopoeia* defines the drug digitalis as the dried leaf of *Digitalis purpurea*. The leaves are collected from either first- or second-year plants, usually from July to September. They are dried rapidly, either with or without artificial heat, and then are stored and shipped in airtight, waterproof containers. In the period between the World Wars a yearly average of about 50,000 pounds of digitalis was imported into the United States, chiefly from England and continental Europe. At the present time much of our supply is grown in Pennsylvania, Minnesota, and the Pacific Northwest. Sufficient digitalis to meet domestic medical needs can be grown on several hundred acres.

Digitalis is commonly administered as tablets made either from the powdered leaves or from an extract of the leaves. Another form sometimes used is a 70 to 75 per cent alcohol tincture of the leaf. The most active principle in this drug is a glycoside called digitoxin, a colorless, odorless, crystalline, bitter substance. When digitalis is taken in any of its forms, the heart is regulated to beat more uniformly and efficiently because its muscle tone is improved. There is an increase in the force of contraction of the heart muscle that pushes the blood through the arteries. The period of the heart's relaxing and filling up again is prolonged. Digitalis has tided many people over a period of severe cardiac crises.

HANDSOME GARDEN PLANT

The foxglove, well known as an ornamental plant, is a biennial, producing during the first year of its growth only a rosette of leaves. In the second season the leafy flower stalk appears and reaches a height of usually three to four feet. The bell-shaped flowers, up to three inches long, vary in color from white to lavender and purple. When the foxglove is in bloom, the numerous large blossoms make this plant one of the most handsome to be seen in our gardens. The genus *Digitalis* contains some thirty species, native to central and southern Europe, the Canary Islands, and western and central Asia. Many of these are cultivated as ornamental plants, and all of them seem to have the same medicinal effect as the foxglove.

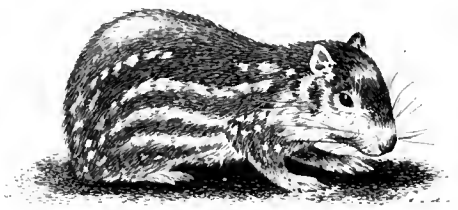
Foxglove is a member of the figwort family (Scrophulariaceae), a group whose flowers are surpassed in variety of form and color only by the orchids. Relatively few members of this family are of economic importance. These include numerous garden subjects such as penstemon, veronica, torenia, linaria, and the ubiquitous snapdragon; the parasitic witch weeds of Africa and Asia, depredators of cereal crops; and the princess trees of eastern Asia that yield commercial timber. But of all the figwort family, none is more important to man than the foxglove, source of one of the most dependable and useful of all plant drugs.

NATURE MYSTERY: THE SECRET OF THE PACA'S POUCHES

BY PHILIP HERSHKOVITZ
CURATOR OF MAMMALS

THE PACA is a large rodent that lives in the forests of tropical America. It is about the same size and shape as its close relative, the porcupine, but its fur is short and stiff, not spiny, and the upper parts of its body are flecked by fawn-like rows of whitish spots. The hind legs are long, the ears are short and rounded, and the tail is a mere nubbin.

The really amazing thing about the paca, is the extraordinary development of its cheek bones. They are expanded into enormous chambers, one on each side of the face. A slit-like opening in front of each eye reveals the presence of the chamber. The skin of the face dips through this opening into the front part of the bony chamber where it forms a hairy pocket. The lining of the mouth of the animal forms another pouch that fits into the back part of the same expanded portion of the cheek bone. Thus, each side of the head has a pair of pouches, one inner and one outer, which touch each other. Any pressure on one pouch pushes its mate in the same direction. There is absolutely nothing like this anywhere else in nature.



Drawing by Tom Dolan

MYSTERY SOLVED

The paca of tropical America is a large, spotted rodent with a broad head and strange cheek-pouches. The function of the pouches has just been discovered by Curator Hershkovitz.

How does the paca use this remarkable combination of a pair of extensible skin pouches lodged within each cheek-bone chamber? This question has mystified hunters and intrigued and baffled zoologists for centuries.

FOOD STORAGE RULED OUT

Is it possible that the cheek pouches of the paca are used for storing food? Certain other rodents, and Old World monkeys too, have cheek pouches that serve that very purpose. Such pouches, however, are quite different from those of the paca. They are simple extensible folds of skin entirely independent of facial bones, and there is only one on each side of the mouth. They are filled with food by hand and they are emptied by hand, or by the muscles of the cheek, with or without the aid of the tongue. The cheek pouches of the paca cannot be used this way. The opening of each outer pouch is narrow and framed with bone, and it would be impossible for the paca to force food into it with its forefeet. In any case, the pouch is too small to serve as a food reservoir for an animal so large. As for each internal pouch—it was never designed for storage. In the final analysis, no one has ever found food in the pouches of a paca.

I had many opportunities during the course of Museum expeditions to observe pacas in their natural abodes. I studied their habits and learned the most successful ways to hunt them. I performed dissections on a number of them, but an explanation for the existence of the cheek pouches was not apparent. Native hunters, wise in the ways of the paca, only shrugged when I showed them the pouches and tambor-shaped chamber of the cheek bone. Odd structures, they admitted, but are not all pacas made that way?

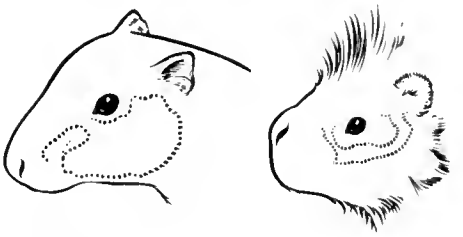
Everyone agreed that the flesh of the paca is delicious no matter how prepared. The liver, however, is bad medicine and should not be eaten. Indians of the Amazon basin point out that the tusk of the paca mounted with beeswax on their blowguns for a sight insures deadly aim and good hunting. Others aver that one of the leg bones, the fibula, makes a good spatula for spreading hot pepper-sauce over the meat. Yes, wilderness sages could tell me how well the paca serves them, but none knew how the cheek pouches serve the paca.

A GOURMET'S DELIGHT

It isn't that the paca is one of those rare species known only to specialists in natural history and to a few lucky hunters. This shy nocturnal beast is undoubtedly the most sought-after game animal in all forested parts of Latin America from southern Mexico to southern Brazil. It is pursued for food by the fox, the ocelot, the jaguar, and the Indian with the same avidity as a gourmet selects it from the menu of the choicest restaurants below the border. The Spanish discoverers of the mainland, the first Europeans to taste the light-pink succulent flesh of the paca, gave rapturous accounts of its exquisite flavor. The Spaniards, however, never let their interest in the animal stray from the purely gastronomic level. They said nothing about the peculiarities of the paca's cheeks.

Cartoon by Ruth Andris

My hope for finding the solution for the mystery lay in hunting the paca and observing it in nature. The animal lives in burrows in rocky ground or at the base of trees between the main roots. Frequently it makes its abode in caves. The paca's burrow has at least two entrances and, where the substratum is honeycombed, there may be as many as a dozen openings leading to the nest. There are runways from the openings of the burrows to the various feeding places and, invariably, to water.



Drawing by Tom Dolan

'COUSINS' COMPARED

The enormously expanded cheekbone enclosing the pouches of the paca (on the left) has been drawn with a broken line. The animal's relative, the porcupine, which has a normal cheekbone, is shown on the right.

The rodent not only drinks copiously but instinctively seeks safety in water when pursued. The Spanish name *guardatinaje*, corrupted in some parts of Latin America to *guatinaje*, *guatín*, and *guanta*, means "animal that refuges in water holes." To catch a paca at home, it is necessary quickly to locate and block all but one of the entrances to the nest. To make sure the animal is really trapped, the hunter pokes a long stem or sapling through the remaining open hole and listens for the sound of the prodded beast. If present, the paca responds with a rumbling noise that reverberates like low distant thunder. The animal is then dug out or smoked out, or it may be pulled out by a dog small enough to gain entrance to the nest. Unhappily I failed to learn anything about the cheek pouches from pacas taken this way.

MYSTERY SOLVED AT LAST

It was a specially set live-trap during my last expedition to Colombia that made the paca give up its secret. Live-trapping for pacas along their runways demands great care to avoid contamination of the trail and

(*Continued on page 7, column 3*)

EXHIBIT OF WORLD'S SONGBIRDS COMPLETED

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

OUR DISPLAY of the songbirds of the world has been completed with the installation of a third exhibit representing ten families from larks to birds of paradise. This is part of a project planned to present in Boardman Conover Hall (Hall 21) a synopsis of the birds of the world. Representative examples of each family or of related families are grouped together on plaques with perches reduced to a minimum to avoid distracting attention from the birds themselves. Collateral material, such as nests, sketches, and diagrams, are introduced to increase the information presented and to avoid monotony in the exhibit, while background and plaques are painted in harmonizing pastel shades to add to the pleasing effect. This accords with the exhibition technique developed in Chicago Natural History Museum for this display as described in earlier Museum BULLETINS (November, 1952, p. 6, and July 1955, p. 4).

BIRDS OF PARADISE
Part of the new addition to exhibit of songbirds in Boardman Conover Hall.

The new exhibit contains some of the most widespread and best-known groups of birds, such as the larks, including the European skylark, whose flight song inspired the poets Shelley and Wordsworth; the swallows, harbingers of spring; and the crows and jays, among the most intelligent of birds.

However, a number of the families are exclusively Old World, such as cuckoo shrikes and Old World orioles; and several are restricted to the antipodes in the Australian–New Guinea area: the bell magpies and the Australian butcherbirds, the magpie larks, the bowerbirds, and the birds of paradise.

The birds of paradise have received more space than the small number of species in the family (only about 40) would warrant, if it were not for their bizarre and beautiful ornamentation and their strange displays. We have shown the greater bird of paradise of the New Guinea forests, which at mating time gathers in bands in the treetops where the birds raise their long orange-yellow flank plumes and go through elaborate dances; the long-tailed bird of paradise with its velvety frontal shield edged with burnished copper; the superb bird of paradise with its metallic green-blue breast shield and its velvety cape erected; the red king bird of paradise; and the orange-winged magnificent bird of paradise.

Perhaps most unusual of all is the blue bird of paradise, which in its display hangs upside down so that its vivid blue plumes fall in filmy blue sprays on each side of its body to frame a maroon and black spot in the middle of its belly. Correlated with such extravagant courtship behavior, these species are polygamous. The female is dull colored, and she alone looks after the nest, the eggs, and the young.

'POOR RELATIONS'

Contrasting with these "dandies" in the family are some that are practically "poor relations," illustrated by the manucode in the exhibit. They have no brilliant plumes, are monogamous, and both sexes take a share in nest duties.

The bowerbirds are another family closely related to the birds of paradise and the crows. They are relatively dull-colored birds, but what they lack in physical ornamentation they have made up in specialized behavior. To take the place of brilliant and bizarre plumage, bowerbirds have developed the bower-building habit. Some of the bowers are saucer-shaped structures of moss with a "maypole" raised in the center; others are hut-like or wigwam-like, and the birds spread brilliantly colored objects in front of them like flower gardens; and others include an "avenue" lined on each side with a fence of twigs stuck upright, and at each end of this avenue the birds make a platform decked with various objects that attract them, such as bones, shells, and fruit.

'LONELY HEARTS CLUBS'

The birds use these bowers as dancing and mating stations and spend a great deal of time keeping them in repair and changing the decorations. We have shown in this family the catbird, the regent's bowerbird, and the satin bowerbird with a small piece of its bower. This last species has two special distinctions. It is the only bird I know that orients a structure north and south, building its avenue so that the walls shade the structure except at midday. Also, it uses a wad of vegetable material saturated with fruit juice or with ground-up charcoal and saliva to actually paint the walls of the avenue in its bower.

Curator Returns from Bahamas

Dr. Fritz Haas, Curator of Lower Invertebrates, has returned from a field trip to the island of North Bimini in the Bahamas. For several weeks he was the guest of New York's American Museum of Natural History at its Lerner Marine Laboratory in North Bimini. He made studies of the life-conditions of sessile marine-invertebrates in the shallow waters of the Bahama Bank, as well as of the land mollusks on the three little islands that constitute the Bimini group. Data obtained by him will be of value in connection with a projected exhibition program.

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. Requests for such service must be made at least one week in advance.

Although there are no tours on Sundays (and none on Saturday, September 1 or Labor Day, September 3), the Museum is open from 9 A.M. to 5 P.M. on those days.

A SCIENTIST'S ADVICE TO OUR SCHOOLS

(*Continued from page 2*)

vertisements of biological supply houses that make a business of supplying material and plans for projects. For schools competing in science fairs, there is the science fair organization itself, which will give advice and information about sources. In book shops never was there such a flood of natural-history literature, in low-priced editions, even comic books, and much of this material is of high quality. Even the daily papers carry a surprising amount of natural history. And finally, if there is a natural-history museum within reach, the pupil should visit it and look at the exhibits. He should not ask the curators to supply the material and plans, doing both the pupil's and the teacher's work!

OUTLINE FOR PROPER GUIDANCE

My attitude regarding such inquiries is best shown by the following actual answers to such letters:

(1.) "In regard to your request for all information on animals, I doubt that you realize the scope of your question. There are probably more than 1,000,000 different species of animals and we have hundreds of volumes containing information about them.

"As yours is a school project, instead of my sending you information I will point out how you can go about your project using material at hand. Begin with the volumes available to you in your school library. Look up the word animal, then all the names of animals you can think of: mammal, bird, fish, reptile, starfish, mollusk, squid, worm, amoeba, etc., and the additional names you find along the way. The amount of material you find in a big dictionary will probably surprise you. If you are interested further, go to an encyclopedia and repeat the process. Then look up textbooks on biology available through your teacher. Perhaps you have a local library with back files of the *National Geographic Magazine* or *Nature Magazine* or Chicago Natural History Museum BULLETIN, amongst others in which there is a wealth of material.

(2.) "Rather than sending the feathers and the information you ask for your project, I would make another suggestion. Having had some experience with high-school projects and their aims, I would suggest that rather than getting as many different kinds of feathers as possible, you endeavor to find out as much as you can about the feathers of some bird that is available to you. Surely a duck, chicken, pigeon, pheasant, crow, or starling—some common bird—could be secured for study. Then you will find a whole field to investigate right there. There are different kinds of feathers on the same bird: flight feathers, contour feathers, filoplumes, and down feathers. There is the structure of each feather: barbs, barbules, etc., that can be studied under a lens or a microscope. There are different functions for feathers and different ways in which they integrate into a whole. This varies with the different types of feathers on the same bird. Then there is the arrangement of the feathers on the bird. They are not distributed uniformly nor haphazardly, but are arranged in orderly patterns. Color pattern of course is another aspect. Finally, there is the question of the uses of the various feathers: the pinions for flight, the rectrices for steering and balancing, the body feathers for protection from the weather, and the down feathers for warmth. The number of feathers on a bird can also be counted and there is in some species a difference between the number present in summer and in winter, perhaps an adaptation to climate.

"As you can see, there is more than enough material for a high-school project in the feathers of a single common bird. I suggest that a project along these lines would be much more profitable to you in the amount you learn, than making a haphazard collection of feathers of different kinds of birds."

(3.) "In regard to your request for information about the origin of parakeets, I note that this is a biology class project, so I assume you would like some suggestions as to how to go about looking up information about parakeets.

"The first thing to do is to look in the dictionaries and the encyclopedias in your school or public library. Then look up books on parrots or perhaps general books on cage birds or birds as pets.

"In looking up the parakeets you will find that the common parakeet that is so popular in the United States today is also called a budgerigar, shell parakeet, Australian lovebird, Australian parakeet, and warbling or undulated grass parakeet. Its scientific name is *Melopsittacus undulatus*, and it comes from Australia. If you can find any book on Australian birds in your local library, that also may help you in your project.

"The first living budgerigar was brought to Europe in 1840. Since then it has become very popular as a cage bird and pet in Europe and in America.

"Since about 1900 parakeets have been raised on a large scale in Europe and since 1924 in America.

"Some magazine, such as *All-Pets Magazine*, might also supply you with additional information about these birds."

Seasonal Change in Visiting Hours

Autumn visiting hours, 9 A.M. to 5 P.M., will go into effect at the Museum on September 4, the day after Labor Day.

MYSTERY OF THE PACA AND ITS POUCHES

(*Continued from page 5*)

trap with suspicious odors. The wily paca survives even in well-settled countrysides because it becomes more wary and sensitive to danger as its enemies increase. The paca that smells a trap in its runway will never use that trail again. I set my trap at the foot of a steep slope where the animal was obliged to slide or jump without means for detaining itself or deviating from course. The trap was triggered in the morning. Heavy rains, later in the day, washed away all strange odors before the paca emerged that night. Not only did the snare work but, to my great astonishment, the captive obligingly showed me how its cheek pouches function!

The beast, an adult male weighing about 20 pounds, was held in the trap by its forefoot. At my approach, the furious animal suddenly emitted the familiar rumbling noise with its mouth closed and then clicked its front teeth rapidly. When I withdrew a short distance, the animal quieted down. When I neared again, it repeated the sound and the clicking of its incisors. After a few attempts at slashing with those long, thick tusks, the animal permitted me to come within a few inches of its mouth. At that historic moment I saw the closed ends of the external pouches just barely extruding through the slits on the sides of the face and quivering as the rumbling sound was being made. The enigma of pouches and chambered cheek bones was solved. Here was one of nature's oddest mechanisms for the amplification and reverberation of sound. The vibrating air is forced from the closed mouth into the internal pouches. The latter distend against the external pouches forcing them to extrude slightly and to flutter because of the variable pressure. The bony chambers protect the delicate pouches and act as resonating chambers.

Development of a unique system for sound production in pacas opens up the problem of special sound-producing organs in other animals. The inflated resonating drum at the base of the tongue in howler monkeys is just as remarkable as the cheek-bone chambers of the paca. But "How the Howler Howls" would make a good title for another story.

Research in Great Lakes Area

Test excavations on sites of early American Indians in areas of the Upper Peninsula of Michigan near the Wisconsin border were made last month by George I. Quimby, Curator of North American Archaeology and Ethnology. This field trip was part of a general Great Lakes area research-project in which anthropologists, botanists, and geologists of a number of Midwest museums, colleges, and universities are participating.

LECTURES ON SATURDAYS TO BEGIN OCTOBER 6

The Museum's 106th course of free illustrated lectures for adults will be presented on the eight Saturday afternoons in October and November. All of the lectures will be given at 2:30 P.M. in the James Simpson Theatre. Color motion-pictures will accompany each lecture.

The opening program will be "Minnesota," on October 6, when Fran William Hall of the National Audubon Society will present a naturalist's viewpoint as he shows in color films the scenic beauties and the wildlife of "the land of 10,000 lakes."

The complete schedule of the eight lectures will appear in the October BULLETIN. A section of the Theatre is reserved for Members of the Museum at each program. Each Member is entitled to two reserved seats, for which 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.

SATURDAY PROGRAMS FOR CHILDREN

"Alohaland"—a visit to beautiful Hawaii in color motion-pictures—will be the opening program in the series of free motion-pictures for children to be presented on Saturday mornings at 10:30 o'clock during October and November in the James Simpson Theatre. The shows are given under the auspices of the James Nelson and Anna Louise Raymond Foundation.

On the first program, October 6, in addition to the films, Fran William Hall of the National Audubon Society will make a personal appearance to tell his story of the people, animals, and plants of Hawaii.

Titles of the seven other programs during the two months will be announced in the October BULLETIN. No tickets are needed for admission, and children are invited to attend alone, accompanied by parents or other adults, or in groups from schools, clubs, and other centers.

STAFF NOTES

Rupert L. Wenzel, Curator of Insects, and **Henry S. Dybas,** Associate Curator, attended the meeting of the Tenth International Congress of Entomology at Montreal from August 17 to 25, where Curator Wenzel presented a paper on photomicrography and other techniques. Associate Curator Dybas accompanied other members of the congress on a field trip to Laurentide National Park where he collected minute insects of the forest floor and treeholes . . . . **Dr. Karl P. Schmidt,** Curator Emeritus of Zoology, gave four lectures before high-school and college teachers at the Institute of Biology held at the University of Utah under the auspices of the National Science Foundation. He has been invited by the American Institute of Biological Sciences to speak at several small colleges of the Midwest during the forthcoming academic year . . . . **Dr. Theodor Just,** Chief Curator of Botany, presented a paper on paleobotany at the annual meeting at the University of Connecticut last month of the American Institute of Biological Sciences.

Studies of Volcanoes Resumed

Dr. Sharat K. Roy, Chief Curator of Geology, left last month for field trips in Mexico and Central America to continue his studies of volcanoes and collect specimens of volcanic products. After attending the International Geological Congress in Mexico City and participating in study-excursions to recent and Cenozoic volcanoes, he will proceed to Central America for further research and collecting at volcanoes in Nicaragua, Guatemala, and, if time permits, other countries. He will return to the Museum late in October.

GIFTS TO THE MUSEUM

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

Department of Anthropology:

From: University of Chicago—41 flint artifacts, southern France; Giles Healey, Pacific Palisades, Calif.—3 photographs of Stela 2 at Bonampak, Mexico; Roberto Quiroz, Tempe, Ariz.—wool poncho and leather cap, Bolivia; Dennis E. Shanahan, Chicago—12 prehistoric Eskimo objects of bone and ivory, Point Barrow, Alaska

Department of Botany:

From: Director of Agriculture, Reduit, Mauritius—25 seed samples of agricultural legumes; Dr. L. J. Gier, Liberty, Mo.—2 Festuca; Miss Nellie Haynie, Elmhurst, Ill.—a *Rhamnus frangula;* University of Minnesota, St. Paul—3 seed samples of hybrid *Zea mays;* G. E. Moore, St. Louis—an anemone; New York State College of Agriculture, Ithaca, N.Y.—2 photographs of Dutch-elm-disease-fungus fruiting bodies; E. J. Palmer, Webb City, Mo.—594 plants

Department of Zoology:

From: Mrs. Charles Fernald, Chicago—a mounted passenger pigeon; Arthur M. Greenhall, Trinidad, B.W.I.—12 coral snakes; Miss LaVerne Hand, a collection of shells, worldwide; W. J. Hanson, Lawrence, Kan.—2 paratypes of a stratiomyid fly, Duchesne, Utah; Dr. Hans Holub, Indonesia—4 frogs, 2 lizards, apple-snails, 3 fishes; Harry Hoogstraal, Cairo, Egypt—3 frogs; Hermano Niceforo Maria, Bogotá, Colombia—8 salamanders, 172 frogs, 5 lizards, 9 snakes; Dr. Edward C. Raney, Ithaca, N.Y.—2 fishes, North Carolina; University of Texas, Austin—7 fishes

EXPEDITION RETURNS FROM PERU DIG

The 1956 Archaeological Expedition to Peru returned to the Museum in August. Under the leadership of Dr. Donald Collier, Curator of South American Archaeology and Ethnology, the expedition completed six months of exploration and excavations in Casma Valley on the Peruvian coast, 200 miles north of Lima. Curator Collier was assisted by Donald Thompson, who is a graduate student at Harvard University. The expedition was made possible by a grant from the National Science Foundation.

Previous to this year's work the Casma Valley had been one of the least-known archaeologically of the coastal valleys. For this reason an attempt was made to study all parts of the valley to determine the number, character, and age of the prehistoric settlements and other ruins. Detailed studies, including mapping, photography, and the making of surface collections, were carried out at fifty-three sites, and test excavations were made at ten of these. Of particular interest to the expedition were two large towns laid out in rectangular grid pattern, each covering nearly a square mile. These dated from the Tiahuanaco period, about A.D. 1000.

The expedition's collection, consisting of ceramics, fragments of textiles, organic materials from refuse deposits (animal bones, shells, and vegetable material), and wood samples for radiocarbon dating, will be shipped to the Museum from Peru in the near future. Then will begin the task of laboratory analysis and of piecing together the lives of the ancient farmers and town dwellers of Casma Valley.

NEW MEMBERS

(July 16 to August 15)

Associate Members

J. W. Anderson, Joseph W. Hibben, Frank P. Kosmach, Lawrence E. Langdon, Van E. Marker, Dr. Peter S. Y. Neskow, Dr. Melvin R. Salk, E. W. Zimmerman

Non-Resident Associate Member

George R. Baxter

Sustaining Members

Wilfrid X. Stanhaus, Douglas E. Tibbitts

Annual Members

C. Foster Brown, Jr., Mrs. Dorothy M. Burwell, James A. Cuca, Draper Daniels, R. C. Dickinson, Louis Fishman, Mrs. Donald W. Fiske, Kenneth S. Flagg, J. D. Fuchs, Mrs. Milton Handelsman, Miss Marie Hill, George S. Isham, A. C. Ketzler, E. Richard Kuehne, Charles W. Lake, Jr., Fenton D. Lapham, Roger MacArthur, Ray J. McCurdy, Stephen M. Murphy, Mrs. Max D. Orr, Frank J. Richter, Mrs. James E. Rutherford, Paul A. Schroeder, L. W. Stratton, Ray G. Torgerson, Guy H. Van Swearingen, Mrs. Charles F. Venrick, Lester Witte

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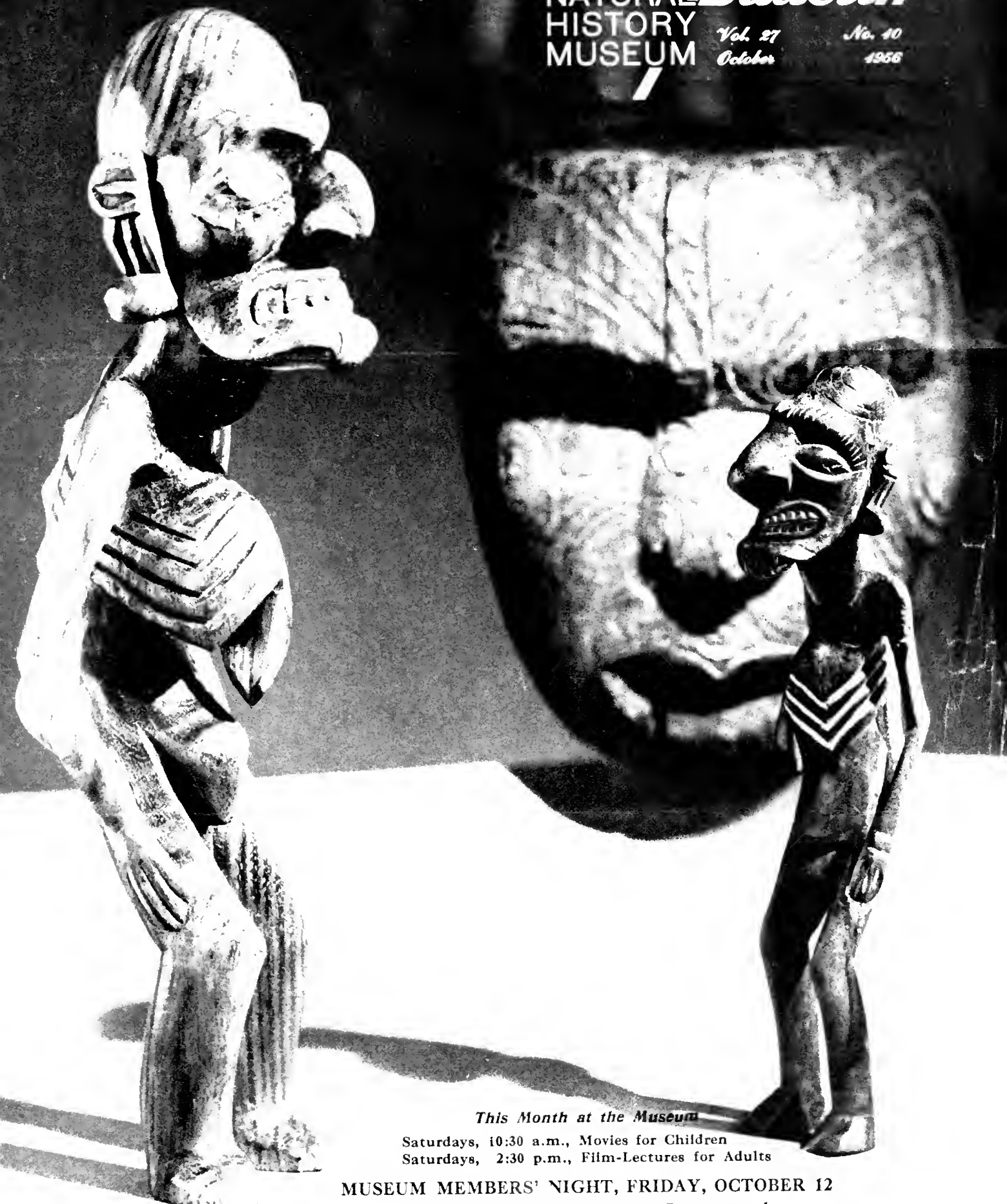

This Month at the Museum

Saturdays, 10:30 a.m., Movies for Children
Saturdays, 2:30 p.m., Film-Lectures for Adults

MUSEUM MEMBERS' NIGHT, FRIDAY, OCTOBER 12

Preview of New Exhibits, Theatre Program, and
Open House (7 to 10:30 p.m.)

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

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

INTERNATIONAL MUSEUM WEEK SPOTLIGHTS CO-OPERATION

A surprising number of Museum visitors are unacquainted with forces behind the scenes that are constantly at work to improve exhibits and research collections. One of these forces is the flourishing exchange program carried on among museums all over the world.

Chicago Natural History Museum, via a network of good will, exchanges knowledge and thereby shares knowledge with the largest and most renowned or the smallest and most remote institutions of the world. While relations among countries continually fluctuate from friendship to mere toleration to outright enmity, museums maintain consistently active exchange relations that are dedicated, in the final analysis, to increasing man's understanding of himself and his world.

Co-operation among museums and allied institutions also makes it possible for students, scholars, and scientists to visit foreign institutions to gain new ideas and, in some cases, even to learn more about their own countries. A scientist from the Dark Continent visiting this Museum was heard to remark, "How strange that I should come to Chicago to learn about Africa."

International Museum Week, under the sponsorship of the U. S. National Commission of UNESCO and the International Council of Museums, will be held from October 7 through October 13 as a world-wide effort to focus attention on the peaceful and creative role of the museums of the world. A special exhibit in Stanley Field Hall during International Museum Week will display specimens and publications on loan or received in exchange from foreign institutions, illustrations of our Museum exhibits that have appeared in foreign publications, and publications of this Museum dealing with collections from other lands.

Last year the Museum's four departments —Anthropology, Botany, Geology and Zoology—participated in 74 exchanges of natural-science material with other museums, institutions, libraries, and individuals located all over the world. A glance at the lists of material received in exchange last year reveals the world-wide scope of the program. A plaster torso from Thebes, Egypt, sent by the Brooklyn Museum, arrived in the Department of Anthropology. A collection of Devonian fishes found in the Baltic Sea was sent to the Department of Geology from the natural history museum in Stockholm, Sweden. Wood specimens came to the Department of Geology from institutions in Argentina, Ceylon, Arizona, Germany, New York, Southern Rhodesia, and the Union of South Africa. A listing of

(*Continued on page 8, column 1*)

THIS MONTH'S COVER

The three grotesque carvings reproduced on our cover are unique examples of Polynesian art. They were selected to establish the motif of three halls of material from Pacific isles featured for this year's Museum Members' Night, October 12. The two standing figures, from Easter Island, are carved from driftwood (there are virtually no trees on the island). They are called Moai Kavakava and represent venerated ancestors. The imposing and somber mask-like carving dominating the background is a gable ornament from a Maori house. The carving represents the intricate curvilinear incised patterns used by Maori specialists in tattooing the faces of warriors. The tall figure is a recent gift from Robert Trier, of Chicago, a Contributor of the Museum. The smaller figure was presented by Sister M. Inez Hilger, of Saint Cloud, Minnesota. The gable ornament was donated by William Preston Harrison, of Chicago.

MEMBERS' NIGHT

PROGRAM

Friday, October 12

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—

Preview of New Exhibits: Isles of the Pacific. Melanesia, Micronesia, Polynesia, and Indonesia (Halls A, F, and G, on Ground Floor). Also, **A Visit to the Home of a Cameroons Tribal King** (Hall E, Ground Floor).

Special Exhibit: World-Wide Relations of the Museum (arranged for International Museum Week, October 7 through 13).

MOTION PICTURES, 9:15 P.M.

In James Simpson Theatre
(Ground Floor West)

"KAPINGAMARANGI"

A color-film documenting life in Oceania today with the changes brought about in the postwar years; with narration by Roland W. Force, Curator of Oceanic Archaeology and Ethnology. Preceding the film will be an address of welcome to Members by Dr. Clifford C. Gregg, Director, and a review of the work of the Department of Anthropology by Dr. Paul S. Martin, Chief Curator.

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.

MEMBERS' NIGHT: A 'JOURNEY' TO OCEANIA AND AFRICA

MEMBERS of the Museum and their guests are invited—**on Members' Night, Friday, October 12**—to make a journey such as no travel agency, ship line, or airline can offer. In a single evening our visitors will go on a tour that ranges through each of the principal island groups of the Pacific—Melanesia, Polynesia, Micronesia, and Indonesia—and thence by magic carpet to far-off Africa where they will be guests at the "palace" (actually a large mud hut with thatched roof) of a king in the Cameroons. Doors of the Museum will open at 6 P.M. to accommodate Members and guests who wish to dine in the Museum Cafeteria (6 to 8 P.M.). Open house will be held in the third and fourth floor laboratories and offices by the scientific and technical staff of the Museum from 7 to 9 P.M. A notable color motion-picture, "*Kapingamarangi,*" of life today in a Pacific isle will be shown in the James Simpson Theatre at 9:15 P.M., with narration by Roland W. Force, Curator of Oceanic Archaeology and Ethnology. Preceding the film, Dr. Clifford C. Gregg, Director of the Museum, will make a welcoming address, and Dr. Paul S. Martin, Chief Curator of Anthropology, will review the work of his department. There is ample free parking-space for Members' cars. Free motor-coach service to and from the Museum will be provided (for details see program on page 2).

OUR PACIFIC EXHIBITS ARE WORTH A BRAG!

By ROLAND W. FORCE
CURATOR OF OCEANIC ARCHAEOLOGY AND ETHNOLOGY

WARANGA tangata hau!
So end the folk tales on one Pacific island. When translated from the Polynesian dialect to English the phrase means:"Just a tale told by people."

Culture, in the anthropological use of the term, is just that—just a tale told by people

EASTER-ISLAND ENIGMA

One of many massive sculptured stone heads, the significance of which is a mystery even to the Polynesian inhabitants of the isle today. Some of the heads exceed 25 feet in height. In one of the Museum's Pacific halls (Hall F) large reproductions may be seen on Members' Night.

—told by their customs, their manufactures, their daily life. In the long run, it becomes converted into history—in the short run, it is a slice of the continuum of life. Outside of the living tale as it may be witnessed on an actual visit to the islands, the tale of life in the Pacific is told better in the halls of Chicago Natural History Museum than anywhere else in the world. A new presentation of the Museum's exhibits from these areas, is now offered in thoroughly refurbished halls (Halls A, A-1, F, and G), in which new artistry has been applied in the arrangement of the exhibits to show individual objects and groups of objects to better advantage.

The tales told by the native peoples of the Pacific are many and varied. In each case the denouement of these tales was brought about by contact with explorers, traders, whalers, and missionaries—the representatives of more technologically complex societies. These contacts in greater or lesser degree resulted in changes of plot of catastrophic proportions. In more than one instance the casts simply died out, leaving only the empty stage upon which the tale had been enacted for centuries—a lonely, palm-studded, coral-reefed pinpoint in a vast ocean. In other cases the stage properties changed, the actors were coached in new techniques, outfitted in different costumes, forced to alter their plots. However altered, the show has gone on, the tales continue.

Sir Peter Buck (Te Rangi Hiroa), noted part-Maori anthropologist, once used an old Maori proverb analogically to demonstrate the great "change of plot" in the cultures of the Pacific:

The old net is laid aside;
A new net goes a-fishing.

"The old world created by our Polynesian ancestors has passed away, and a new world is in the process of being fashioned," mused Sir Peter, expanding upon this proverb. "The stone temples have been destroyed, and the temple drums and shell trumpets have long been silent. Tane, Tu, Rongo, Tangaroa and the other members of the divine family of the Sky-father and the Earth-mother have left us. The great voyaging canoes have crumbled to dust, and the sea captains and the expert craftsmen have passed to the Spirit-land. The regalia and symbols of spiritual and tem-

(*Continued on page 4, column 1*)

A KING HAS HIS DAY ON MEMBERS' NIGHT

By JANE ROCKWELL
ASSOCIATE EDITOR

IF IT WERE POSSIBLE, visitors might be tempted on the night of October 12 to trade places with the Cameroons king whose tribal home is the subject of an elaborate new exhibit in Hall E on the Ground Floor of the Museum and a featured attraction of Members' Night.

AFRICAN ANCESTOR-FIGURES

These dramatic wood-carvings are of great religious import to the inhabitants of the Cameroons Grasslands in West Africa. The examples shown above now grace the house of a Cameroons king that has been erected in Hall E and will be opened for the first time on Members' Night.

In the highly organized and often hectic society of today, an evening's visit to the home of the ruler of a village in the Cameroons Grasslands region of West Africa fifty years ago may offer a refreshing change of pace for the citizen of 1956.

Unfettered by modern appliances and

(*Continued on page 4, column 3*)

PACIFIC EXHIBITS—

(*Continued from page 3*)

poral power have been scattered among the museums of other peoples. The glory of the Stone Age has departed out of Polynesia.

"The old net is full of holes, its meshes have rotted, and it has been laid aside.

"What new net goes a-fishing?"

The new net, or the changed plot of the tale told by the people of one Pacific island, is the subject of a recent motion-picture record of native life that will be presented on the screen of the James Simpson Theatre in the Museum at 9:15 on Members' Night.

The island called Kapingamarangi, whose life is documented in the film, is located in southern Micronesia. Studies made of the culture of this island in the past few years reveal a most interesting new net—a tale upon which no final curtain has fallen. The film will round out the story of life in the Pacific for Members' Night visitors who in the preceding two hours have made the grand tour of the Pacific via the Museum exhibits.

Colorful Primitive Arts

The cultures of the various Pacific island-groups have produced some of the most colorful and interesting creations to be found in any category of primitive art. As the result primarily of expeditions over many years, the Museum has assembled in Halls A (and A-1), G, and F (on the Ground Floor) some of the world's finest collections representing almost all phases of Pacific cultures. New installations with fluorescent lighting and improved physical arrangement of the halls permit these exhibits to cast the true atmosphere of the many places represented —Saipan, Guam, the Carolines, New Britain, New Ireland, Sumatra, Java, Australia and New Zealand, Samoa, the Philippines, Hawaii, the Solomons, New Hebrides, Marquesas, Borneo, New Guinea, and many others. For Members' Night the halls will be flooded with native music faithfully recorded on tape among various Pacific peoples. Not only the exhibition halls but also the Pacific Research Laboratory will be open to visitors. Here the preparatory work for the refurbished exhibits was carried out under the direction of Evett D. Hester, assigned to this task under the Museum's Thomas J. Dee Fellowship in Anthropology. Mr. Hester and other members of the staff will be present to greet Members and their guests and to furnish information requested.

Finest Melanesian Collection

The most complete and superb collection of material from Melanesia ever brought together in any museum of the world is to be seen in the newly arranged Hall A. Ornaments, ritual objects, masks, and items of utilitarian nature form together an impressive array of material culture from one of the most interesting areas of Oceania. Most of the components of the collection were secured by the late Dr. Albert B. Lewis, Curator of Melanesian Ethnology from 1907 to 1940, who spent four years in the early 1900's as leader of the Joseph N. Field Expeditions to Melanesia. The unique elements of design found on weapons and ceremonial paraphernalia make Hall A one of the most colorful parts of the Museum. The value of these specimens is especially enhanced by the fact that many are no longer available in the areas where they were collected. The native cultures that produced them no longer function with the aboriginal vigor of years past. Moreover, many of the comparable collections in Europe were destroyed during World War II.

Life of the Philippines

Also in Hall A are the extensive collections brought from the Philippines by Dr. Fay-Cooper Cole, formerly Assistant Curator of Malayan Ethnology at the Museum and later a member of the faculty of the University of Chicago, retaining his Museum connection as Research Associate in Malayan Ethnology. Dr. Cole's broad experience in field research in Indonesia and in the Philippines resulted in a catalogue of data accompanying these specimens that is especially noteworthy. The Philippine exhibits are interspersed with life-size dioramas that take the viewer into a Luzon village where pottery is being manufactured and a native blacksmith is forging weapons and tools. Native textiles from the Philippine highlands and weapons from the head-hunters of the same region are among the outstanding exhibits.

Indonesia Well Represented

Hall G contains an enviable collection of materials from Indonesia. Among its attractions is an assemblage of the many kinds of strange musical instruments used by a Balinese orchestra to accompany the beautifully stylized dances of these people. There is also an exhibit of the dancers' masks. The complicated process of *batik* cloth manufacture is illustrated, and there is a miniature village of the Menangkabau people. The people of Indonesia are recognized as some of the world's most accomplished artisans and the products of their arts and crafts are lavishly displayed in full testament to their skills.

Polynesia and Micronesia

The massive sculptured heads of Easter Island in eastern Polynesia stand guard in Hall F where they flank the intricately carved Maori council house, one of only half a dozen or so still extant in the world today. The Easter Island heads have remained a mystery to professional anthropologists and laymen alike for many years. These enigmatic blocks of stone are remnants of a lost people. The brightly colored feather "kahili" from Hawaii and the similarly festive feather capes in adjoining cases show the painstaking and skillful efforts of native craftsmen whose watchword was certainly that this is indeed "a timeless world." War clubs from Fiji, fish nets and hooks from Hawaii, armor and shark's-tooth swords from the warlike inhabitants of the Gilbert Islands, and thousands of other items from Micronesia and Polynesia are displayed in this hall.

Within the confines of a BULLETIN it is possible to present only the sketchiest indication of the contents of these three great halls. Together they form a whole museum in themselves—a museum of many fascinating peoples and cultures that have flourished on the tiny isles that dot the vast Pacific.

MUSEUM MEMBERS' NIGHT
Friday, October 12

AFRICAN KING'S HOUSE—

(*Continued from page 3*)

gadgets, the royal house in the Cameroons is 30 feet high (including its thatched roof), 15 feet wide, and 23 feet long. The entrance to the house is through two doorways on which human and animal figures are carved. Another feature of the king's house that may appeal to present-day dwellers is that when the king tires of his hut or when the birds, bats, and squirrels become too noisy or dirty in the hut's thatched roof, the king simply orders his servants to build another house—a task that takes little more than a week. The Museum's maintenance crew built our reconstruction of the King's House of plaster and steel because Museum building-rules require more durable material than the mud and latticed bamboo of the original in Africa. Another major change from the original is the inclusion of several viewing windows placed so that visitors may easily see the interior of the house.

Patrons of the Arts

Cameroons chieftains were patrons of the arts, and so their homes were repositories for the finest sculptures, charms, fetishes, and ancestor figures available. More than one hundred objects from the Museum's Cameroons collection—one of the finest in the world—were selected for the house. Royal stools equivalent to thrones, masks of religious and magical significance, ceremonial drums, tobacco pipes more than five feet long, a sleeping mat for the one of the king's many wives who was currently in favor, and the king's own bed, an elaborately carved object with a built-in wooden pillow.

The events that go to make up a day in the life of a Cameroons king—from his early-morning fishing jaunt and bath in a nearby

stream, his holding of court and other official duties, to an evening feast and dance in honor of a neighboring chieftain—are told in a booklet entitled *The King's Day*, written by Mrs. Margaret Plass of New York City and London. Mrs. Plass, who recently represented the Department of Ethnography of the British Museum at the Fifth Session of the International Congress of Anthropological and Ethnological Sciences at Philadelphia, served this Museum as a consultant in the planning of the new exhibit. Copies of the booklet, which contains photographs of some of the objects found in the King's House, will be given to visitors on Members' Night.

In recreating the King's House and presenting the Museum's Cameroons specimens in their immediate physical context together with a written account of the life in that region of Africa, the Department of Anthropology has endeavored to provide Members' Night visitors, and later the general public, with a more illuminating view of the life of an African people than would have been possible by the exhibition of specimens alone. Phillip H. Lewis, an assistant in the Department of Anthropology, supervised the selection of specimens and installations.

The Cameroons region in 1956 has markedly changed from what it was fifty years ago—there is a tendency to replace the thatch of the roofs with galvanized iron, the clay pots with kerosene tins, the ancient drums with modern phonographs, and the painted symbolic friezes on hut walls with travel posters and soft-drink advertisements. But on Members' Night visitors will see that the tranquil life of the Cameroons of fifty years ago has been preserved in the Museum's African exhibits.

MOVIES FOR CHILDREN ON 8 SATURDAYS

The Raymond Foundation will present its autumn series of free motion-picture programs for children on Saturday mornings during October and November. All programs begin at 10:30 A.M. in the James Simpson Theatre of the Museum. No tickets are needed. Children are welcome to attend alone, accompanied by parents, or in groups from schools, clubs, or other centers.

On four of the programs the explorers who made the films will be present to tell the story of their adventures. Following are titles and dates:

October 6—Alohaland
The islands of Hawaii, their people and the natural wildlife
Story by Fran William Hall

October 13—A World Is Born
A Disney color-picture on the first 2 billion years of life on our earth
Also a cartoon

October 20—Outdoor Almanac
Year-round activities in nature
Story by Karl H. Maslowski

October 27—Treasure Island
A Disney interpretation of Robert Louis Stevenson's adventure story

November 3—Prehistoric Times
Strange undersea life; also dinosaurs, mammoths, saber-tooth cats, and prehistoric hunters and artists
Also a cartoon

November 10—Adventure in Africa
A four-month and 10,000-mile safari
Story by Murl Deusing

November 17—The Great Adventure
Two boys' adventures on a Swedish farm (Arne Sucksdorff's nature masterpiece)

November 24—'Gatorland
Into the cypress swamps of Dixieland
Story by Allen Cruickshank

MUSEUM MEMBERS INVITED TO VISIT LABS

The Museum's scientific staff will hold open house in the laboratories throughout the Departments of Anthropology, Botany, Geology and Zoology from 7 to 9 P.M. on Members' Night, October 12. The visitors will have opportunity to talk to curators engaged in many lines of research, and to view demonstrations of museum techniques in preparing material for exhibition and study. Illustration shows part of the ichthyological laboratory where Loren P. Woods, Curator of Fishes, and Assistant Pearl Sonoda find out more truly exciting things about finny creatures than those related in the wildest of sportsmen's yarns.

MUSEUM MEMBERS' NIGHT
Friday, October 12

AUDUBON SOCIETY OFFERS LECTURES AT MUSEUM

On Sunday afternoons during the fall, winter, and spring the Illinois Audubon Society will present in the James Simpson Theatre of the Museum a series of five free lectures illustrated with color motion-pictures. The first is scheduled for October 14, when Patricia Bailey Witherspoon will give a screen-tour of "Kangaroo Continent."

Other lectures to be given are: November 18, "Cypress Kingdom," Alexander Sprunt, Jr.; January 27, "Ranch and Range," Albert Wool; March 10, "Great Smoky Skyland," G. Harrison Orians; and April 28, "Little-Known New Jersey," George Ragensburg. Admission is free. Seats in the reserved section of the Theatre are available both to Members of the Audubon Society and Members of the Museum on presentation of membership card.

Mrs. Witherspoon is the daughter of Dr. Alfred M. Bailey, Director of the Denver Museum of Natural History. Together they explored strange and fascinating Australia, where the ordinary is picturesque and the extraordinary is almost unbelievable. The films present the life of two of the world's strangest mammals—the duck-billed platypus and the spiny echidna, both of which lay eggs. Also shown are koalas, the originals for the famous Teddy bears, and of coarse kangaroos. Other scenes show a herd of fur-seals at Lady Julia Percy Island and birds, mammals, and plants of the North and South islands of New Zealand.

STAFF NOTES

Dr. Julian A. Steyermark, Curator of the Phanerogamic Herbarium, has been awarded a grant from the National Science Foundation to complete his work on a catalogue of the plants of Missouri. He recently lectured on botanical subjects before the Kiwanis Club of Chicago, and the Danville (Illinois) Garden Club, and the Missouri Chapter of Nature Conservancy at St. Louis . . . . **Dr. Austin L. Rand,** Chief Curator of Zoology, and **Melvin A. Traylor, Jr.,** Assistant Curator of Birds, attended the meetings of the American Ornithologists' Union in Denver last month . . . . **Loren P. Woods,** Curator of Fishes, will leave in October for studies of tropical eastern Pacific fishes at Leland Stanford University, and the University of California at Los Angeles . . . . The staffs of the Departments of Anthropology and Zoology last month were hosts to many distinguished scientists from abroad who visited Chicago after attending congresses in Philadelphia and Montreal. Among the countries represented were Norway, Italy, Switzerland, the Soviet Union, Great Britain, Germany, Uruguay, and Brazil.

LECTURES ON SATURDAYS BEGIN OCTOBER 6

WITHOUT LEAVING CHICAGO this fall you can spend a Saturday afternoon in the Canary Islands. Or you can thrill at the weird forms surrounding you as you sit comfortably at the bottom of the sea. You can join a safari and come face-to-face with Africa's lions and elephants in the wild. You can take an enchanted voyage among the isles of the Mediterranean or an exciting trip on rubber rafts down the canyon-bound tortuous Colorado River.

These are some of the stay-at-home-travel opportunities offered in the 106th series of free lectures for adults. Illustrated with color motion-pictures, the lectures will be presented at 2:30 o'clock on the eight Saturday afternoons during October and November in the James Simpson Theatre of the Museum. The programs are provided by the Edward E. Ayer Lecture Foundation Fund. Admittance is restricted to adults because of limits of accommodations, but children will have their own series of free motion-picture programs on the mornings of the same Saturdays under the auspices of the Raymond Foundation.

A section of the Theatre seats for the adult lectures is reserved for Members of the Museum until 2:25 P.M.

Following are the programs:

MALTA—'THAT UNSINKABLE AIRCRAFT CARRIER'

Herbert Knapp will show color films and tell the story of this and other Mediterranean isles in his lecture on November 17. Other lectures on travel and science will be given on Saturday afternoons throughout October and November.

October 6—Minnesota

Fran William Hall

For the nature-lover and the sportsman few areas anywhere have as much to offer as "the land of 10,000 lakes"—Minnesota. The awe-inspiring scenic beauties, the infinite variety of birds and other animals, the rich flora, and the vast forests are brought to the screen in vivid color by the films of Fran William Hall, one of the topflight naturalist-lecturers of the National Audubon Society. He proves that the wonders of nature can be just as exciting a few hundred miles from Chicago as in some exotic land half-way around the world.

October 13—The Canary Islands

Robert Davis

"A colorful archipelago of everlasting spring" is the way Robert Davis describes the Canaries, the island group lying some seventy-five miles off the northwest coast of Africa. As shown in our lecturer's color-films, the islands greet the visitor with displays of flowers and luxuriant vegetation on mountain slopes that rise from a desert to snowcapped peaks as high as 12,000 feet. On the largest island, Tenerife, noted for its bananas and vineyards, are found the weird dragon-trees that are believed to live 3,000 years but of which only a few now remain. On the island of Artenara a visit is made to a village of cave-dwellers. The islands, incidentally, were not named for the singing birds but from the Latin word *canis* for fierce dogs found there by ancient invaders (the birds were named for the islands).

October 20—Outdoor Almanac

Karl Maslowski

A sweeping panorama of nature's annual cycle of year-round activity is presented in the lecture and color films of Karl Maslowski, dramatic ace photographer and keen naturalist. In "Outdoor Almanac" the audience is permitted to follow in close intimacy the season-to-season life of a family of raccoons, a fawn deer growing to buckhood, playful fox-cubs, bats, and hummingbirds and also the life cycle of flowers and other plants. Just as our own lives and activities differ around the calendar, the changes that spring, summer, autumn, and winter bring to creatures and plants are revealed in Maslowski's unusual filmed document.

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October 27—Call of the Sea

John D. Craig

Many people may travel the world over, but few are privileged to see the bottom of the sea with its weird and mysterious forms of life. But now, through the daring of John D. Craig, author of *Danger Is My Business*, and by magic of underwater color-photography, all may share in the thrills of expert deepsea divers. Craig's film and lecture cover most aspects of sea-life. Record dives are made, shipwrecks are explored in their burial-places—freak fishes are found and whales are hunted. There is a ride on the back of a giant manta-ray and a game of tag with sea-elephants in the ocean depths. The audience will participate in the thrill of shooting a tremendous thirty-foot surf and roaming silent kelp forests deep in the blue water.

November 3—Thrills on the Colorado

Julian Gromer

Action of this film and story, as told by Gromer, begins with harnessing fifteen huskies to a sledge that takes to the trail from high in snow-covered mountains of Colorado. The journey along the Colorado River is picked up at the source in Rocky Mountain National Park, whence the river hurries on its way to Shadow Mountain and the Grand Lakes. At Hite, Utah, huge stacks of supplies are loaded aboard rubber rafts, and for the next two weeks the exploring party is on the canyon-bound river where there is no turning back. Remote wonders are explored along the banks, and quicksands and rapids add to the thrills.

November 10—Adventure in Africa

Murl Deusing

The day-to-day activities of eleven lions in the wild on the Serengeti Plains, as recorded on color-film by Murl Deusing and his wife who lived near the animals for many days, are a feature of this lecture. Many other adventures are packed into this story of four months and 10,000 miles of safari in the African veld and jungle. The Deusings captured giraffes and zebras and recorded the seldom-heard voice of the giraffe. They faced charges of mad elephants and rhinos as they calmly kept their cameras grinding. They risked their lives making close-ups of poisonous puff adders and spitting cobras.

November 17—Mediterranean Isles

Herbert Knapp

Lodging with all meals included, from 65 cents to 5 dollars a day, and potatoes at 1 cent a pound! Yes, these are 1956 prices in the Paradise-like isle of Mallorca says Herbert Knapp, who brings color films of this and other islands that dot the blue of the Mediterranean. He describes Mallorca as a beauty spot that holds the answer for jaded nerves and battered budgets. His lecture and films take his audience also to Sicily, Corsica, Crete, Corfu, Rhodes, and Malta—some of them ancient, all of them garden spots of the modern world, and certain of them tension spots of history currently in the making.

November 24—River of the Crying Bird

Allan Cruickshank

In Florida a beautiful river flows southward to the sea. Called the Wakulla, an Indian word for "mysterious water," it is a river of the crying bird—where the limpkin wails a kind of music as truly Dixieland as that of Basin Street. It is this river with its many wildlife wonders that noted naturalist Allan Cruickshank has filmed in all its marvelous color. The river begins twenty miles south of Tallahassee and flows out into the Gulf of Mexico, with many of its miles bordered by a wilderness of cypress knees and moss-draped trees inhabited by the American egret, alligators, and the anhinga or snake-bird.

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.

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.

Although there are no tours on Sundays, the Museum is open from 9 A.M. to 5 P.M.

COLLECTING IN THE BORNEO RAIN FORESTS

By ROBERT F. INGER
CURATOR OF AMPHIBIANS AND REPTILES

THE BORNEO Zoological Expedition of 1956 ceased operations in the field on August 20. On that day the last boxes were locked and banded, the last cans soldered shut, and the whole shipment turned over to a steamship company in Kuching, Sarawak. I had spent the five preceding months in North Borneo and Sarawak (both British colonies) collecting frogs and toads, lizards, snakes, turtles, fresh-water fishes, and mammals. In that time about 40 snakes, 200 lizards, 1,000 frogs and toads, and several thousand fishes were obtained.

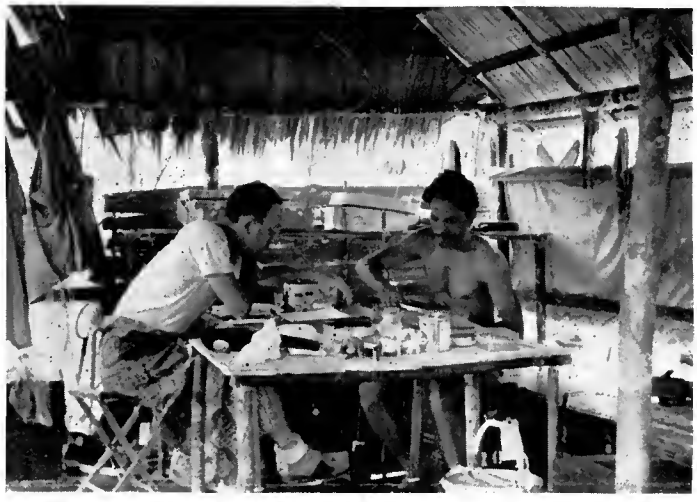
One of the aims of the expedition was to learn as much as possible about the lives of the animals. What are their relations with one another? What do they eat? Exactly what sorts of places do they live in? At what times are they active? To answer such questions a great many kinds of observations are needed. Therefore the notebooks that were filled are as important as the specimens collected. Detailed information on the habitat of each animal, notes on food and activities, descriptions of the areas worked, and observations on weather were all recorded.

For the weather-conscious readers of the BULLETIN, the weather in Borneo was fine. Perhaps it was a little damp, but not excessively so. The average rainfall during my stay there was 6 inches per month. At midafternoon the temperature usually reached 85 to 95 degrees but fell to 80 or below by 9 P.M., with a low of 70 to 75 in the early morning hours. The relative humidity was rather high. At 6 A.M. it was 90 to 95 per cent, dropping to 50 to 70 per cent at midday and climbing to 90 to 95 per cent by nightfall.

Two of the field bases were in eastern North Borneo approximately 100 miles from the bases used by the Borneo Zoological Expedition of 1950, of which I was a member. Study of the material obtained in 1950 pointed to the necessity of working in the areas chosen this year. But, had it not been for a revolution in communications in the intervening six years, these bases could not have been reached. In 1950 no boats were available for transportation up rivers, in contrast to present availability. In fact, far in the interior of Sarawak so many of the Dyaks now have outboard motors that the river sounds like one of our own summer resorts.

Since there are many tribes of natives in Borneo, the people I employed varied from one field base to the next. For example, in North Borneo people known as Dusuns worked for me. At Matang, Sarawak, my assistants were Land Dyaks, while up the Rejang River in Sarawak they were Sea Dyaks (more properly known as Ibans). Though each tribe has its own language, most of the people speak Malay. If a stranger (like myself) works alone in Borneo, he must conduct his business in Malay. Fortunately it is a relatively easy language to learn.

The second zoological expedition to Borneo was, if anything, more interesting than the first. The advantages of working in a particular area twice can scarcely be overestimated. Indeed Dr. Wilfred H. Osgood, who was Chief Curator of Zoology until 1940, was so impressed with this fact that he coined an aphorism that the staff of the Department of Zoology swears by: "Never go anywhere for the first time."



FIELD LABORATORY IN BORNEO

Expedition camp is a place for skinning, tagging, and preserving specimens and for writing copious notes as well as for sleeping and eating. The working day of Dr. Robert F. Inger and his Iban assistant, Gaun, often ran to 16 hours.

Any region of tropical rain forest is so rich from the biologist's point of view that one's first trip to a place like Borneo passes in a kaleidoscope of sights, sounds, and smells. The luxuriance of the vegetation and the wealth of animal types are almost overwhelming. It is literally a case of not being able to see the forest for the trees. But, given several years in which to digest the experiences and to study the specimens

(Continued on page 8, column 3)

MUSEUM MEMBERS' NIGHT
Friday, October 12

INTERNATIONAL WEEK—

(*Continued from page 2*)

material received in exchange last year in the Department of Zoology includes the names of institutions in England, Kenya Colony, India, Israel, Belgium, Buenos Aires, Mexico, Durban, Netherlands, Philippine Islands, and Pennsylvania.

Hundreds of natural-science publications are received throughout the year on an exchange basis by the Museum's Library. While wars and depressions temporarily curtail and sometimes halt exchange activities, the hunger for scientific knowledge goes on unappeased. Recently exchange relations with four countries behind the iron curtain—the USSR itself and Czechoslovakia, Poland, and Austria—were reestablished, and others soon may follow. Our Museum, through exchange with institutions and individuals last year, distributed 12,737 copies of its own publications. This year the number is likely to increase.

In the Museum the hall that most typifies the spirit of International Museum Week is the Hall of the Races of Mankind (Chauncey Keep Memorial Hall, Hall 3) where a series of 96 bronze and four stone sculptures illustrates representative types of living races of man. The sculptures, modeled from life by Malvina Hoffman, are arranged in geographical order by continents: the west end of the hall shows the races of Africa and Oceania, the octagonal section in the center of the hall the races of Europe and America, and the east end the races of Asia. In the center of the octagon the bronze group entitled "Unity of Mankind" presents life-size figures that represent at their highest development the black, white, and yellow races, together supporting the world.

At a time when increased communication knits all countries closer together, the museums of the world have a unique opportunity to promote, through educational means, understanding among peoples and nations.

—J. R.

MUSEUM MEMBERS' NIGHT
Friday, October 12

BORNEO EXPEDITION—

(*Continued from page 7*)

collected and the observations recorded, one is mentally prepared for a second expedition. And generally during the second trip one's original impressions are sifted, clarified, and expanded so that a clearer picture of this terribly complex environment begins to emerge.

Yet the work is far from over. The new collections must be studied, the new observations analyzed, and an attempt made to integrate the new information with the old. Even then the important goal of understanding the tropical rain forest will not have been achieved. The staff of Chicago Natural History Museum is too small for that ambition. What we do expect, however, is that the Museum will have made a contribution toward that goal.

GIFTS TO THE MUSEUM

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

Department of Anthropology:

From: Theodore J. Shapas, Dolton, Ill: —Late Woodland pottery vessel

Department of Botany:

From: Dr. John W. Thieret, Homewood, Ill.—45 cultivated plants; U. S. Department of Agriculture, Beltsville, Md.—photograph of Dutch-elm-diseased tree; University of Arkansas, Fayetteville, Ark. —*Draba verna*, Missouri; Karl Bartel, Blue Island, Ill.—5 plants; Bill Bauer, Imperial, Mo.—*Centaurium texense;* Holly Reed Bennett, Chicago—944 herbarium specimens, Illinois, Indiana, Michigan, Montana; Dr. Henry Field, Coconut Grove, Fla.—4 fungi, Massachusetts; Forest Department, Colony of North Borneo—188 specimens of Dipterocarpaceae; Dr. Duane Isely, Ames, Iowa—3 prints of *Mimosa horridula* type; Dr. E. L. Keithahm, Juneau, Alaska—*Dodecatheon Jeffreyi;* New York Botanical Garden—50 Rubiaceae, South America; Dr. Earl E. Sherff, Hastings, Mich.—512 plants, Hawaii and Europe; Mrs. L. F. Yutema, Wadsworth, Ill.—2 plants; Emil Sella, Chicago—2 *Solanum rostratum;* Jesse Strauss, Glencoe, Ill.—*Ornithogalum umbellatum.*

Department of Geology:

From: Albert W. Tucker Estate, Daytona Beach, Fla.—mineral collection

Department of Zoology:

From:Bernard Benesh, Burrville, Tenn. —32 insects; Charles M. Bogert, New York —2 salamanders, lizard, Mexico; Chicago Zoological Society, Brookfield, Ill.— bird skeleton, Antarctica; Dr. Gordon M. Clark, College Park, Md.—2 paratypes of bird mite; General Biological Supply House, Chicago—8 caecilians; William J. Gerhard, Chicago—786 U. S. Hemiptera-Homoptera (true bugs), United States; Arthur M. Greenhall, Trinidad—fish specimen; Dr. Arnold B. Grobman, Gainesville, Fla.—2 salamanders, Virginia; C. E. Heether, Skokie, Ill.—fresh-water clam; Harry Hoogstraal, Cairo, Egypt—144 birdskins, 37 frogs, 40 lizards, 8 snakes, 6 turtles

DINOSAUR EXCURSION

Pausing on the first lap of their journey to "Dinosaur Land" in the Museum, these two youngsters in Stanley Field Hall gaze upward at Gorgosaurus (a meat-eating dinosaur of some 75 million years ago), which seems about to devour his prey, Lambeosaurus, a plant-eating contemporary.

Boys and girls can visit Dinosaur Land (Museum Journey No. 7) any day during October and November within regular Museum visiting hours. Travel instructions and questions about the various dinosaurs seen on the Museum Journey will be given to children upon request at the Museum's north and south entrances. Youngsters who satisfactorily complete the Dinosaur-Land questionnaire and those of three other Museum Journeys can become "Museum Travelers" and receive a special award. Those successfully participating in eight Museum Journeys can become official "Museum Adventurers." Under the direction of the Raymond Foundation, journeys showing Africa, China, Animals Around the World, Toys, and Bible Plants, and a Postage-Stamp Safari have been given since the program began early last year.

Winter Visiting Hours to Begin

Winter visiting hours, 9 A.M. to 4 P.M., will go into effect at the Museum on October 15. Sunday hours: 9 A.M.–5 P.M.

NEW MEMBERS

(August 16 to September 14)

Associate Members

Robert Buehler, Mrs. Edmund L. Burke, Sheridan Gallagher, Mrs. Spencer R. Keare, Thomas W. McCloud, Miss Elizabeth W. Morgan

Annual Members

L. R. Austin, Benjamin Baldwin, Carl E. Betz, Sidney Buchbinder, James O. Burke, Miss Jessie Churan, John J. Coffey, Jr., J. Robert Coffield, Miss Charlotte A. Colegrove, Robert A. Crawford, F. Schuyler Dauwalter, Philip G. Duff, Mrs. Daisy Earley, Sampson Esko, Nelson C. George, Gilbert T. Graham, Harold Graham, John E. Grice, Howard G. Haas, Robert Insley, Robert H. Lodge, Philip W. Lotz, L. G. McKnight, Laurence W. Morgan, Dwight Nicholson, George Radford, Eugene F. Ryan, Arthur J. Schiller, Charles I. Schneider, Richard A. Staat, Philip F. Stafford, Mrs. Dorothy J. Steitz, Dr. Graham A. Vance, John J. Weber, George B. Young

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Chicago Natural History Museum

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Roosevelt Road and Lake Shore Drive, Chicago 5

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FRANK V. GREGG MEMORIAL

In memory of Commander Frank V. Gregg, United States Navy, employees of the Museum have established a permanent memorial fund at the Museum. Commander Gregg, son of Dr. Clifford C. Gregg, Director of the Museum, was killed in an automobile accident early in September.

A CURATOR REVIEWS BOOK BY HIS CHIEF—FRANKLY

AMERICAN WATER AND GAME BIRDS. By Austin L. Rand.* 239 pages, including 127 full color plates; 75 other illustrations. E. P. Dutton and Company, Inc., New York, 1956. $11.50.

In earlier years a richly illustrated and obviously costly book such as this could have been published only as a special limited edition intended for that segment of the population sometimes facetiously referred to as the "carriage trade." Even today, when pretentious bird-books for the general public have become almost commonplace, *American Water and Game Birds* stands out as the most impressive production of the year.

On closer and more critical examination, the result of Dr. Rand's latest excursion into the realm of popular bird-literature proves to have a dual character of varying excellence. In a sense, *American Water and Game Birds* is fundamentally an eye-catching collection of bird portraits, more than one hundred in natural color, supported by a text of considerable length. Both elements, the illustrations and the printed word, are essential to the whole, but perhaps are best considered separately, since of unequal merit.

The superior organization of the book as a whole is at once evident. In an introduction of some 8,000 words Rand defines the scope of his subject, touches upon matters of conservation, and indicates the value —both aesthetic and economic—of our American heritage in water birds and upland game birds. In brief, these conspicuous elements of our wildlife are brought into pleasing focus, preparatory to elaborating on the several component species.

AREAS WHERE BIRDS THRONG

Much of the introduction is devoted quite effectively to a descriptive survey of the areas and localities most noted for their great concentrations of birdlife. Here one learns with pleasure that, even today, phenomenally favored localities exist throughout the nation, several being within easy distance of our most congested centers of population. This section shows the author at his best, since he obviously is both personally familiar with the areas discussed and well qualified to serve as the reader's guide to their wildfowl.

Each of the thirty-five chapters succeeding the introduction is devoted to a single family of birds, arranged in standard sequence from loons to pigeons and doves. A general account of the family and its more notable characteristics is followed by an informative account of the American species. Here, in the aggregate, is to be found a truly impressive array of pertinent facts relating to distribution, habitat, migration, food, behavior, and other aspects of avian biology. Technicalities are largely avoided, the author successfully presenting his material in a style that is at once lucid and scholarly. He will be read with pleasure and profit by the ornithologist, the casual bird-watcher, and the sportsman.

American Water and Game Birds, unfortunately, is less successful as a collection of bird portraits. Although profusely illustrated with the handiwork of an artist of distinction and of several leading wildlife photographers, the assemblage of illustrations leaves much to be disired.

MANY COLOR PLATES

The color plates, especially—and there are 127 of these—are of very uneven distinction. Some of the pictures are strikingly beautiful and in every way superior. But others, and they are in the majority, can best be described as merely adequate. A few are decidedly inferior. Indeed, a critical viewer might strongly suspect that certain of the color plates portray mounted birds photographed in staged surroundings. The color reproduction is often faulty, although in many instances this doubtless could have been corrected by known technical means. It is unfortunate that the publishers apparently made less than a conscientious effort to obtain the very best of the many good color-photographs that have been taken of these birds.

A series of 35 bird silhouettes, by Ugo Mochi, serves as chapter headings and is perhaps the most pleasing pictorial feature of the book. It is further illustrated by 40 black-and-white photographs that are routinely adequate and occasionally superior.

Although falling somewhat short of its promise, *American Water and Game Birds* nevertheless has a place in every bird library. In the opinion of this reviewer it is superior, both in text and in its illustrations, to the companion volume *Land Birds of America*, published in 1953. With the appearance of this book Dr. Rand takes a long stride forward in becoming as well known to the general bird-watcher as he long has been to the scientific world.

EMMET R. BLAKE
Curator of Birds

* Chief Curator of Zoology, Chicago Natural History Museum.

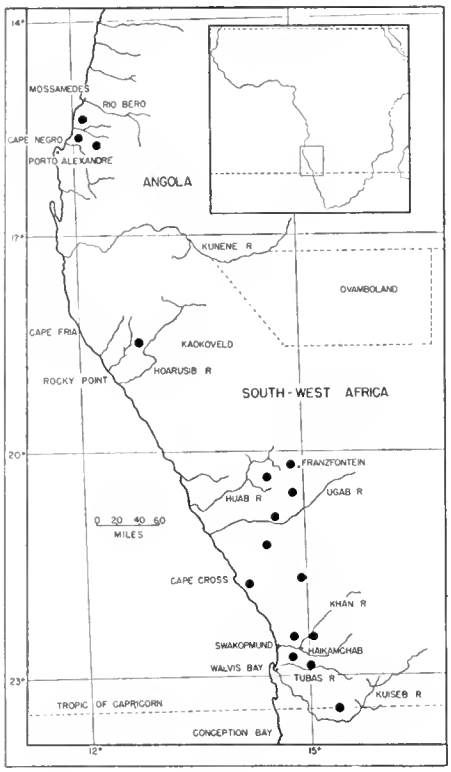
THIS MONTH'S COVER

A royal bedchamber is shown on our cover. It is part of the full-size one-room "palace" of an African tribal king placed on exhibition in Hall E last month. The royal residence is furnished from the Museum's Cameroons collections which have been pronounced the finest and most extensive in the world. The carved wooden couch with zebra-striped blanket was exclusively the king's. This bed was forbidden to all of his 86 wives under the threat that it had magical power to make them barren. The wife summoned as favorite of the day occupied the mat with pillow on the floor. At the left end of the shelf over the bed is one of the king's crowns; the receptacles on the shelf held the bones of revered ancestors. This entire exhibit was prepared by Phillip H. Lewis and other members of the Museum staff in consultation with Mrs. Webster Plass of New York and London, volunteer keeper in the Department of Ethnography of the British Museum. Mrs. Plass painted some of the murals simulating native art.

WELWITSCHIA, LIVING FOSSIL OF SOUTH AFRICAN DESERT *

By THEODOR JUST
CHIEF CURATOR OF BOTANY

DESCRIBED AS A TREE that isn't a tree and likened in appearance to an enormous woody carrot or turnip or giant octopus, *Welwitschia mirabilis* Hooker f. occupies indeed a unique place among living and fossil plants. Originally placed in the family *Gnetaceae*, the highest family of the gymnosperms (plants whose seeds are not enclosed in a special ovary), *Welwitschia* is



Drawing by Samuel H. Grove, Jr.

WHERE IT'S FOUND

Map shows known distribution of Welwitschia mirabilis, extending along Atlantic coast of Africa from Portuguese colony of Angola to Southwest Africa. The plant was discovered in 1860 near Cape Negro, Angola, by Dr. Friedrich Welwitsch.

now regarded as the sole representative of a new family, *Welwitschiaceae*. This assignment is based on new knowledge pertaining to this plant as well as other gymnosperms, both living and extinct.

Exploration of the coastal area extending from Angola to South Africa has disclosed a number of new and, in some cases, different localities where *Welwitschia* occurs (see accompanying map). Thus the total area of its known distribution covers about 700 miles of desert near the coast and projects inland for about 100 miles into the Kaokoveld. These inland habitats are semidesert and have an annual rainfall of several inches, whereas in the coastal belt welwitschia plants depend largely on nightly fog or on dew for their water supply. Welwitschia plants tend to grow in dried-up river beds and depressions because their seeds are believed to have been washed ashore and germinated there. With equally good reason it has recently been suggested that the dry winged seeds may have been transported by wind and left in these depressed and relatively protected spots.

GERMINATION EXPERIMENTS SUCCESSFUL

The life-history of *Welwitschia* is also better known now. The plants are dioecious (with male and female flowers appearing on different plants) and are pollinated by the brown-red insect *Odontopus sexpunctatus* (a hemipteron belonging to the family *Pyrrhocoridae*). However, it is not known whether this insect is the only pollinating agent and whether insect-pollination is obligatory. After many failures welwitschia plants can now be grown in greenhouses and carried from seed to maturity. Experiments at Montreal Botanical Garden were successful and a male plant was brought to flower after thirteen years. Similar experiments at the Botanical Garden in Stellenbosch were equally successful where a female plant was brought to flower after 25 years and set seeds after having been hand-pollinated. Male and female cones appear about the same time (January) and seeds ripen in May. The nightly fogs in the natural habitat cause the seeds to germinate immediately. However, some seeds fail to germinate because they are infected by a fungus that fills them with black spores. Fortunately the fungus is still quite restricted in occurrence, and *Welwitschia* is not in immediate danger of becoming extinct. Grazing by sheep in the Kaokoveld, about 100 miles from the coast, has also been reported as a serious local threat to the plants. The leathery fibrous leaves containing numerous sclereids full of calcium oxalate crystals must be a rough diet even for sheep, unless serious drought prevails.

Measurements taken of cultivated specimens indicate that old plants, such as the female plant shown in the Museum exhibit, may be hundreds of years old and possibly more than a thousand. Because the plants lack growth rings comparable to those of our native trees, welwitschia plants can be regarded as old, but their age cannot be determined by any standard methods.

Comparison of the two seed leaves (cotyledons) with the two large permanent leaves, situated at right angles to the former, shows that these organs have the same venation pattern, a condition not known in other gymnosperms. Further fundamental differences separating *Welwitschia* from its former associates are as follows: The structure of the wood of *Welwitschia* approaches in certain respects that of its former associates and in other respects approaches that of palms and other flowering plants. The reproductive structures are quite unlike those of most gymnosperms with the exception of those of the fossil cycads (cycadeoids). *Welwitschia* also differs from the majority of gymnosperms by its complex type of stomatal apparatus (the minute pores and adjacent cells found on leaves and other organs through which plants carry on gaseous exchange with their environment). Among living plants only *Welwitschia* and its former associate *Gnetum* (tropical climbers and trees) have this type of stomatal apparatus, whereas among fossil plants only the fossil cycads (cycadeoids) possess it.

PART OF EXHIBIT IN MUSEUM

Closeup of the large female plant of Welwitschia mirabilis, as shown in Martin A. and Carrie Ryerson Hall (Hall 29—Plant Life). This trunk is 46 inches across its greatest diameter. Exhibit shows reproductive organs (cones) and the two large permanent leaves that continue to grow from the base, and tear from the opposite end. Plant may live hundreds of years.

Thus in these two very important characteristics *Welwitschia* approaches the fossil cycads and differs profoundly from other gymnosperms.

OTHER DIFFERENCES

In addition, *Welwitschia* has a different arrangement of vascular elements and

* Ten years ago Chicago Natural History Museum installed a habitat group in Martin A. and Carrie Ryerson Hall (Hall 29, Hall of Plant Life) showing several specimens of *Welwitschia mirabilis* that had been collected in the Mossamedes desert (Angola) by Professor Henri Humbert of Muséum National d'Histoire Naturelle in Paris. For details see BULLETIN, November-December 1946.

lacks an apex (growing point) after the seedling stage, resulting in a closed system of growth, a condition unique among higher plants and the immediate cause of its failure to grow in height. In fact, *Welwitschia* has

COLLECTOR OF MUSEUM'S SPECIMENS

Professor Henri Humbert of the Muséum National d'Histoire Naturelle in Paris, standing in Mossamedes Desert of Angola where he collected Welwitschia plants shown in the Museum's exhibit.

been aptly described as "a seedling whose apical growth has been arrested." In this respect, *Welwitschia* has no counterpart in the plant kingdom. Another striking character is represented by the rather large number of chromosomes (carriers of hereditary characteristics or genes). The somatic (diploid) number of chromosomes in *Welwitschia* is 42, among the highest reported from gymnosperms. In one instance the count was 84, suggesting that the particular plant was a tetraploid, carrying four sets of the haploid number (21) of chromosomes. Finally, *Welwitschia* apparently possesses sex-determining chromosomes operating in the same manner as those of the well-known

WELWITSCHIA POSTAGE STAMP

An issue of the South African government. From the private collection of Dr. John W. Thieret.

fruitfly, *Drosophila melanogaster*, classic experimental animal of modern genetics.

A recent report that fossil pollen of *Welwitschia* has been found in Tertiary deposits of Russia remains to be verified. No other fossil material referable to this genus has come to light. But the many important structural characteristics shared by *Welwitschia* with certain groups of fossil plants, especially the fossil cycads, document its isolated position among living plants and entitle us to regard it as a living fossil.

TRAILING A LOST TRIBE OF CENTURIES AGO

By PAUL S. MARTIN
CHIEF CURATOR OF ANTHROPOLOGY

THE Museum's Southwest Archaeological Expedition of 1956 spent most of the summer preparing a new camp in Arizona and moving into it. A small house that will serve as our archaeological research station and headquarters for the next decade was purchased in the town of Vernon. Repairs and interior modifications of the house were made and a small unit for bunkhouse and storeroom was built. A small addition for darkroom, food storage, and laboratory will be constructed next season. All gear and equipment from our old headquarters in New Mexico were moved to the new camp.

An archaeologist must be a Jack-of-all-trades and able to do carpentering, wiring, plumbing, concrete work, and the like. We also learned about well-drilling.

ANCIENT SITES SURVEYED

After headquarters were partly organized, we started our survey work—that is the search for sites or ancient homesteads of the Indians who lived there many centuries ago. The region investigated occupies a portion of the Colorado plateau and embraces part of the Little Colorado drainage. It is near the foothills of the White Mountains. The area is semiarid and volcanic in origin. Volcanic features such as cinder cones, about 500 to 1,000 feet in height, and small volcanic dikes are the most prominent features. The elevation above sea level ranges from 4,500 feet to 10,000, the average elevation being about 7,000 feet.

Our search for sites was carried on in a methodical manner. We first visited all ranchers, collectors, and local archaeologists, some of whom gave us definite leads to sites they knew.

Then, by truck and on foot, we branched out farther and farther on our own to determine in a broad manner the cultural sequence of the region (750 square miles).

By these means we found more than 100 sites and became aware of about 300 more. We took detailed notes on each ruin that interested us, trying not to duplicate similar types of sites. The notes include such information as location with reference to roads, land boundaries, and other permanent landmarks, the closest water supply, size of village area, surrounding flora and topography, the number of rooms or houses, and the kinds of pottery and tools of stone. A collection of sherds from each site was made and shipped to the Museum for analysis and study. No digging at all was done this season because all available time was devoted to reconnaisance and research.

During the fifteen previous seasons of work in New Mexico we had been fortunate in discovering a sequence of civilization—the Mogollon—some 4,000 to 5,000 years in length. This long unbroken sequence is one of very few in the Southwest comparable in length and detail. The data obtained are of inestimable value in studying the rise and fall of civilizations and in other studies.

TRAILING VANISHED INDIANS

However, "*our*" Mogollon Indians, abandoned the Reserve–Pine Lawn area about A.D. 1350. Where they went and why was unknown. We felt that our researches would be reinforced and of greater importance if we could find the heirs of the Mogollon culture.

Preliminary research caused us to think that the Mogollones moved north and westward into the country comprising the headwaters of the Little Colorado River and its tributaries.

Accordingly, we pulled up stakes and planted ourselves more or less in the middle of this region, which, incidentally, is almost virgin territory as far as archaeological work is concerned.

The earliest evidences of man found this season occur on the higher, ancient beaches of now extinct lakes. These sites were ancient camps and flint factories. They yielded stone tools and remains of old fire pits—but no pottery. We think these evidences of habitation are fairly old—perhaps 2,000 to 4,000 years or even more.

The next-younger sites are pit-house villages, on the surfaces of which were picked up pottery fragments and tools of stone. These villages we would guess to be about 1,200 to 2,000 years old.

The larger sites, as revealed solely by the pottery fragments picked up, became larger and more grandiose. Pottery became fancier and there are many more kinds. Some of the villages contain a hundred rooms or more and cover several acres.

The significance of all of this is that we are now certain that the Pine Lawn peoples *did* move into this area, beginning perhaps about A.D. 700–900. One of the fancy pottery types that we picked up is related to types made by the Hopi Indians in historic times (since 1540), and another is clearly related to a pottery made by the Zuni Indians, also in historic times.

Hence we have a kind of "lady or the tiger" problem. Which people are the heirs of the Mogollon culture or many of its components—the Hopi or the Zuni Indians—or are both of them Mogollon heirs? We are getting closer to the solution of our problem, "What became of the Mogollon people?"

The expedition staff included Dr. John Rinaldo, Assistant Curator of Archaeology, Mrs. Martha Perry, Charles Lewis, Roland Strassburger, Douglas Keney, and George Dunham.

STAFF NOTES

John R. Millar, Deputy Director, and **Miss Miriam Wood,** Chief of the Raymond Foundation, attended the Midwest Museums Conference at St. Louis, October 18–20. Miss Wood addressed the conference on "The Schools Come to the Museum." .... **Bruce Erickson** has been appointed as a preparator of fossils in the Department of Geology. He replaces **Cameron Gifford** who has left for graduate studies at Harvard University .... **Miss Eugenia Bernoff** has been appointed Reference Librarian, to replace **Mrs. Samuel H. (Donna) Grove, Jr.,** who has resigned. Miss Bernoff, who attended Wright Junior College and the University of Chicago, was formerly employed by the *Encyclopaedia Britannica* .... **Dr. Karl P. Schmidt,** Curator Emeritus of Zoology, attended the meetings of the National Science Foundation in Washington, D.C., October 19–20. Dr. Schmidt and **Dr. Robert F. Inger,** Curator of Amphibians and Reptiles, participated in the Midwest Symposium on Systematic Biology in St. Louis, October 26–27.

KOREA PRESENTS PICTURE OF TYPICAL WOMAN

Korea is again represented in the physical anthropology exhibits in Chauncey Keep Memorial Hall of the Museum (Hall 3, Races of Mankind). From last March until October there had been a blank space among the illuminated transparent color-pictures of racial types of the world. The photo-

KOREAN BEAUTY GRACES MUSEUM

Portrait of typical young woman of Seoul is presented to Museum by Mrs. Dorothy Stone Mills and Dr. Paul Chung representing Korean-American Friendship Association of Chicago. In center is Dr. Paul S. Martin, Chief Curator of Anthropology.

graph of two women that formerly occupied this place had been removed on the request of Korean government officials who declared that the exhibit was not typical of the women of the Republic of Korea.

The new picture, supplied through Korean government channels, is a portrait of Miss Mi-hee Yang, a 25-year-old resident of Seoul, who is shown wearing the traditional holiday-type of dress of her country.

A formal presentation of the picture to the Museum was made on October 2. Dr. Clifford C. Gregg, Director, accepted it on behalf of the Museum from Dr. Paul Chung and Mrs. Dorothy Stone Mills, who represented the Korean-American Friendship Association of Chicago.

MEMBERS' NIGHT DRAWS A RECORD ATTENDANCE

"Good heavens! I didn't realize that all this went on upstairs in the Museum!"

This exclamation of surprise was echoed many times over on Members' Night by guests as they explored the far reaches of the Museum on visits to offices, workshops, and laboratories normally closed to the public. Nearly 1,400 persons were present at this year's event, October 12, the most successful of the six Members' Nights since 1951. Host this year was the Department of Anthropology. The main attractions of the evening were the preview of a new permanent exhibit, the African King's House, and three newly reinstalled halls embracing the principal island-groups of the Pacific: Melanesia, Micronesia, Polynesia, Indonesia, and the Philippines. The annual affair closed with a film program in the James Simpson Theatre.

Sharing the spotlight with the featured events of the evening were the tours of the Museum, behind-the-scenes, where the actual research and preparation of exhibits are done by scientists, technicians, editors, librarians, and other Museum personnel. Staff members were on hand to discuss their research and exhibition projects and to show new collections received at the Museum during the past year. Many visitors were surprised to learn that the specimens in the exhibition halls form only a small part of the total collections housed in the Museum for study purposes.

Mrs. Webster Plass, of New York and London, who served as consultant in the planning of the African King's House exhibit, was present to tell visitors about the house and its furnishings. A booklet, *The King's Day,* a story written for the occasion by Mrs. Plass describing the life of a chieftain who might have occupied the mud and thatch hut of the exhibit, was distributed to Members and their friends during the evening.

After a welcoming address by Dr. Clifford C. Gregg, Director, and a brief talk by Dr. Paul S. Martin, Chief Curator of Anthropology, a film *Kapingamarangi,* narrated by Roland W. Force, Curator of Oceanic Archaeology and Ethnology, was shown in the James Simpson Theatre.

MEMBERS' NIGHT GROUP 'BEHIND THE SCENES'

Dioramist Alfred Lee Rowell demonstrates for Museum guests steps in making miniature restoration of an ancient scene. The exhibit in preparation will show a group of Mayas dedicating a new stela to their gods (Mexico, circa A.D. 760).

'Thunderbolts' of Tibet

Tibetan "thunderbolts" with which to invoke the wrath of heaven are on exhibition in Hall 32 (West Gallery). These are emblems of the god Indra, made of bronze in a form symbolizing lightning strokes. With a bell in the left hand and one of these thunderbolts in the right, Tibetan lamas call for the destruction of demons and opponents of Buddhism.

KEY TO PAST SOUGHT IN LOUISIANA BAYOUS

By EUGENE S. RICHARDSON, Jr.
and RAINER ZANGERL*

HERE IN THE MUSEUM when we speak of Mecca we are alluding not to the home of the Prophet but to a project under way in the Department of Geology. In 1954 and 1955, Members' Night visitors have had a glimpse of this, and reports in the BULLETIN have told something of its story. In the Mecca project, we are deciphering the story of the life and the environment of a shallow sea that once crept across and drowned a forest near Mecca, Indiana, during the Coal Age (Pennsylvanian period, about 240,000,000 years ago).

Our basic information is pried from the rock that was once black mud on the bottom of that sea. We have split the rock, a black shale, to thin shards, and have charted the position, character, and orientation of more than 62,000 fossils and fossil fragments in it. We have ground bits of the shale to near-transparency for study under the microscope. We have recorded clues to the depth of the ancient sea, its temperature, its saltiness, and of course its plant and animal life.

PALEONTOLOGISTS EXPLORE BAYOUS

This navigable channel through the cypress swamp is provided by Bayou Labranche near New Orleans. The left bank is fringed with miles of alligator weed.

But to interpret our clues and to understand what they mean in terms of an actual geographic environment that once existed, we have to know what environments are possible. "The present," says every geology textbook, "is the key to the past." How, indeed, could it be otherwise? All the factors of an environment are controlled by natural forces—gravitation, atmospheric convection, erosion and deposition, chemical affinities, and many others; and natural forces, we are convinced, have nothing to do with time. They are in effect today, they operated in the past, and the future will know their continued validity.

SCIENTIFIC CLUES WEIGHED

Thus, with a general idea of what is possible and what is not, and with due attention to the immutable laws of nature, we were able to build up in our minds a developing picture of the Mecca environment as we went along. The sea was shallow (because it had advanced slowly across a nearly flat shore); it was exceptionally quiet (because the black bituminous mud had accumulated in undisturbed sheets and decaying fishes lying on the bottom were buried without being moved); it was warm (because the Coal Age climate was warm); it was connected with the open ocean (because it contains a few far-swimming marine shellfish); but it was not a normally healthful marine environment (because the usual marine creatures of the time were not able to live in it); it was, in fact, from time to time quite a poisonous place (because thousands of fishes died there); black muck accumulated rapidly on its bottom (quickly covering the dead fishes before they had completely decayed).

So far, so good. This is, after all, a pretty complete picture. But certain questions plagued us. How can a black muck accumulate quickly in water that has no current to carry it? How can a good-sized body of water be both shallow and quiet, so that wind and waves won't stir up the bottom? Just how long does it take for bacteria to reduce a fish carcass to its component bones, anyway?

We searched the world's scientific literature for answers and found that, though similar questions had come up before, they were in slightly different context and the answers weren't quite in line with what we wanted. So for a while we gave up looking in the rock for our answers, put the books back on the shelves, and set out to find some modern environment that would match what we knew of ancient Mecca.

TO MISSISSIPPI DELTA

Because Coal Age Mecca was subtropical, we looked for a region with subtropical climate. Because the flooded land was flat, we looked for a flat country, partly under water. Because it lay near the sea, we went toward the sea. Everything combined, then, to draw us to the Mississippi Delta country in Louisiana in the summer season, and thither we went last July, seeking a modern Mecca. New Orleans is, of course, a "Mecca" in another sense—a more usual sense. For us it became doubly Mecca. We needed laboratory facilities, and with hospitality surely more generous than even the fabled Southern variety, Professor Fred Cagle and his staff of the Department of Zoology at Tulane University in New Orleans provided space for us to work and all the equipment we needed for exploring the swamps and lakes of the Delta country.

It was with Tulane's outboard motorboat that we made our way through bayous and lagoons; with their microscope we studied the muds and animal life; in their alcohol we brought some of our evidence back to the Museum. We remain deeply grateful to many men of the Tulane staff for guiding us in the field and for sharing with us their detailed knowledge of the area. Dr. Royal Suttkus, Dr. George Penn, Dr. Milton Fingerman, Dr. Joseph Young, and Dr. and Mrs. Cagle, of the Department of Zoology, freely gave us their time; Mr. Fitzjarrel, the many-talented custodian of that department, found us all the supplies and equipment we needed. Dr. Donald Tinkle, about to assume a teaching position in Texas, guided us on foot into the swamps of the Sarpy Wildlife Refuge and there shared with us a subtropical thunderstorm. Joseph Ewen, of the Department of Botany, instructed us in recognizing the different vegetation of salt- and freshwater-marshes. Dr. Richard J. Russell, Dean of the Graduate College at Louisiana State University in Baton Rouge, told us of his work in the geographic study of the Gulf Coastal Plain, and Ed Orton, of the Institute of Coastal Plain Studies at Lousiana State University, guided us to Lake Hatch when Dean Russell's description of it persuaded us that here, indeed, was Mecca. The help and interest of these people were equivalent to months of travel and study.

The country to which they introduced us is very different from that of Illinois—or of present-day Mecca, Indiana. It is flat, lying very near to sea level (parts of the city of New Orleans itself are below sea level), the only natural relief being the natural levees along the Mississippi River

* Dr. Richardson is Curator of Fossil Invertebrates; Dr. Zangerl is Curator of Fossil Reptiles.

and also those marking its abandoned courses. These natural levees, rising a few feet above the general level of the swamps, determine the location of towns, roads, and railroads. Thus a typical Delta town, like the city of Houma, though surrounded by miles of unpeopled land, is itself crowded and compact. Between the towns in the southern part of the Delta are extensive marshes and numerous shallow lakes of fresh or brackish water. Farther north, in the vicinity of New Orleans itself, are the storied cypress swamps, large expanses of forest knee-deep in water, drained by deeper waterways, the natural bayous and the man-made canals. Behind the city of New Orleans lies large and shallow Lake Pontchartrain, its mud bottom rich in plant debris. We had thought that this lake might provide us with an analogy to Mecca, but we soon learned that any wind stirs up the bottom, and we had to discard Lake Pontchartrain.

BAYOU BY-WAYS

The swamps, while immune to wind, support a forest growth, as Mecca did not. The bayous, natural drainageways through the swamps, are also protected from wind, but they carry an appreciable current that keeps their bottoms scoured. However, garfish live in the bayous, as their remote ancestors, the palaeoniscoid fishes, lived at Mecca; and the bottom sediment in swamp and bayou is in large part decomposed plant-matter, as it was at Mecca. So we examined some typical bayous, finding some aspects of Mecca recreated for us.

Many of the bayous, where not kept cleared by man, are choked with floating vegetation. The water hyacinth and the alligator weed, fast-growing plants dangling their roots in water rather than sinking them into soil, cover all untended water that is not too salty and interfere seriously with navigation. We found that this weedy mat will support a man, but only if he lies prone and is willing to be about half submerged. Walking on it might be possible with extra-large snowshoes (a feat that we didn't try).

Dean Russell told us of the *flotant*, a unique type of marsh confined to the Delta country. Here, the surface of a lake or bayou is covered by the floating mat of water hyacinth and alligator weed, but other plants—reeds, rushes, grasses, and finally dry-land weeds and even shrubs have taken root upon it, making a well-knit upper crust as much as two or three feet thick. Beneath the *flotant* may be water of any depth; alligators and especially garpike live under it as seals live under the polar ice, and, like the seals, they have holes here and there for air.

LIKE WALKING ON A MATTRESS

With Mr. Orton's guidance, we explored a typical mature *flotant*, covering the surface of Lake Hatch, south of Houma. Near the shore of the lake, where we first stepped upon it, the *flotant* readily supports the weight of a man, though it gives underfoot, and one feels he is walking on a mattress. As in the muskeg swamps of the north, if one man jumps on the *flotant*, his companions bounce. Farther from shore, the vegetation becomes thinner as fewer and fewer shrubs, rushes, and land-plants lend their roots and stems to the knitting of the mattress. Here, we found, it is only too easy to step through the vegetation rather than upon it. Farther along, patches of pure water hyacinth and alligator weed are found, on which even prone creeping is difficult. In our brief foray onto Lake Hatch, though we gained a considerable distance from the shore, we never did manage to arrive at the open water. No matter; we were already far enough out to sink our coring rod into the bottom for a mud sample, and we were persuaded that here was an answer to some of the Mecca questions.

The floating vegetation, whether firm enough to walk on or not, is the most effective damper of wind and wave. With such a cover, a body of water may be both shallow and quiet. Also, the cover is the source of the great quantity of decayed vegetation required to produce a black bitumous sediment such as that at Mecca. Lake Hatch, however, is not the perfect analogy; its water is fresh. In fresh water, sediment remains in suspension rather than settling quickly to the lake floor, and as a result, there is no definite bottom. Instead the water becomes muddier and muddier with depth, and presently is a muddy soup, then a soupy mud, then a harder mud, and finally clay. We found that our coring rod sank about 10 feet into Lake Hatch of its own weight and could be pushed another 14 feet with virtually no pressure before it finally brought up anything at all solid. This was not the condition in Mecca, where fish carcasses lay on a solid bottom and where dead sharks sank head first into mud, leaving body and tail to the attention of oxygen-using bacteria. However, if the water were slightly salty, a process known as *flocculation* would cause the sediment to sink rapidly, and the lake would have a more definite floor. Thus a salt or brackish body of water covered with a mat of vegetation would answer for Mecca. As it happens, the *flotant* of the present day cannot grow on salty water, but it is entirely possible (even, we think, probable) that a similar mat might have grown on the surface of our shallow Mecca sea.

THE TIME ELEMENT

Now, another of the initial questions set us to wondering how long it took to accumulate the black shale at Mecca. But rate of deposition, especially under a *flotant*, is difficult to measure, and Dr. Russell informed us that little was known on this problem. We attempted an indirect estimate of the rate of mud accumulation. When an animal dies, it is immediately attacked by bacteria, causing decay, and the rate of decay depends on the temperature and on the amount of oxygen available to the bacteria. Decay continues, with attendant scattering of the separated parts of the carcass, until it is buried and the bacteria smothered; thereafter another group of bacteria, using no oxygen, takes over and the flesh is entirely consumed. If a fish carcass lies on the bottom of a lake, the oxygen-using bacteria will reduce it to bare bones in—but here's what no one could tell us—in how long a time? a month? three months? If we knew that, we could estimate the rate of shale formation at Mecca, for there our fossil fishes are found in various easily recognizable stages of disarticulation.

In our experiment, we had to assume the temperature conditions and the oxygen supply, and we had to assume that bacteria of a quarter of a billion years ago operated just like our modern acquaintances. But to evaluate the variables as much as possible, we picked several different underwater environments in the Delta country. Here we set out dead fishes in screen cages to keep off the larger scavengers, and kept track of the rate of decay in water of various characters. To our surprise, we found that one week was sufficient to reduce a ¾-pound fish to clean disjointed bones in water ranging from 79 degrees to over 100 degrees and with a variation in saltiness from a brackish coastal lagoon to the nearly fresh water of a cypress swamp. Apparently our variables of temperature and salt were not highly critical. At the present time, we have other fishes being observed for us by co-operators in Massachusetts, Idaho, and Illinois. Early returns show that in these appreciably cooler waters the decay rate is much slower than in Louisiana, as one might expect.

The surprisingly consistent results of the fish-rotting experiments in the South give us a means of estimating how long it took for enough black sediment to settle on the Mecca fishes to prevent further disarticulation and scattering of the bones, and thus how long it took to form the shale.

So, by means of an expedition to an area without fossils—and where we didn't even look for any—we have found answers, and guideposts to answers, for questions concerning fossils from long ago. Truly the Present is the Key to the Past.

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.

FOUR MORE FILM-LECTURES IN MUSEUM THEATRE

Four more Saturday afternoons of travel via color motion-pictures and the lectures of explorers await Museum audiences in November. These remaining programs of the autumn season, provided by the Edward E. Ayer Lecture Foundation Fund, will be given in the James Simpson Theatre of the Museum, and all will begin at 2:30 P.M. Admittance is restricted to adults because of the limits of accommodations, but free programs of movies for children are presented on the mornings of the same Saturdays under the auspices of the Raymond Foundation.

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.

Following are the programs for adults:

November 3—Thrills on the Colorado
Julian Gromer

November 10—Adventure in Africa
Murl Deusing

November 17—Mediterranean Isles
Herbert Knapp

November 24—River of the Crying Bird
Allan Cruickshank

MOVIES FOR CHILDREN DURING NOVEMBER

The autumn series of free movies for children will continue on Saturday mornings through November. The programs, provided by the James Nelson and Anna Louise Raymond Foundation, begin at 10:30 A.M. and are given in the James Simpson Theatre of the Museum. No tickets are needed, and children are welcome to come alone, accompanied by adults, or in groups. Dates and titles follow:

November 3—Prehistoric Times
Strange undersea life; also dinosaurs, mammoths, saber-tooth cats, and prehistoric hunters and artists
Also a cartoon

November 10—Adventure in Africa
A four-month and 10,000-mile safari
Story by Murl Deusing

November 17—The Great Adventure
Two boys' adventures on a Swedish farm (Arne Sucksdorff's nature masterpiece)

November 24—'Gatorland
Into the cypress swamps of Dixieland
Story by Allen Cruickshank

AFRICAN KING'S HOUSE

Photograph shows exterior of "palace" of mud with thatched roof and bamboo doors used by a tribal king in the Cameroons grasslands. This full-size reproduction has been installed in Hall E of the Museum. Especially notable are the intricately carved wooden door posts. The figures on these have many subtle symbolical implications. A peek into the interior of the royal residence is afforded by the picture on our cover.

GIFTS TO THE MUSEUM

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

Department of Anthropology:

From: Transvaal Museum, Union of South Africa—15 casts of human skeletal material

Department of Botany:

From: *American Nurseryman*, Chicago—*Caesalpinia Gilliesii*, Missouri; American Spice Trade Association, Chicago—samples of 32 spices and condiments; Henry F. Dunbar, Kingston, N. Y.—*Asclepias syriaca* var. *kansana;* C. E. Hansen, Chicago—3 plants; Nellie Haynie, Villa Park, Ill.—2 plants; Lincoln Park Conservatory, Chicago—2 plants; Dr. Dwight Moore, Fayetteville, Ark.—5 plants; Juan V. Poncho, Chicago—18 plants, Philippines; Mrs. Lauramarie Scharlett, Norwalk, Calif.—*Sterculia villosa;* Dr. Karl P. Schmidt, Homewood, Ill.—19 plants; Mrs. Ellen T. Smith, Lake Forest, Ill.—*Pterospora andromedea*, Ontario, Canada; Dr. John W. Thieret, Homewood, Ill.—33 plants; Vaughan's Seed Co., Chicago—*Calendula officinalis* var. *prolifera*, Europe

Department of Geology:

From Indiana University, Bloomington—fossil insect; Maidi Wiebe, Maywood, Ill.—specimen of Pennsylvanian trilobite

Department of Zoology:

From: Harry Hoostraal, Cairo, Egypt—265 mammals; Morris K. Jacobson, Rockaway, N. Y.—five lots of inland shells, Peru; Jack P. Moyer, Hamilton, N. Y.—2 mammals, Japan; Museo Argentino de Ciencias Naturales, Buenos Aires—15 cricetine rodents; Col. Richard B. Stith, Lacon, Ill.—trumpeter swan, North America; Iraq Natural History Museum—jackal skeleton; Miguel A. Klappenbach, Montevido, Uruguay—83 land-shells, Brazil; James G. McMillan, Winnetka, Ill.—walking-stick insect

AUDUBON SCREEN-TOUR ON NOVEMBER 18

The Illinois Audubon Society will present the second of its 1956–57 screen-tours in the James Simpson Theatre of the Museum on Sunday afternoon, November 18, at 2:30 o'clock. The lecture and color films, under the title "Cypress Kingdom," will be presented by Alexander Sprunt, Jr., noted naturalist of the National Audubon Society.

Sprunt will lead his audience into wooded labyrinths of the South that rank among the most mysterious of all regions, teeming with exotic vegetation and alive with alligators, egrets, and ibises. Visits by way of lily-filled water trails are made to the swamp homes of the Seminole Indians. Man's stature is dwarfed by the lofty columns of cypress and strangler fig, and airplants add extravagance to an already luxuriant foliage.

NEW MEMBERS

(September 17 to October 15)

Associate Members

Miss Kay Binder, Charles S. Dunphy, Robert O. Lehmann, Guy E. Reed, R. W. Regensburger, Earl Ross

Sustaining Members

Albert F. Haas, Dr. Robert R. Hartman, Robert D. Michels

Annual Members

R. H. Anderson, Herbert R. Arnold, Lester S. Auerbach, Dr. Seymour Banks, Miss Nell Bartels, Mrs. John C. Bell, Raymond H. Bish, Frederick M. Bowes, Dr. Charles W. Brewer, William F. Bunn, Raymond N. Carlen, Miss Dorothy Daggett, Joseph De Cesare, Joshua J. D. Derry, Winfield T. Durbin, L. A. Ellner, Max B. Friedlander, Gordon H. Gannett, Jr., Dr. John P. Graham, Donald D. Grassick, Dr. Ronald G. Haley, Dr. Donald J. Heffner, Raymond A. Hoffman, Lemuel B. Hunter, B. J. Jennings, Charles A. Jennings, J. D. Kelsey, George G. Kolar, William M. Kuzmiak, Oscar L. Lancaster, Jr., T. E. Lauder, Charles L. McEvoy, John L. Means, Mrs. Charles Metcalfe, Mrs. Dorothy Stone Mills, John H. Morava, Carl F. Morgan, Miss Etha C. Myers, Harold B. Myers, William E. O'Connor, John C. O'Gorman, Fred M. Padgett, R. W. Partridge, Stanley L. Payne, Kurt G. Penn, Dr. C. H. Piper, John S. Reed, Sam A. Rothermel, Werner Ryser, Mrs. Florence Scala, Dr. H. Frederick Staack, Jr., Harold Stein, Ralph Synnestvedt, Thomas F. Tansey, Walter Stanley Tubutis, Jr., Edwin H. Schell, Erhardt M. Schmidt, V. R. Van Natta, G. W. Watts, Richard H. Whalen, William Patrick Whalen, Warren Wheary, Jerome P. Whiston, Gustave J. Willy, Richard Sidney Yager, William F. Zoll

Ruthlessly destroyed, until in comparatively recent years they became extinct, passenger pigeons are still preserved in a group in Stanley Field Hall.

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Bulletin

Vol. 27 No. 12

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Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

THE BULLETIN

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

MARSHALL FIELD
1893–1956

IN THE DEATH of Marshall Field, Chicago Natural History Museum has lost a friend and strong supporter. Mr. Field, grandson of the founder of the Museum, became a member of its Board of Trustees in 1914, a member of the Executive Committee the following year, and served as its First Vice-President since 1946. His interest was manifested not only in his activity on the Board, but through his personal touch with the work of the institution. He had sponsored 48 expeditions, in addition to the one to Africa that he personally led and that brought back to the Museum the splendid group of African lions displayed in Carl E. Akeley Memorial Hall. His interests were as broad as the scope of the Museum itself. He had sponsored expeditions in this country and to all parts of the earth in search of zoological, botanical, and geological specimens. He also sponsored several archaeological or ethnological expeditions that helped to round out the Museum's collections in the study of mankind.

His greatest single gift to the Museum came in the fall of 1943 in connection with the 50th Anniversary of the Museum, which, until that time, had borne the family name of "Field." At the anniversary celebration Stanley Field, the President of the Museum, announced the change in name to Chicago Natural History Museum, noting that members of the Field family, including Marshall Field, had thought it best for the future of the institution that the Museum be identified with the city of Chicago rather than with the family that had been responsible for its development to a position of pre-eminence in research and education.

Mr. Marshall Field was a frequent visitor to the Museum and was personally acquainted with many members of the staff. His personal encouragement as well as his generous sponsorship endeared him to those to whom was entrusted the responsibility of bringing the institution to the front rank among scientific institutions of its kind.

His interest in the Museum employees as individuals made him one of the proponents of the Museum's pension plan that was established in 1939. Some years earlier, his benefactions had restored full salaries to the employees, after the depression of 1929 had forced a reduction in salaries as well as in all other phases of operation.

He will always be remembered by the members of the Museum staff as a genial visitor with an unusual appreciation of their work and a personal interest in their progress and welfare.

—C.C.G.

STAFF NOTES

D. Dwight Davis, Curator of Vertebrate Anatomy, recently gave an illustrated lecture at North Central College on the Museum's Seventeen-year Cicada Project .... **Dr. Robert H. Denison,** Curator of Fossil Fishes, and **Bruce Erickson,** Preparator of Fossils, are working on a collection of fossil fishes they recently brought from Columbus, Ohio. The collection is a gift from J. Ernest Carmen, Professor Emeritus of Geology at Ohio State University .... **Dr. Julian A. Steyermark,** Curator of the Phanerogamic Herbarium, recently lectured before the University Club of Waukegan on the lost world of Venezuela and before the Chicago Horticultural Society on wild flowers .... **Roland W. Force,** Curator of Oceanic Archaeology and Ethnology, recently spoke on aspects of Pacific ethnology before seminars at Northwestern University and the University of Chicago .... **George I. Quimby,** Curator of North American Archaeology and Ethnology, recently consulted collections in the Milwaukee Public Museum in connection with his Great Lakes area archaeological project .... **Mrs. Meta P. Howell,** Librarian, **Mrs. M. Eileen Rocourt,** Associate Librarian, and **Miss Marjorie A. West,** Assistant to the Librarian, attended the recent meeting of the Special Libraries Association in Chicago.

THIS MONTH'S COVER

Marshall Field, Trustee and First Vice-President of the Museum who died November 8, was one of the outstanding Benefactors of the Museum. Many exhibits now in the Museum resulted from contributions of Mr. Field and from expeditions he sponsored. Two pages of this Bulletin (4 and 5) are devoted to pictures of a selection of these. Mr. Field also added vastly to the research resources of the Museum's study collections. The cover portrait is from a photograph by the Halsman Studio of New York.

GIFTS TO THE MUSEUM

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

Department of Zoology:

From: University of Michigan, Ann Arbor —2 land-shells, Aneitum, New Hebrides; Sister Adrian Marie O. P., Notre Dame, Ind.—2 stained fish-specimens, Minnesota and Ohio; Dr. Harold Trapido, Poona, India—471 reptiles and amphibians, mammal, Panama; U. S. Fish and Wildlife Service, Seattle—3 fishes, North Pacific; Fraser Walsh, Formosa—2 birdskins; Maidi Wiebe, Maywood, Ill.—2 lots of freshwater mollusks, Wisconsin; Nancy Traylor, Winnetka, Ill.—2 fishes; U. S. Fish and Wildlife Service, Pascagoula, Miss.—66 fishes, Atlantic Ocean, off Florida; Fraser Walsh, Formosa—7 butterflies, 26 insects, 2 birdskins; Dr. Wolfgang Weyrauch, Lima, Peru—a collection of Peruvian shells; Louis O. Williams, Tegucigalpa, Honduras—salamander, Costa Rica; Alex K. Wyatt, Chicago—50 butterflies and moths, Mexico; Seymour H. Levy, Tucson, Ariz.—lizard, Illinois; Mrs. R. J. Rogers, Chicago—species of land-shell, Miyoko Island, Ryukyu Islands; U. S. Fish and Wildlife Service, 161 fishes, 5 lots of marine invertebrates, Gulf of Mexico and Atlantic Ocean; Art Institute of Chicago—22 bronze animal figures; Dr. William S. Bullock, Angol, Chile —8 salamanders, 16 frogs, 20 lizards; Raymond Grow, Gary, Ind.—birdskin; N. L. H. Krauss, Honolulu, 2 frogs, Mexico

Library:

Books from: Archie F. Wilson, Short Hills, N. J.; Dr. Paul D. Voth, Chicago; Dr. Austin L. Rand, Chesterton, Ind.; Dr. Richard N. Wegner, Greifswald, Germany; Alexander Lindsay, Oak Park, Ill.

Museum to be Closed on Two Holidays

The Museum will be closed on Christmas and New Year's Day so that its employees may remain with their families. These are the only two days in the year when the Museum is not open to visitors.

SONGLESS PERCHING BIRDS HAVE CHARM OF DIVERSITY

By EMMET R. BLAKE
CURATOR OF BIRDS

A "SONGBIRD" that resembles a pheasant, a handsome red-and-black bird remarkable for its courtship dance, a colorful tropical American species with a bill of grotesque dimensions, and a drab thrush-like bird whose explosive call is as startling as the whistle of a Michigan Avenue traffic officer are among the scores of interesting birds that comprise a new exhibit recently added to the Synoptic Series in Boardman Conover Hall (Hall 21).

'Perching Birds' in New Exhibit

The twenty-two bird families of the latest exhibit both complete our display of the world's "perching birds" (Passeriformes) and introduce several related families, the woodpeckers and their allies (Piciformes). Although the distinction between these great Orders of birds is not at once apparent, being of an anatomical nature, their juxtaposition in a single exhibit brings together birds of remarkable diversity, as reflected in their size, form, color, habits, and distribution. As in earlier exhibits of this series, the characteristics of each family are emphasized by placing them on individual plaques, these being arranged on a large panel in a manner that suggests the relationships of the several groups. A series of maps shows the distribution of each family.

AUSTRALIA'S LYRE-BIRD

The largest and, in many respects, the most remarkable bird in this display is the lyre-bird of Australia. Much like a pheasant in appearance, and with a long lyre-shaped tail from which is derived the English name, it is an extraordinary mimic and has a repertoire of loud liquid calls that places it among the foremost of Australian songsters.

Lyre-birds, solitary and notably shy, live in the undergrowth of wild, rough country. Recent studies have shown that the unique lyriform tail of the adult male, possessed by only one of the two known species, is not acquired before the seventh or eighth year of age. The sixteen feathers of the tail are molted annually thereafter and require about four months for replacement.

Birds of brilliant plumage and others with subdued coloring often are members of a single family. Diversity of plumage is especially conspicuous among cotingas, a characteristic tropical American family of which one species (Xantus's Becard) occurs locally in southern Arizona. One of the most colorful cotingas is the cock-of-the-rock, a native of northern South America. The two species, one orange-and-black, the other red-and-black, suggest miniature domestic fowls, the resemblance being enhanced by their crests of unusual form. Females are drab brownish and lack special adornments. Both species frequent humid forests and prefer ravines choked with boulders and undergrowth. In spring the males clear arenas on the forest floor where, watched by females, they strut and posture in a nuptial dance.

ONE HAS A 'POMPADOUR'

Other well-known cotingas are the bellbirds, with their ringing metallic calls; the umbrella-bird, largest of all, with a remarkable pompadour of feathers; the capuchin-bird, bare of head, with a call suggesting the bawling of a lost calf; the fruit-crows; and the screaming piha. The latter, a gray robin-sized bird, lives in the lowland forests of South America. Its shrill whistle has a ventriloquial quality and is surprisingly loud for so small a creature. Several individuals sometimes sing alternately, the jungle ringing with their calls. One of my earliest and most vivid recollections of the Amazonian forest is the occasion when I became badly lost while attempting to locate what I thought to be a single bird.

Toucans, of which three species are shown, are spectacular chiefly because of their outsized bills and grotesque appearance. All are restricted to tropical America and most live in the humid lowlands. Toucans' bills, despite their size, are quite light by reason of their cellular structure. In some species the bill is tinted with yellow, green, blue, or red. Toucans feed on fruit and berries, and, at certain seasons, flocks of several species may gather in favored trees.

Familiar birds as well as the rare and strange have a place in the exhibit, for it is designed to show a cross-section of birdlife. A pileated and a golden-fronted woodpecker, both well-known in the United States, compete for attention with a European wryneck, Asiatic crimson-backed woodpecker, and others on the woodpecker panel. Local birdwatchers may be surprised by the range of size to be found in this family alone, as illustrated by a piculet measuring some three inches in length and by a Mexican imperial ivory-billed woodpecker that exceeds a raven in size. Jacamar, puffbird, honeyguide, woodhewer, tapaculo, pitta, asities, and manakin are a few of the family names that become alive and meaningful when associated with the examples now on exhibit in Hall 21.

The exhibit was designed by the Division of Birds. Taxidermy is by Carl W. Cotton.

BIRDS OF VENEZUELA IN WATER COLORS

A special exhibit of water-color paintings of 64 of the best-known birds of Venezuela is scheduled for showing in Stanley Field Hall from December 24 to January 27 inclusive. The paintings are the work of Kathleen Deery de Phelps (Mrs. William H. de Phelps, Jr.), who is a resident of Caracas, where her husband is connected with the Natural History Museum. Large photographs of Venezuelan scenes will be interspersed with the paintings in the exhibit.

Mrs. Phelp's bird pictures, the originals of which will be shown here, have been reproduced as illustrations in a handbook on South American birds published by the Creole Petroleum Company.

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.

MARSHALL FIELD GI

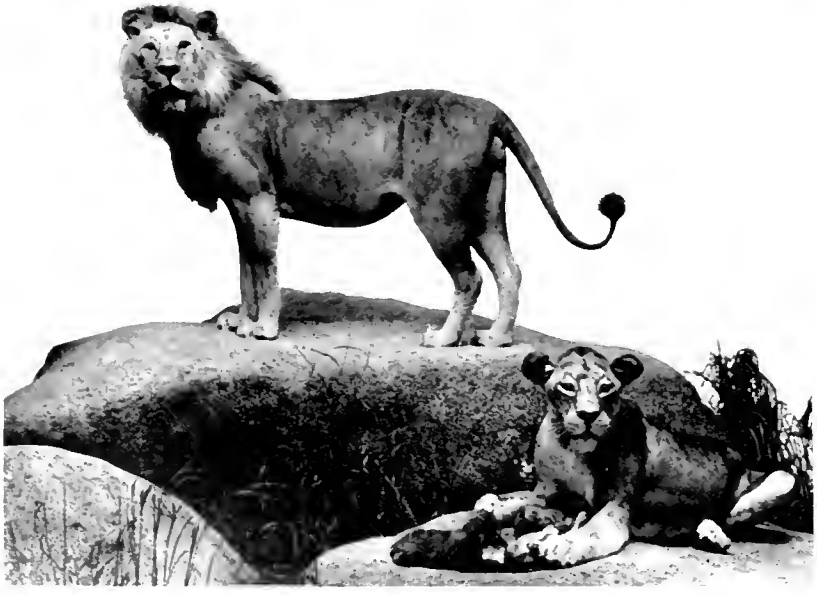
MARSHALL FIELD
49 expeditions for Ch
ral History Museum pro
than any other man has
written anywhere. These
covered a vast geograp
Scores of scientists were ser
regions of Africa, Madagasc
East, Asia, and both Ame
nents. They collected mod
and fossils of creatures
hundreds of millions of years. Their archaeological
bared civilizations of centuries ago. They collected
materials representing many primitive peoples. Th
specimens of exotic plant life. Mr. Field himself co
expedition to Africa that resulted in a habitat gro
On these pages are shown only a few of the addit
exhibits made possible by Marshall Field expe
contributions. Research collections also were expa

Jade figurine, Colombia

Temple gateway from Babylonia as restored in Hall K

Habitat group of crocodiles, Hall 18

South American tapirs, Hall 16



Lions collected by Marshall Field, Hall 22

Megatherium—giant ground sloth of Bolivia, H

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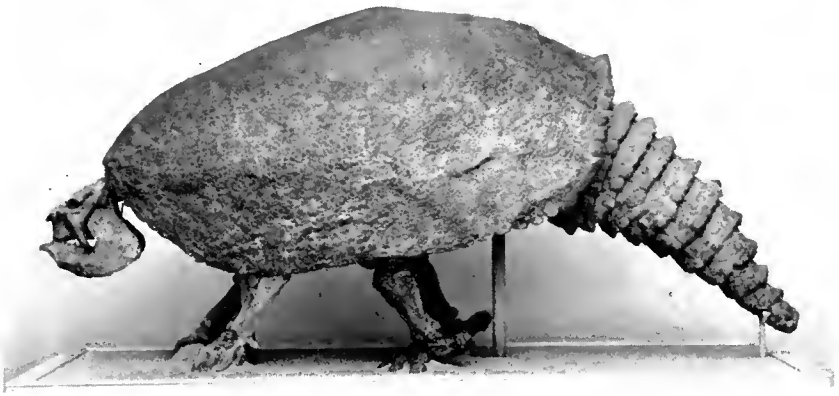
Gold figurine, Colombia

Azilian boar-hunt diorama, Hall C

Above: Aninga, an aquatic aroid of the Lower Amazon

Right: Biriba, of Brazil; a popular edible fruit

Right: Jaboticaba, from Brazil. Its grapelike fruit grows directly from bark of trunk and large branches



Glyptodon, from Argentina, Pleistocene epoch

Okapi of Belgian Congo

COLLECTING FOSSILS IN WASHAKIE BASIN

By WILLIAM D. TURNBULL
ASSISTANT CURATOR OF FOSSIL MAMMALS

THE Washakie Basin of southwestern Wyoming—locale of the Museum's 1956 Paleontological Expedition—is one of the largest areas within the United States to retain a character of extreme isolation. It is a high and very arid intermontane basin nestled among several ranges of the Rockies, including the Uinta and Medicine Bow mountains. The drainage is largely intermittent: the beds of the major streams lie at an elevation of about 6,500 feet at their lowest reaches within the basin. Badlands are extensively developed in parts of the basin. Although the uplands seldom reach heights of 8,500 feet and thus do not present the phenomenal topographic relief often

COLLECTING REQUIRES PERSISTENCE

Orville L. Gilpin, Chief Preparator of Fossils, is busy on the tough job of working a fossil rhinoceros jaw out of its sandstone channel matrix on Wyoming expedition. The pebble-strewn sandstone surfaces and crevasses 40 feet deep add to difficulties.

seen in "true" mountains with granitic cores, they do form striking scarp "mountains." These become the more impressive when one considers that they are but erosional features—the remnants of what once were far more extensive flood-plain and lake-bed sedimentary deposits that were stacked like plates, one above the other, and that have since been dissected and partly weathered away by the slow but effective action of the wind and water.

Rainfall amounts to only a few inches a year: the winter snows contribute the bulk of the annual precipitation. Permanent human habitation is virtually limited to the extreme periphery of the basin. Sage hens, lizards, antelopes, cotton-tail rabbits, and small rodents abound, and bobcats, "wild" horses, and deer are seen occasionally. Historically, this is the country of the pony express, the overland stage coach, and later of Jesse James.

Such is the nature of the country selected for this year's fossil mammal search. Choice of the area was governed by several considerations. In the first place, the Museum's study collection of fossil mammals of middle and late Eocene age (about 50 million years ago) needed bolstering and, since many of the Washakie Basin sediments were deposited during the latter part of this epoch, it was satisfactory from this standpoint. A further consideration was the likelihood that more knowledge and finds of greater significance would be apt to result from working this isolated, hence more neglected, basin than from working one of the better-known basins with well-known faunas.

Results of this year's two-month collecting trip are quite gratifying. The Museum now has an excellent start toward the assemblage of a middle Eocene fauna from this locality—a fauna comprised of early members of most of the modern mammalian groups including representatives of some of their aberrant side branches, as well as a few archaic mammals, carry-overs from earlier times. The perissodactyls, represented by rhinoceroses and titanotheres, are the most common members of the fauna. Horses also were present, and small artiodactyls, rodents, and carnivores occur in numbers. Of the aberrant and archaic forms, uintatheres, condylarths, and pantodonts were found. In all, close to a ton of fossils in the rock was shipped or carried home from the field, enough to provide an occasional happy diversion from dinosaurs for the preparation staff, and fascinating material for study.

I was accompanied in the field by Orville L. Gilpin, Chief Preparator of Fossils. We enjoyed the security of a new field vehicle, complete with four-wheel drive and a power winch, which provided us with the best and most reliable transportation we have ever had for field work. The vast uninhabited distances found in that part of the country make it imperative not only that reliable equipment be used but also that adequate emergency supplies of food, water, and gasoline be constantly available. The new vehicle quite literally made accessible areas that otherwise could have been reached only by pack trips that would have been prohibitively time-consuming. It permitted us to begin a systematic prospecting of all faunal levels and to collect in any area of the basin.

Boys and Girls of 4-H Clubs Make Annual Museum Tours

In accordance with the tradition of many years, the Museum was host on November 27 to about 1,300 farm boys and girls from almost every state and from Canada as well. These young people were winners of awards for excellence of achievement and came to Chicago as delegates to the National Congress of 4-H Clubs, which is held each year simultaneously with the International Livestock Exposition. The group was about equally divided between boys and girls. The entire staff of the Raymond Foundation and other staff members assisted the visitors in touring those sections of the Museum exhibits that conformed with individual interests.

GIGANTIC TASK ENDS, AND BEGINS AGAIN

Two and one-half years of nearly continuous work in splitting tons of shale from a Mecca (Indiana) quarry in search of tiny fossils came to an end in the paleontological laboratories last month, but the curators involved—Dr. Rainer Zangerl (Fossil Reptiles) and Dr. Eugene S. Richardson, Jr. (Fossil Invertebrates)—found themselves only at a new beginning of a task that will require many more years to complete. They are now faced with the interpretation of the vast quantity of data assembled in the gigantic rock-breaking job they have come through. From their investigations they expect to reconstruct the story of the life in this part of the Middle West some 240,000,000 years ago when forests were drowned in the sweep of a sea across the

area. In the photograph Dr. Clifford C. Gregg (left), Director of the Museum, temporarily assuming the role of an honorary curator, has just split the last piece of shale and is pointing to a detail on one of the slabs. Characteristically, Dr. Zangerl (center) and Dr. Richardson (right) display no unhappiness over the formidable research task now confronting them. At least, their many weeks of back-tiring work with pickax to dislodge the shale from the quarry floor and to load fifteen truckloads of it for transport to Chicago are behind them.

The history and culture of the Indians of North, Central, and South America are broadly covered in exhibits occupying seven halls of the Department of Anthropology (Halls 4, 5, 6, 7, 8, 9, and 10).

'BURIED TREASURE' LEFT BY ANCIENT INDIANS

By JOHN B. RINALDO
ASSISTANT CURATOR OF ARCHAEOLOGY

ONE OF THE MOST enjoyable experiences in archaeology is the discovery of a cache or secret hoard. Much of what is found in excavating ruined dwellings is trivial—small fragments of various pottery vessels, tiny flint chips, and unworked animal bone that have been scattered at random through the trash and rubble of fallen walls.

But when broken cooking pots are found still in place where they were left, standing by the fire, or the milling stones still where they were laid carefully side by side after grinding was done, the archaeologist derives a certain satisfaction in seeing how these things were actually used. From the position of these things something more specific and intimate is learned about these ancient peoples than that this or that pottery-type or scraper-type was prevalent during several generations. Consequently this satisfaction is even greater when the archaeologist is so fortunate as to discover a group of objects hidden away in a secret hoard that certainly has remained undisturbed since it was sealed up by someone long ago. Here he derives not only the archaeologist's satisfaction of finding a direct personal link between himself and that individual human being of long ago and the things valued and used in ritual or craft activities but also the fascination of discovering the secret location and contents of buried "treasure"—although the value of the "treasure" may be negligible from our point of view.

THRILL OF DISCOVERY

I cannot adequately convey the emotional charge of such an experience. The first such cache that I remember finding was discovered in the course of clearing the floor of a ceremonial room in a small ruin in western New Mexico. While scraping along the wall with a trowel I noticed a soft place filled with ashy earth—the evidence of a pit that, instead of being located in the usual manner out in the room, ran underneath the wall. On probing and digging this out farther with the trowel, we struck into a hollow place that yielded in succession the skeleton of a turkey, two medium-size bowls with burnished black interior, a small narrow-mouthed jar, a cut-shell bracelet, and fragments of turquoise. These were obviously objects of considerable ritual value that had been placed together in this hoard after some ceremony.

A second series of such caches was better concealed but contained less spectacular objects. These caches were discovered while we were excavating a cliff-dwelling located in a cave in the mountains of the same area. It was our practice in this ruin to scrape off the adobe plaster with which floors of the rooms were coated. In the approximate center of one of the rear rooms this process revealed a small cup-like cavity in which had been placed a carved prayer stick and some ears of corn wrapped up carefully in a fragment of reed mat. Certainly these were ritual offerings to some ancestral god of the Pueblo Indians.

In this same room a large corn storage-pit was partitioned off into two bell-shaped sections, one of which extended under the wall. In this latter section, back underneath the wall in the pitch darkness, I felt a plug of adobe. I worked this loose and found behind it a small cubbyhole containing a number of ears of corn, possibly seed corn, that somebody had taken special precautions to secrete.

In yet another room, located at the front of the cave, while examining the wall plaster I noted a peculiar circular bump situated about half-way up the back wall. I scraped around this with my knife and trowel and thus revealed another adobe plug. In the niche behind this seal were two lumps of azurite—a bright blue mineral highly prized for pigment by contemporary Pueblo Indians. Furthermore, the two lumps fitted nicely together into what had been a single piece.

Such discoveries are not the usual experience of archaeologists, but we go out each field-season with the hope of adding by such means to a more intimate knowledge of how people lived in the past. Such knowledge offers lessons for the present.

ISLAND HOMES PROVIDE SECURITY TO BIRDS

By AUSTIN L. RAND
CHIEF CURATOR OF ZOOLOGY

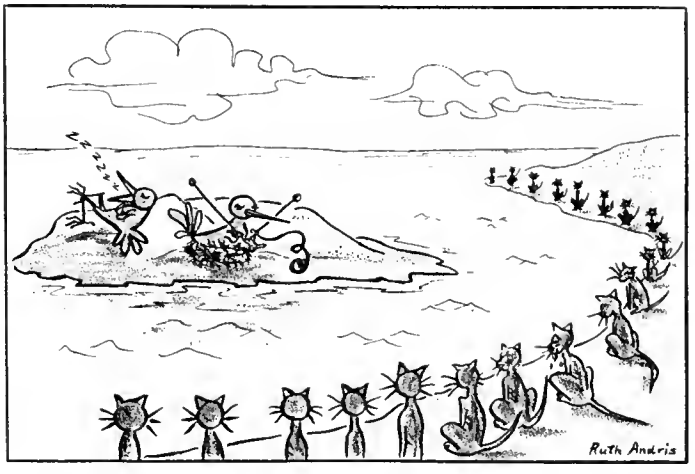
MODERN MEN have written escapist literature about their experiences in "Island Solitude," or "How We Found an Island Home," and back in medieval times many a baron's castle was turned into an artificial island by a moat encircling it. But long before that, birds had taken advantage of the seclusion and freedom from intrusion and attack provided by islands.

The great "bird cities" of Bering Sea where auklets swirl up in countless swarms from their nests, the great colonies of gannets in the Gulf of St. Lawrence and the tern colonies of the Carolina and Texas coasts with birds by tens of thousands, the noddy and sooty terns' nesting-grounds in the Dry Tortugas, and the rookeries of the murres off our west coast where the startled birds pour from a ledge like a waterfall—these colonies all are on islands where raids by fox, cat, weasel, and raccoon are unlikely.

This island nesting is especially important for ground-nesting colonial birds, where a predator, finding one nest, finds all. But some solitary nesters favor islands, too. The loons, whose loud wails and screams are such thrilling sounds in the vacationland of the north woods, nest on islands in lakes when they can. Their distant relatives, the grebes, also like to have their nests surrounded by water when they can. Scorning the limitations of islands formed by geological processes, grebes make their own castles out in the water. They dive and bring up water-weed that they pile in one place, making a sodden heap. Sometimes the weeds form an island and sometimes a raft, depending on the depth of the water, and in the top of this mound the grebe makes a hollow for its eggs.

Most coots, which are aberrant swimming rails, make a floating nest like that of a grebe, but from South America Dr. S. Dillon Ripley, of Yale University, brings back a story of a horned coot that makes an island of stones for its nest.

The horned coot, one of the rarest of birds, lives only on lakes high in the Andes. There vegetation is scarce and the horned coots bring pebbles to a selected site in shallow water and pile them up until a low mound appears above the surface. In the top of this the coot lines a hollow with algae for its eggs. The mound may be as much as three feet high, and the weight of one nest has been estimated at one and one-half tons. This making of a rock island for a nest site seems unique in the bird world, and the weight of the nest would vie with that of the great heaps of earth that the mound builders of the Australian area scrape together for their nests.



EARLY ENTRIES URGED IN PHOTO CONTEST

The photographs you most cherish from a recent vacation may prove of interest to others, too, and may merit exhibition and possibly a prize in the forthcoming Twelfth Chicago International Exhibition of Nature Photography. The exhibition will be held during February in Stanley Field Hall of the Museum under the sponsorship of the Nature Camera Club of Chicago.

Among contests limited exclusively to subjects in nature this contest is the world's largest. It is also one of the largest photo contests of any kind.

Early entries are solicited to facilitate the task of classifying the photographs in preparation for their ultimate judging. The deadline for entries is January 14.

The judges appointed by the Chicago Nature Camera Club are: Russel Kriete, photographer; Dr. Jay Webb Lowell, physician and photographer; Barbara Palser, of the University of Chicago's Department of Botany; Dr. Eugene S. Richardson, Jr., Curator of Fossil Invertebrates at the Museum; and Melvin A. Traylor, Jr., Assistant Curator of Birds at the Museum.

As usual, entries will be in two divisions —prints and color slides. Prints may be either in color or black-and-white. Those selected by the judges will be displayed in Stanley Field Hall. The successful color-slide entries will be projected on the screen of the James Simpson Theatre on two Sunday afternoons during February.

To be eligible, entries in both the print and slide divisions must qualify under three subclassifications: (1) Animal Life, (2) Plant Life, or (3) General. Scenic views, geological formations, clouds, and other natural phenomena that do not fit into either the animal or plant-life sections will be included in the General classification. In each classification of prints and slides, medals and ribbons will be awarded by the Nature Camera Club of Chicago. In addition, the Photographic Society of America will award special prizes.

Contestants are permitted to submit up to four entries in each division. Photographs should be sent to the Museum. Entry forms containing complete information on the rules may be obtained by request to the Museum.

CHIEF CURATOR ROY BACK FROM VOLCANIC STUDIES

Dr. Sharat K. Roy, Chief Curator of Geology, has returned from two and one-half months of volcanic studies in Mexico, Guatemala, and El Salvador. In Mexico his field work was confined to Mesozoic and Cenozoic volcanoes; in Guatemala he visited Agua, Fuego, Acatenango, and Santa Maria volcanoes, and in El Salvador the volcanoes of San Miguel, San Vicente, San Salvador, Ilopango, Santa Ana, and Izalco, and the cinder cones of Metapan.

The most important observation of volcanism made by Dr. Roy was at Volcan Izalco in El Salvador. Last year, on February 28, Izalco had the most violent eruption in its history, during which it literally "blew its top" and split its northeast flank, pouring forth a vast flow of lava, ashes, and cinders. This year, in September, Dr. Roy found the volcano appearing as though nothing had happened. It has regained its original shape and height by pouring ashes and cinders over the damaged area. Dr. Roy believes that Izalco's action typifies that of all other volcanoes of its kind—that damages caused by eruptions are soon repaired.

CHRISTMAS SHOPPING EASY VIA MUSEUM

The Museum offers two unique special services that make Christmas shopping easy. If you use them you don't have to leave your home, you stay away from crowds, and you don't have to wrap packages. Everything you need to do can be done at your own desk.

First, there is the plan for giving Museum Memberships as Christmas gifts. This is completely described in a separate leaflet enclosed with this BULLETIN.

Second, there is the Museum BOOK SHOP, which handles orders by mail or telephone (WAbash 2-9410). It has a fine selection of books for both adults and children, all endorsed by members of the Museum scientific staff. It offers unusual art objects, notably authentic native wood-carvings recently received from Africa. There are also novelties, toys, and items for juvenile collectors. The BOOK SHOP will handle all details of wrapping and mailing gift purchases to recipients, together with such personal greetings as the purchaser may specify, charging only postal costs.

Ancestors Are Influential In African Cameroon

Ancestor worship in the Cameroon region of West Africa involves a special dance in which ancestral skulls are placed in a secluded spot near their wooden effigies. Proximity to the skulls, it is believed, imbues the images with the spirits of the ancestors, after which the effigies are kept in a dwelling house and fed, treated with respect, and consulted about the future. Other habits and customs of the people of West and Central Africa are illustrated in Hall D.

EIGHTH JOURNEY OFFERS HOLIDAY ANIMAL HUNT

Beginning this month, and continuing daily through January, girls and boys are offered an entertaining way to learn more about the meaning of the holiday season when "Holiday Animal Hunt"—Museum Journey No. 8—is held at the Museum.

Animals associated with holiday stories and legends—from Rudolph the Rednosed Reindeer (whose other name is the Alaskan caribou) to the dove, a symbol of peace and the spirit of the holiday season—will be waiting in the Museum's halls to be recognized and identified. A questionnaire and instruction sheet will be available at the Museum's north and south entrances for children who wish to participate.

Girls and boys who complete four Museum Journeys successfully can become Museum Travelers; those who complete eight are Museum Adventurers and the recipients of special awards. Youngsters may take the Journeys at any time during regular Museum visiting hours (9 A.M. to 4 P.M.).

NEW MEMBERS

(October 16 to November 15)

Associate Members

Arthur S. Bowes, Dr. Harley E. Cluxton, Jr., Theodore A. Criel, Jr., Mrs. Robert F. Dick, Norman E. Johnson, Dr. Fiske Jones, Paul C. Kimball, William C. Kraus, William H. Miller, Mrs. Langdon Pearse, Philip S. Rinaldo, Jr., Dr. Armin F. Schick, Frederick J. Slater, Mrs. M. B. Trimble

Sustaining Member

David H. Betts

Annual Members

Burton R. Abrams, Irving S. Abrams, James Ross Abrams, Francis M. Anderson, Mrs. H. D. Arneson, Bruce Baker, John E. Benz, Fred G. Billings, R. M. Brockett, Dave Chapman, John W. Christensen, Miss Lorena Clarke, Dr. Maurice H. Cottle, Edwin E. Dato, D. E. Davidson, James M. Doss, Arthur Filerman, E. S. Files, E. E. Foulks, Mrs. Silvia Freudenfeld, Howard S. Gold, Fred L. Goldsby, Raymond J. Graham, Horace C. Hime, Donald G. Hodgdon, Walter P. Hooper, Robert A. Kellberg, Dr. Joseph L. Koczur, Adolph Krause, Mrs. Ross Llewellyn, Mrs. Ernest G. Loeb, Roy F. Melchior, Arthur J. Miller, Jr., Henry E. Miller, Joseph L. Mullin, Mrs. Arnold C. Nelson, Jr., Paul K. Newberg, Kenneth R. Nixon, Mark L. Patterson, Lindell Peterson, Chester L. Posey, Howard C. Reeder, Jerry R. Scandiff, Miss Helen M. Seelmayer, Harry G. Shaffer, Dr. Sidney V. Soanes, Lawrence F. Stern, Paul M. Stokes, Merle Stone, Robert E. Sutton, Richard Wessling, Jack M. Whitney II, Alexander M. Wood

A stone age type of culture that has persisted in the modern world is represented by exhibits in Hall A-1 illustrating the life and customs of Australian aboriginals.

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