CHICAGO NATURAL HISTORY MUSEUM **Bulletin**
Vol. 31 No. 1
January 1960

1960

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WAbash 2-9410

THE BULLETIN

EDITOR

CLIFFORD C. GREGG.....*Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
THEODOR JUST.....*Chief Curator of Botany*
SHARAT K. ROY.....*Chief Curator of Geology*
AUSTIN L. RAND.....*Chief Curator of Zoology*

MANAGING EDITOR

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

ASSOCIATE EDITOR

MARILYN JINDRICH.....*Assistant in Public Relations*

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

AUDUBON SCREEN-TOUR ON 'WILD EUROPE'

A traveler may have toured, in the conventional sense, all of Europe and never have seen that side of the Old World continent that the famous ornithologist, Roger Tory Peterson will show in his color motion picture, "Wild Europe" when he lectures for the Illinois Audubon Society in the James Simpson Theatre of the Museum on Sunday afternoon, January 17.

In his film he will show such sights (usually neglected by the average tourist) as the spectacular gathering of oystercatchers at Hilbre Island in the Irish Sea; the flamingoes in the vast salt lakes of the Rhone delta; ruffs dancing in the bogs of the Netherlands, habitat of the white spoonbill; families of storks on old churches in the Rhine valley; red kites, black kites, and imperial eagles among the cork oaks of Andalusia; great griffon vultures soaring about the ancient citadels of Spain, and bee-eaters, the most colorful birds of Europe, hawking the Mediterranean air for dragonflies. The screen-tour includes wild life refuges on the coasts of Holland, islands off Britain's shores, the great Camargue region of France, and the forests of Finland.

The lecture will begin at 2:30 P.M., and admission is free.

THIS MONTH'S COVER

Our cover symbolizes the dawning of the New Year. Designed by Staff Artist E. John Pfiffner and prepared by him in collaboration with Assistant Photographer Homer V. Holdren, it is based on the Museum's life-size diorama of a Neolithic sun-worshiping priest welcoming a new day. The scene is the mysterious avenue of prehistoric menhirs at Carnac in France's ancient province of Brittany. The time represented is approximately 4,000 years ago. The diorama is one in a series of eight in the Hall of the Stone Age of the Old World (Hall C) illustrating stages in the development of early man from about 250,000 years ago to the first days of recorded history.

STAFF NOTES

The Museum was represented by three delegates at the annual meeting of the American Anthropological Association in Mexico City, December 28–30. **Dr. Paul S. Martin,** Chief Curator of Anthropology, presented a paper on "Recent Excavations in Arizona." **Dr. Donald Collier,** Curator of South American Archaeology and Ethnology, presented one on "Agriculture and Civilization in Peru." **George I. Quimby,** Curator of North American Archaeology and Ethnology, was the third Museum delegate. . . . **Dr. Roland W. Force,** Curator of Oceanic Archaeology and Ethnology, presented a paper on "Metonomy, Metaphor and Palauan Social Organization" at the annual meeting of the American Association for the Advancement of Science held in Chicago December 26–31. . . . **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 **William D. Turnbull,** Assistant Curator of Fossil Mammals, attended the recent Darwin Centennial Celebration and meetings of the Society for the Study of Evolution, held in Chicago late in November. Dr. Richardson was official delegate of the Paleontological Society. Dr. Zangerl and Dr. Richardson also attended a field conference with the Indiana Geological Survey. Mr. Turnbull attended the meetings of the Geological Society of America and the Society of Vertebrate Paleontology in Pittsburgh. . . Most members of the Zoology staff attended some of the Darwin Centennial meetings at the University of Chicago. **D. Dwight Davis,** Curator of Vertebrate Anatomy, **Rupert L. Wenzel,** Curator of Insects, and **Henry S. Dybas,** Associate Curator of Insects, attended meetings of the Society for the Study of Evolution. Mr. Wenzel also attended the Detroit meetings of the Entomological Society of America, and was elected to the standing committee on entomological nomenclature. He has been appointed a research associate in the department of biology at Northwestern University. Mr. Dybas recently lectured on Panama before the Chicago Entomological Society and the Thornton Township High School Biology Club, Harvey, Illinois.

JANUARY 6 CONCERT FEATURES SOPRANO

The Festival String Quartet makes its second appearance on the stage of James Simpson Theatre on January 6 when Phyllis Curtin, soprano, and Ray Still, oboist, join the quartet as special guest artists for the evening's performance. The program will include music by Haydn, Villa-Lobos, Hindemith, and Debussy. Miss Curtin, making her first public appearance in Chicago, will sing three Villa-Lobos songs, followed by Hindemith's "Die Serenaden."

The quartet's debut in James Simpson Theatre on December 9 was attended by nearly 1,000. Members of the string quartet are Sidney Harth, concertmaster of the Chicago Symphony Orchestra, and his wife, Teresa—violinists; and two other members of the Chicago Symphony—Rolf Persinger, violist, and Harry Sturm, cellist.

Other concerts will be presented on February 10, March 9, and April 13—the entire series presented free to music lovers by Free Concerts Foundation, headed by Mrs. J. Dennis Freund. Selection of James Simpson Theatre for the free music series came as the result of the discovery, last August, of the theater's musical potentialities. At that time time Mrs. Freund sponsored a program of chamber music.

Roger Dettmer, drama and music critic for *Chicago's American*, commented after the program: "For many it came last summer as a pleasant surprise to discover in the west wing basement of Chicago Natural History Museum, a theatre suitable for chamber music that has (1) good acoustics, (2) comfortable seats, (3) unimpaired sight lines, (4) ample parking facilities, (5) passable decor . . . Simpson Theatre turned out to be the best concert hall in Greater Chicago selected by the committee (Pan American Games) for anything." Similarly, Robert Marsh of the *Sun-Times*, after the December 9 concert, called it the "city's finest auditorium for small instrumental groups."

Tickets are required for the concerts in the series and may be obtained by calling in person at the Museum or writing Free Concerts Foundation, Chicago Natural History Museum (Roosevelt Road and Lake Shore Drive, Chicago 5) and enclosing a stamped, self-addressed envelope.

By Staff Illustrator Marion Pahl

SOUTH SEA ISLES: WHAT LED TO EARLY DISCOVERIES

By ROLAND W. FORCE
CURATOR OF OCEANIC ARCHAEOLOGY AND ETHNOLOGY

Part I

IF YOU WANT to frighten yourself, consider spending your life on a tiny speck of sand which rises no more than twelve feet above the surface of the ocean and upon which you can make a complete and leisurely circuit while smoking a cigarette. For as far as you can see on all sides there is nothing but wetness. And you can see only 12 miles before the horizon limits your view to sky. Beyond those 12 miles there may be 1,200 more—just as wet as those you can see; 1,200 miles which are seldom traversed by either ship or plane—even today. Twelve hundred miles of deep, dark blue treachery that constantly try to submerge you. The only thing that keeps you from wearing a life preserver twenty-four hours a day and refusing to budge from the top of the highest coconut palm on the island is that if you are there you belong to a "people of the Pacific." In the first place, chances are extremely good that you do not count a life preserver among your possessions; and besides you have been born in this environment, and a long list of your ancestors has managed to stay alive and reproduce and live normal "for your island" lives. Surely some of them have been washed away by violent storms, and others have failed to return from a day's fishing junket to the reef, only to be blown in their small and flimsy canoes to another postage stamp size home which, if looked at hurriedly, might pass for your island anyway.

This hypothetical fantasy is not fantasy, but fact, for several millions of people who live in the part of the world we call the Pacific.

It used to be that people formed their ideas about the Pacific in terms of Melville or Maugham, or Nordhoff and Hall. Many persons had read or seen the movie version of *Rain*. Sadie Thompson was an exciting, if somewhat tawdry, character—the Tuttles of Tahiti, immortalized by Charles Laughton, were thought of as typical island folk. *Swiss Family Robinson* and *Robinson Crusoe* typified what "islands" were like.

Since then, tens of thousands of young Americans learned about the more intricate geography of Pearl City on Oahu, froze in staging depots on New Zealand's North Island, sweated through interminable months in coastal New Guinea swamps, bounced over countless reefs in landing craft, struggled through unbelievable terrain to get close enough to a concrete pillbox to use a flamethrower or automatic weapon.

And some stayed on—in the military cemetery in the Punch Bowl—that ancient and quiet volcanic cone which stands guard over Honolulu. The Coral Sea, Leyte Gulf, Midway, Iwo and less well-known spots such as a small isolated inlet of Iwayama Bay in the Palaus where at low tide the aluminum skeleton of what looks strikingly like a pterodactyl projects out of the mangrove mud, all became well-known to many Americans.

Latter-day writers such as Ernie Pyle, James Michener, Richard Tregaskis, and Norman Mailer put zoom lenses on the American bifocals. Mary Martin and Ezio Pinza did their bit, and Hollywood helped with a movie of the play. Cinerama helped, and then, of course, everyone rode Kon-Tiki to Polynesia.

Even with the increased awareness of the Pacific world that books, films, and personal visits have brought about, most people actually know very little about the Pacific. If asked they could probably tell their interrogator that Bikini was in the Pacific—somewhere, that the Philippines were beyond that, and that Australia was more to the south—down under. The geography of the area, let alone the kind of people who live there and their history and way of life, is baffling enough to them.

Few are aware that the U. S. Department of Interior (somewhat illogically) today administers a portion of the Pacific which is larger than the United States itself. Most have probably never considered that each time they button their shirt, wipe their feet on a door mat, or shampoo their hair they are *en rapport* with the Pacific.

DISCOVERY AND EXPLORATION

Even though Americans have rediscovered the Pacific in mid-20th century, 400 or 500 years after the early Portuguese and Spanish explorers did, there is a remarkable amount of unawareness of the nature of the discovery.

The period we are concerned with here is called the "Age of Discovery" in history books and covers the years from about 1520 to 1780.

We may divide the period into three subperiods: (1) 16th century (Portuguese and Spanish), (2) 17th century (Dutch), and (3) 18th century (English and French).

Of course, the Pacific was sailed into by Chinese junks for a limited distance as early as 200 B.C. Contact was established with Java, the Philippines, and Japan. Then, too, there is the possibility that some unfortunate voyagers from China or Japan actually got lost and drifted across the Pacific from west to east and landed on the Northwest Coast of America or in the Hawaiian Islands. One thing which has never been explained is the existence of iron in Hawaii at the time Captain James Cook *discovered* the islands in the late 18th century.

Prior to the rather late period of exploration in the Pacific by Europeans there had been a long tradition of "armchair" theorizing about the Pacific—even before it was known as the Pacific.

Greek geographers reasoned that such an ocean must exist—just to balance the one they knew about (the Atlantic) which they called the Western Ocean. Of course, this conjecture was all before anybody knew that there was anything like America in between the two bodies of water. Maps made as late as 1492 showed an unbroken expanse of water from Europe to Asia.

Another matter of speculation was the presumed existence of Terra Australis Incognito (the unknown southern land). Explorers were still trying to find this continent until Captain Cook reached Antarctica.

SPICE AND SCURVY

The Pacific takes its name from Magellan who experienced exceptionally calm weather on his voyage in 1520 around the tip of South America. Seven years before, Balboa had stood on his Panama promontory and had become the first European to view the Pacific from its eastern shores. Because he was facing south at the moment, he logically called the body of water the South Seas. The name has been retained and even has been applied to the Arctic areas of the Pacific.

At base, the absence of the refrigerator is really responsible for most of the disturbances of native life in the Pacific. It is truly remarkable that the world-shaking events in history can be laid to the most pedestrian causes.

If some enterprising medieval Edison had

(*Continued on page 8*)

Text by AUSTIN L. RAND
Chief Curator of Zoology

A NATURE CAL

A silent landscape of snow-covered fields, gray leafless woodlots, frozen ponds rimmed with dead cattails, and Lake Michigan with an ice barrier along the shore and floating, wind-driven ice fields. Farmsteads snowed in. Our coldest month with days below zero. Plant life is dormant, as are most animals. But winter ducks, goldeneyes, old squaws, and gulls are on Lake Michigan; other winter birds, chickadees, woodpeckers, cardinals and evening grosbeaks come to feeding stations, and some mammals, such as rabbits, squirrels and raccoons leave trails in the snow.

JANUARY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Soft warm breezes and sunshine, gentle showers, sudden squalls, thunder and lightning, hail, and even snowstorms—all make April weather. Green leaves appear on currant and honeysuckle bushes, daffodils and tulips bloom in gardens, and the tide of woodland flowers swells to form a living carpet of two dozen species in the still leafless woods. Smelts run upstream to spawn, small moths flutter against lighted windows, small grasshoppers and leafhoppers fly up from disturbing footsteps in the grass, butterflies appear, dragonflies skim ponds where turtles bask, and leopard frogs croak. Another wave of migrant birds, hermit thrushes, fox sparrows, and Bonaparte's gulls passes through; the pond ducks leave and purple martins arrive. Gardeners plant peas, farmers oats, and fishermen angle for perch and seine carp.

APRIL

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Not until late in the month does winter relax its grip more than momentarily, with brief thaws that wipe away the snow. Then plant activity starts with the pussy willows coming out; resident birds, titmice and cardinals start to sing; great-horned owls hoot and nest; and the early spring migrants, doves, song sparrows, redwings and meadowlarks arrive and sing. When sun shines strong on snowbanks the tiny spring-tails or snow-fleas swarm on the snow, making it look as though dusted with soot; and skunk cabbage pushes up through the snow and dead leaves. While ice fishing continues on little lakes, goldeneye ducks court on Lake Michigan; tom cats begin to yowl; possums and coons become more active; and children fly kites.

FEBRUARY

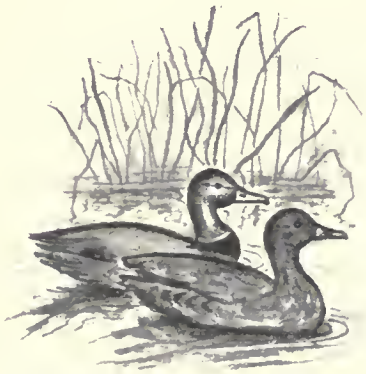
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

Green fields and roadsides with yellow dandelions and mustard and white daisy fleabane; growing leaves on trees cast a summer shade; blue lupine massed in dunes; yellow ladyslippers bloom in pinery.

Lavish display of pink-white blooms on fruit trees, shadbush, wild crab and dogwood; migration of warblers and scarlet tanagers at height—you can see 30 species in one woodlot; vegetable gardens growing, rhubarb ready for pies; scarlet poppies and blue iris brave in yards; young robins, thrashers and screech owls out of nest, and young foxes and squirrels running about; elm and maple seed strewn on sidewalks.

MAY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				



Spring—and the returning sun banishes cold and snow for longer and longer spells. The ponds thaw open and ducks, mallard, shovelers, and widgeon swim on them. The first frog chorus comes from shallow sun-heated pools, and robins and starlings join the morning bird song chorus; blackbirds roost in the marshes and feed on our lawns; lawns and winter wheat fields are greener; snowdrops and crocuses bloom in our yards, the maples along our streets, the first wild flower, pepper-and-salt, in the woodlots, and skunk cabbage in the swamps. By late March the last of the shaded snow banks are usually gone.

MARCH

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Summer: brown fields of planted corn and soy beans at first contrast with the green woodlots and wheat and alfalfa, tall enough to wave in the wind; white daisies, red clover yellow clover, blackberries and later multiflora roses bloom along roadsides where catalpa trees also bloom and ragweed and milkweed are up enough to notice. Strawberries and some cherries and peas ripen, and first hay is cut. In the yards are added peonies, red and white roses; white mock orange and pink beauty bush. Young crows and jays are noisy, and robins nesting again; cricket frogs click and bullfrogs boom in the marshes; craneflies and lacewings like a haze over hay fields at sunset at end of month. Small flocks of English sparrows inspect ripening oats and wheat; and in the evenings fireflies rise like sparks from fields. Fishermen catching perch in Lake Michigan and sunfish in little lakes.

JUNE

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

ory Museum presents . . .

NDAR FOR 1960

Illustrations by RUTH ANDRIS

Hot weather begins; people flock to Lake Michigan beaches; yellow wheat and oats ready for harvest contrast with heavy summer green of rest of landscape. Full-grown young rabbits get run over on roads; young tree frogs transform and leave ponds; mud daubing wasps provision their nest chambers with paralyzed spiders; ant lions wait in their funnel-shaped pit-traps in the sand; in some years egrets arrive on ponds; first southbound migrants and sandpipers; blackbirds flock to sleeping roosts. Along roadsides are thistles, Queen Anne's lace and chicory; in yards zinneas, petunias, phlox and hollyhocks; gardens yield string beans, beets and carrots; swallowtail and cabbage butterflies are daytime visitors. In the dunes, blueberries ripen and cactus blooms.

JULY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
0	11	12	13	14	15	16
7	18	19	20	21	22	23
4	25	26	27	28	29	30
1						

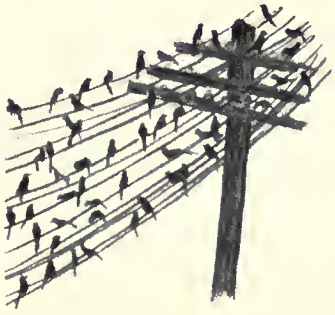
The second hot month and the deep green of summer is tattered and fading; early autumn colors appear in sourgum and swamp maple; sweet corn is in season and squirrel hunting started; roadside stands sell garden produce; flocking of purple martins, robins and blackbirds more conspicuous; gulls and terns arrive on Lake Michigan where picnickers crowd beaches; bats seem more common and some strays are trapped in houses; a few birds are singing after late summer lull—some start south. Crickets and katydids sing at night; grasshoppers are growing up and swarms of small insects come to lighted windows; big yellow garden iders make their webs that trap grasshoppers.

Swamp and swales richly tapestried with Joe Pye weed, boneset, iron ed and sedges; wild sunflowers and goldenrod. In yards are marigolds, lvia, cannas, and goldenglow.

AUGUST

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
4	15	16	17	18	19	20
1	22	23	24	25	26	27
8	29	30	31			

It's autumn; the beach season nds on Labor Day; soon it is topoat weather, smoke rises from himneys and the countryside gets golden, olive tinge with rustling eaves and splashes of red and range. Flycatchers and warblers oin the southward exodus of land irds that travel by night, while ighthawks travel by day in long nes; leopard frogs move back to onds; and families of woodchucks nd ground squirrels break up and the young ander widely. Apples, plums and grapes pen; honey harvesting starts; haws are red, e elderberries are black. There are asters, ewel weed and sunflowers on the roadsides and nnias and chrysanthemums in the yards. Monarch butterflies migrate southward. Black irds on wires or on marshes in big flocks.



SEPTEMBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

The month of the colored leaves; early, the maples and sassafras, elm and hickory are red, orange and yellow; later these fall as the oaks change to purple reds and red browns. Now comes smoky, golden sunshine of Indian summer. The season of growth is about past. The falling bright leaves outshine the vivid autumn chrysanthemums, cover streets with a rustling layer and feed bonfires in the evenings.

Bittersweet berries break open orange; osage oranges fall, milkweed down floats on the breeze, cattail heads break open; asters bloom on the roadside and witch hazel in the woods of the dunes.

Corn picking starts, pumpkins and walnuts ripen; pond ducks arrive and geese go over; seed eating birds such as juncos arrive from the North, jaegers pass on the lake, and the blue racers gather to hibernate.

OCTOBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

With leafless trees, bleached cornfields, green fields of winter wheat, here and there patches of color left over from October, and near freezing temperatures. Wind whistles around corners and soughs through bare branches. The last garden flowers, chrysanthemums, are nipped by the frosts, and the witch hazel flowers soon go; duckweed is conspicuous on wooded swamps; acorns are being harvested by blackbirds, jays and squirrels; little bands of tree sparrows fly up from the roadsides and the great blackbird roosts in the cattails are soon deserted. Winter water birds appear on Lake Michigan—grebes and mergansers—and jaegers are passing along the shore. The highway maintenance people put little heaps of cinders and salt by the roadsides at hills, reminding us that slippery roads often come with a snowstorm about Thanksgiving Day.

NOVEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Winter's here—it may be snowy like January, or bare and bleak like late November, or a mixture of the two. Bird feeding stations have a half-dozen regulars and the winter ducks and gulls increase on Lake Michigan. The ponds freeze over and the ice barrier starts to build up on Lake Michigan's shore. On December 21 comes the winter solstice when the sun reaches its farthest south and starts north again for a new cycle.

DECEMBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

NATURE GAVE THIS STRANGE FISH BUILT-IN BIFOCALS

By LOREN P. WOODS
CURATOR OF FISHES

LATE one hot, humid afternoon in September the U. S. Fish and Wildlife Service M.V *Oregon* found a berth at the end of a long pier that crossed a mud bank along the shore of the Surinam River at Paramaribo, Dutch Guiana. I was gathering cameras and film to go ashore when an engineer came running back with the news that there were fish crawling all over the mud flats. So postponing the shore trip until a cooler hour, I spent the rest of the afternoon watching numbers of the four-eyed fish, *Anableps*, swim up out of the water to wiggle across the mud or lie at the water's edge with their tails remaining in the lapping billows.

Almost every general popular book on the natural history of fishes at least mentions the four-eyed fish and its peculiar eyes. Actually there are only two eyes, as in other fishes, but in *Anableps* the eyes are in humps, raised well above the rest of the head, and are divided horizontally by a pigmented line, so the eye appears to have two pupils. *Anableps* habitually swims at the surface with the upper part of the eye in the air and the lower part in water (Fig. 1). The lens is pear-shaped with different focal lengths in each half; the retina receiving light from the air is of different structure from the retina that receives light from the water below. Their built-in bifocals enable them to see in both air and water.

Figure 1. Anableps, the four-eyed fish, shown resting at the surface. Its eyes, on humps, project partly above water. (Photo made at Shedd Aquarium)

There are three species of *Anableps*, all with similar eyes and, in many respects, similar habits. All reach a length of 8 to 12 inches. One species lives in the Tehuantepec River of southern Mexico, a broad, shallow, clear stream where I collected them several years ago. The range of this species extends down the Pacific coast to Panama. There are two additional species in South America ranging from Venezuela to the Amazon. One of these is chiefly marine, entering brackish estuaries; the other lives in rivers, bayous and lakes.

Although these fish and their peculiar eyes have been described again and again in scientific and travel literature since the mid-18th century, very little is actually known of their habits. Most accounts describe them swimming and feeding in schools at the surface. When alarmed they do not submerge, but the school scatters, individual fish rapidly skipping over the water, sculling with their tails. It has been reported that they cannot submerge for more than 30 or 40 seconds, but this is not true. The Shedd Aquarium formerly had six or eight individuals acclimated in a large tank 6 by 7 by 4 feet, containing approximately 1,200 gallons of water. Surface schooling and scattering was the usual pattern of their behavior in this tank, but when fed they frequently went to the bottom to pick up food, remaining well below the surface for considerable periods.

Figure 2. Habitat of Anableps—the Surinam River at Paramaribo, Dutch Guiana. The mud flats are seen at left.

In Surinam none was seen swimming in open water during low tides of the late afternoon and early morning. When they went into the turbid water they disappeared. At the river edge of the mud flat, one would occasionally jump out of the water, immediately curving back without much splash. When heading toward the exposed mud, the upper part of the eyes would be above water, the fish frequently bobbing down to keep their eyes moist. They are wary and very active, swimming so rapidly they can rarely be caught with a net. The usual method of collecting adults is with a rifle loaded with dust shot.

Certainly in the Guianas, *Anableps* swims and schools at the surface; but in the section of the sluggish, silty, brackish portion of the Surinam where the tides change the river level and salinity, large numbers were out of the water, small sections of the mud flats being occupied by as many as 50 fish at a time. Most of the fish, 3 to 12 inches long, rested out of water on the mud just where the ripples washed over them and kept them moist (Figs. 2 and 3). Some fish would travel with eel-like motions across the flats as far as 30 feet from the open water, but these would move into pools or channels at intervals of five or ten minutes and then back up on the mud again. The passage of the fish across the mud would be marked by a smooth track about half an inch wide. When established on the mud and no longer awash, they used their pectoral fins to brace their heads higher than the body. They could see and hear quite well

Figure 3. A group of Anableps lying in a rivulet on mud flats.

in the air, for although we were 20–25 feet away from them, sudden motion or scuffing on the wooden dock would frighten them back into the water.

The fish lying out on the mud formed loose aggregations of all sizes with no evident attempt to avoid contact with others or to be near others. Neither was there any orientation in relation to the position of the sun, shore, water or pools; but they lay like so much loose-strewn kindling, facing all directions. There were channels through the mud — little drainage rivulets — and many fish rested in or along the edges of these or with the mouth over a little water-filled depression. At intervals the mouth would be dipped

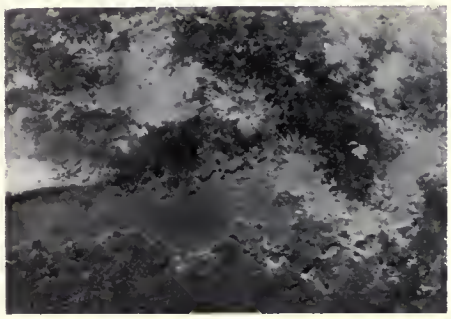


Figure 4. A small pool where young Anableps live, with holes for protective retreat when danger threatens. The radiating lines mark areas in which the young fish have been eating mud.

into the water and rapid movements of both mouth and gill covers could be seen. I think this action took in water to moisten the gills. As the tide raised the river level, the fish moved higher onto the mud flat maintaining their relative distance from the edge of the water ripples. By dark (6 P.M.) the advancing tide had completely covered the mud flat and no fish could be seen anywhere.

As with many of their top minnow relatives such as the guppy, swordtail and black mollie, *Anableps* produces living young instead of eggs. Fully grown fish are very good to eat, and in the Guianas there is a great demand for fish; but *Anableps* is avoided by the majority of people because the young found inside the fish has caused the belief that *Anableps* is cannibalistic.

In Mexico a female *Anableps* 7 inches in length was reported to contain nine young, 1.5 inches long. The young I observed in the early morning in pools on the mud flats were 1 to 2 inches in length. Possibly the smallest were only a few hours or few days old. They were exceedingly abundant, as every possible puddle on the uneven surface of the mud flat contained a large number. By the time they are 3 or 4 inches long they swim and behave as the adults described above. None of the 1 to 2-inch young was seen to swim, but only to crawl over the bottom.

The young under 2 inches in length lived high on the mud flat in shallow pools three to six inches across and one-half to one inch deep (Fig. 4). These tiny fish could be detected when they stirred up the loose silt and, as the cloud settled, only the elevated eyes could be seen. If I remained perfectly still they would emerge not only from the silt but from caves in the sides or holes in the bottoms of their puddles, crawl to the edge close against the water surface, and begin eating the silt and straining it through their gills for whatever organic material could be extracted. This eating process was followed by a fine cloud of silt ejected from the gill opening and resulted in a pretty pattern of lines radiating from feeding spots where each fish had nibbled away the darker surface silt, exposing lighter mud beneath (Fig. 4).

When I focused the camera close to them, this movement caused all to disappear either into the mud or into holes. Some of the holes had two or more entrances and a fish would seldom move far from its home, always returning to the same hole. Some could feed with their tails still part way down in the hole. I never saw two fish using the same retreat, though the entrances were sometimes only an eighth to a quarter-inch apart. As the tide rose covering these miniature pools the tiny fish disappeared completely into the mud and into their holes. The bottom could be seen as clearly as when the pools were isolated but the fish were no longer visible. This high tide retreat may be to escape the larger fishes, drums, cichlids and characins that come onto the flats to feed when these flats are covered with water. There are tracks of shore birds all around the puddles, so shyness on the part of the young, the ability to bury themselves where they are, the alertness to withdraw quickly into a hole are all necessary to their survival.

RARE FISHES OBTAINED IN WEST INDIES

During the latter part of 1959, Loren P. Woods, Curator of Fishes, participated in a 31-day exploratory fishing cruise of the U. S. Fish and Wildlife Service Motor Vessel *Oregon* to the West Indies. Very poor trawling grounds were found at depths of 17 to 380 fathoms in the waters of the Virgin Islands, Saba Banks and Puerto Rico. Everywhere the bottom was very rough, rocky or covered with growths of coral or sponges, resulting in torn nets and relatively few fishes. However, those few were of unusual interest because so little collecting has been done in such difficult areas. Many undescribed species and many kinds previously very rare in collections were secured along with a variety of better known, widely distributed species. These latest collections are especially useful for comparison in the study of specimens from the Western Caribbean and Brazil-Guiana offshore waters gathered on *Oregon* cruises during the past three years.

Activities were hampered by frequent storms and high seas but these were not of sufficient intensity or duration to prevent covering of each island and bank area.

LAST CALL FOR ENTRIES OF NATURE PHOTOS

Photographers, both amateur and professional, desiring to submit entries for the 15th Chicago International Exhibition of Nature Photography, are urged to send their prints and color slides promptly. The deadline is January 18. From the thousands of entries the judges will select several hundred to be exhibited in Stanley Field Hall of the Museum during the period from February 6 to 26. Medals and honorable mentions will be awarded to those considered the best. The exhibition is held under the joint auspices of the Chicago Nature Camera Club and the Museum.

While the facilities in Stanley Field Hall are suitable only for the exhibition of prints, either black-and-white or in color, the slides will be exhibited by projection on the screen of the James Simpson Theatre on two Sunday afternoons, February 7 and 14 at 2:30 P.M. Admission to the theatre showings is free.

The print division and the color slide division each have three subject classifications: (1) Animal Life; (2) Plant Life, and (3) General which comprises landscapes and seascapes, clouds, and other inanimate natural phenomena. Contestants are permitted to submit up to four entries of prints plus four of slides. Entry forms will be supplied by the Museum on request. Photographs should be mailed directly to the Museum.

The panel of judges is composed of Mrs. George W. Blaha, APSA, photographer and naturalist; Arthur Hunter, teacher and naturalist; Ray Souers, photographer, and two members of the Museum staff—Dr. Alan Solem, Curator of Lower Invertebrates, and Dr. John W. Thieret, Curator of Economic Botany.

The Nature Division of the Photographic Society of America will award special medals for slides adjudged the best examples of color harmony in nature. The other awards will be made by the Nature Camera Club.

In volume of entries submitted by photographers all over the world, in number of pictures exhibited, and in number of awards, this contest has always been the world's largest devoted especially to nature photography, and in fact is one of the world's largest photo contests of any type.

Mammalogist Completes Study Trip

Philip Hershkovitz, Curator of Mammals, recently returned from a three-week trip to study African and South American mammals in the collections of the museums in Cambridge of Harvard University, the American Museum of Natural History, New York, and the U.S. National Museum in Washington, D.C.

The giant clam of the Pacific and Indian oceans, largest known bivalve, is exhibited in Hall M.

SOUTH SEA ISLES—

(*Continued from page 3*)

occupied himself with bringing out the first Frigidaire, then there would have been no need for the Portuguese and the Spanish to be so interested in beating well-worn tracks over the seas to search out pungent spices to preserve and camouflage the pungent meats of European tables. In other words, the quest for spices began it all.

Lacking spices, the food of most of Europe was unspeakably drab and insipid. Centuries were to elapse before the fruits, tubers, and the other products which now seem commonplace were to be used or acclimatized in Europe. Potatoes, tomatoes, and corn—all New World crops were of course unknown. There were no lemons—and even if there had been, there was no sugar, so lemonade was out of the question completely. No coffee, and no tea, so there couldn't have been a British Empire quite yet. Even the groaning boards of the wealthy suffered from a monotonous sameness. Gluttony without spice is hardly worth the trouble. So it was that the jaded palates of Europe welcomed a dash of pepper, a pinch of nutmeg, a little ginger, or a smattering of cinnamon. More and more *spices became the variety of life.*

The desire for spices soon became what one anthropologist has called an "acquired drive." If a little was good, then more was better. Even beer was strongly seasoned with ginger and mulled wine was so laden with spices that it tasted like liquid fire.

Now, it would be quite unfair to conclude that Europeans of this period were completely oriented toward ingestion—or indigestion as the case may be. The scents of the East were important too. Musk, ambergris, attar of roses, sandalwood, and incense came to be much sought after. Fine fabrics such as silks and damasks were essential to the noble wardrobe. Pearls and semi-precious stones and, of course, precious metals were the objects of many voyages; but spices were more coveted than any other products of the distant East.

There was a time when, for example, with pepper you could buy land, pay dowries, or purchase your freedom. You might even pay your taxes with it. For bribes it could hardly be surpassed. Ginger, cinnamon and camphor were weighed by merchants in sequestered shops with windows shut and drafts eliminated so that none of the precious dust would be lost to a vagrant breeze. The early spice caravans had already introduced the taste for these rare prizes shortly after Marco Polo's magnificent travels. It was, however, a deadly journey by caravan and the perils of the route cost many a life, while cargo after cargo was lost long before it got a good start on the way to Europe. Obviously what was needed was a short route; one which would obviate the necessity for paying fees to countless middlemen. In Malaysia the clove and the nutmeg, the cinnamon-laurel and the pepper plant grew thick as weeds and were not considered rare at all. But by the time the trade goods passed from hand to hand the old story was repeated — too many middlemen. Somehow they, too, had to be circumnavigated. So now we must burst another bubble—altruism did not inspire regents to sponsor expeditions at vast expense. Ideals were served less than the concern of royalty over the local exchequer. In other words, throughout the age of discovery, one of the chief driving forces was the mercantile spirit and a certain quality of hedonism. As one writer has phrased it, behind the hero stood the trader, the royal family that wanted to stay that way, and at times the officer of the church who was seeking wealth in terms of souls—an entrepreneur, nonetheless.

The ignorance which spawned early voyages is appalling in lofty retrospect. Ptolemy taught that life could not exist at the equator because neither plant nor animal could withstand the vertical rays of the sun. Circumnavigation was impossible since Africa connected somehow with Terra Australis and sandy wastes extended to the South Pole. Finally some intrepid souls got around to challenging these ideas which had held sway for so long a time. This was a period in which the populace of Europe was, not unlike the world today, on the verge of a *space age.*

(*To be continued*)

NEW MEMBERS

(November 17 to December 16)

Life Member

Joseph C. Belden, Jr.

Non-Resident Life Members

Herbert J. Watt, Mrs. Charles Deere Wiman

Associate Members

Lorn E. Arnold, Robert M. Arnold, Dr. Alfredo Bellizzi, Mrs. G. L. Bergen, Dr. Henry E. Bielinski, Dr. John F. Bimmerle, Dr. Carroll L. Birch, Dr. Chester J. Black, H. Templeton Brown, Adolph Buechler, Dave Chapman, Clyde F. DeWitt, Tom Dolan, Arthur E. Gibbs, Leslie S. Gordon, Jerry Herdina, Howard G. Hokenson, Roy C. Ingersoll, Dr. George N. Jessen, Hulburd Johnston, J. D. Kelsey, Lorenz F. Koerber, Jr., Fenton D. Lapham, Miss Lilian Marchant, Francis X. Mettenet, Paul K. Newberg, Harry H. Patrick, Dr. D. J. Pellettiere, Mrs. Gordon L. Pirie, Chester L. Posey, Clair M. Roddewig, J. F. Rosenthal, John I. Shaw, Mrs. Roy E. Sturtevant, Selwyn H. Torff, Harry N. Wyatt, T. L. Yates

Non-Resident Associate Members

Dr. Sydney J. Johnson, Mrs. Sydney J. Johnson, James H. McBain

Sustaining Members

Alfred Akerhaugen, Dr. Stanley Martin

Annual Members

R. J. Adelman, William H. Alder, Mrs. A. G. Alm, John P. Ash, W. Russell Bagott, A. C. Bailey, Mrs. Andrew Baird, Dr. Harold Balikov, Mrs. Ernest H. Ballard, Mrs. Charles Bender, William Bessey, Frank L. Bixby, Archie R. Boe, Ben F. Bohac, Dr. P. R. Brachman, Martin H. Braun, Jonathan Q. Caldwell, B. E. Callahan, Charles A. Capek, Mrs. Arthur L. Conrad, Philip R. Crippen, Jr., Miss Dorothy Daggett, Raymond A. Danders, George Edson Danforth, Joseph P. Demme, Mrs. N. Alfred Diggs, Mrs. David Dimsdale, Mrs. H. F. Duncan, Mrs. Angela Ebzery, David C. Eisendrath, Mrs. Edwin P. Elliott, Mrs. Clarence W. Elmer, Miss Frances C. English, L. E. Engstrom, J. O. Epeneter, Mrs. Joseph E. Eschbach, Peter Fagan, Louis Feinberg, Robert S. Fiffer, George E. Filipetti, Maurice Fisher, Mrs. Charles C. Fitzmorris, Sr., John Freeman, Harry L. Gadau, H. H. Gawthorp, Michael Grant, A. W. Hachmeister, Joseph G. Hagstrom, David N. Hagues, Mrs. David N. Hagues, Robert S. Halperin, Miss Alice Hamilton, Miss Mildred L. Hannaford, Watson D. Harbaugh, Robert E. Hattis, Miss Nellie V. Haynie, James D. Head, H. Harry Henderson, Dr. Paul G. Hesse, J. Homer Hilf, Charles H. Hocking, Mrs. Charles R. Hodgman, Jr., Jesse J. Holland, Joseph Hollerbach, Clarence L. Holmberg, Thomas M. Howell, Jr., James A. Jensen, Edward F. Johnson, Howard J. Johnson, R. S. Kalwajtys, Mrs. Marion O. Kane, Miss Jessie Katz, E. L. Kearney, Mrs. J. E. Keller, Thomas R. King, William P. Klein, Robert J. Koretz, Thomas D. Kurtz, Albert H. Levy, Mrs. Raymond G. Lonnon, John T. Love, Dr. Albert A. Loverde, Mrs. D. J. Luick, Merrill W. MacNamee, Cecil E. Magid, Earle A. Mann, T. E. Marston, Mrs. Louise C. M. Martin, John M. Maxwell, Frederick Mayer, W. A. Mayfield, Robert W. Maynard, Franklin McDermott, H. T. McDermott, Martin J. McGuire, William V. McKinzie, Hugh S. McLetchie, Harley V. McNamara, Everett C. McNear, Samuel E. McTier, Wesley C. Miller, Dr. E. M. Moore, McGarry P. Murray, W. L. Myers, Mrs. Herbert Nash, Ernest L. Newton, P. K. O'Connor, Clarence Olsen, O. W. O'Neal, Richard Orlikoff, Mrs. Max D. Orr, Franklin R. Overmeyer, William J. Payes, Jr., Dr. Albert G. Peters, O. Ewald Peterson, Stanley R. Piatek, M. Hudson Rathburn, T. Hamil Reidy, John S. Reiner, Sr., R. Joseph Rich, Harry Rosset, Theodore Rossman, Mrs. Eugene Smith Runions, Harold S. Russell, Jack L. Sachs, Mark J. Satter, Dr. A. L. Schiller, A. Scheele, Aaron Scheinfeld, Norman J. Schlossman, Nathan H. Schwartz, Dr. Steven O. Schwartz, John R. Seib, Lee C. Shaw, Curtis Smith, David I. Spark, Mrs. Humphrey Orr Spencer, Willson Spielmann, David B. Sweeney, William Traynor, Sol Uretz, Dr. Victoria B. Vacha, Dr. Derrick T. Vail, Raymond J. Vonesh, Dr. Rose Mary Wajoy, Dr. James M. Wall, Wayne Wallis, Norman E. Watson, Dr. A. C. Webb, Dr. William Weisdorf, Dr. Edward Weiss, C. A. Wells, Alfred C. Wenzel, Dr. Lucjan L. Witkowski, Herbert Zimmerman

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays at 2 P.M., (Saturdays 2:30).

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO NATURAL HISTORY MUSEUM
Bulletin
Vol. 31 No. 2
February 1960

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WAbash 2-9410

THE BULLETIN

EDITOR

CLIFFORD C. GREGG.....*Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
THEODOR JUST.....*Chief Curator of Botany*
SHARAT K. ROY.....*Chief Curator of Geology*
AUSTIN L. RAND.....*Chief Curator of Zoology*

MANAGING EDITOR

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

ASSOCIATE EDITOR

MARILYN JINDRICH.....*Associate in Public Relations*
† deceased

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

HORACE B. HARTE

1896–1960

Mr. H. B. Harte, able public relations counsel for the Museum for 32 years died suddenly at his home on January 8.

Mr. Harte was born Nov. 5, 1896, in New York City. His death climaxed a newspaper and public relations career that started in 1918 when he joined the staff of the Chicago Daily News as a reporter. Before that time he had attended Northwestern University and had served in the United States Coast Guard during World War I. In 1920 he left the Daily News for the editorial staff of "National Safety News," publication of the National Safety Council.

H. B. Harte

Mr. Harte became a Chicago Tribune staff member in 1922, serving on the Tribune's Paris edition, and at that time wrote a series of syndicated articles on post-World War I Europe called "An American Observer Abroad." He remained in that position until 1924 when he took up free-lance publicity work. One year later he became assistant city editor of the New York Daily Mirror. He left the Mirror to join the Miami Tribune and later to do publicity work in Hollywood, Fla. In 1926 be became a copyreader for the "Ohio State Journal."

In 1927 the seasoned writer and publicity agent came to Chicago Natural History Museum as public relations counsel, a position he held until his death. He served also as a copyreader at the Chicago Sun, from 1945 until shortly before the Sun-Times merger in 1948. Son of Walter B. Harte, a newspaperman, and Grace H. Harte, a veteran Chicago lawyer who died in 1957, Mr. Harte leaves a widow, Margaret Wagner Harte, and one son, Robert.

All who knew Mr. Harte recognized as his outstanding virtues his never-failing patience and deep humility. He was reputed never to have said an unkind word to anyone. One of his great loves was for the city of Paris, France, which claimed his heart when he was a reporter there early in his career. He had planned to visit that city with Mrs. Harte during April and May of this year.

STAFF NOTES

Allen S. Liss, Department of Anthropology's Custodian of Collections, recently attended the annual meeting of the Illinois Archaeological Survey, at which he was reelected a member of the board of directors. . . . **Dr. Rainer Zangerl**, Curator of Fossil Reptiles, participated in a seminar lecture discussing marginal marine ecology at Marquette University on January 15. **Dr. Eugene S. Richardson, Jr.**, Curator of Fossil Invertebrates, accompanied Dr. Zangerl. . . . **Henry S. Dybas**, Associate Curator of Insects, spoke on "Natural History and Ecology of the Periodical Cicada" at a meeting of the Chicago Ornithological Society. . . . **Loren P. Woods**, Curator of Fishes, addressed the Chicago Academy of Science, the Conservation Council, and the La Grange Chemists' Group on the topic, "Great Lakes Fishes and Fisheries." . . . **Miriam Wood**, head of the Raymond Foundation, attended the council meeting of the American Association of Museums in her capacity as president of the Midwest Museums Conference. . . . **Mr. W. Peyton Fawcett**, cataloguer and classifier in the library, has returned to his position at the Museum after two years in the United States Army.

The following staff promotions, effective January 1, 1960, are announced by the Director:

Mr. Phillip H. Lewis, Assistant Curator of Primitive Art, has been promoted to Associate Curator of Primitive Art.

Mr. Hymen Marx, Assistant in the Division of Reptiles, has been promoted to Assistant Curator of Reptiles.

Miss Janet Wright of the Division of Reptiles has been promoted to Assistant.

Miss M. Dianne Maurer of the Division of Birds has been promoted to Assistant.

Miss Marilyn K. Jindrich, Assistant in the Division of Public Relations, has been promoted to Associate.

THIS MONTH'S COVER

Few creatures are more graceful in the air than the fork-tailed common tern whose beautiful-to-watch, deep wing beats send it gliding over ocean swells in search of fish. This month's cover is a photograph titled "Common Tern at Nest," entered in the 15th Chicago International Exhibition of Nature Photography (held in the Museum from February 6 to 26) by Leslie A. Campbell of Belchertown, Massachusetts. It captures the upward "brake action" of the tern's wings as it alights on the sea shore to tend to its brood. Because the tern nests right on the sand, the presence of cats and dogs, or "man's camp follower," the Norway rat, is nearly always disastrous to a tern colony.

AUDUBON SCREEN-TOUR OF APPALACHIANS

The Blue Ridge and Allegheny Mountains of the Appalachian Range provide a background for "Roanoke Northwest," color film and lecture to be presented in the James Simpson Theatre of the Museum on Sunday, February 21, at 2:30 P.M. under the auspices of the Illinois Audubon Society. Lecturer for this screen-tour, fifth in the Audubon series of six, is G. Harrison Orians, naturalist and university professor.

Orians' color film follows the wild life of the region through the four seasons, and over a geographic span from the Virginia shores to the high hills of the Ohio River. By exploring far from all beaten paths, he has obtained intimate glimpses of the lives of small mammals, birds, insects and wild flowers.

Admission is free. Members of the Museum are cordially invited to attend, and to bring guests.

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.

SOUTH SEA ISLES: DISCOVERY NOT ALL ACCOLADES AND FAME

By ROLAND W. FORCE
CURATOR OF OCEANIC ARCHAEOLOGY AND ETHNOLOGY

Part II

THE PORTUGUESE voyages of discovery owe much to a man who did not live to see them. Prince Henry the Navigator was practically a landlubber; he is rumored to have set foot on a ship but once. He made no map and published no treatise which has survived; but he did put his wealth behind "research." He provided as near an approach to the Ford Foundation as existed in 15th century Europe. He furthered inquiry into navigation. This brave soul might just as well have been dubbed Henry the Doubter, because that is what he did.

He was not the first, but perhaps he was the most ardent—or perhaps he just lived at the right time and was in the right place. There were reasons to doubt that Africa supplied a rigid link with the land thought to exist at the south. Herodotus recorded the rumor that a Phoenician fleet during the time of the Pharaohs had sailed south down the Red Sea and then two years later had miraculously returned quite unexpectedly through the Pillars of Hercules (the Straits of Gibraltar). Moorish slave traders had told of a land of wealth beyond the Sahara which they called "bilat ghana." Later the area was termed the Guinea Coast and lately the old name has come into the news again. A map showing this area of Africa had appeared as early as 1150. There were reasons for believing, then, that there were lands that could be reached by sea outside the Mediterranean. Prince Henry died in 1460 before any of his dreams came to fruition. But he had planted the seeds, and in the years 1511–14 the Portuguese had reached the Spice Islands of Malaysia (the Moluccas).

Vasco da Gama is given credit for the first voyage to the Indies (1498), but the Cape of Good Hope was rounded earlier by Dias in 1486. Portugal's security in having found THE route to the riches of the east was shaken by Columbus' Spanish-backed venture westward. Feelings ran high. A war loomed over the horizon, and it would no doubt have materialized had it not been for the paternal offices of the Pope. He stepped into the fracas and by papal bull on May 4, 1493 drew a line of demarcation. All undiscovered land westward of this line (a hundred leagues west of the Cape Verde Islands—320 miles west of Cape Vert in extreme West Africa) was to belong to Spain—territory to the east was to be Portugal. A year or so later on, under the Treaty of Tordesillas, the line was shifted (at Portugal's insistence) to 270 leagues west which meant ultimately that Portugal would receive the still undiscovered Brazil.

EVER WIDENING HORIZONS

There followed in the next few years a tremendous time of vast discovery. Cabot, an Italian in the English service, reached Newfoundland in 1498. In 1500 Pinzon (Spanish) and Cabral (Portuguese independently discovered Brazil. In the same year Cortereal (Portuguese) reached Labrador and other Portuguese reached Madagascar. Shortly thereafter, Vespucci went down the South American coast as far as the Rio de la Plata. The Portuguese reached Malacca on the Malay Peninsula in 1509. Four years later Ponce de León discovered Florida and Balboa caught sight of the Pacific.

In case the impression is given that the lot of these early voyages was all accolades and fame, history records that Balboa was ultimately beheaded, Cortez fell into disgrace, Columbus was brought back to Seville in chains, and Pizarro was murdered. Later on Magellan was to end his life in the Philippines, Mendaña his in the Solomons, and Cook his in ignominious fashion in Hawaii. There were safer occupations. Nor did the less well-known and unsung heroes of the age, the seamen, fare much better. Of the estimated 268 men who sailed with Magellan from Spain on his voyage across the Pacific, only 18 returned. Out of 1,955 men on seven vessels who sailed with Anson in 1740, 1,051 died of scurvy. The Spanish fleet sent to intercept Anson met with even greater disaster—only 100 out of 3,000 men survived.

In spite of the early strides by the Portuguese, the 16th century in the Pacific belonged to the Spanish—the Portuguese had to content themselves with all of Africa, India, and Brazil—plus a few islands in the Indies thrown in. Though Magellan was Portuguese and had served the Portuguese flag in the Indies and in Morocco for many years, he sailed under the Spanish flag when he rounded the tip of South America and sailed through the strait that bears his name. As will be recalled, Magellan accomplished the remarkable feat of sailing all the way across the Pacific as far as the Marianas without sighting inhabited islands.

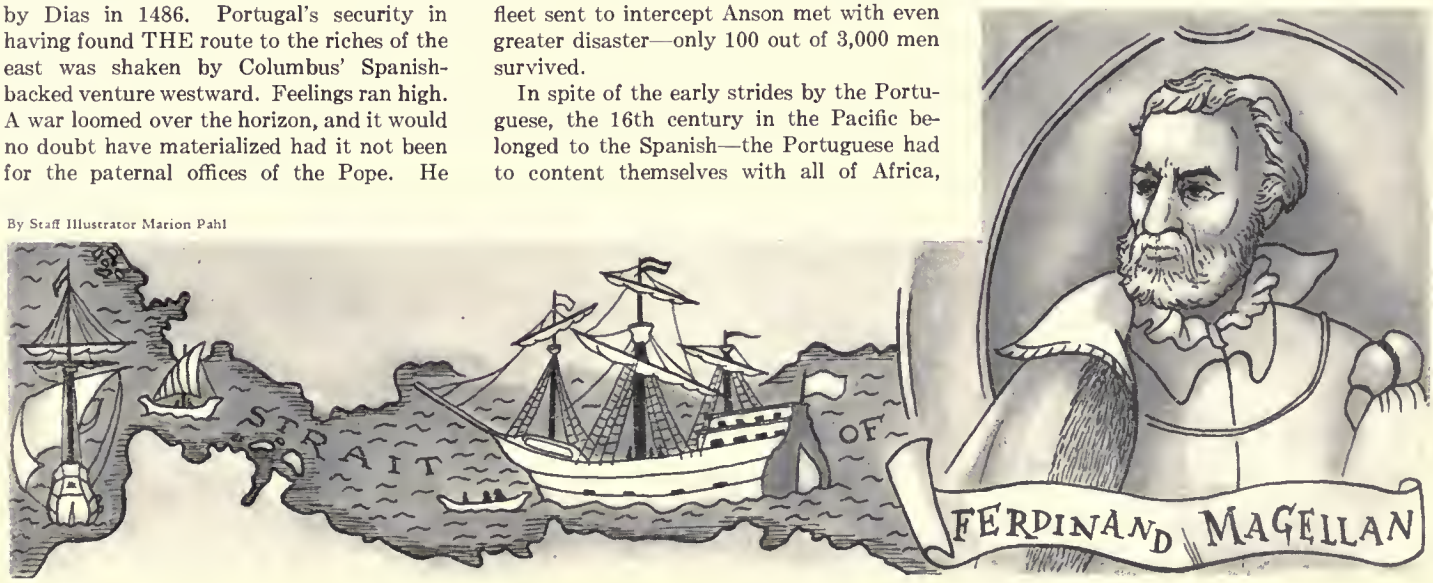
Magellan was rebuffed by the Portuguese King Emanuel I, so he took his idea that the Indies might be reached by going around the southern tip of South America (as da Gama had gone around the tip of Africa) to Spain. There his idea met with favor. He swore new allegiance and set out shortly in five refurbished ships. It is interesting to note that he carried, among his supplies, trade goods to be used in barter. Items such as these were included: mirrors, bells, (20,000 of the latter), 4,800 common knives (stamped *Made in Germany*), 600 pairs of scissors, colored kerchiefs, red caps, brass bracelets, paste jewels, tinted glassware, and bright lengths of wool and satin. All in all, a mass of junk worth little in Europe, but of fabulous importance to primitive peoples.

ADVENTURE IN DISASTER

The story of the voyage of Magellan and his men as recorded by his chronicler, Pigafetta, is a real adventure in disaster. In the first place, Magellan implied in his petition for support that he knew of the passage he sought, where as actually he only suspected its existence. The other four ships in the expedition were in the command of Spanish officers who resented the authority demanded by the Portuguese sailor. Magellan is characterized as a stern and taciturn leader who confided nothing to his com-

(*Continued on page 7, column 2*)

By Staff Illustrator Marion Pahl



NATURE PHOTO EXHIBIT OPENS ON FEBRUARY 6

T. S. Lal of Quilon, S. India, named his photo entry "Frightened Group."

Rare moments of beauty and mystery in nature that have been caught by the split-second action of a camera will be on display in Hall 2 of the Museum from February 6 to 26 in the 15th Chicago International Exhibition of Nature Photography.

Co-sponsored by the Museum and the Nature Camera Club of Chicago, the contest for many years has been the largest in the world devoted to nature photography, with number of entries submitted totalling in the thousands. The entries include color and black-and-white prints, and color slides, of scenic and unusual natural phenomena, plant life, and animal life photographed by amateur and professional photographers. Several hundred of the best of the prints will be selected for display in the exhibition, and on February 7 and 14 (Sundays) at 2:30 P.M. slides will be exhibited by projection on the screen of the James Simpson Theatre.

"White Sands Yucca," an entry in the Nature Photo Show, by M. S. Barrett of Adams, Massachusetts.

Judging of the contest covers two exhausting days and involves great alertness and acute observation, as well as photographic and artistic sense, on the part of the judges. In past years some photographs given passing scores by the judges, on later and closer examination proved to be pictures of mounted, dry, dead insects with missing parts, or formal arrangements of flowers. In one year's contest a photographer even reversed a negative in printing so that the flow of lines was more pleasing to him. But in the process he had endowed the land snails shown with a highly unorthodox left-hand spiral.

The panel of judges for this year's contest was composed of Mrs. George W. Blaha, APSA, photographer and naturalist; Arthur Hunter, teacher and naturalist; Ray Souers, photographer; and two members of the Museum staff—Dr. Alan Solem, Curator of Lower Invertebrates, and Dr. John W. Thieret, Curator of Economic Botany. Silver medals and honorable mentions will be awarded in the various print and slide classifications. Objective of the contest is "to make the photographer a better naturalist and the naturalist a better photographer."

GIFTS TO THE MUSEUM

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

Department of Anthropology

From: Miss Edna H. Bahr, Ridgefield, Conn.—archaeological materials, China; Dr. David C. Graham, Englewood, Colo.—ethnological objects, China; Mrs. Robert A. Harris, Oak Park, Ill.—photographic slides, Philippines; Mr. and Mrs. Lawrence E. Norem, Hubbard Woods, Ill.—ethnological materials, India, China and Japan; Dr. Albert L. Raymond, Northfield, Ill.—replica of petroglyph, Oregon

Department of Botany

From: H. R. Bennett, Chicago—713 phanerogams, Middle West and Oregon; Dr. C. Earle Smith, Jr., Oak Park, Ill.—1,101 phanerogams, Mexico, Panama and Venezuela; F. A. Swink, Willow Springs, Ill. — 236 phanerogams, Saskatchewan and Middle West; Dr. L. O. Williams, Beltsville, Md.—25 publications

Department of Geology

From: Dr. E. P. Henderson, Washington, D.C.—slice of meteorite, 546 grams, Florida

THIRD CONCERT FEATURES CONDUCTOR-PIANIST

Walter Hendl, associate conductor of the Chicago Symphony and an accomplished pianist, is scheduled as featured guest artist for the Free Concerts Foundation's third chamber music concert on February 10, 8:30 P.M. in the Museum's James Simpson Theatre.

Hendl will appear with the Festival String Quartet composed of Sidney Harth, concertmaster of the Chicago Symphony orchestra, and his wife Teresa—violinists; Rolf Persinger, violist; and Harry Sturm, cellist. Both Persinger and Sturm share first chair positions in their sections in the Chicago Symphony orchestra. The musical program for the evening includes three selected works by Vivaldi, Paganini's "String Quartet," and "Piano Quartet, A Major, Opus 26" by Brahms. A special composition, "Trio for Violin, Violoncello and Piano" by Glasow will also be included in the program, a work that has its world premiere performance at the February 10 concert.

The second free concert on January 6, which featured Phyllis Curtin, soprano, and Ray Still, oboist, drew a packed house and glowing reviews by Chicago's music critics. Headlines appearing above the reviews ranged from "Free Concert Group Program Rewarding," to "Chamber Concert Packs Surprises," to "Second Program Was First Rate."

Free Concerts Foundation, Inc. is headed by Mrs. J. Dennis Freund, who is also founder of the organization. Subsequent concerts will be presented on March 9 and April 13. Tickets are required for the concerts and are obtainable by writing Free Concerts Foundation, Chicago Natural History Museum (Roosevelt Road and Lake Shore Drive, Chicago 5) and enclosing a stamped, self-addressed envelope.

Department of Zoology

From: Mrs. Dorothy E. Beetle, Laramie, Wyo.—non-marine land shells; Mrs. Rose Burch, Los Angeles—a cowry shell, Cooks Island; Dr. Francisco Campos R., Ecuador 5 bats; Mrs. Maude A. Farber, Beverly Hills, Calif.—a duck-billed platypus, New South Wales; Harry Hoogstraal, Cairo, Egypt—156 bird skins, 23 mammals, a sea turtle; Ernest J. Roscoe, Chicago—land snails, western United States; Dr. Jeanne S. Schwengel, Scarsdale, N.Y.—marine shells, Hawaii; Dr. Charles H. Seevers, Chicago—581 beetles, Africa; Dr. Alan Solem, Chicago—2,500 sea mollusks, world-wide; Mrs. Margaret Teskey, Marinette, Wis.—2 land snails, Tennessee; Robert E. Woodruff, Gainesville, Fla.—21 Scarabaeid beetles; Loren Woods, Homewood, Ill.—a raccoon, and non-marine snails, Merida, Yucatan, Mexico; Dr. Frank N. Young, Bloomington, Ind. — 24 water beetles; W. D. Thomas, Balboa, Canal Zone—250 non-marine snails; U. S. Fish and Wildlife Service, Washington, D.C.—5 fish specimens; U. S. National Museum, Washington, D.C.—56 reprints on mammals; Dr. John Williams, Nairobi, East Africa — a bird skin

BURIAL YIELDS CLEWS TO RED OCHER CULTURE

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

THE PEOPLE of the Red Ocher Culture were Indians who first lived in the Upper Great Lakes region and adjacent areas a thousand years or more before the birth of Christ. When these Indians buried their dead, they sprinkled powdered red ocher, usually in profuse quantities, over the body and offerings in the grave. Thus, some thousands of years afterwards when archaeologists discovered the cultural remains of these people, they named this assemblage of tools, weapons, ornaments, and burial customs the "Red Ocher Culture."

The name is not a very good one because it has since been found out that other groups of Indians living in the region at the same time, as well as some earlier groups and some later groups, also used powdered red ocher in their graves. But to remember this fact is less confusing than to try to change the established name of this culture to something more suitable.

In the Upper Great Lakes region the Red Ocher Culture has a time span of about 1,000 years. It had its beginnings in the Algoma Stage of post-glacial lake levels at 1100 or 1200 B.C., when the water plane in the basins of Lakes Michigan, Huron, and Superior stood at 595 feet above modern sea level, or about 15 feet higher than at present. This culture had ended by the time of the migration of Hopewell Indians into the region around 100 or 200 B.C.

ARTIFACTS IN MUSEUM

Early Red Ocher Culture or Red Ocher I lasted from about 1100 B.C. to perhaps 500 B.C. in the Upper Great Lakes region, and it is a typical culture of the Late Archaic period. It can best be illustrated by this Museum's collection of characteristic tools, weapons, and ornaments from a site in Dyer, Indiana that was excavated in 1915 by Philip C. Schupp of Chicago.

The Dyer site consisted of a burial in a sandy ridge that was once a shoreline feature of glacial Lake Chicago. At the time of its use by Red Ocher Indians this ridge was a marked elevation at the edge of a swamp or shallow lake and near the mouth of a creek that emptied into the lake or swamp.

The burial in a once deep pit was that of an adult male in a flexed position. At the side of the right arm there was a bar amulet 6⅜ inches long made of ground and polished slate. Near the left arm there was a double pointed copper awl, square in section and 4¾ inches long. Around the neck of the skeleton were 45 globular, thick copper beads graduated in size and ranging from ¼ inch to ¾ inch in diameter.

On top of the skeleton there were three copper celts, or axes, ranging in length from 4¼ to 5¾ inches, and a tremendous leaf-shaped blade of whitish flint with the point broken off. This blade was 15½ inches long as found in the grave, but when restored in accordance with other whole blades of this class, it is at least 19 inches long.

A large leaf-shaped ceremonial knife of chipped flint, typical of the Red Ocher Culture, excavated at Dyer, Indiana, in 1915, and now in the Museum's collections.

Beneath the skeleton there were two side-notched, leaf-shaped blades of the type called "turkey-tail," so named because the basilar part of the blade, in silhouette, resembles the posterior of a plucked turkey. These "turkey tail" blades were made of a dark, blue-gray flint and were 5 to 5½ inches long. With them there was a stemmed blade made of the same kind of flint and otherwise similar.

Other objects found in the grave were a faceted lump of galena, or lead ore, and a small, broken point of brown and dark gray flint that looks as if it might have had multiple side notches.

Powdered red ocher was scattered throughout the grave. It covered the skeleton and all of the stone and copper artifacts, and permeated the sand at the borders of the grave pit.

OTHER CULTURE TRAITS

Although the site at Dyer is typical of Red Ocher I it did not have all of the types of artifacts known for that culture. Probably there is no site that contains all of the characteristic tools, weapons, and ornaments. Various other Red Ocher I sites have produced additional traits such as bird-stones, shell beads, leaf-shaped knives of copper, slate gorgets, grooved and ungrooved axes of stone, caches of trianguloid blades, and copper harpoons with multiple barbs on one side.

However, the diagnostic traits of the Red Ocher culture are the "turkey tail" blades of blue-gray flint and the large leaf-shaped knives, usually of white flint. If either or both of these traits are present in caches or burials, with or without red ocher, the culture is identifiable as Red Ocher. Although Red Ocher I shares many of its traits with other Late Archaic cultures, particularly one called Glacial Kame, it does not share the "turkey tail" blades of chipped stone and the particular type of large leaf-shaped knives.

Red Ocher II, which lasted in the Upper Great Lakes region from about 500 B.C. to 100 B.C., can be recognized by the addition of burial mounds and/or Early Woodland pottery. In adjacent regions Red Ocher II seems to merge with Early Adena culture, and like Early Adena is one of the immediate ancestors of the famous Hopewell culture.

MUSEUM ATTENDANCE INCREASED IN 1959

"Probably the year of greatest impact upon the people of Chicago" is the description given to 1959's activities and events at Chicago Natural History Museum by Dr. Clifford C. Gregg, Director.

Attendance increased to 1,075,426 from 1,049,401 in 1958. This was the 3rd consecutive year in which the number of visitors has exceeded a million.

"Chicagoans were made more aware of what the Museum is, what it does, and what it has to offer the public than ever before," said Dr. Gregg. "There were more special events, more special exhibits, more innovations than in previous years, and Chicago responded to these attractions. One way in which the Museum's role in the city's life has been emphasized has been by the silhouette-illumination of the exterior of the white marble building every night since June 16 when, along with other public buildings in the park system, it completed installation of the new lighting system. During the summer the Museum remained open to visitors beyond the normal hours on a number of evenings, and late in the year evening chamber music concerts once a month were inaugurated in the James Simpson Theatre. During the period of the Pan American Games and Festival of the Americas the Museum staged, for the first time anywhere in the United States, a special exhibit assembling American Indian art of the entire western hemisphere, ranging from Alaska to Patagonia. In November and December the centennial of the publication of Darwin's *Origin of Species* was celebrated with a special exhibit of Darwiniana. Many new permanent exhibits were also added in the Museum's four departments—Anthropology, Botany, Geology, and Zoology."

As always, Dr. Gregg noted, a full program of scientific research and field work by expeditions in various parts of the world was continued. There were zoogical expeditions working in the Belgian Congo, Peru, Panama, Nepal, the Philippines, Dutch Guiana, Mexico, Colombia, and at sea collecting fishes in West Indian waters.

"THE VOICE OF YOUTH"—LETTERS APPRAISE THE MUSEUM

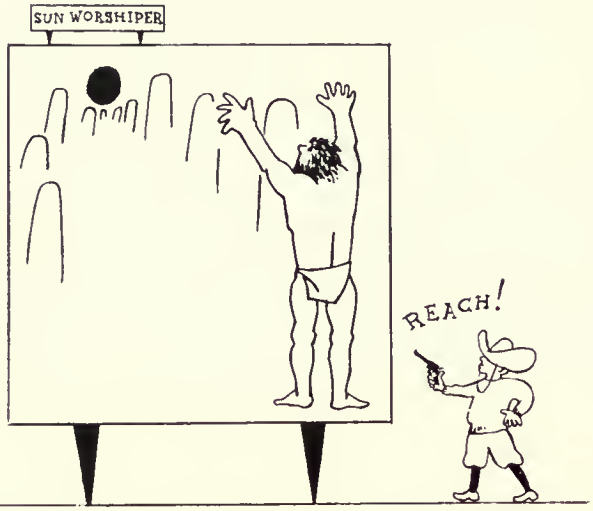
IT HAS BEEN occasionally commented, concerning the structure of the American family, that in this country we have not a patriarchy, or a matriarchy, but a filiarchy —a child-centered society. In a number of instances where the child is the center of interest in a family, or literally seems to dominate his home, the preceding statement very definitely seems to be borne out. All too familiar are the words cooed by a doting parent, "All right Herbie, now show the nice people how you can sing like Jimmy Durante," etc., etc., keeping their guests "entertained" for hours in this manner, with supplementary stories about what Herbie has said or done in the past.

Regardless of how tiring this parental proclivity may be, it cannot be denied that at times "kids do say the darndest things" (to use an expression coined by Art Linkletter and used as the title of a book he wrote). In fact, without any conscious effort, children very often are top humorists in their own right, supplying material for countless newspaper and magazine columns, and humor books.

Here at the Museum we, too, have reserved a space for juvenile humor. It is a bulletin board located at our south entrance. Posted on the board from time to time are letters and drawings received from the many children who visit the Museum daily on specially organized school tours. (The Raymond Foundation has been conducting tours for school children since 1922; last year 121,898 children participated in the program.) It is to the Raymond Foundation members that most of the correspondence is written. Following are a few of the letters, sent with serious purpose to the Museum by visiting students, that have elicited chuckles, and sometimes roars, from Museum staff members.

This first letter is from the kind of school group about which every Museum guard dreams. "Dear Sirs: Class 29 have planned to take a trip to the Museum. We will come on April 18, 1959. We will keep the place clean. We will not touch any thing. We will walk in a double line and look around. We will bring our own lunches and eat there."

By the same token, this next letter is the kind of commentary the theatre would like to see a lot more of in critics' reviews—glowing and completely honest. "Genilemen: You had what other Museums Didn't have. You had everything from A to Z I just want to say thanks a million for letting me have a wonderful time in fact that was the first museum I ever been to. And I bet all the money I have I had more fun then any body else. The thing I like best is where I could go real high and see that big white room of yours." (Stanley Field Hall, to most people who visit the Museum.)



This is one of a number of color cartoons painted on the walls of the Museum's "picnic room" by Staff Illustrator Marion Pahl. The lunchroom is used by school groups visiting the Museum.

The following letter no doubt would have made a Museum curator blanch, had he read it, and cause him to hope that the youngster's observations had not been too accurate. "Dear Miss Smith, I enjoyed the tour very much with you. Even thow we did not stay together. Sue saw a spider on one of the mummies she thought. I thank you for taking time off to show the dinosaurs and fossils."

Obviously, this next little girl cares little for the "rugged" he-man look. "Dear Sir, I went to the muzeim, I saw cave men, I thought they needed a shave. But my sister said that they didn't have any rasers blades. I thought they looked very funny. But they looked very small compeard to the men now."

Here's another youngster with a little constructive criticism for the Museum. "Dear Miss Smith and Miss Svoboda, I had a good time. The whale was big. I like things that are very big. I wish you could have a big whale in the museum even if you have chop down the walls." (Maybe, "destructive" is a better word for his suggestion.)

This next letter illustrates the difficulties that can arise from the problem of interpretation and reinterpretation. "Dear Miss Cox, I enjoyed the tour of the museum with the class. The most interesting thing of all was the movies about Carl's Bad Cavern. . . ."

Even in little children there seems to be an inherent feeling for equality and a revulsion for the double standard. This feeling for justice is brought out quite clearly in this next letter. "Dear Miss Svoboda, Thank you for telling us about the different things at the museum. The things I liked best were the mummies. The thing I didn't like was when you said that boys went to school and the girls stayed home. " (He is referring to the ancient Egyptian educational system.) "I'd rather have it the other way around" (written by a boy, of course).

In this next letter, the youngster even goes so far as to question the art of the ancient Egyptian embalmers. "Dear Miss Smith, I enjoyed the tour very much. I liked the x-ray pictures of the mummies best. I wonder who would make a mummy that was only part there." (He is referring to the x-ray of one of the Museum's mummies that exposes the deceptive practice by an Egyptian undertaker of substituting a stick of wood for the torso of the mummy.)

This next one, although not exactly exhibit oriented, does give a thorough rundown of the writer's day at the Museum. "Dear Miss Fleming, I liked my trip to the Museum, not mentioning the bus. I liked Bushmen, the mummies . . . the best. Everything was terrific. When it was time to eat, I had coke, cherries, and a couple of cookes and when I got back on the bus I said whose sandwiches are these. Then I shut my mouth because they were mine. And at the museum, we all bought (to) little steel Triceritops and Tyrannosauris."

The following letter illustrates maturity and unselfishness that even some adults don't possess. "Dear Mrs. Cox, We thank you for showing us the dinosaurs and the cavemen. You were a good guide to us. You told us to stand back so other people could see."

In this next letter you can see that the the little girl who wrote it has a keen insight into the functions of the Museum and a deep understanding of the role of the Museum in relation to her. "I learned lots of *work* from you. Thank you for showing us around."

But perhaps one of the most heartwarming of the letters sent to the Raymond Foundation is this next one, with which we shall close this digression from the strictly scientific and academic side of the Museum. "Dear Miss Smith, I couldn't come to the Museum of Natural History because I was a bad boy in the room and the teacher rfused to take me would you please send me a booklet on the forest Indians. Henry Jones."

—M. J.

SOME SPECIMEN LABELS TELL ODD STORIES

By ALAN SOLEM
CURATOR OF LOWER INVERTEBRATES

IN THE RESEARCH COLLECTIONS housed on the third and fourth floors of the Museum are thousands upon thousands of specimens, neatly arranged in trays in dust-proof cabinets. Each specimen must have a label, telling certain vital bits of information about it.

Such a label is a very terse, straightforward bit of writing—number, name, geographic locality, date collected, and name of the collector. This is hardly an item of romance or adventure, yet there is often a fascinating story behind the label which sometimes breaks through the paper barrier.

Only a zoologist could appreciate the thrill of unpacking a shell and reading "Red Sea, Forskal, 1769." Here is a specimen collected by a student of the famous Linneaus who died while searching for specimens in the Middle East. The same story can be found from labels of all well-known collectors. Unpacking *Pupina brazieri* from Erromanga in the New Hebrides brings to mind Brazier's statement that he collected on Erromanga while under attack by natives. A notable case of devotion to science.

Yet occasionally, a universally interesting label is found. Recently Chicago Natural History Museum received some western North American land shells on exchange from Munroe L. Walton. With specimens of *Oreohelix amariradix* (a rare Montana land snail) was the cryptic message "All taken dead which may be excusable with the rancher beside you with a shot gun making sure you did not set the place on fire."

Several malacologists have called attention to a note with the type specimens of *Melania brevispina* J. G. Anthony which reads "New species determined when I was blind, by touch alone."

A former curator at the University of Michigan, Calvin Goodrich, even wrote a brief paper on the unusual labels he'd seen. A Mr. S. C. Shoup sent specimens with the unscientific data "This is at the site of 'Maggie's Mill' where the song, 'When You and I were Young Maggie,' was written."

A former Illinois resident, W. W. Calkins, added "Battle Field of Chickamauga, near which on the second day of the battle I was wounded."

From the labels seen, it is an easy step to contemplate those not yet written. Last winter Henry S. Dybas, Associate Curator of Insects, and I were collecting insects and snails from the Rio Tribique in the hinterlands of Panama. The village women were doing the weekly laundry in the same stream and were quite curious about the activities of the "Locos gringos." On finding that I was after "caracolitos" (snails) one woman excitedly kept insisting that there were bigger ones around the bend of the river. I was interested in some tiny snails only found in stream riffles and did not desire the large *Neritina* found in the calmer stretches. She kept insisting I see the bigger snails and waved her machete wildly. At last I went and collected a few. Perhaps it would be slightly misleading, but these snails were "Collected at knife point."

Calvin Goodrich relates the acme of unwritten labels. A famous entomologist, E. B. Williamson, went on a Sunday afternoon excursion. Slipping away from the crowd, he changed into old pants for collecting and started after dragonflies. Spotting a species known previously from only two specimens, the afternoon passed quickly. Finally he just barely caught the train home—still wearing his old pants. The others were left by the stream. The specimens really could have been labeled "This is the spot where I lost my pants!"

SOUTH SEA ISLES—

(*Continued from page 3*)

panions. He was autocratic, uncompromising, ploddingly stubborn—a characteristic which allowed him to persevere and to accomplish deeds which would have defeated less sturdy wills, but which also brought him to an untimely end at the very apogee of his success.

After months of exploration of the nooks and crannies of the east coast of South America and a bleak winter season spent in a cove or two near Patagonia, success was met and the strait that now bears his name was found. Not, however, without mutiny and the defection of one of the larger ships in the convoy (it turned around and went back across the Atlantic to Spain), and the loss of another vessel before Tierra del Fuego was reached.

Magellan overcame the mutiny, buried his scurvy-ridden dead, and finally, much depleted in supplies, set out across the unknown Pacific with three remaining ships. These weathered and worn craft left behind the desolate slopes of bleak Patagonia and sailed northwestward in calm seas where water tanks became putrid, flour crawled with vermin, rats were bartered for at high prices, and finally even the leather hides in the rigging were cooked and chewed along with sawdust to sustain life.

A trail of withered corpses dropped behind as the course proceeded westward. Finally land was sighted and unspeakable disappointment followed when it was found to be several treeless atolls in what must have been the northern Marshalls in Micronesia. These they called St. Paul's and Shark Islands, or the Desadventuradas. Weeks later the Marianas were sighted and contact with the natives made. These Magellan called the Islands of the Lateen sails. It was March, 1521.

CHILDREN'S MOVIES BEGIN MARCH 5

The Raymond Foundation will open its spring series of free programs for children on Saturday morning, March 5, with color motion pictures on "China, Land of the Dragon." On the same program there will be a cartoon. Other programs scheduled for March are:

March 12—Falconry—the Sport of Kings
(To be presented in person by Lou Gaeta and his live falcon, Jezebel)

March 19—My Home State—Illinois
(Cub Scout day)

March 26—Conservation Is Our Business
(Camp Fire Girl Day)

Except for the March 12 program, all these shows are motion pictures. More films will be presented on each Saturday morning through April, and the rest of the titles will be announced in the March BULLETIN. All programs begin at 10:30 A.M. in the James Simpson Theatre.

Pigafetta made drawings of the first contact with islanders by Europeans, but he neglected to give us any real idea of what the people looked like. He did say, however, that "They go naked, and some are bearded and have black hair that reaches to the waist .... Their amusement ... is to plough the seas with those small boats of theirs," and the "thieves stole whatever they could lay their hands on, so that we could not protect ourselves .... They even very deftly stole from us the small boat which was fastened to the poop of the flagship." In a fracas arising out of a shore party's attempt to recapture the boat, the native population was attacked and displayed their absolute ignorance of the bow and crossbow by standing dumbly while the arrows pierced their bodies. The record states that a wounded native would look surprisedly at his impaled arm and try to pluck the missile from his flesh with an amazing lack of understanding as to how it got there. The retreat was general. The islands were renamed the Islands of Thieves (the Ladrones) because of the obvious propensity of the natives.

Newly provisioned, and with crews in a healthier state of mind, the vessels sailed on to the Philippines, which were at first taken by Magellan to be the famed Spice Islands for which he was headed. Even when it became apparent that this was not the case, Magellan lingered, exploring more and more of the small islands which form the central and south-central Phillippines. He came ultimately to Cebu and with much pomp and ceremony "Christianized" the chief's family and as many of his subjects as appeared. Success was within his grasp—he could have left and sailed on to the

Moluccas which were not too far distant. He knew he was close, because his trusty slave Enrique (a Sumatran who had come into his possession in Malacca on the Malay Peninsula many years before) found to his surprise that he could understand what the natives in the Philippines were saying. However, Magellan's stubbornness intruded itself once more, and in an attempt to show the invincibility of the warriors of the new sovereign to whom the chief from Cebu had just sworn his allegiance, Magellan took 60 men on a war mission to the neighboring island of Mactan. He declined any assistance from local "troops" and ordered 1,000 Cebu warriors to stand offshore in canoes and observe "how it was done."

MAGELLAN SLAIN

At this point Magellan's success story becomes a tragedy. The boats in which his forces attempted to make a landing were stranded offshore out of firing range by an encircling reef. A contingent with Magellan in the lead therefore jumped into the waist-deep water and began wading ashore to close quarters. Fifteen hundred Mactanians awaited them, and in the chaos that followed eight men were slain—of these, one was Magellan, who refused to retreat in what ended as a complete rout. Face was lost in immense proportions. Later on, even negotiations failed, and a truce party of some 30 men was also slain by the avid warriors of Mactan. Magellan's body was never recovered.

Prior to this time one of the three remaining ships had been abandoned and burned because it was impossible to stop its severe leaking. Now there were two—and they proceeded to the Moluccas under command of a young Basque nobleman by the name of del Cano who, ironically, had been one of the mutineers prior to the rounding of the tip of South America. It was he who was to bring the one remaining ship back to Spain with a crew of but 18 and four native survivors. What is worse, after Magellan had secured the Moluccas for Spain at the cost of his own and numerous other lives, and after enduring indescribable hardship in the process, the King of Spain ultimately sold the islands to Portugal for a paltry sum.

Moreover, nobody ever used Magellan's strait. Those who tried often went aground and were lost, and finally, much later, accounts were plublished in Europe which denied the existence of the channel—saying that it had been closed by landslides. Still later it was Drake who used the seaway in sneaking up on Spanish shipping in the Pacific. Since 1913 we have had the Panama Canal to use, but even in the interim between Magellan's voyage in 1520 and that date, the passage was largely shunned for other routes. Nevertheless, the voyage was a landmark, and it marked a first in Pacific exploration. *(To be continued)*

LECTURES ON SATURDAYS TO START MARCH 5

The spring series of color films and lectures for adults—the 113th such series to be presented by the Edward E. Ayer Lecture Foundation—will open on Saturday, March 5 with "The Pitcairn Story." Commander Irving Johnson will be the lecturer.

On the three other Saturdays in March the lectures will be:

March 12—Pathways Through Pakistan
J. Michael Hagopian

March 19—Sub-Antarctic Isle
Alfred M. Bailey

March 26—Rural England
Alfred Wolff

All the lectures begin at 2:30 P.M., and admission is free. Five more programs will be given in April. Details on the entire series will be published in the March BULLETIN.

Research Grant to Museum Scientist

The National Science Foundation has awarded a grant of $17,200 to the Museum for the use of Philip Hershkovitz, Curator of Mammals, in continuation of a three-year research project for the purpose of preparing for publication a *Check List of Recent Mammals of South America*. Mr. Hershkovitz has had extensive field experience in South America, and spent more than four years between 1948 and 1952 as leader of the Museum's Colombia Zoological Expedition, the longest expedition continuously in the field in the Museum's history.

Scientist from Israel Here

Prof. Oskar Theodor of the Medical School of Hebrew University, Jerusalem, recently spent two weeks in the Museum's Division of Insects, studying bat parasites and conferring with the staff. The Museum's collection of external parasites of bats, especially bloodsucking flies, is one of the most comprehensive in existence. Prof. Theodor has won great distinction as a medical entomologist and parasitologist. His visit here is part of a study trip to the United States and Brazil under a grant from the National Institute of Health, Bethesda, Maryland.

NEW MEMBERS

(December 17 to January 15)

Contributors

Herbert Baker, Mrs. Herbert Baker, George I. Quimby, Dr. Alan Solem

Life Member

Mrs. Charles C. Haffner, Jr.

Associate Members

Dr. Joseph Ackerman, James R. Addington, B. H. Bunn, W. F. Crawford, Dr. William L. DeLarye, Samuel E. Entsminger, Miss Grance S. Flagg, Don R. Grimes, Frank Brookes Hubachek, George L. Irvine, Herbert M. Johnson, Gordon Lang, C. E. McKittrick, Bryan S. Reid, Jr., Lester W. Reinecke, Miss Marie Katherine Remien, Robert S. Russell, H. R. Sampson, Harold W. Schloss, Noel M. Seeburg, Jr., M. M. Shoemaker, Joseph J. Stefan, Harold C. Steiner, John C. Sturgis, Wayne Swonk, Melvin Thillens, Richard Uslander, Andrew J. Watt, Lafeton Whitney, Milton Zadek

Non-Resident Associate Member

Martin W. Hanson

Sustaining Member

Mr. Carroll G. Bowen

Annual Members

Mrs. Thomas Amberg, Osborn Andreas, Mrs. Lucius A. Andrew, Jr., Dr. Cornelius M. Annan, Mrs. H. D. Arneson, Joseph P. Antonow, Mrs. W. C. Bachelder, William U. Bardwell, Mrs. George A. Becker, Emery E. Bergfors, Dr. Haskell E. Bernstein, George Bixby, Jr., A. C. Boitel, Paul F. Bovyn, O. S. Caesar, Charles J. Callanan, Francis P. Canary, Larry W. Cantrell, Mrs. Oscar D. Carlstrom, Joseph T. Carp, James P. Cody, John J. Cogan, A. B. Costello, Walter W. Cruttenden, Sr., Dr. Charles U. Culmer, James H. Cunningham, Donald Defrees, Alfred F. Finkel, John Jay Fox, Jr., Robert Frankenbush, A. J. Frystak, Harold Geilman, Charles F. Glore, Jr., William Grage, Carl I. Gustafson, Mrs. Edward K. Hardy, Warren S. Hassell, Dr. David B. Hatcher' Robert W. Havey, Paul H. Heineke, Kai Henriksen, Mrs. Cyrus G. Hill, Dr. Walter C. Hoag, John F. Hutson, Eric Isaac, Milton J. Isaacs, W. R. Isom, Mrs. Oscar W. Issaacson, Frank Kaplan, John J. Kapov, Christ Karafotias, G. E. Keister, John O. Kindahl, Mrs. Roy Kroeschell, C. W. Kuhnen, Mrs. Philip R. Latta, Mrs. Louis Leavitt, Raymond E. Lee, Clarence J. Lehecka, Robert Leighton, Miss Elaine Linnert, Mrs. John L. Manta, Henry A. Markus, Mrs. Aquil Mastri, Dr. William J. Mauer, Ralph R. Minkler, Walter A. Monney, Myron T. Monsen, Westley F. Mont-Pas, James C. Moreland, Dr. Harry A. Oberhelman, Dr. Abraham M. Oberman, Andrew Pettinger, Mrs. S. C. Pirie, Jr., George B. Pletsch, J. Rockefeller Prentice, James N. Rawleigh, H. Edward Reeves, William Renouf, Scott Robertson, Walter D. Rudolph, Mrs. F. H. Sasser, Miss Edith E. Sayers, Mrs. Agnes K. Schmitt, F. Girard Schoettler, Dr. Paul W. Schroeder, Dr. Jerome L. Schulman, Donald K. Searles, Bruce L. Simpson, Dr. Edwin S. Sinaiko, Dr. W. Walter Sittler, Leon N. Skan, Ralph Skoner, Mrs. Hope Taylor, William L. Taylor, Jr., Bruce T. Telfer, Nels E. Tessem, Mrs. Reuben Thorson, Fred A. Tipple, Dr. David D. Turow, Delbert N. Urick, Dr. Pedro A. Valdes, Dr. Cornelius A. Vander Laan, Steve Vargo, Mrs. Leslie H. Vogel, Hamilton Vose, Jr., Dr. Carl F. Waters, Sheldon A. Weaver, Dr. Marvin A. Weiss, Mrs. David Wenner, Jr., Dr. Howard L. Werner, Dr. Robert E. Westfall, Dr. Philip C. Williams, Dr. Edward J. Wiss

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO NATURAL HISTORY MUSEUM
Bulletin
Vol. 31 No. 3
March 1960

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

THE BULLETIN

EDITOR

CLIFFORD C. GREGG ..... *Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN ..... *Chief Curator of Anthropology*
JOHN R. MILLAR ..... *Chief Curator of Botany*
SHARAT K. ROY ..... *Chief Curator of Geology*
AUSTIN L. RAND ..... *Chief Curator of Zoology*
THEODOR JUST ..... *Curator Emeritus of Botany*

ASSOCIATE EDITOR

MARILYN JINDRICH ..... *Associate in Public Relations*

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

STAFF NOTES

Dr. C. Earle Smith, Jr., Associate Curator of Vascular Plants, spoke on the topic, Latin America, to the fifth grade class at Oliver Holmes School, Oak Park, on January 27. He illustrated his lecture with kodachromes and samples of economic plant materials. . . . **Dr. Alan Solem,** Curator of Lower Invertebrates, left for Florida February 16 to act as a judge for the St. Petersburg Shell Club Show. . . . **Mrs. Ruth Andris,** zoology departmental secretary and a frequent illustrator in the *BULLETIN*, had a piece of sculpture accepted for the Brotherhood Week Art Exhibit displayed at Marshall Field and Company Art Galleries from February 22 through March 5. . . . **Bertram Woodland,** Associate Curator of Petrology, will appear on the WGN-TV program, "Science In Our World Today," on March 7, 8:15 to 8:30 A.M.

Girl Scouts Give Aid to Botany

Eleven Senior Girl Scouts of the South Cook County Council are participating in a museum aid project in plant mounting by contributing 36 hours of service on six alternate Saturdays. Directing the project, which will end March 19, are Mr. Robert Reich, Custodian of the Herbarium, and Mrs. Dorothy Gibson, Botany Departmental Secretary.

FILMS FOR CHILDREN BEGIN MARCH 5

An unusual and interesting program on "Falconry, the Sport of Kings," will be offered in the Museum on March 12 as part of the Raymond Foundation's spring, 1960, series of entertainment for children. The program will present Lou Gaeta, in person, and his live falcon, Jezebel, in an interesting session demonstrating an art that has almost completely died in the world.

The spring series of entertainment is the offering of the James Nelson and Anna Louise Raymond Foundation. Programs are presented on Saturdays at 10:30 A.M. in the James Simpson Theatre. Although five of the shows have been designated as special days for various children's organizations, *all* children, regardless of whether they are affiliated with these organizations or not, are welcome at *all* programs. The programs are free.

Following is the complete schedule:

March 5—China—Land of the Dragon

March 12—Falconry—The Sport of Kings

March 19—My Home State—Illinois (Cub Scout Day)

March 26—Conservation Is Our Business (Camp Fire Girl Day)

April 2—International Friendship (Girl Scout Day)

April 9—The Voyage of the Beagle (Museum Traveler Day)

April 16—NO PROGRAM—Easter Weekend

April 23—The Red Balloon

April 30—All Cartoon Program

Children may come alone, in groups, or with parents or other adults.

STANLEY FIELD RE-ELECTED

At the January meeting of the Board of Trustees, Mr. Stanley Field was elected President of the Museum for the 52nd consecutive year. His accomplishments during his term of office have been commented on at some length in the 1957 and 1958 Annual Reports of the Director of the Museum. His continuing leadership is a source of inspiration both to the Board of Trustees and to the staff of the Museum.

Others re-elected to office include:
Hughston M. McBain, 1st Vice President
Walther Buchen, 2nd Vice President
Joseph N. Field, 3rd Vice President
Solomon A. Smith, Treasurer
Clifford C. Gregg, Director and Secretary

Mr. E. Leland Webber was elected Assistant Director and Assistant Secretary of the Museum.

THIS MONTH'S COVER

The woman porter with the whimsical smile pictured on our cover is a native of Nepal, a small independent state located between India and Tibet. Of special interest in the picture is the unusual brooche of gold and turquoise worn around the woman's neck. Typical of the Nepalese love of jewelry, it is often used to carry snuff. In many cases such an ornament represents all of a person's wealth. Nepal, a country of about 56,000 square miles and 5,600,000 population, is distinguished for having many of the world's highest mountains. It also has some rather unique customs, as described in Dr. R. L. Fleming's article on page 3 of this issue. The photo of the Nepalese woman porter was taken by John Moyer, of the Museum's staff, and is included in a special Museum exhibit, "People and Places in India," on display in Hall 18.

MILLAR HEADS BOTANY

After having served more than the required minimum of ten years as Chief Curator, Dr. Theodor Just has been appointed Curator Emeritus of the Department of Botany. Relieved of his administrative burdens, he will be free to devote his entire time to research, writing, and editorial work.

John R. Millar, by unanimous vote of the Board of Trustees at its last meeting, was elected Chief Curator of Botany to replace Dr. Just. Mr. Millar joined the staff of the Museum on February 1, 1918, and was associated with the Stanley Field Plant Reproduction Laboratory continuously from that time until 1937 when he was appointed Curator of the N. W. Harris Public School Extension of the Museum. In 1946, Mr. Millar became Deputy Director of the Museum and served in that capacity until called to his present assignment.

Mr. Millar's wide experience in botany includes collecting trips to South Florida, 1918–1919; the Stanley Field Expedition to British Guiana in 1922; the Captain Marshall Field Brazilian Expedition in 1926; and the Sewell Avery Expedition to Nova Scotia in 1938.

Spring Visiting Hours Begin at Museum

Beginning March 1, spring visiting hours will go into effect at the Museum. The building will be open from 9 A.M. to 5 P.M. every day. These hours will prevail until May 1 when summer hours of 9 A.M. to 6 P.M. will be observed.

SOMETHING NEW IN CALENDARS—NEPAL'S UNUSUAL YEAR

Dr. R. L. Fleming, Field Associate of the Department of Zoology, was stationed in Mussoorie, India, as high school supervisor from 1947 through 1953. While at Mussoorie, he made trips into Nepal—from the lowlands up to far above timberline in the Himalayas —on which he collected many bird specimens for the Museum. Since 1953 he has been superintendent of the Medical Mission to Nepal of the Board of World Missions of the Methodist Church.

His active interest in bird study resulted in an extensive report on "Birds from Nepal," which he co-authored with Chief Curator Austin L. Rand. The article which follows was inspired by the nature calendar published in the January issue of the BULLETIN.

By ROBERT L. FLEMING
DEPARTMENT OF ZOOLOGY FIELD ASSOCIATE

THE NEPALESE have worked out an independent measure of time compared to Americans. They are well along in their 2016th year with New Year's Day slated for the middle of April. Twelve lunar months linked in six pairs make up their "seasons," but to the casual western observer in Kathmandu there seem to be only three — the warm, the wet, and the cold seasons. At a latitude of mid-Florida and an altitude well under a mile, the days come and go in pleasant succession.

To take a closer look at the seasonal pattern in Kathmandu, let us begin with the first day of spring in early February. Fields glow with yellow mustard when the usual chill of evening is suddenly broken by the first faint puff of warm air. Spring comes but oh so gently. Next day the wedding season breaks with gala sounds of fife and drum. Processions carry large colored umbrellas under which ride brides and grooms. This happy time is reflected in a burst of melody from the magpie robin, perched on a housetop. In the neighbouring hills tree rhododendrons with clusters of scarlet blooms brighten the ridges and draw many birds, even the giant weasel-like, pine martens, to feast on the flowers.

March brings the festival of Holi, a season of wild abandonment, when sins, in the form of garbage, are thrown into the streets and when the younger generation slop dirty colored water on passers-by or pour crimson powder down people's necks. It is "hallow'een" time and wood is stolen to burn in the Holi fire at street intersections at night. It is well to have no errands down town for a week, and if one does, he wears his oldest clothing. The strengthening rays of the sun now stimulate the bird population. Winter migrants with layers of stored-up fat, are on their way from India to their nesting grounds beyond the Himalayas. Wild pears put forth their small, white flowers in scrub jungle, while sprays of peach and apricot trees decorate city gardens. No more fog hangs over the valley at dawn, but a dust haze, fanned by winds from the Indian plain, already fills the air.

SEEK LEGENDARY "SNOW MAN"

The koel cuckoo announces the month of April by screaming his harsh song both day and night. The dust haze has thickened and obscures the nearby hills. Expeditions led by foreigners are on their way to the top of Dhaulagiri or to the home of the abominable snow man. On overhanging crags one finds the beautiful white and yellow bride-of-heaven orchids which grow in clusters of three to seven flowers. Back in the valley, farmers are busy with winter wheat harvest or are preparing the earth for future rice planting. The shallow rivers dry up and people travel to and from Kathmandu over the sand of the stream beds.

In May days are warm with the temperature in the 90's, but the ten to fifteen degree fall at night makes it very comfortable. The last of the migrating birds pass through the valley, while on the neighbouring hills the dawn chorus of resident and summer nesting birds is at its height. By the end of the month, mountaineers reach their upper limits and "snow men" have again successfully eluded their pursuers.

The tiny purple sunbird ushers in June with a wild, clear warble as he alights on gladioli and probes their bases with a long, curved bill. Two weeks later immature males and females overtake him — but he is off, leaving his family in Kathmandu for a number of weeks. Crepe myrtle hedges burst into bloom; some are trees forty feet high. The Indian Embassy gounds are especially beautiful. By the middle of the month people begin to offer special prayers for rain, and in a few days the first downpours occur. Over night the great parade ground in the center of Kathmandu turns from straw to a deep green.

EVERY YEAR 'LEAP YEAR'

Summer months of July and August are farmers' time of feverish activity. As soon as the ground is moist, men work long hours, turning up soil with a king-size, short-handled "hoe." Squads of women rhythmically break clods of earth with large wooden mallets. The sprouting rice is taken from seedling beds and planted by hand in flooded fields. Long rows of women bend to their task and sing love ballads as they work. Boys on the banks of fields may sing a reply, and should a girl win the contest which follows, she may propose marriage. This version of leap-year comes annually and draws a large number of smiling spectators.

By now monsoon rains are strong. Snakes escape from their watery holes and seek shelter in houses. Rat snakes and keelbacks are the more common. People dread a dark-colored snake, for should such a one glide

(Continued on page 7, column 1)

TIBETANS HOPE TO MAKE A SALE

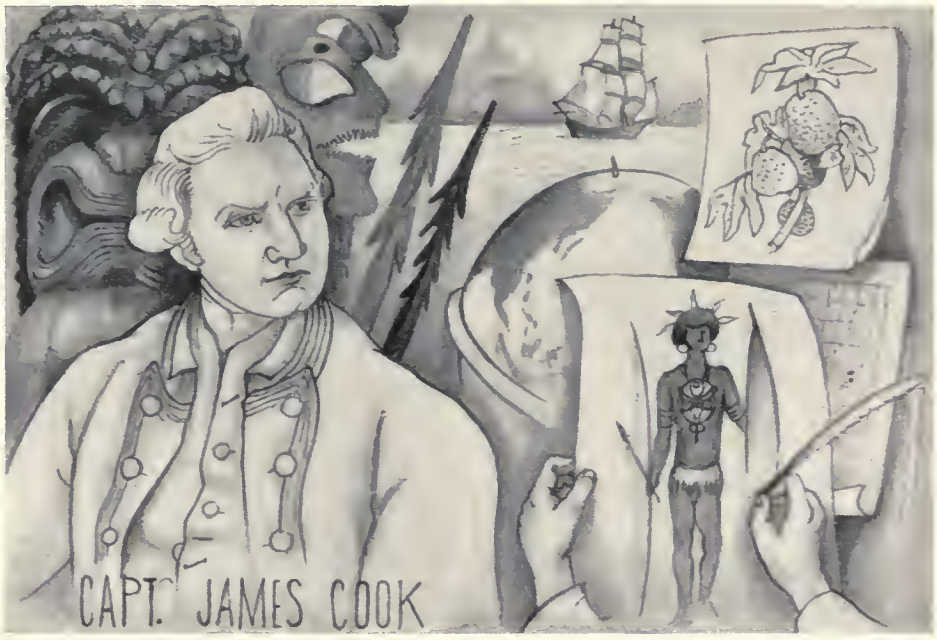
In winter months Tibetans travel to Kathmandu with goods to sell. Above are two Tibetans with yaks (large wild, or domesticated, oxen of Tibet).

Discovery of Pacific Isles . . .

IT ALL STARTED WITH SPICE AND ENDED WITH SCIENCE

By ROLAND W. FORCE
CURATOR OF OCEANIC ARCHAEOLOGY AND ETHNOLOGY

Part III



By Staff Illustrator Marion Pahl

THE SALE of the Moluccas by Spain to Portugal in 1528 demonstrated what seems to have been a rather foolhardy approach to things. But what must be remembered is that Spain had other involvements. She retained the Philippines and spent 250 years sailing back and forth between the west coast ports of Mexico and the Philippines—trying, for the most part, to miss the scattered intervening islands which were considered of little value from the standpoint of exploitation. Not all Spanish exploration had an economic impetus. There was an enormous amount of zeal to spread the gospel—and where better spread it than in Terra Australis Nondum Detecta. At various times voyagers alternately thought that New Guinea, Australia, New Zealand, the New Hebrides, and even parts of the Solomons belonged to this hypothetical mass of land to the south.

In 1567 Alvaro de Mendaña (a nephew of the Viceroy of Peru) was commissioned to set sail with two ships in search of the supposed austral continent. He was to establish a settlement there and convert the natives to Christianity. The track sailed was westward into Polynesia, between the Tuamotus and the Marquesas, sighting neither. After a typical voyage of the period in which starvation and death played their usual roles, and during which the Ellice Islands were sighted, the expedition found itself in the Solomons. Beyond a certain amount of plunder and pillage, the voyagers succeeded in mapping the islands in such an exclusive manner that they could not be found for another 200 years. After an unfruitful attempt at colonization, Mendaña turned homeward to the north toward the Gilberts and Marshalls, but not touching them, discovered Wake, and ultimately returned, bedraggled, to Peru.

Undaunted, Mendaña spent a quarter of a century stirring up support for a return visit to the Solomons, and finally, in 1595, went to sea once more. This time he made it to the Marquesas, where he managed to kill several hundred "infidels," and from there finally reached Santa Cruz in the Solomons. The "colony" did not work out any better this time, and Mendaña, as well as many others in his party, met his end in the Isles of Solomon. The remnants of the voyage ended up in Manila.

A later voyage of conversion was undertaken by Pedro Fernandes de Quiros, one of Mendaña's subordinates. He found royal favor and sailed in 1605 from Peru with three ships. He ended up in the New Hebrides after what (theoretically) was the cleanest voyage in history—no gambling, swearing, or mistreating of natives was condoned. A colony was founded in the New Hebrides, and it was called Australia del Espiritu Santo or New Jerusalem—another testimonial to the fervor with which Quiros was imbued. Disease, native unrest, and mutiny — the three horsemen of the Pacific—caused the abandonment of the colony. Quiros returned to Peru, and one of his ships under Torres sailed west through the straits, which were to bear his name, between New Guinea and Australia. Quiros continued to petition for new expeditions until his death in 1614. With him died Spain's conquest of the Pacific. She held onto what she had for some time, but new discoveries were not sought. During the Portuguese and Spanish period some discoveries were made by English and French pirates such as Drake and Cavendish, but they amounted to very little compared with what was to occur later on.

DUTCH HARD CASH PERIOD

The Dutch were a breed apart. They were hard headed, super-practical businessmen. They were the men in gray flannel of their day, without the ingredient of conformity that has come to be associated with this category of man.

The Dutch took astute advantage of the decline of Spanish and Portuguese power on the high seas and in the world of nations. Many Dutchmen had sailed under Spanish and Portuguese command and when the opportunity presented itself (with the defeat of the Spanish armada in 1588 and the general weakening of Portuguese influence), the Dutch stepped into the breach, and by 1602 held the East Indies in their grasp. In 1598 alone they sent five expeditions into the Indies and in the short span of four years had set up the famed United East Indies Company. Mostly the Dutch were interested in trade, and there was more to be had with the relatively sophisticated peoples in Southeast Asia than in the more nether reaches of the Pacific Ocean.

Several names stand out in terms of Pacific exploration for the Dutch. LeMaire and Schouten left Holland in 1615 to discover a means of beating the monopoly on trade held by the United East India Company. They sailed around the tip of South America and into Polynesia, touching the Tuamotus, Hoorn (Horne) Island in the Fiji-Samoa area; skirted New Ireland and New Guinea, and discovered the coastal groups known now as the Admiralties and the Schouten Islands. The thing that made it difficult for independent Dutch merchants was that the monopolistic United East India Company had exclusive rights to the only two known passages leading to the Indies—the Cape of Good Hope and the Strait of Magellan. LeMaire and Schouten sailed around the island at the tip of South America (Staten Island) and through another strait which now bears LeMaire's name. Upon reaching Batavia, however, the LeMaire voyage came to an abrupt halt with the confiscation of the ship and its property. Later, after much litigation, it was proved that the route taken was in fact a new one and the voyage had not actually been in violation of existing regulations. This may have given LeMaire and his father (the merchant) some satisfaction, but little else.

We credit Van Dieman (a Dutch administrator) with having inspired most of the

real Dutch exploration in the western Pacific. He was appointed governor-general and appeared on the scene in Batavia in 1636. He commissioned certain explorations to answer questions about land to the south. In 1642 Tasman discovered Tasmania, which he called Van Dieman's land, though it now bears his name. He went on to discover New Zealand and probably Tonga and Fiji. Later, on another voyage, Tasman explored the northern coast of Australia. Tasman's ventures were considered failures by all except Van Dieman who, after all, got an island named after him; and when he died, the sport came to an end. Not a single exploitable area had been discovered. The books had to balance and tomfoolery such as exploration would not allow this. The only other Dutchman who amounts to much in our history books is Roggeveen, who in 1722 happened onto lonely Easter Island — so-called since his arrival was on Easter day. Roggeveen also sighted eastern Samoa and was repaid for his trouble by having his ships confiscated for having trespassed in areas controlled by the all-powerful East India Company.

SCIENCE AND STABILIZATION PERIOD

The period of British and French exploration began with freebooters who devoted themselves to looting Spanish galleons. Between 1695 and 1726 it is estimated that there were more than a hundred British and French voyages into the Pacific. The Englishman Dampier visited Guam, the Philippines, Australia, New Ireland, and New Britain, and is immortalized by having his name attached to the passage between New Guinea and New Britain. In many ways more notable than his deeds were the writings of this buccaneer. He inspired many to follow in his footsteps with his graphic descriptions of island life. Here, in truth, dwelt the *noble savage*, needless to say, walking in beauty. Another seafaring subject of the British Crown was Anson, who is also noted for plunder and the vivid descriptions of his voyages to the Marianas.

Byron, an Englishman, was one of the first to benefit from competing government sponsorship of exploration by Britain and France. This was a situation not unlike today's in which the United States and Soviet Russia are vying to see who can get a man into space first; and it, too, had a scientific emphasis. During his voyages to the Marianas, the Tuamotus, and the Gilberts, Byron did a good deal of mapping, and numerous errors were cleared up. Descriptions of the flora and fauna were published, as well as accounts of the native populations.

Wallis and Carteret, also sailing from England, visited the Tuamotus, the Society Islands (Tahiti), and Tinian and Saipan in Micronesia. These latter islands were much visited by voyagers in need of supplies. Carteret is credited with rediscovering the Solomons, exploring the Bismarcks, mapping the Admiralties, and finding a channel between New Britain and New Ireland.

Bougainville, a French captain, took scientists along on his voyage and thereby established a precedent. He visited Tahiti, Samoa, the New Hebrides, and the Solomons. Finally he ran up against the great barrier reef of Australia and had to turn around. He later mapped the Louisiade Archipelago and ultimately had one of the Solomons named after him.

This brings us to the famed Captain James Cook. In three voyages (1768–79) he left little else to be done by explorers in the Pacific. He picked up the loose pieces and fitted them together, finally paying for the privilege by being killed by irate Hawaiians who wanted to keep a ship's boat they had stolen for the nails it contained. The penalties for contact with South Sea Islanders have always been high — but inestimably higher from the islanders' point of view.

Cook, once and for all, settled the issue as to the existence of Australis. He sailed on two different occasions so far south that he was stopped by ice fields. What is more, he used newly developed instruments (the chronometer and the sextant) to chart the Pacific so expertly that little revision has been necessary. Astronomical observations were made, plants were collected, natives were sketched and described, notes were taken on natural resources, harbors were listed, currents were noted; and in general, exhaustive information of all descriptions was collected. On his various voyages, Cook and his men touched the Societies, Antarctica, the Hervey Islands, New Zealand, Hawaii, eastern Australia, the Tuamotus, the Marquesas, Niue, New Caledonia, Norfolk, Mangaia, Tubuai, and many other smaller islands. Most significantly perhaps, Cook overcame scurvy (a malady stemming from insufficient vitamin C) by rationing fresh lemon juice daily and by putting in for fresh supplies as often as possible. He also ran a clean ship and insisted on clean quarters and dry clothing for his men. Of importance to anthropology also is the fact that Cook collected ethnographic specimens which are now lodged in various museums the world over.

All and all, this man and his companions solved most of the major mysteries of the Pacific. It has never been the same since.

The door was opened to future generations of traders, missionaries, whalers, and other latter-day representatives of civilization. Gone forever was the isolation of the islander. The last stronghold of aboriginality had been pierced. It all started with spice and it ended with science—the age of discovery was over.

(*To be continued*)

SECRET SOCIETY MASK

Used by women of the Mende tribe in Sierra Leone Protectorate, West Africa. Seventeen inches high, the mask is carved in wood, and decorated with a fringe of dyed raffia.

SECRET SOCIETY MASK FROM AFRICA

By PHILLIP H. LEWIS
Associate Curator of Primitive Art

Widespread among the peoples of the Sierra Leone Protectorate and Liberia is a women's secret society called *Sande*, or sometimes *Bundu*. The mask shown in the accompanying illustration was used by members of that secret society, and was collected from the *Mende* people, who number about 600,000 and are found in Sierra Leone.

The *Sande* society is a women's organization which parallels the better known *Poro* society of the same area. The main function of the *Sande* society is to initiate and educate young women to the proper fulfillment of women's work.

The mask shown here is used as part of the impersonation or representation of the *Sande* spirit. A woman of high rank in the secret society is given the honor of being allowed to represent the spirit by wearing the mask. The forms of the mask are derived from the forms of a human head and face; but these have been altered by making the face very small, the forehead and head large, and by emphasizing the hairdress.

Ideals of beauty current among the *Mende* are expressed in the following translation of a mourning song sung by a member of the *Sande* society for a deceased woman:

"Let me not hear this! My child, big forehead, woman with plenty of hair, what brought this for you?"

This suggests that the impersonated spirit is thought of as a human-like creature. However, it is exaggerated and stylized so that the *Mende* know, when they see the masked figure, that they are looking at a supernatural creature, and not an ordinary person. Art is thus used to make visible and tangible a part of the supernatural world.

FILMS OFFER 'WORLD TOUR' WITH WELL-KNOWN LECTURERS

AROUND THE WORLD via motion picture camera! For the 113th time the Museum offers the public a popular free motion picture-lecture series, featuring well-known lecturers and the color films they have taken while traveling in remote and famous places in the world. The programs, sponsored by the Edward E. Ayer Lecture Foundation, are presented on Saturdays at 2:30 P.M. in the James Simpson Theatre. Members of the Museum may claim reserved seats by presenting their membership cards before 2:25 P.M. on the lecture day.

Following is the complete spring schedule:

March 5—The Pitcairn Story

Irving M. Johnson, U.S.N.R.

For Captain Irving M. Johnson and his wife, "home" has come to mean a schooner and brigantine called the "Yankee," a vessel that seven times in the last 25 years has carried the Johnsons to colorful Pitcairn Island. The "Yankee," resembling the historic "Bounty," mutineers of which in 1790 occupied Pitcairn Island (the present island population is directly descended from those early mutineers), has captured a place in the history of the island—that is, the "Yankee" and her camera-toting skipper, Captain Johnson. Johnson's color motion picture includes scenes illustrating life on Pitcairn 25 years ago, as well as life as it is now, with some exciting camera accounts of underwater diving operations to recover parts of the famous "Bounty."

March 12—Pathways Through Pakistan

J. Michael Hagopian

Pakistan is the world's largest Moslem country—and its most important Moslem country, according to J. Michael Hagopian, who will bring to the Simpson Theatre interesting glimpses of Pakistani life with a personal commentary on the country's past, its present, and its future. His color film highlights city life in Karachi, Sukkur, Lahore, Dacca, and Chittagong; the historical heritage of the Mogul Emperors; peasant life along the riverfronts of the Indus, Ganges, and the Brahmaputra; and tribal dances of the Bengal jungle. In addition, Dr. Hagopian will speak on the Communist threat to Pakistan, the Pak-India controversy over Kashmir, and Pakistan's relations with the United States.

March 19—Subantarctic New Zealand

Alfred M. Bailey

A destroyer escort doing picket duty on the fringe of the Antarctic, as part of the of the program of the International Geophysical Year, is the vehicle for Alfred M. Bailey's screen tour to rugged subantarctic Campbell Island. Located in the "howling fifties," four hundred and fifty miles south of the main islands of New Zealand, Campbell Island is one of the most isolated weather stations in the world. However, its remoteness does not rule out the existence of a wealth of interesting wildlife—the Royal Albatrosses (largest flying birds in the world), droll penguins, and great herds of gigantic elephant seals—that is included in Bailey's film, along with an interesting camera study of the unusual activities of a meteorological station.

March 26—Rural England

Alfred Wolff

The impressive "trooping of the colors" ceremony on the Queen's birthday, changing of the Guard at Windsor Castle, Stratford-upon-Avon, Tintagel Castle of King Arthur, Canterbury, quaint Cotswold villages, old-fashioned Cornwall seaports—all spell England and will be a part of Alfred Wolff's presentation that concentrates on the rural life of the island nation. The motion picture, not limiting itself to traditional and ceremonial England, will present also a little of modern England with a look at the world's first atomic energy plant, and intimate glimpses of the people at home and at work.

April 2—Holland

Gerald Hooper

Holland, a country that has been waging a ceaseless battle with the sea for many years, provided interesting subject matter for Gerald Hooper's camera when he roamed the lowland country from Amsterdam's canals and odd architecture, to the Hague, Rotterdam, and on, and on, creating an informative motion picture as he traveled. Hooper has made a special camera study of the world's greatest drainage venture—the dikes, the pumping, newly claimed ground, fertile farms—and will give his audience a taste of the colorful Holland Festival, which features performances of the world's leading artists and musical groups.

April 9—Yankee Spy in Texas

Robert Daris

Robert Davis, as a "yankee spy in disguise," invaded Texas to make a comprehensive film of our great western state noted for its oil, cattle, and vast expanses of grazing land. In his film, however, Davis pays special attention to the fantastic development that has taken place in agriculture, industry, and fishing, with side excursions to such places as the famous King Ranch and an arabian horse ranch. He also points out the necessity of border patrols and airplanes, the role the armed forces play in Texas, and its splendid educational institutions. As a background for his film Davis includes bits of historical information on the development of the "Lone Star" state.

April 16—Switzerland

Kenneth Richter

The theme of Kenneth Richter's "Switzerland" is the strikingly successful union of three greatly different peoples—German, French, and Italian—in a confederation which has served them well for centuries and today stands as an example to the whole world. Richter's audience will travel with him high into the Alps by chair lift, and then journey on foot in the mountains. The film takes you into the home of a Swiss family and shows the Swiss people at work in watchmaking, dairy farming, and heavy industry. Stops on the tour are Geneva and Zurich, financial centers of the world.

April 23—The Mighty Mississippi

James W. Metcalf

The mighty Mississippi winds its way south from its source in a small northern Minnesota lake called Itasca to the Gulf of Mexico, weaving a pattern of beauty, industry, and commerce in the land through which it passes. James Metcalf has recorded the complete story of the Mississippi's 2,552-mile journey to the sea, giving special attention to the lovely landscapes along its banks and to some of its important industrial cities. These cities ship much of their produce on the Mississippi, upstream or down, on an endless water conveyor belt that transports more than 40 per cent of the nation's bulk freight.

April 30—The Shandon Hills

John E. Taft

A love for wildlife and the wild lands in which it lives brought about the development of John E. Taft into an enthusiastic naturalist and ardent conservationist. The Shandon Hills of his native California present a rare combination of harsh, lonely terrain and lovely meadows which attract a wide variety of wild creatures, both resident and migrant. In his color motion picture Mr. Taft takes his audience along the trail of the four seasons, portraying animal life in its ceaseless struggle for existence against enemies and hostile weather, as well as in the beauty of the California springtime. A little-known area in California presents scenes of surprising beauty and interest.

Five Antioch Students Join Museum Staff

Five students from Antioch College (Yellow Springs, Ohio) are employed in the Museum's scientific departments as part of Antioch's specialized eductional program of in-the-field study. The students will remain with the Museum three months, during which time they are adding to their education while rendering valuable assistance to the Museum.

DR. KENNETH STARR LEAVES FOR FAR EASTERN STUDY

Dr. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology, departed February 17 for Taiwan (Formosa) to pursue a special study-research assignment for the Museum. His trip will take him around the world, as he plans to return via Asia, Europe, and across the Atlantic, making stops at special points of scientific interest.

Main objectives of Dr. Starr's trip, which will cover a period of six months or more, are: (1) to pursue further his studies in the anthropology and cultural history of China and (2) to examine the large holdings of Chinese ink-rubbings in public and private collections. Rubbings are ink-on-paper copies of low-relief or incised inscriptions and designs on stone, metal, fired clay, and other hard materials. They often have been very illuminating in studying the history and art of China and other Asiatic countries.

Some of the special stops on the tour will be the Bernice Bishop Museum in Hawaii, where Dr. Starr will confer with Dr. Kenneth Emory on an unusual collection of rubbings of petroglyphs made by Dr. Emory; Japan, where Dr. Starr will spend some time studying Japanese collections of rubbings; Taiwan's National Central Library and the Institute of History and Philology of Academia Sinica; and the ancient ruins of Angker Wat in Cambodia. The trip is being sponsored by the Museum, the American Council of Learned Societies, and Science Research Council.

"I'm Innocent" by M. J. Schmidt, of Chicago, won an honorable mention in nature photo show.

"Animal With Scales" by Madam Van der Bussche, of Belgium, awarded honorable mention in photo show, one of many photos from foreign countries.

NATURE PHOTO CONTEST BREAKS ALL RECORDS

The 15th Chicago International Exhibition of Nature Photography held this February broke all previous records in numbers of prints and slides submitted, and in the number of persons who entered the contest.

Approximately 600 prints and 3,400 slides were entered in the contest by over 1,000 photographers. Entries poured in from the four corners of the world, including Austria, Czechoslovakia, Sweden, Germany, Belgium, Luxembourg, England, India, Japan, Malaya, and South Africa. This year, for the first time in the contest's history, a packet of 52 prints was entered by Russia's Union of Soviet Societies of Friendship and Cultural Exchange with Foreign Countries.

After a weekend of judging, 6 entries were selected to receive silver medals and 117 were chosen for honorable mentions. Winners of silver medals are: **Prints**—"White Sands Yucca," M. S. Barrett, Adams, Massachusetts; "Waiting," William Van Allen, Bend, Oregon; "Storm Clouds," Caryl Firth, Trappe, Maryland; **Slides**—"Lake of Lava," Bob Haugen, Hawaii National Park, Hawaii; "Winter's Embellishments," Leslie A. Campbell, Belchertown, Massachusetts; "Blue Quartet," Raymond Schortmann, Easthampton, Massachusetts.

The contest is the largest in the world devoted to nature photography.

'WILDLIFE DOWN UNDER,' LAST AUDUBON PROGRAM

The Illinois Audubon Society goes to Australia for its final screen-tour in the 1959–60 lecture series with Alfred M. Bailey's presentation of "Wildlife Down Under," on Sunday, March 20, in the James Simpson Theatre.

Dr. Bailey, director of the Denver Museum, made his color motion picture during the springtime, the most brilliant season in the year in Australia. The film story of his most recent expedition to Outback country includes such natural curiosities as magnetic ants, vast hordes of waterfowl, emus, monitor lizards, kangaroos, koalas—as well as the aborigines.

The program will be presented at 2:30 P.M. Admission is free.

NEPALESE YEAR—

(*Continued from page 3*)

across the road it is a sure sign of the approaching death of a member of the family. On wet hillsides, earthworms occasionally form living chains yards long. Leeches abound in certain areas. Not content to inch their way along the ground, they cluster at ends of grasses along a trail or drop from trees with extreme accuracy.

Blue-green fields of August give way to yellow-green fields of September as rice and corn ripen. Boys now fly kites to inform the rain god that no more moisture is needed on harvest fields. Many dogs roam the city streets and about half the females come into heat at this time. Now is the season for *naspatis*, an apple-pear which makes good sauce, and for guavas, brought in eared string sacks carried on the backs of villagers. Birds begin to appear in the "down migration" from Siberia, led by the wagtails. Over a hundred species of ferns cover trees and the ground while a dozen or more species of orchids cling to oaks and rhododendrons. The rice harvest begins and continues for six weeks.

October is "Christmas" for the Nepalese. Schools and government offices close. People come home from India for this *Dusai* season. They put on new clothing, visit family and friends, feast and make merry. Regiments sacrifice young buffaloes and goats; the commander-in-chief of the army bathes his hands in the blood and marks their flags with his handprint. Gardens are full of marigolds. Crickets and other insects still chorus at night. Tree and house sparrows gather at dawn and dusk in a noisy community chit-chat. The rainy season ends and billows of cumulus clouds fill the sky.

The Festival of Lights in early November, concludes the fall holiday season. Dealers whitewash their shops and brighten them at night with oil lamps or electricity in honor of the goddess of wealth. It is the end of the fiscal year. It is also the marriage season again; people don their best clothing and feast with family members. In the market, the first oranges appear, along with huge heads of cauliflower and radishes two feet long. Rice fields are clear of grain, and when the first shower comes, soil is prepared for potatoes, beans and cabbages. Poinsettias leaf out and are twenty or more inches across. Skies are clear and ranges of glittering snow peaks stretch away toward Tibet.

During the winter months of November, December, and January, Tibetans and northern Nepalese come to Kathmandu with their long-haired goats, sheep, and yak-tails for sale. A dry, cold wind blows from the north, and streets are quickly deserted after the short work day from eleven to four. Colder days bring birds like grosbeaks from higher elevations down to Kathmundu Valley. Even then roses and sweet peas fill gardens, while the nearby hills are fragrant with the scent of daphne.

After a period of waiting, there comes that first faint puff of warm evening air. Astrologers declare the marriage season open and spring has come again.

Shell Collection Grows . . .

MUSEUM RECEIVES GIFT OF LIFE-LONG HOBBY

By ALAN SOLEM
CURATOR OF LOWER INVERTEBRATES

THE UNPACKING of more than 13,000 sets of shells from the collection of the late Fred Button of Oakland, California has just been completed. Started by his father in 1865, this collection represents the life-long hobby of two busy men, dating from Civil War days and continuing until Mr. Button's death in 1926. Since then, it has been stored in the attic of his daughter's home until acquired by Chicago Natural History Museum in 1959.

World events are no respectors of natural history collections. Wars, natural disasters, carelessness in museums, and minor accidents all serve to lose valuable specimens documenting early work of natural scientists. The exchange of specimens with students in other lands often leads to rediscovery of material long assumed lost. Any old collection may have a few important items, but never have we seen so many as in the Button collection.

SHELLS FROM HISTORY

Sea shells from the Red Sea collected by a student of Linnaeus in 1769, sets of species of which the original material was destroyed in the San Francisco earthquake (now being eagerly studied by scientists at the California Academy of Sciences), a few shells from the completely destroyed Hungarian and Hamburg museums, literally hundreds of sets of shells from South African, Australian, and Hawaiian authorities, and many others all form valuable records of past research and provide reference sets on which to base new studies.

Life-long residents of West America, the Buttons had naturally concentrated on shells from their own region, but also made an effort to obtain duplicates for trading with foreign students. Probably this is the most complete private collection of West American species in existence. But Mr. Button did not limit his collecting to American shells. Several thousand glass vials contain minute shells from all continents and all imaginable habitats. Unlike many collectors, the Buttons were very partial to minute shells, and more material of this kind than was contained in the Museum's entire collection has come from this addition.

IMPORTANCE OF AMATEURS

Of greater interest to most shell collectors are the cowry shells. Approximately 168 species are recognized, and a few amateur collectors who specialize in nothing but cowries, have managed to accumulate up to 156 species. The Button collection contained 143 species, and wooden cabinets from the collection have been exchanged to add another seven species, giving Chicago Natural History Museum the largest representation of the family in any American museum.

In connection with another project, I recently estimated that fully 90 per cent of our mollusk collection is the result of the activities of amateur conchologists, either through gifts to the Museum or from collections purchased from estates. Mostly, amateurs collect big pretty shells, but the rare exceptions, such as the Button family, do exist.

From the standpoint of research, this is one of the finest collections received by our Museum to date.

NEW CHILDRENS' JOURNEY LEADS TO CHINA

Children may journey to the fascinating land of China without ever leaving Chicago by participating in the Raymond Foundation's new spring journey, "China—Land of the Dragon," beginning in March and continuing through May. The journey into the Republic of China (covering a period from 1911–1940) directs young "journeyers" to exhibits of Chinese puppets and Chinese theatre, and to a special exhibit that demonstrates the typical curricula of a grade school student in China during the early 1900's.

The journey may be taken by any boy or girl, and travel instructions are available at the north and south doors. After completion of four different journeys, the "journeyer" becomes a certified Museum Traveler; after eight, a Museum Adventurer; and after 12, a Museum Explorer. With the completion of 16 different journeys a child becomes eligible for a special journey and then membership in the Museum's Discoverers' Club.

NEW MEMBERS

(January 18 to February 5)

Associate Members

Nathan Allen, Arthur I. Appleton, William A. Brandt, Robert M. Buddington, Chesser M. Campbell, Arthur D. Chilgren, Miss Bonnie Colvin, Eugene Cotton, John K. Dorsey, Mrs. R. Taylor Drake, R. W. Ferguson, Patrick H. Hume, Paul Jorgensen, Carl A. Kroch, Mrs. Herbert I. Markham, James P. McGuffin, John Alden Morgan, Bernard M. Peskin, Walter S. Snodell, Jr., Henry F. Tenney, Wilfred Tracy, Miss Frances Tyrrell, S. E. Ullmann, Dr. Ernest H. Wakefield, J. L. Young.

Non-Resident Associate Member

Dr. Sidney Soanes

Sustaining Member

J. E. Warner

Annual Members

Miss Mary L. Allfree, Mrs. A. Robert Altschul, Mrs. Walter P. Alvis, Mrs. John D. Ames, Dr. E. A. Archer, Mrs. Charles B. Armour, Samuel B. Bass, Mrs. Maurice H. Bent, Ralph C. Blaha, William G. Budinger, Mrs. Frank J. Calvin, Sherman H. Canty, Dr. C. L. Crean, Joseph DeCesare, Edward J. Donahoe, S. M. Dover, H. Folger Fellowes, Aaron G. Gaines, Mrs. William Goodman, Sidney S. Gorham, Jr., Walter Haines, Herman F. Hajen, John W. Heddens, Alan Hindmarch, Miss Miriam L. Hockman, Dr. Melvin R. Homer, S. J. Ives, Arnold B. Kalnitz, Mrs. Anthony Kamenjarin, Fred R. Kaufmann, Jr., Joseph J. Keene, Lawrence A. Kerns, Gerald C. Kimes, George L. Knoll, John M. Knowlton, Walter R. Kolesiak, Dr. Leonard F. Kowakski, Walter C. Kurz, Miss Jane A. Laird, Donald B. Lourie, Dr. Anthony V. Madonia, Frank McCallister, Milton T. Miller, H. C. Murphy, Ralph G. Newman, Walter J. Nickel, Harold L. Norby, James D. Norman, John S. Osborne, Mrs. George E. Pabich, Dan Pagenta, Paul J. Panuce, Alfred L. Parme, Elliott H. Pennebaker, Dr. Charles B. Puestow, Robert W. Record, D. B. Regan, Dr. Joelle Rentfro, Miss Irma L. Richards, Frank W. Riederer, Dr. John A. Sanfilippo, Mrs. Edward A. Slindee, Edgar H. Smith, Dr. Harold M. Spinka, R. L. Smith, Jr., William I. Templeman, F. W. Terry, Dr. Anthony B. Vacante, Dr. D. M. Vachout, Mrs. Alexia Wasleff, French Waterman, Dr. Gurli Wernstrom, Dr. Ralph P. White, Mrs. Frank E. Wilhelm, Albert M. Wolf, Miss Genevieve A. Zaczek.

FREE CONCERT FEATURES LEONARD ROSE

Leonard Rose, noted cellist, will appear as guest artist with the Festival String Quartet at the Free Concert Foundation's fourth chamber music concert in James Simpson Theatre on March 9, at 8:30 P.M. Rose is presently touring America, making a number of guest appearances. He has recently returned from an extensive European tour.

The evening's musical program will be "Italian Serenade" by Wolf, "Duo for Violin and Cello, Opus 7" by Kodaly, and Schubert's "Quintet for Two Violins, Viola, and Two Cellos."

Free Concerts Foundation Inc. was organized by Mrs. J. Dennis Freund so that Chicagoans might have an opportunity to hear, without charge, chamber music by gifted artists. The final concert in the 1959–'60 series will be presented on April 13, when Eugene Istomin will be the featured soloist.

Although admission to the concerts is free, tickets are required. They may be obtained by writing Free Concerts Foundation, Chicago Natural History Museum (Roosevelt and Lake Shore Drive), enclosing a stamped, self-addressed envelope. Free parking is available in the Museum's north and west parking areas.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO NATURAL HISTORY MUSEUM
Bulletin
Vol. 31 April
No. 4 1960

Chicago Natural History Museum

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

THE BULLETIN

EDITOR

CLIFFORD C. GREGG ..... *Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN ..... *Chief Curator of Anthropology*
JOHN R. MILLAR ..... *Chief Curator of Botany*
SHARAT K. ROY ..... *Chief Curator of Geology*
AUSTIN L. RAND ..... *Chief Curator of Zoology*
THEODOR JUST ..... *Curator Emeritus of Botany*

ASSOCIATE EDITOR

MARILYN JINDRICH ..... *Associate in Public Relations*

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

STAFF NOTES

Dr. Roland W. Force, Curator of Asiatic Archaeology and Ethnology, attended the Viking Fund Medals and Awards presentation dinner in New York City on March 4 at which the Wenner-Gren Foundation for Anthropological Research presented awards for outstanding achievement in the field of anthropology. . . . **Allen Liss,** Custodian of Anthropology Collections, was guest speaker March 14 on WTTW's television sociology (145) course in human relations. . . . **Dr. Ranier Zangerl,** Curator of Fossil Reptiles, and **Dr. Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, spoke on the "Mecca Project" before the University of Chicago's department of geology on March 9. . . . **D. Dwight Davis,** Curator of Vertebrate Anamony, recently spoke before an orthodontists' seminar at the Edgewater Beach Hotel. . . . The Chicago Entomological Society, meeting at the Museum last month, heard **Henry S. Dybas,** Associate Curator of Insects, speak on the topic, "The Population Ecology of the Periodical Cicada". . . . **Dr. Robert F. Inger,** Curator of Reptiles and Amphibians, delivered a lecture during March on the evolution of reptiles before a comparative anatomy class at the University of Chicago. . . . **Melvin A. Traylor,** Associate Curator of Birds, departed last month for a study trip to the American Museum of Natural History in New York. . . . **Loren P. Woods,** Curator of Fishes, in March lectured to a group of visiting biology students from the University of Wisconsin. . . . **Rupert L. Wenzel,** Curator of Insects and **Henry S. Dybas,** Associate Curator of Insects, attended the meetings of the North Central States Branch of the Entomological Society of America in Milwaukee, March 23 and 24th. . . . "Science In Our World Today," an educational program on WGN-TV (Channel 9) on May 10 will have as guest speaker **Dr. John W. Thieret,** Curator of Economic Botany, who will talk on the topic, "Man Uses Plants." The program is televised from 8:15 to 8:30 A.M. . . . **Mrs. Meta P. Howell,** Librarian, recently attended sessions of the American Library Association and **Mrs. M. Eileen Rocourt,** Associate Librarian, as Chairman of the Museum Division of Special Libraries Association, attended the association's advisory meetings. Both association meetings were held in Chicago.

UNIVERSITY OF HEIDELBERG HONORS DR. HAAS

Dr. Fritz Haas, Curator Emeritus of Lower Invertebrates, was honored February 22, 1960, by a diploma from his alma mater, the University of Heidelberg, congratulating him on his distinguished career of outstanding service in research on land and fresh water mollusks. Written congratulations were also extended by the *Senckenbergische Naturforschender Gesellshaft,* the natural history museum at Frankfort-on-Main.

FRITZ HAAS

Dr. Haas received the degree of Doctor of Natural Philosophy from the University of Heidelberg in 1910. During his 50 year career in science Dr. Haas has had 265 scientific papers published, 21 by Chicago Natural History Museum. Of these publications, 201 are in German. Much of the data in some of the publications was gathered on expeditions to distant parts of the world. The geographical range of Dr. Haas' past expeditions includes Africa, Brazil, Spain, Palestine, Germany, Norway, Bermuda, Cuba, Florida, and the Great Smokies.

Dr. Haas came to Chicago Natural History Museum in 1938 as Curator of Lower Invertebrates, and in January, 1959, he was named curator emeritus. In 1954 the Senckenberg museum presented Dr. Haas the Cretzschmar medal for scientific achievement.

THIS MONTH'S COVER

There's no mistaking the massive hulk of an African rhinoceros. The one on our cover, who appears to have just stepped out of a "luxurious" mud bath, can be seen in the Parc National de la Garamba, an animal reserve in the northeastern part of the Belgian Congo. The picture was taken by Dr. H. S. De Saeger, of the Institut des Parcs Nationaux du Congo Belge, and is one example of the African wildlife that Museum Members will see on Members' Night, April 29, in the special illustrated lecture by Dr. Robert F. Inger, covering his recent trip to the Belgian Congo.

EUGENE ISTOMIN TO PLAY AT APRIL 13 CONCERT

Pianist Eugene Istomin will appear with the Festival String Quartet in James Simpson Theatre on April 13 in a chamber music program that concludes a season of free concerts presented at the Museum by the Free Concerts Foundation.

The program for the evening will feature Beethoven's "Piano Quartet, E Flat Major," "String Quartet, A Minor," by Walton, and Brahms' "Piano Quintet, F Minor, Opus 34."

Chicago's interest in and support of the free concert series was demonstrated by the large attendance at each performance, including the February 10 concert that drew close to 600 persons in spite of a traffic-paralyzing snowstorm that raged all day and into the evening. And at the March 9 concert when the weather was better but not good, Guest Cellist Leonard Rose was greeted by a packed house of more than 1,100 persons.

Free Concerts Foundation was founded by Mrs. J. Dennis Freund, who organized the Festival String Quartet especially for the free concerts series. Members of the quartet are: Violinist Sidney Harth, concertmaster of the Chicago Symphony orchestra; Teresa Testa Harth, violinist; Rolf Persinger, violist; and Harry Sturm, violoncellist. Mrs. Harth is a member of the Lyric Opera orchestra; Persinger and Sturm both play for the Chicago Symphony Orchestra.

Tickets for the final concert may be obtained by writing Free Concerts Foundation, Chicago Natural History Museum, enclosing a stamped, self-addressed envelope.

MUSEUM MEMBERS' NIGHT
Friday, April 29

To those Museum Members who have contributed to the Museum's growth and progress, and to their friends, the Museum extends a cordial invitation. This special evening is planned in their honor.

Discovery of the Pacific Isles . . .

THE MISSIONARIES CREATE A PSALM BOOK CIVILIZATION

By ROLAND W. FORCE
CURATOR OF OCEANIC ARCHAEOLOGY AND ETHNOLOGY

Part IV

AMONG the first Europeans to venture on the scene in Pacific island cultures after their discovery were men and women bent on bringing the Word of God to the heathen pagans, who not only engaged in sinful activities, but obviously enjoyed them.

By Staff Illustrator Marion Pahl

Some of the descriptions of the quality of sin in the island world are so graphically explicated in early missionary reports that the effect on some readers approximated envy rather than pity.

One of the most famous junkets into Polynesia was that of the missionary ship *Duff* which arrived in Tahiti in 1797. The missionary party was composed of a motley group of individuals among whom only four were ordained ministers. The *Duff*, under command of Captain James Wilson, included among its mission members some tradesmen; craftsmen such as tailors, carpenters, weavers, and bricklayers; a surgeon, and even a gentleman's gentleman. They were transported to various islands. Eighteen were left on Tahiti while the *Duff* sailed on to Tonga (1,200 miles westward) to leave off half that number. Thence to the Marquesas where one man was left. It took six months to distribute the members of the party.

It was not very long until three members of the Tonga contingent were martyred and the rest fled hurriedly. In Tahiti three of the women died within three months while another member of the group went native. In five years only seven of the original 18 were still alive.

MISSIONARIES TO MARTYRS

It is easy to see why the story of the first venture of missionaries into the Pacific has been described as an "epic of glorious failure and brave endurance." One bricklayer proved to be among the hardiest members of the Tahiti mission and even taught one of the high chiefs to write. Finally even one of the native priests dragged all the idols from the sacred *marae* (platform) and in a fit of what seems to present-day museum men sheer madness and wanton destruction, made a bonfire of them on the beach. It took Henry Nott, the bricklayer, until 1837 to completely translate the Bible into Tahitian and get copies printed up for native use.

The London Missionary Society later sent a few very able and devoted men into the Pacific to take up the work of the hardy first adventurers. One of these was the Reverend John Williams who worked in Polynesia for over 20 years and became a hero in England to the point where he was referred to as the "Ulysses of the Pacific." He stretched his luck eventually and went farther west to the New Hebrides where natives clubbed him to death as he attempted to land on Erromanga. "The blood of martyrs is the seed of the church." Three or four missionaries later, the Erromangese were finally missionized—at least nominally and to the extent that they no longer ate the zealots who came to their shores.

The rather general emphasis which came to be placed on the personal quality of relations between natives and missionaries caused one wag to compose this wry bit of doggerel:

There was a young Reverend from Galt,
With whom Fiji chiefs found one fault;
He was tender and sweet,
As any you'd meet,
But he tasted quite bad without salt.

ASSESSING THE MISSIONS

The British missionaries in the Pacific were preceded by the Spanish, who concentrated mostly on the Philippines, the Marianas, and the Carolines. American Protestant missionaries came on the scene much later. The Boston Mission came to Hawaii in 1820 and spread out to Micronesia, where it still holds strong sway in the Gilberts, the Marshalls, and the Eastern Carolines on islands like Kusai.

Though the missionaries generally took the natives' part in disputes with traders and whalers, they probably did more than any group to contribute to the downfall of island cultures. It has been said that they "too often taught uncritically that anything native was bad." They introduced clothing and made the Mother Hubbard garb a hallmark of missionized islanders. They introduced only certain elements of a culture complex which we may call "the wearing of clothing." Neglected were elements having to do with the cleansing of soiled garments and the necessity for changing wet clothing.

On the positive side, in many cases missionaries did reduce the native language to writing. The missionaries also provided a new experience for the islanders. Here for the first time were white men who did not come to pillage and plunder; who did not carry off their food or their women. The men and women who came to bring the message of salvation to the islands were hardy types who literally gave up their lives for their fellowmen. Financial support was meager and though a few, such as Chalmers, were hailed as heroes, most remained the unsung variety.

"CIVILIZING" THE NATIVES

The reactions of the early missionaries to the natives they came to save are interesting to read. The famous Rev. Gill is sometimes quoted as having written of one island group that: they roved about "in a state of perfect nudity, they delighted to paint their bodies; as you approached the miserable-looking beings you could not suppress the emotions of loathing and disgust which involuntarily arose in your mind." Nudity was one of the things that particularly bothered missionaries and led to a great evangelical movement in the islands which is referred to by one author as "shirtism." One particularly diligent missionary emphasized

shirts for natives especially. He apparently had very little imagination—which has been said by some to have been an enormous asset in mission work—but this is probably unkind. A oneness of purpose is perhaps the best way to characterize the early men of the Church. Such a man was the shirt-emphasizing missionary called Geddie. He is described as having been a real old-style, hardbitten Presbyterian; a fine, clean, intolerant, and tough 100 per cent all-talking, hymning, and danceless sort of man; one who wouldn't even go down to the beach to get his once-a-year delivery of mail if it happened to arrive on Sunday.

"WHATEVER YE SHALL SEW"

The shirt became the essential symbol of Christianity in the islands—a native could not be a Christian in his own clothes or without clothing at all. Trousers and shirt became the entrance requirements for church attendance. The effects of shirtism were far-reaching. On the economic side the natives were first yoked to the trader and later to the copra dealer so that they could earn enough money to purchase clothing. The clothes they were able to purchase were usually of the poorest quality and soon rotted in the humid tropics. Hygienically, clothes could not be kept clean within the native standard of living. Hence skin disease, pneumonia, tuberculosis and parasites benefited. And, finally, psychologically, a new element of shame and secrecy was introduced into the previously open and balanced physical approach of the sexes.

The sandalwood traders did their best to do away with the missionaries since they saw that the clerics usually took the natives' side in disputes. On more than one occasion traders told natives that epidemics which plagued their islands were brought about by the missionaries. What followed was usually another martyrdom. The effects of disease in the islands were these: (1) the natives were either driven into desperate missionism, (2) they slaughtered missionaries with gusto, or (3) they came to hate all white men with a vengeance. Sometimes the natives made all three responses in various orders.

Practically nothing of the old culture was tolerated by the missionary. In everything he saw something heathen and "sexual." Much of what happened in the Pacific would have happened anyway, in time, but the missionary sped the process up. This is the missionary spirit. But with all this, one must agree with Robert Louis Stevenson that even with all their "gross blots, with all their deficiency of candour, humour, and common sense," the missionaries still were the best and most useful whites in early days in the Pacific.

(To be continued)

DR. ALAN SOLEM DEPARTS FOR FIELD WORK IN WEST

The path followed by two scientist-adventurers in Arizona 50 years ago will be retraced by Alan Solem, Curator of Lower Invertebrates, on the first leg of a field trip to the West, for which he departed last March 9. He intends to visit collecting sites first examined in the beginning of the 1900's to see what has happened to the snails over a period of a half century, using as a guide the detailed records kept by the two earlier expeditioners of finds and exact areas explored. Dr. Solem's early predecessors were Henry A. Pilsbry, world-renown scientiest formerly with the Academy of Natural Science in Philadelphia, and James Ferriss, one-time newspaper publisher in Joliet.

From Arizona Dr. Solem will travel to California, Washington, Idaho, and Wyoming. During his trip he is scheduled to make a number of speaking appearances, including an engagement with the Greater St. Louis Shell Club, a seminar at Emporia State Teachers College, and a seminar at the University of Arizona.

In 1959 Dr. Solem visited Panama where he made preliminary studies on the mixing of the South American and North American snail fauna in the geologically recent Isthmus of Panama. The collecting in arid areas of Panama showed that more data was needed on the effects of drier climates on snails, which led to this field trip to the West.

FEATURE WESTERN WORLD IN APRIL SCREEN-TOURS

Five color motion pictures and lectures on world travel are offered by the Museum during April with the geographic emphasis shifting to the West—to western Europe and the United States. This spring's program of free travel-tours by well-known lecturers marks the 113th time the Museum has presented the special travel-film series. The programs are made possible by the Edward E. Ayer Lecture Foundation and presented at 2:30 P.M. in the museum's James Simpson Theatre. Members of the Museum may claim reserved seats by presenting their membership cards before 2:25 P.M. on the lecture day.

Following are the programs for April:

April 2—Holland
Gerald Hooper

April 9—Yankee Spy in Texas
Robert Davis

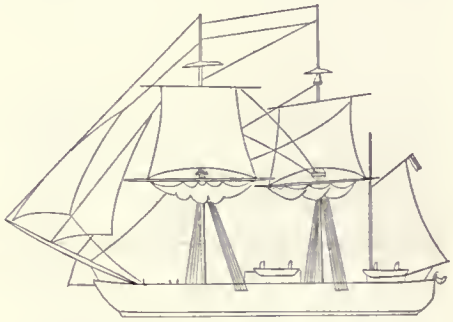
April 16—Switzerland
Kenneth Richter

April 23—The Mighty Mississippi
James W. Metcalf

April 30—The Shandon Hills
John E. Taft

AWARDS TO BE PRESENTED TO 67 "JOURNEYERS"

"The Voyage of the Beagle," a motion picture that traces Charles Darwin's historic trip around the world on the "Beagle" (the voyage on which he formulated many of his first ideas concerning evolution), will begin Chicago Natural History Museum's special children's awards program on Saturday, April 9.



The awards program honors children who have completed specified numbers of museum journeys to achieve various merit ranks, the highest of which is membership in the Museum's Discoverers' Club. To become a Museum Traveler a youngster must have completed four different journeys; eight must be completed for Museum Adventurer status; 12, for Museum Explorer. With the completion of 16 different journeys a child becomes eligible for the special "Voyage of the Beagle" journey, and then membership in the Discoverers' Club.

This spring 67 boys and girls will receive awards—35 will become Travelers; 15, Adventurers; 5, Explorers; three will start the special advanced journey; and nine will be named new members of the Museum's Discoverers' Club. The program begins at 10:30 A.M. in the James Simpson Theatre.

Other childrens' programs offered during the month of April follow:

April 2—International Friendship
(Girl Scout Day)

April 9—The Voyage of the Beagle
(Museum Traveler Day)

April 16—NO PROGRAM—Easter Weekend.

April 23—The Red Balloon

April 30—All Cartoon Program

Children may come to these free programs alone, in groups, or with parents or other adults. The programs are made possible by the James Nelson and Anna Louise Raymond Foundation. All are offered on Saturdays at 10:30 AM..

MUSEUM MEMBERS' NIGHT
Friday, April 29

MUSEUM PLANS EVENING HONORING ITS MEMBERS APRIL 29

BEHIND THE SCENES. Staff Artist E. John Pfiffner in picture on the left is working in his studio on the third floor on an oil painting for and exhibit. In the picture on the right Albert Forslev, Associate Curator of Mineralogy, is seen operating the department of geology's X-ray diffraction unit. Museum Members will have a chance to meet the scientific staff on the evening of April 29, when the Museum opens its doors to its Members.

IT'S SPRING and once again Chicago Natural History Museum will open its doors to its more than 7,000 members for behind-the-scenes glimpses of the Museum's staff at work. The date set for 1960 Members' Night is Friday, April 29.

That evening an exciting new experience in museum educational entertainment, called "Sound Trek," will be offered free to members. What is "Sound Trek?" Briefly, it is a new dimension in museum exhibition technique—a "radio guide" system that enables the visitor not only to see the exciting world of natural history but to hear, as well, informative commentaries about the exhibits by members of the Museum's scientific staff. All you do is pick up a "radio guide"—small, light, and compact—at the door, and let it do the rest as you wander wherever you will through the Museum. Twenty halls are now wired for "Sound Trek," and you have a choice of two channels in each. One carries a scientific and detailed commentary on the exhibits, and the other a shorter, less technical commentary by a member of the Raymond Foundation staff. Although there are in the world a few museum's with similar systems, Chicago Natural History Museum has the only system which carries two simultaneous commentaries in a single hall.

A second highlight of the evening is a special illustrated lecture on Africa. Last year Dr. Robert F. Inger, Curator of Reptiles and Amphibians, assisted by a grant from the Institut des Parcs Nationaux du Congo Belge, spent three and one-half months in the Parc National de la Garamba, in the Belgian Congo. He brought back with him outstanding color slides of African wildlife and landscapes, as well as tape recordings —and just as many stories to tell. Museum members will have an opportunity to hear some of his interesting stories and scientific findings at 8 P.M. on Members' Night.

Also planned for the Museum's members is a premiere showing of a collection of photographs depicting human racial types from all parts of the world. They were taken by New York Photographer Nicholas Muray on a grant from the Wenner-Gren Foundation for Anthropological Research. The Wenner-Gren Foundation has generously lent the collection to the Museum for use in this special exhibition. The photographs will be on display in Hall 2 on the first floor, adjacent to the Hall of Man, which features the sculptures of Malvina Hoffman.

As indicated elsewhere in this Bulletin, a number of additions to exhibits and exhibit halls have been made in the last year. These include the addition to Hall 8 of considerable ancient Aztec material and the unusually fine Aztec Great Market diorama by Alfred Lee Rowell, as well as new exhibits in Hall 7 showing the silver craftsmanship of the Indians of the Southwest. Also in anthropology, exhibits from Ancient Rome and Etruria were recently moved from Hall 2 to a new home in Hall L on the ground floor. A doorway has been constructed to connect it with the adjacent Hall of Egypt.

In the botanical halls on the second floor, the North American Tree Hall (Hall 26), started last year, has been completed. Similarly, the Hall of Meteorites, Moon, and Minerals (Hall 35), housing the world's most comprehensive meteorite collection, has been augmented by a number of new screens during last year. On the same floor, the impressive hall of fossil mammals, Hall 38, last year was subjected to an extensive restoration program. Four fossil giants—the mastodon, northern mammoth, great ground sloth, and Irish giant deer—were re-mounted on new steel frames and in new positions. In zoology the "Birds of the World" exhibit in Hall 21 was expanded to include a new screen featuring swifts, night jars, humming birds, and horn bills. Finally, in Hall 18 can be seen the special Darwin Centennial exhibit that graphically explains Darwin's theory of evolution.

No matter how attractive the "show case" may be, people somehow never outgrow a sort of childhood "Alice in Wonderland" curiosity to see what goes on behind the scenes, whether it be in a factory, in a television studio, or in a newspaper plant. At Chicago Natural History Museum a look behind the scenes is particularly interesting because it is in the areas closed to the public that most of the Museum's activity takes place. From 7 to 10:00 P.M. on Members' Night the Museum's scientists, artists, preparators, technicians and other staff specialists will meet with the Members in the offices and laboratories on the third, fourth, and ground floors to explain each staff member's particular function in the museum's operation and to demonstrate the intricate processes involved in the creation of Museum exhibits. The vast study collections which far outnumber the specimens in exhibition halls will also be open to members.

SUPPOSED APE-MAN OR "MISSING LINK" OF SOUTH AMERICA

By PHILIP HERSHKOVITZ
CURATOR OF MAMMALS

EVER SINCE DARWIN expounded his theory of evolution, man has engaged in a search for links between himself and the apes. Discoveries of fossil man-like apes or ape-like men have always created a stir, but today the excitement is rarely felt outside scientific circles. On the other hand, rumors or equivocal reports of a live ape-man or "missing link" tracked down in the wilds of Africa, Asia or South America arouses the interest of the entire world. Curiosity about man's relatives, usually wholesome but sometimes varied with prejudice, has made the public an easy target for charlatans, pseudoscientists, deluded travelers and explorers, and even forgers with "missing links" their stock in trade.

The most notorious hoax perpetrated on the public, and not a few anthropologists, was the Piltdown Man. This supposed ancestral species, the widely acclaimed Dawn Man, was discovered before World War I in a gravel bed in Piltdown Common, Sussex, England. The animal was represented by some human skull fragments and an ape-like lower jaw with two molar teeth. A number of authorities questioned the association of skull bones and lower jaw, but not until 1953 was it conclusively demonstrated that these bones and teeth were cunningly altered and cleverly planted where they would be conveniently "discovered." The skull fragments proved to be of modern man, the lower jaw and teeth those of a young orangutan. Some prompt results of the exposé were the rewriting of pertinent parts of text books and encyclopedias and quiet re-designings of exhibits on man's evolution in a number of natural history museums.

Among purported living ape men, the best known currently is the *abominable snowman*. This mysterious creature of the Himalayan snowfields has so far eluded capture. The *orang-pendek*, or ape man of Sumatra, is another example. The footprints, bits of hide, hair and other concrete evidence attributed to it turn out to have belonged to some common animal, most often the sun bear, orangutan or gibbon.

"APE MAN" BUILD UP

The New World can also lay claim to a few bogus ape men of which the best known is based on a photograph of a dead spider monkey and the uncorroborated and successively garnished statements of an adventurer. The hoax was exposed 30 years ago and references to the animal have long been expunged from the family tree of man exhibited in the dignified Musée de l'Homme, or Museum of Man, in Paris. A recently published popular book on animal mythology entitled "On the Track of Unknown Animals" by Bernard Heuvelmans, revived the story of the South American "ape man" with embellishments and background effects never thought of by the original promoters of the fraud. This pseudoscientific book inspired a second round of sensational newspaper and magazine stories built around copies of the original photograph of what, paradoxically, is so obviously a spider monkey that the wonder is how it can be foisted off as anything else.

De Loys' photograph of the "Ape Man" he allegedly discovered and killed in the virgin forests of the Colombian-Venezuelan boundary region. The animal is a female of the common spider monkey of northwestern South America.

The originator of the South American ape man story was François De Loys, a French, or perhaps Swiss, geologist, who prospected along the border of Colombia and Venezuela between the years 1917 and 1920. While encamped on the banks of the Tarra, a tributary of the Catatumbo River, De Loys heard a strange noise in the bordering forest. He hurried with several of his assistants toward the source of the sound and noted that it originated at some distance below the tops of the trees. Once in the forest the men were surprised by two raging animals charging toward them. Thinking they were being assaulted by bears, De Loys and his companions leapt for their guns and made ready to receive the attackers. The infuriated beasts rushed forward shouting, gesticulating and breaking and throwing branches at the men. The individual in front, a female, was shot on the spot, while the other, said to be a male, retreated and disappeared. The dead animal was taken to the border of the Tarra River, propped up on a crate in a life-like pose, and photographed. According to De Loys, the animal had no tail, stood 4 feet 5 inches (135 centimeters) high, and the number of teeth in its mouth was given as 32—the same as in man.

The story is vague in important details. Nothing is divulged of De Loys' antecedents or the precise nature of his mission in South America. De Loys never specified the day, the month, or even the year in which he made what he pretended was a most remarkable discovery. The action of the animals in breaking branches and throwing them, a frequently observed trait of spider monkeys, seems to have made a deep impression on De Loys. Nevertheless, he does not say the animals were actually moving through the trees, and he gives no reason to believe they were running on the ground. Indeed the connections made by De Loys between the time and place sequences of his actions and those of the animals are extremely misty. The subject of the photograph, however, cannot be denied—but it is posed from the wrong side for proving it has no tail. The number and kind of its teeth cannot be determined from the picture and, except for a wooden box of problematical dimensions, there is no familiar object such as a gun, a hat, or a person by which to gauge the real size of the animal.

"SCIENCE" BROUGHT IN

Several unspecified years after his return to Europe, De Loys showed the photograph and told his story to a French anthropologist, Dr. Georges Montandon. Why De Loys kept the matter secret all this time is not explained. In any case, Dr. Montandon had developed a unique theory of several independent origins of man and anthropoid apes in different parts of the globe and was prone to find comfort and support in De Loys' account of the existence of a man-like ape in South America. Like De Loys before him, the anthropologist withheld knowledge of the find for a few years.

At last, in March 1929, at least 10 years after the events happened, Professor Montandon presented a paper before the members of the French Academy of Sciences detailing the discovery of the first New World anthropoid known to science, an animal, he declared, more human in appearance than any ape of the Old World. The anthropologist was careful to base his conclusions on the invisible characters—the great size, the tailessness, and the human dental formula. The beast was then dutifully given the technical name *Ameranthropoides loysi* in honor of the explorer, and its official description was published in the prestigious Comptes Rendus of the Academy. In justice to Montandon it must be recorded that the description is hedged with the avowed reservation that the anthropoid might, after all, prove to be only a large species of spider monkey.

Two months later, Dr. Montandon published another account in the more popular *Illustrated Scientific Review* of Paris. This time, the standing height of the beast was

raised to 157 centimeters, or nearly 9 inches more than when first described. Emboldened by public interest in the fanciful aspects of the South American primate, Montandon published still another version. Now the animals which supposedly attacked De Loys and his company are not moving in trees and breaking branches. They advance instead in erect posture, supporting themselves by seizing the shrubbery along their path.

A thin light was also shed on how De Loys may have counted the monkey's teeth. The skull was supposedly removed from the body and entrusted to the expeditionary cook for safe keeping. This dignitary, according to the story imprudently converted his precious charge into a salt cellar. It is difficult to understand how or why such a fragile, perishable, if not putrid, and unwiedly object as a monkey skull would be used for a salt dispenser. In any case the salt, according to the narrator, caused the skull to disintegrate, and the fragments of bone were forever lost to science.

The fantastic history of the supposed anthropoid ape was too exciting to be overlooked by foreign newspapers and magazines. François De Loys himself made capital of the find bearing his name by writing an article for the June 15, 1929, issue of the *Illustrated London News*.

EXPERTS EXPOSE CLAIMS

In his account, captioned as the discovery of the ancestory of man on the American continent, De Loys accepted Montandon's exaggerated dimensions of the animal and, not to be outdone, ventured that the weight "guessed, it is true, without scales, was probably well over eight stone, or 112 pounds." Continuing in the same vein De Loys confided that his animal had "ground habits," but neglected to describe them. That the long arms, hooked fingers, grasping toes, and, particularly, the large opposable great toe of the animal shown in the photograph are telltale characters of a creature with decidedly arboreal habits seems to have escaped the notice of the geologist.

The claims made by Montandon and De Loys were almost immediately scotched by experts. The renowned British anthropologist, Sir Arthur Keith, who had been beguiled by the Piltdown hoax, made no mistake here. De Loys' animal, he declared, "belongs to the genus *Ateles;* in brief it is a spider-monkey, whether of a known species we cannot say owing to a lack of evidence." Dr. Angel Cabrera, the world's leading authority on the mammals of South America, scathingly rebuked both Montandon and De Loys for their zoological pretensions. At the same time he pointed out that even if the alleged anthropoid ape was as large as claimed, lacked a tail, and possessed 32 teeth, instead of the 36 normally present in American monkeys, it would still be either a spider monkey or some closely related species of the same family.

The famous primatologist, Ernest Hooten also identified the animal in the photograph as a spider monkey. In addition he had word from an acquaintance in South America that men who accompanied De Loys had testified that the animal shot and photographed was indeed a spider monkey.

PROOF IN THE BAG

During the course of my early field work in northern Colombia I made a point of exploring the same Tarra river region visited by De Loys. The area is one of the wildest in South America. It is inhabited by a savage tribe of the Motilones Indians, but not any man-like apes. Spider monkeys, however, were abundant and I secured a large series for laboratory study. These monkeys agreed in everything from the thumbless hands to the triangular blaze on the forehead, with the photograph of *Ameranthropoides loysi*, a copy of which I carried with me. The animals proved to belong to a race of the common species of spider monkeys known technically as *Ateles belzebut hybridus*. The largest specimen I secured, a female, measured 21 inches from crown to base of tail. The largest spider monkey on record, also a female of the same species, measured 26 inches in combined head and body length.

How these dimensions compare with those of the animal photographed by De Loys is impossible to judge with accuracy. Standing height measurements such as those given by De Loys and Montandon for *Ameranthropoides loysi* are not reliable. It may be possible, however, to make a rough estimate of the size of the animal by using for a scale the box in the photograph. According to De Loys this was a petrol crate. If it was of the common sort used in northern South America it packed two 5 gallon cans and its height is not over 15 inches. The cans themselves are 13 inches high. The height of the monkey from seat to crown is 1.8 times the height of the box or 27 inches. This is the combined length of head, body and buttocks. Account must be taken of the fact that the head and feet of the animal are nearer the camera than the crate and, therefore, appear disproportionately larger in the photograph than they are in life. The adjusted dimensions for combined head and body length alone would probably be under 25 inches. It may be safe to conclude, therefore, that far from being a giant ape, *Ameranthropoides loysi* is not only a common spider monkey but is hardly an extremely large one.

From time to time our attention is called to expeditions being formed, or only planned, for the purpose of finding a real specimen of the ape man of northern South America. It is hoped that the information in this article may be of some help.

NEW MEMBERS

(February 8 to March 4)

Associate Members

Wayne M. Allen, Louis Ancel, Mrs. Otis G. Andrews, C. M. Blumenschein, George T. Bogert, Richard P. Brown, Jr., Nicholas J. Bua, Louis Buffardi, Dr. G. L. Christopher, Aaron H. Cohn, William F. Coale, Jr., Harry A. Coldiron, Mrs. David P. Cordray, Charles J. Cretors, Miss Natalie Crohn, John H. Darby, William E. Dunlap, Carl H. Ebert, E. E. Ellies, James Fitzmorris, Thomas Fullerton, Paul W. Guenzel, Mrs. Marion Hilker, Dormand S. Hill, William H. Hillier, Robert Hirtenstein, Miss Alice Howe, Miss Amy L. Howe, Mrs. Florence H. Hunter, Dr. George M. Kramer, William Bross Lloyd, Jr., Eugene W. Maters, Carl A. Metz, Byron S. Miller, DeWitt O'Kieffe, Wendel Fentress Ott, Dean Rottenberry, Harry R. Sanow, T. R. Sorensen, John B. Ughetti, Herman Wendorf, Lloyd Woodall

Non-Resident Associate Member

Gordon K. Palais

Sustaining Member

David A. Hill

Annual Members

Paul J. Aicher, Dr. Nathaniel S. Apter, Carl A. Arend, Mrs. Robert M. Atwater, William H. Avery, Jr., Mrs. Joseph W. Baer, Mrs. Herbert Baker, Mrs. C. R. Barker, Dr. George O. Baumrudker, David Becker, Oscar J. Becker, Dr. John G. Bellows, Dr. M. D. Bennin, Mrs. George V. Bobrinskoy, John C. Bulger, Ara A. Cambere, Mrs. Charles Carey, Mrs. William T. Carlisle, Arthur T. Chameroy, Norman M. Chase, Joseph M. Cody, John I. Cole, George M. Craig, James A. Dooley, Mrs. Heber T. Dotson, Dr. Clifford L. Dougherty, M. C. Duensing, Mrs. James F. Gallagher, William B. Gardner, Howard Goodman, Leonard Gordon, Miss Addie Clark Harding, Mrs. Robert Henner, A. E. Hibbs, Dr. Victor Izui, G. McStay Jackson, Thomas G. Johnston, Nat M. Kahn, Jacob Kalnin, J. Peter Kass, Mrs. Harold A. Katz, Alan D. Katz, Joseph C. Kay, Victor P. Kayser, William P. Kearney, Richard B. Kemp, Henry W. Kenoe, Carl W. Koehn, Mrs. David H. Kraft, Melvin A. Kramer, Mrs. Winnifred Levinson, Reuben J. Liffshin, Paul B. N. Lind, LeRoy A. Lindberg, Harrison C. Lingle, Dr. Roland P. Mackay, Leo S. Maranz, Dr. Richard E. Marcus, Dr. Bernard S. Margolis, Morgan F. McDonnell, Miss Dorothy McMahon, Mrs. Howard C. Meadors, J. F. Mele, Seymour H. Merens, James F. Milburn, Charles F. Naser, Dale O'Brien, Dr. Franklin T. O'Connell, Jr., Miss Alice Olhausen, Mrs. William H. Page, II, Alfred B. Perlman, Roger Pettit, Milton T. Raynor, Dr. Arthur G. Rink, Mrs. Margaret H. Robb, George G. Rossit, Robert M. Scott, Miss Susan Shepard, Charles L. Stewart, Jr., Robert C. Taylor, Francis Edgar Thacker, Mrs. Joseph L. Valentine, S. M. Vance, John L. Vollbrecht, Dr. Hans H. Wagner, Dr. Arthur M. Weiss, Richard H. Weldon, Marvin J. Welfeld, Dr. Donald C. Wharton, Dr. Jasper F. Williams, Dr. Alvin M. Winograd, Norman M. Yeretsky, Ores E. Zehr, Maurice M. Zusser.

MEMBERS' NIGHT ATTRACTIONS

Friday, April 29
(7:00 to 10:30 P.M.)

BEHIND THE SCENES—

The Museum's scientific staff will be on hand in their offices, laboratories, and work rooms from 7 to 10 P.M. to explain various phases of a museum's operation. In addition, the doors will be open to the working quarters of the Museum's editors, librarians, staff artists, photographers, taxidermists, preparators, and plant reproduction artists and craftsmen.

FEATURING—

"Congo Safari" by Robert F. Inger. An illustrated lecture by Dr. Inger on his three and one-half-month field trip to the Parc National de la Garamba in the Belgian Congo.

"Peoples of the World." A premiere showing of a splendid photographic collection of people from all over the world taken by the well-known New York photographer, Nicholas Muray, and loaned by the Wenner-Gren Foundation.

SOUND TREK RADIO GUIDES—a new dimension in museum exhibition

HAVE YOU SEEN THESE EXHIBITS?

Archaeology of Etruria and Rome—*newly installed*; Ancient and Modern Indians of Southwestern United States, Mexico, and Central America; Hall of North American Trees; Hall of Plant Life—*nowhere in the world is to be found a comparable collection of plant models*; Clarence Buckingham Hall—*exhibiting a model of the visible face of the moon, as well as meteorite and mineral collections*; Restored and Remounted Fossil Giants; Birds of the World; Darwin's Origin of Species Centennial Exhibit.

FOR YOUR CONVENIENCE—

Free Motor Bus Service from the Loop will be available for Museum Members and guests. Buses marked for Museum shuttle-service will leave from Jackson Boulevard and State Street every 15 minutes beginning at 6:30 P.M. The last bus will leave the Museum at 10:45 P.M. Stops will be made both ways at Seventh and Michigan, and at Jackson and Michigan.

Ample Free Parking space is available in the Museum's north parking lot.

For Dining, the Museum's Cafeteria will be open from 6 to 8 p.m.

Refreshments will be served in Stanley Field Hall and in the General Library.

CHICAGO NATURAL HISTORY MUSEUM
Bulletin
Vol. 31 No. 5
May 1960

Photo by Muray

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
TELEPHONE: WAbash 2-9410

THE BULLETIN

EDITOR

CLIFFORD C. GREGG ..... *Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN ..... *Chief Curator of Anthropology*
JOHN R. MILLAR ..... *Chief Curator of Botany*
SHARAT K. ROY ..... *Chief Curator of Geology*
AUSTIN L. RAND ..... *Chief Curator of Zoology*
THEODOR JUST ..... *Curator Emeritus of Botany*

ASSOCIATE EDITOR

MARILYN JINDRICH ..... *Associate in Public Relations*

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

NAMED TOP HONOR BOOK

Indian Art of the Americas, a Museum publication by Dr. Donald Collier, Curator of South American Archaeology and Ethnology, was selected by the Chicago Book Clinic as a Top Honor Book for display in its Eleventh Annual Exhibition of Chicago and Midwestern Bookmaking. The book was judged by a set of standards for good bookmaking in design, planning, binding, printing, publishing intention, and reader appeal. Certificates of Award were presented by the Chicago Book Clinic to Greer Allen of the University of Chicago Printing Department, the designer of the book, and to Chicago Natural History Museum, the publisher. Dr. Collier, as author, accepted the publisher's award on behalf of the Museum at a private showing of Top Honor Books at the May meeting of the Chicago Book Clinic at the Tower Club. The award-winning books will be on exhibition during May at the Chicago Public Library and at many midwestern libraries throughout the year.

Indian Art of the Americas (64 pages, 65 illustrations, paperbound) is a catalogue of the special exhibit held at the Museum in late summer and fall on the occasion of the Festival of the Americas and the Third Pan American games. The book is on sale at the Museum.

—HMacM—

STAFF NOTES

Dr. Roland Force, Curator of Oceanic Archaeology and Ethnology, presented a paper, "The Concept of Process and the Start of Cultural Change," at the annual meeting of the Central State Anthropological Society held in Bloomington, Indiana, April 23. . . . **Dr. Paul Martin**, Chief Curator of Anthropology, spoke recently on "Excavations in the Southwest" before the Highland Park Archaeology Club. . . . "The Applications of Clay Mineralogy to Civil Engineering" was the topic of a lecture given by **Albert W. Forslev**, Associate Curator of Mineralogy, before the Illinois Institute of Technology chapter of the American Society of Civil Engineers on March 22, 1960. . . . Miss **Maidi Wiebe**, Geology Artist, won the Frederick War Memorial prize for her oil painting, "Evolution," exhibited at the Austin, Oak Park, and River Forest Art League's annual spring exhibition. . . . **Dr. R. M. Strong**, Research Associate, attended the Seventh International Congress of Anatomists, the first to be held in this country, and the Seventy-third Annual Meeting of the American Association of Anatomists in New York City. . . . **Henry S. Dybas**, Associate Curator of Insects, discussed the "Population Ecology of the Periodical Cicada" in a lecture delivered at Purdue University. . . . **Loren P. Woods**, Curator of Fishes, was interviewed by Phil Lind on station WAIT April 22 on the subject of "The Great Lakes." During April he also visited various fish and wildlife stations in Michigan to study their operations. . . . **Maryl Andre** of the Raymond Foundation has written a series of programs based on natural history subjects which will be presented, starting May 4, on the WGN-TV children's show, "Lunchtime Little Theatre." The half-hour show is on Channel 9 at noon Wednesdays, Thursdays, and Fridays. Mrs. Andre is also helping direct the programs. . . . **Miss Lillian Ross**, Editor of Scientific Publications, on April 25 attended the Conference of Biological Editors held in Cleveland. . . . The Adult Education Seminar of the University of Chicago, headed by Dean Cyril Houle, last month visited the Museum and heard a talk on Chicago Natural History Museum by **Director Clifford C. Gregg**. . . . **John R. Millar** and **Col. Clifford C. Gregg** acted as spokesmen for the Museum recently on a WCLM half-hour interview program, "This Is Chicago," sponsored by the Office of the Mayor.

THIS MONTH'S COVER

Matabele women of South Africa are introduced at an early age to one of the vanities of life—the wearing of jewelry. The two little Matabele girls on our cover, who live in Mapoch Village near Pretoria, South Africa, are already in beads. As they grow older, the circlets must be cut off and replaced with larger ones. Nickolas Muray snapped the youngsters' picture while touring the world on a trip commissioned by the Wenner-Gren Foundation for the purpose of obtaining pictures of people in other lands. Other pictures he took on his photography assignment are featured in the new exhibit, "Peoples of the World," on display in Hall 2. The exhibit of more than 200 photographs was loaned to the Museum by the Wenner-Gren Foundation.

1960 CHICAGO AREA SCIENCE FAIR WILL OPEN IN STANLEY FIELD HALL, SATURDAY, MAY 14

May 14 is "fair" day at the Museum. But on that Saturday don't expect to see cotton candy venders, barkers, or "try your skill" booths. Instead, the "side shows" will feature elaborate demonstrations and intricate models covering such diverse subjects as atom smashing, mathematical probability, mutations in mice, or the embryonic states of a chick, put on by youngsters from 6th grade through high school—seemingly unusual entertainment for a fair, but not for this one. For this is the annual Chicago Area Science Fair sponsored by the Chicago Area Teachers Science Association in cooperation with Chicago Natural History Museum.

The children participating in the fair represent public, private, and parochial schools, as well as youth organizations, located in Chicago or within a 35-mile radius of the city. In this respect it differs from the Chicago Public Schools Student Science Fair held in April, which was limited to public schools within the city limits.

The students design and assemble their own projects and are prepared to give accurate expository lectures on their exhibits for the benefit of interested visitors. That some of the students often select unique subjects to exhibit was demonstrated by a number of last year's entries—"Mummification," "Contact Lenses," and "Variation of Ulcer Production in the Shay Mouse." Prizes and awards are given on the dual basis of what knowledge the entrant has of his project and its background, and on the exhibit itself. Awards will be made according to subject-area in grades 10 through 12, and according to grade level in grades 6 through 9.

The exhibits will be displayed in Stanley Field Hall from 9. A.M. to 5 P.M. This year more than 150 entries are expected.

TWO NEW EXHIBITS ON DISPLAY DURING MONTH OF MAY

"PEOPLES OF THE WORLD"

In 1956 Nickolas Muray, well-known New York photographer, was commissioned by the Wenner-Gren Foundation for Anthropological Research to create on film an ethnological study of certain areas of the Pacific, Asia, and Africa. Muray spent six months on this mission, during which time he made more than 1,000 pictures.

Chicago Natural History Museum, through the efforts of Dr. Roland Force, Curator of Oceanc Archaeology and Ethnology, is fortunate in being the first museum given the opportunity to exhibit any of the collection—a collection that in future years will travel to museums all over the country. From the complete collection Dr. Force selected the approximately 200 prints that appear in the new exhibit, "Peoples of the World," on display in Edward E. and Emma B. Ayer Hall (Hall 2).

The photographs chosen feature peoples from islands in the South Pacific, from Japan, Hong Kong, Thailand, Burma, Ceylon, India, Pakistan, and Africa. However, it was in Africa that the shutter of Muray's camera had its greatest work-out. His concentration on that continent is reflected in the "Peoples of the World" exhibit, which displays more photographs from Africa than from any other area Muray visited. The countries of Africa featured in the exhibit include Kenya, Uganda, Southern Rhodesia, Nyasaland, Swaziland, The Union of South Africa, and the Belgian Congo.

Nicholas Muray has long been acclaimed in his field. As far back as 1925 he won a first prize in the British Westminister Pictorial Photographic Exhibition. Since that time he has presented numerous one-man shows, taught photography at New York University, and lectured at other institutions. In 1955 Muray photographed some 270 examples of craftsmanship and skill of aboriginal America from the Robert Bliss collection in Washington, D.C. The plates, both black and white and in color, were published in the volume, *Robert Woods Bliss Collection: Pre-Columbian Art.*

"Peoples of the World," which had its premiere showing on Museum Members' Night on April 29, will remain on display in the museum until the end of June.

Two of the more than 200 photographs by Nickolas Muray that appear in special "Peoples of the World" exhibit. On the left are two little Japanese girls in holiday garb. On the right, a young mother of Bulawayo.

Sigrid Ruckser, 15, of the Junior School of the Art Institute painted this picture that appears in student art exhibit on display during May.

ART INSTITUTE SCHOOL EXHIBIT

Visitors touring Chicago Natural History Museum find it a rather common occurrence to come upon an intent artist, seated on a chair or sitting cross-legged on the floor, busily at work with a sketch tablet or drawing board. For a number of years the Museum's exhibits have provided young artists from the School of the Art Institute with colorful and interesting subject matter for their artistic skills, as well as supplying a wealth of information on the development and history of art.

During the month of May the Museum is highlighting the lively and imaginative art work created by students of the School of Art Institute in an exhibition that will also include some special work by teachers in the school. Diversity marks this year's exhibit, and ceramics, etchings, metal and enamel work, and design will be part of the display, in addition to paintings and drawings in many media.

Contributing to the art show are students of all ages, from first graders to adults, their work providing an interesting study in the development of artistic skills. Teachers whose own art work will be specially exhibited are Leah Balsham (ceramics), Vera Berdich (etching), Kathleen Blackshear (history of art), William Frederick (metal design), Whitney Halstead (history of art), Ethel Spears (enameling), Raymond Yoshida (enameling).

Marion Pahl, Museum Staff Illustrator, and Walter Boyer, Ceramic Restorer, were responsible for the selection and display of art work appearing in the exhibit in Edward E. and Emma B. Ayer Hall (Hall 2).

The School of the Art Institute of Chicago is headed by Dean Norman B. Boothby.

A nine-year-old, Beverly Voss, interprets Alaska brown bear habitat group. Drawing on display in current student art exhibit in Hall 2 of the Museum.

Discovery of the Pacific Isles . . .

"BLACKBIRDING" AND THE DECLINE OF ISLAND CULTURES

By ROLAND W. FORCE
CURATOR OF OCEANIC ARCHAEOLOGY AND ETHNOLOGY

Part V

THE FORTUITOUS OCCURRENCE of a mere bit of flora disturbed a number of Pacific island communities in the early 19th century. China, in particular, was anxious to secure sandalwood (*Santalum album*), which was discovered first in Fiji in 1804. New Caledonia and the New Hebrides proved to be wonderful sources for this tree. Sandalwood had been much in demand by the Chinese from about 500 B.C. The oil was used for perfume. The wood was carved into fans and boxes, and was used by Buddhists in funeral rites. Brahmins wanted it for caste marks. It also was used as a remedy for various pains and aches. Prior to its discovery in the Pacific, India had been the only source and prices were high indeed.

In 1828, whalers discovered sandalwood grew in the New Hebrides and after that these islands were never the same. Here is a missionary's account of one of the early excursions for sandalwood. "Three ships stole 250 pigs from Efate. Crew shot 26 natives; women and children were trapped in a cave, wood was piled in the mouth and the whole made into a savory roast so that totally 130 natives were killed." On one island in the New Hebrides the native population responded in kind and in one two-year span 12 foreigners were eaten and 30 more killed without the occurrence of cannibalism. The *Encyclopedia Britannica* tells us that "The loss of life in this [sandalwood] trade was at one time even greater than in that of whaling. . . ." Anyone with an old ship, a stout heart, and plenty of gunpowder could go into the business. An average profit has been estimated to have been in the nature of $3,000 per voyage.

The price of sandalwood varied from £12 to £100 per ton and the supply was rapidly exhausted. The natives placed no value on the wood. In 1830 they were trading a whole dinghy full of sandalwood for one piece of hoop iron. Some buyers used tobacco exclusively. Goats brought a ton apiece, while cats were in demand once the hardy ship's rats had been introduced to island shores.

There was very little of what we might call "team spirit" among the sandalwood traders. Each one was out to beat his competition. One of the best ways to make it unhealthy for those who might follow you was to shoot a few natives after you had made your haul.

Then, too, introducing diseases was popular. The brig *Edward* from California inadvertently brought smallpox to one of the islands of Melanesia in 1853. But in 1861, another ship deliberately took from one island natives who had measles (a particularly virulent disease to islanders who had had no opportunity to develop selective immunity) and landed them on another island. The result—one third of the population promptly died. Islanders who refused to sell sandalwood were either fired upon, or a hostage was taken until they did. The wood became the ransom for the chief taken hostage. Sandalwood supplies were pretty nearly gone by 1860 and fortunes could no longer be made in this venture.

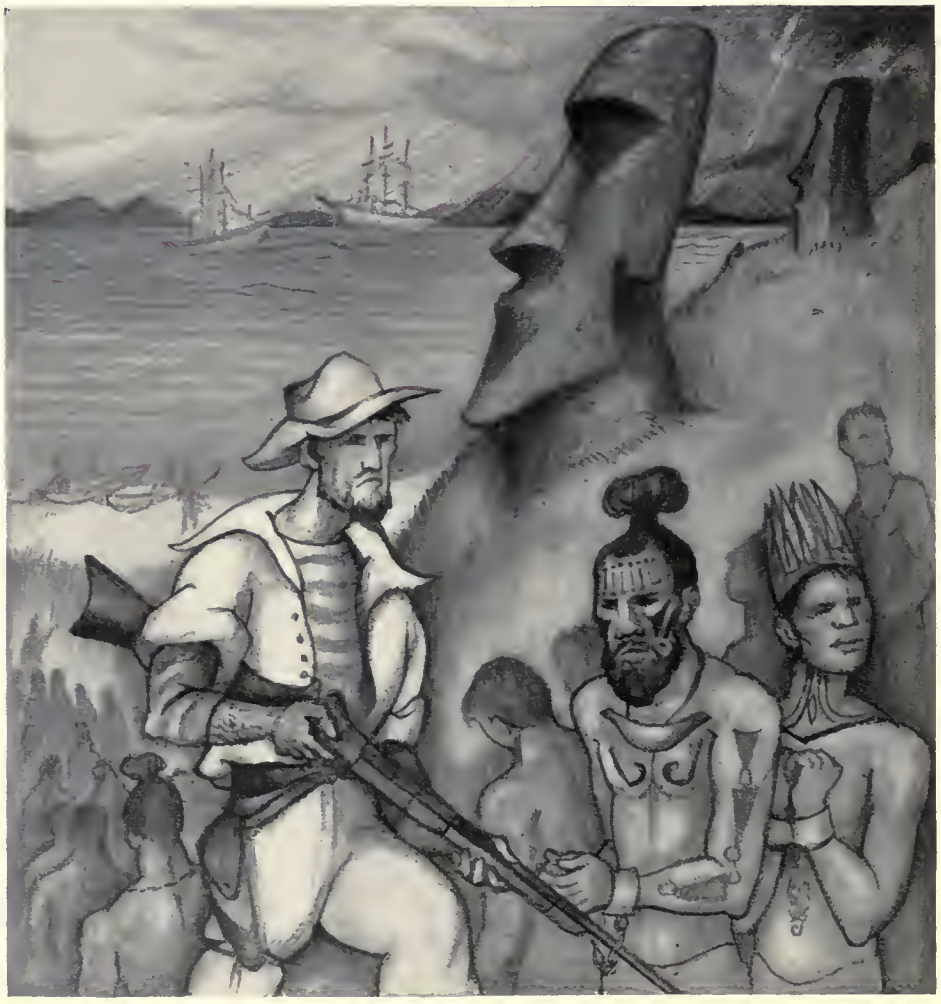
SLAVES BECOME TRADE "ITEMS"

As the sandalwood supplies became exhausted by over-exploitation, the ships and men employed in that trade sought new methods of money-making. They turned to traffic in humans. Labor was urgently needed to work newly established plantations and mines. At first labor recruitment was accomplished by bribe (largely iron and trinkets) and promises of more goods later on. Later when reluctant natives declined invitations to leave their homes for slavery on a strange island away from family, friends, and familiar scenes, the captains of the economic navy took them by force.

Fiji planters in particular could not recruit enough labor at home so they commissioned various ship's captains to secure it from other islands. Between 1864 and 1868, 1,649 natives were imported from the New Hebrides and from the Gilberts. Missionaries began to notice the decimation of their flocks and became alarmed. Over an 18-month span as many ships arrived on one New Hebrides island and made off with 250 natives. Several other small islands were literally stripped of all their males. The story was the same in many parts of the Pacific.

In the late 1850's, for example, the exploitation of the guano deposits on islands off the Peruvian coast was seen as a profitable business, but workers were needed and the recruiting of labor became a flourishing business. As early as 1859 or 1860 a few Easter Islanders were "kidnapped" from their island and sold as slaves, but in 1862

By Staff Illustrator Marion Pahl



a real war expedition was planned against the island. During December of that year eight ships set sail for Easter Island for the purpose of "recruiting" workers. A force of 80 men went ashore and failing to persuade the natives to accompany them, took them by force instead. A group of 500 were assembled and in the process several were shot while resisting the aliens. The others took to their heels, and after the smoke of battle had cleared, 200 Easter Islanders lay securely trussed up. The natives who escaped dove into the sea or ran for elevations or caves. Another means used on other occasions on Easter Island was to throw trinkets on the ground and while the natives were on their knees scrambling for them, they were bound up and rendered helpless. The raids quickly disheartened the natives and to escape from future slave raids they took refuge in the caves of the island where they lived in great discomfort and constant anxiety and neglected the care of their crops. The guano slaves never returned, but died on the barren, foreign islands.

WITH SLAVE TRADE—CRUELTY

Finally, in 1868 a Polynesian Laborers Act was put through Parliament in England and wages were fixed at not less than the stupendous sum of £6 a year (about $17 today). The Act could not be enforced, of course, so the traffic in humans continued. Atrocities became even more common. One account tells of a group of Melanesian natives who were cut off from the shore by a blackbirding boat and were dragged aboard —the chief by means of a boat-hook through his cheek. They were jammed into a musty and airless hold where before long they began to suffocate. They clamored and tried to escape their prison, whereupon the crew fired at them through some small holes in the bulkhead. Three were killed and ultimately thrown overboard. The old chief was not quite dead so he was dispatched with an ax. Later on when this atrocity was discovered, the culprits were brought to trial in Australia, but native evidence was disallowed on the grounds that there were no oaths binding over such people. Finally, one Christianized native was allowed to testify. Most perpetrators, however, escaped punishment. This was partly so because non-British ships and British ships under other national flags were not accountable to British law.

Trickery was also used to lure labor recruits. One captain had a glass eye, another a wooden leg, and another wore a Ku Klux Klan type of garment with a large bag underneath; then he drank quantities of sea water to show his magic. Young men could be bought sometimes from chiefs if gifts amounted to enough. Typical were gifts of guns with the going rate, one firearm for one man. An especially liberal gift was considered ten fathoms of calico, a pipe, and some tobacco.

One of the chief effects of blackbirding was depopulation. In 1886 for example there were over a thousand Melanesian labor recruits in Queensland, Australia. High death rates existed among recruits. If they lasted out the voyage to their destination in old ships which were leaky and overcrowded as well as dirty, they still didn't fare too well. Poor diet, lack of medical attention, and overwork were the most potent factors in maintaining a high death rate. Plantation work hours were from 10 to 14 hours per day with an hour off for a meal. Contracts were usually for a three-year period.

The native could only lose. Punitive expeditions were sent by governments whose subjects had been arrested while trying to steal laborers, and little by little the old cultures decayed.

One of the most potent stimuli for change in the islands was the return of the indentured laborers to their island homes. Most often returns were delayed or prevented by bright lights, flesh pots of the cities of the day, or death. But those who did return brought with them new ideas and different customs. As late as 1913 the British anthropologist W. H. Rivers had this to say about the situation:

> At the present moment there exists in Melanesia an influence far more likely to produce disintegration of native institutions than the work of missionaries. I refer to the repatriation of laborers from Queensland which has been the result of the movement for a white Australia. Large numbers have recently returned to nearly every island. Some have been many years in Queensland, and have quite forgotten all they knew of their native institutions, some even have that contempt for these institutions that often accompanies a smattering of "civilization."

The end result of the sandalwood and slaves period in the Pacific was tremendous depopulation and Europeanized heathenism —another unhappy chapter in Pacific island contact history.

IN MEMORIAM

Mr. Joshua Daston, 66, an assistant in the department of botany since 1934, died suddenly April 19. Mr. Daston was born in Coosa Station, Alabama, but was educated in Italy. He received his bachelor of science degree after attending Colleggio Mario Pagani, Bologna's University, and Firenza's University. In his botanical career he participated in a number of collecting expeditions including expeditions for the Italian Royal Botanical Gardens, the La Mortonal Gardens in Italy, and the F. A. Haege of Germany.

Two Museum guards also died last month. They are Samuel Colovos, with the Museum since 1955, and Clarence Chambers, a guard since 1958.

Longer Museum Hours Begin in May

Beginning May 1 the Museum's doors will remain open to the public from 9A.M. to 6 P.M. seven days a week. These longer hours will remain in effect throughout the coming summer months and through Labor Day. On Memorial Day, May 30, and on July 4 the Museum will observe its regular hours of 9 to 6 P.M. Admission to the Museum is free on Thursdays, Saturdays, and Sundays. Children, students, and teachers are always admitted free.

Studies North Borneo Fishes

Chin Phui Kong, fisheries officer with the department of agriculture of North Borneo in Jesselton, is visiting the Museum on a National Science Foundation grant. He will be working for approximately six months with Dr. R. F. Inger, Curator of Reptiles and Amphibians, on fresh water fishes of North Borneo.

SCHWEITZER DISCUSSION HERE SATURDAY, MAY 14

Four Nobel Peace Prize Winners will be featured at an 85th Anniversary Tribute to Albert Schweitzer to be held at the Museum May 14 at 8:30 P.M.

The Nobel Prize winners are the Rt. Hon. Philip Noel-Baker, R. F. Georges Dominique Pire, Sir Norman Angell, and Lord John Boyd Orr. They will participate in a panel discussion on the topic, "Albert Schweitzer's Blueprint For Peace." The discussion is a part of a symposium to be held that week on the subject, "The Wisdom of Albert Schweitzer."

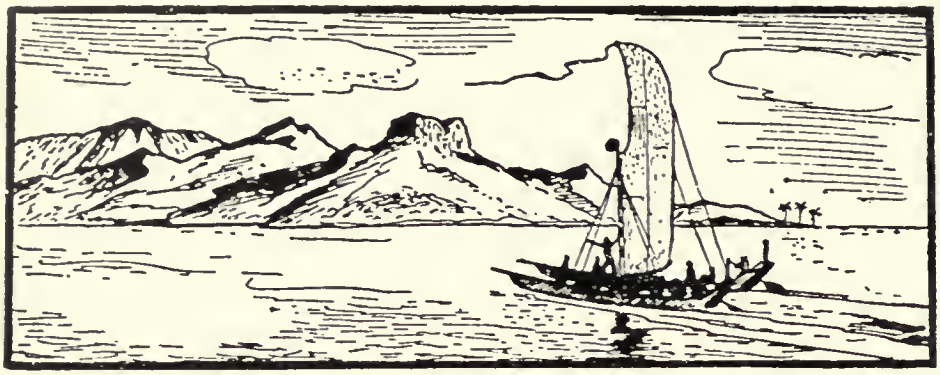
The May 14 program will be held in the James Simpson Theatre and is sponsored by the Albert Schweitzer Education Foundation. Tickets for the evening are available upon request by writing the foundation at 55 E. Washington St., or calling RA 6–3140.

Life Member Wins Prize in Game Competition

A trophy of big horn sheep shot by Mr. William D. Cox, a life member of the Museum, won third prize in the 1958–1959 North American big game competition sponsored by the Boone and Crockett Club. Mr. Cox bagged his sheep last summer at the head of the Ghost River in Alberta, Canada. The trophy was measured by Chicago Natural History Museum prior to its submission to the Boone and Crockett Club Big Game Competition.

The Art Institute conducts classes in this Museum, deriving motifs from exhibits.

BOOKS . . . . . Reviewed By Our Staff



From "Vikings of the Pacific"

A Romantic History of the Pacific

VIKINGS OF THE PACIFIC. By Peter H. Buck. Phoenix Books, Chicago, 1959. 339 pages; three maps; 53 illustrations including reproductions of early engravings, line drawings, and photographs. $1.95.

An old friend has appeared wearing a new dress. First published in 1938 under hard cover as *Vikings of the Sunrise*, this new paper-back edition will please readers anew. The centuries-old drama of the settlement of the exotic South Seas by stalwart and fearless bands of men and women is nowhere so vividly portrayed as on these pages.

Sir Peter Buck, or as he preferred to be called—Te Rangi Hiroa—was a man of rare inspiration. He wanted to learn about his own people. His mother was a Maori chieftainess and taught him to read and write in the Maori language. He also received much guidance and training from his maternal grandmother. Sir Peter's father was an Irishman. Of his mixed racial heritage he was proud and is quoted as having said that any success he achieved was largely due to his good fortune in having been a mongrel. Portions of his life were devoted to work as a medical doctor, statesman, and soldier. But he will be remembered most for his work in ethnology. In order to discover more about Maori culture he devoted himself to studies of related Polynesian societies. He was a peculiar combination of meticulous, painstaking scientific inquirer and of romantic poet. A chauvinist at heart where the Maori were concerned, his feelings expanded to include other Polynesians, ancestral to the Maori, as well.

At one moment he was able to concentrate on a complicated weaving technique and at another he became engrossed in the translation of a chant, paddling song, or lament which he rendered with great artistic skill. His skills ran the gamut from straightforward analysis of material culture to the examination of ephemeral oral traditions—often with great personal artistic creativity.

The book under review is a romantic account of how Buck thought the early navigators from Southeast Asia conquered the vast Pacific. These early voyagers he imbued with enviable heroic stature. Buck was ethnocentric to a fault, but somehow he is easily excused, for his zeal and inspiration are contagious. The reader thrills with Buck at the pageantry of enormous high-prowed double canoes, skimming over the sheen of a calm lagoon with half a hundred oars flashing wet in the sunset's glow. He also shares with the author the awesome glimpse of the storm-lashed and leaking hull of a once proud and elegant craft, separated from its armada, lost on a gray and tempestuous ocean of flailing winds and pelting tropical squalls. There is romance, too, in the mastery of puny mankind over the cruel elements. The sea is an enemy to be fought and vanquished. The cost of victory—the lives of countless valiant explorers, extracted over a span of centuries. There is an opportunity in Buck's book for the reader to share with the stalwarts of old (the Vikings of the Pacific) in the sense of achievement in having bested superior forces and having at last found a new homeland green with palms, with soaring volcanic spires offering testimony of the rich, untilled soil awaiting on the pristine dot of land.

The great strength of this book is its colorful rendering of a great exodus from the known to conquer the unknown—the settlement of the last great block of the earth's surface by mankind.

ROLAND W. FORCE
Curator of Oceanic Archaeology and Ethnology

THE TALE OF A MEADOW. Written and illustrated by Henry B. Kane. Alfred A. Knopf, Inc., New York, 1959. 115 pages, photographs and drawings. $3.00.

A well illustrated little book telling what goes on in a meadow as seen through the eyes of "the boy". The actors range from insects to mammals, against a background of plants. The volume is pleasantly written.

A. L. RAND, *Chief Curator of Zoology*

A COMPREHENSIVE GUIDE TO AMERICAN MAMMALS

THE MAMMALS OF NORTH AMERICA. By E. Raymond Hall and Keith R. Kelson. Ronald Press Company, 1959. In two volumes, vol. 1, pp. xxx+1–546+1–79; vol. 2, pp. viii+547+1–79. 500 maps, 724 text figures. $35.

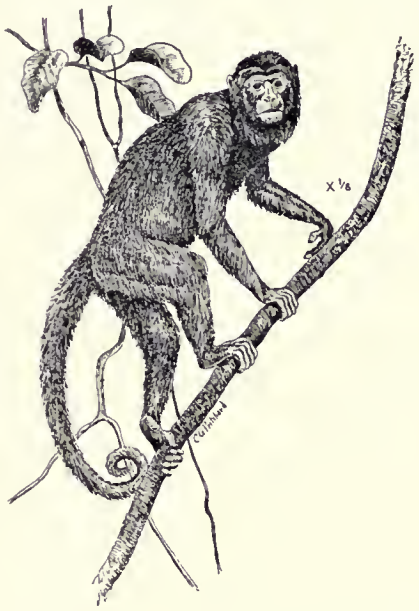
The Mammals of North America, by E. Raymond Hall and Keith R. Kelson, is the most comprehensive and authoritative guide to the classification, distribution, and literature of North American mammals ever published. All scientific names applied to the mammals of this continent are listed in evolutionary sequence. Every order, family, genus and species is described. The identification of each species is aided by practical keys to all groupings, by 186 black-and-white illustrations of the more common mammals, and by 538 line drawings of skulls. One of the most valuable contributions of this work is the 500 original and lucid maps showing the geographic distribution of each species and subspecies. The brief notes on habits are generally of the kind which point up differences between the species and higher groups of mammals.

The exhaustiveness of the work is reflected in the index with its 79 four-columned pages of technical and vernacular names for animals and the 30 two-columned pages of literature cited. The latter duplicates only a small fraction of the more than 10,000 publications cited directly in the text in connection with the technical names quoted. A gratifying feature of this two-volume opus is the inclusion of an index to the entire work at the end of each volume.

The first chapter of text is a dissertation by the senior author on the origin and distribution of North American mammals. Prof. Hall points out that the Tropical Zone of North America has nearly three times as many species as the North Temperate and Arctic Zones combined. This is attributed to the fact that the Tropical Zone provides more kinds of places in which to live. Hall adds that North America has received much from the fauna of Eurasia but has contributed little. On the other hand, North America has contributed more to South America than it has received. These generalizations are true but only if the sum total of mammalian history is considered.

There were times, however, when faunal flows were stronger in opposite directions. For example, the movement of mammals today is greater from the Tropical Zone into the Temperate Zone than in the reverse direction, although Prof. Hall would deny this. We cannot point to any species of Temperate Zone mammal of recent origin advancing into the Tropical Zone. On the other hand, witness the spectacular northward movement of the Tropical Zone opossum and the even more striking northward march of the Tropical Zone nine-banded ar-

madillo. The coati-mundi, too, is an immigrant from the Tropical Zone. A number of species of our common mice, including cotton rats, rice rats, pygmy mice and certain kinds of spiny mice most likely originated and spread from the Tropical Zone of southern Mexico or Central America into the Temperate Zone. The ubiquitous white-footed mice, or deer mice, of the Temperate Zone, may also have originated in the Tropical Zone. There is reason to believe that many



From "The Mammals of North America"

more kinds of mammals originated and advanced in the same way, but having disappeared from the Tropical Zone are now counted as belonging to the Temperate Zone only.

Although new species of North American mammals are still being discovered, the total number of those recognized by science is actually decreasing. According to Hall and Kelson, the *List of North American Mammals* by Gerrit S. Miller, Jr., published in 1924, enumerated 1,399 kinds of mammals as full species. The revised *List* by Miller, Jr. and Remington Kellogg, published in 1955, shows 1,065 named forms as species. In the present work, only 1,003 kinds of mammals are treated as species. Reduction in the number of species recognized as valid is the result of comparisons of the original specimens with additional material in the light of a more precise knowledge of the processes of speciation. Hall and Kelson suspect that ultimately no more than about 800 truly distinct species of North American mammals will be recognized. One wonders why these authors did not bring the millenium nearer by treating as a single species the 77 named forms of brown bears they list, albeit against their better judgment, as distinct "species."

Virtually all technical names ever used for North American mammals have been brought together in this work. Where more than one name had been used for a given kind of mammal, the authors list them in chronological order under the oldest name which is the one recognized as correct. This complete synonymy makes it possible to compare what is said about any animal in the present work with what has been written about the same animal under other names in other works.

Application of the principle of seniority, or priority, in selecting the correct scientific name for an animal insures a large measure of stability and universality in scientific nomenclature. Too strict an application of this principle, however, sometimes yields unfortunate results. For example, Hall and Kelson felt compelled to transfer the generic name *Dama*, inadvertently used over 150 years for the European fallow deer, to the North American white-tailed deer universally known as *Odocoileus*. It seems to me that in this very exceptional case, the interests of zoology would have been better served had the authors left each deer with its familiar name.

Works such as the one under review are compilations made possible by the hundreds of check lists which preceded them. No less than eight check lists of North American mammals were published in this century alone including several by Daniel Giraud Elliot published by Chicago Natural History Museum.

The Mammals of North America, by Hall and Kelson, is a reference work; it is neither light nor entertaining reading. Nevertheless, if I were to recommend three publications on North American mammals to anyone, be he professional mammalogist, arm-chair naturalist, artist-naturalist, editor, or librarian, I would select: first, *The Mammals of North America*, by Hall and Kelson; second, its natural complement, *Lives of Game Animals*, by Ernest Thompson Seton (Doubleday, Page and Co., 1925); and third, the visual and practical *Field Guide to the Mammals*, by W. H. Burt and R. P. Grossenheider (Houghton Mifflin Co., 1952).

PHILIP HERSHKOVITZ
Curator of Mammals

"THE CHEMICAL ELEMENTS" EXPLORES HISTORICAL BASES OF OUR CONCEPTS OF MATTER IN UNIVERSE

THE CHEMICAL ELEMENTS. By Helen Miles Davis; revision by Glenn T. Seabord, Nobelist in Chemistry. Published jointly by Science Service, Washington, and Ballatine Books, New York, 1959 (revised). 204 pages. $.50.

This paper-back book on the chemical elements, the distinctive varieties of matter making up the universe, gives a very intersting account of their discovery. It is unusual in that the author uses extensively quotations and translations from the original classical writings of such famous scientists as Lavoisier, Sir Humphrey Davy, and the Curies, which announced the discoveries to the world. This approach results in considerable variation in the treatment accorded the various elements, but it serves to emphasize the historical aspect—the way in which our knowledge of the fundamental constitution of matter has been slowly built up—and the problems which have been met and overcome in recognizing, isolating, and determining the properties of new elements.

The introductory chapter briefly describes the structure of the atom, and shows that the atoms of the 102 known elements are composed of sub-atomic particles, protons, neutrons, and electrons. The number and arrangement of these particles produce the differences between the elements—the chemical properties, for instance, being determined by the outermost electrons. It is shown how our knowledge of atomic structure provides the explanation of the periodic recurrence of similar chemical properties amongst the elements, although Mendeleef based his Periodic Table of the elements on their physical and chemical properties and was even able to predict the existence of then unknown elements. Tables are also quoted showing the average elemental composition of the earth's crust and the estimated relative abundance of the elements in the universe.

The chapters that follow take up the elements group by group and also include topics such as radioactivity, atomic power, and the man-made elements. The chapters usually begin with an introduction outlining some of the properties of the group or dealing with some interesting aspect of one or more of the elements. A number of the chapters, are made up of quotations that refer to the original discovery and properties of the elements. One minor criticism is that the format of the text often does not clearly indicate the endings of excerpted passages.

The book closes with a list of the elements, their atomic weights, isotopes and brief notes on their uses, a chronological listing of the dates of discovery of the elements, a glossary of old chemical terms, and an an index.

Chemical Elements is a very useful, up-to-date synopsis of the elements which brings together information on their discovery and properties. The author, Helen Miles Davis, died in 1957 while this second edition of the book was in preparation. Dr. Glenn T. Seaborg, assisted by Dr. B. G. Harvey, both of the University of California, Berkeley, revised the text and incorporated the new discoveries of the chemical elements that have occurred since the first edition. Dr. Seaborg received the Nobel prize for his discovery of trans-uranium elements.

BERTRAM G. WOODLAND
Associate Curator of Petrology

New York Not All Concrete And Steel

NATURAL HISTORY OF NEW YORK CITY. By John Kieran. Houghton Mifflin Company, 1959. 428 pages. Illustrated by Henry Bugbee Kane. $5.75.

New York is more than the canyons of steel and concrete one sees from a downtown hotel. In the five boroughs (Manhattan, Richmond or Staten Island, Brooklyn, Queens, and the Bronx) there are 28,000 acres of parks, also truck gardens, farms, and even a grove—a remnant of the original forest that once covered Manhattan Island. There are the ocean beaches, the harbor, and the mighty Hudson River. This means a host of plants and animals, from bedbugs, pigeons, rats and mice in the thickly built-up areas, to deer that wander into its landward areas, and even a sperm whale stranded in Brooklyn. Poachers still trap muskrats within the city limits.

Kieran, veteran of radio's "Information, Please," and author of several books on natural history subjects, gives an encyclopedic store of information about the plants and animals, selecting those he has seen, or those likely to be seen. The treatment is a loose arrangement by groups from the life in a cup of water dipped up from sea or pond, to birds and mammals, flowering plants, and trees.

From this volume the nature lover can get a view of the great variety and wealth of life that flourishes in and about a great city—some because of man, some in spite of him.

A background of the geology and history of the island, and a chapter on the cycle of the seasons introduces one to the factors which determined the flora and fauna upon which man has placed a heavy hand. The pencil drawings by H. B. Kane are a very decorative feature of the volume.

AUSTIN L. RAND
Chief Curator of Zoology

GIFTS TO THE MUSEUM

Following is a list of the principal gifts recently received:

Department of Anthropology

From: Dr. William Bascom, Berkeley, Calif.—ethnological specimens, West Africa; Mrs. Maude A. Farber, Chicago — ethnological specimens, Australia, Melanesia; Mr. & Mrs. Clarence L. Frederick, Chicago—62 ethnological specimens, Africa; Capt. and Mrs. A. W. F. Fuller, London, England—carved Maori Tiki, New Zealand; Mrs. John A. Holabird, Chicago—Navajo textiles, Southwest USA; Mr. & Mrs. Fred Mueller & Mrs. Pauline Tuck, Chicago—ethnological specimens, Polynesia, Samoa; Mr. Robert P. Thacker, Chicago—model house, Kusai, Micronesia

Department of Botany

From: Mr. H. R. Bennett, Chicago—536 phanerogams, Oregon; Dr. E. E. Sherff, Hastings, Michigan—13 phanerogams, Hawaii

Department of Geology

From: Mr. James E. Canright, Bloomington, Ind.—a fossil insect, Nova Scotia; University of Chicago—fossil reptiles, Texas; Mr. August Pivorunas, Chicago—slab of fossil pelecypods; Dr. & Mrs. Robert H. Whitfield, Evanston, Ill.—fossil plant specimens, Wyoming and Tennessee

Department of Zoology

From: Dr. James Brennan, Hamilton, Montana—slides of chigger mites, North and South America; Dr. C. M. Burgess, Honolulu, Hawaii—snail specimens; Dominion Museum, Wellington, New Zealand—3 bird skins; Mr. Stanley Dvorak, Chicago—3 marine snails, Philippines and Sonora, Mexico; Dr. Robert L. Fleming, Katmandu, Nepal—110 bird skins, 3 lizards, 7 snakes; 1 hairworm; The Florida State Museum, Gainesville, Florida—a bat skull, B. W. I., Jamaica; University of Florida, Gainesville, Florida—7 bats, Bahama Isl., Panama, Antigua; Mr. Harry Hoogstraal, Cairo, Egypt—32 mammals, 213 bird skins, 7 frogs, 14 lizards, 8 snakes, a lot of turtle eggs, uterus of a mammal, Sudan, Egypt; Mr. Gunnar Hoy, Argentina—408 bird skins; Mr. Ralph Jackson, Cambridge, Maryland — land snails, Ibarra, Ecuador; Miss Bess Kennedy, Grafton, West Virginia —a pair of miniature ivory dogs; Dr. N. L. H. Krauss, Honolulu, Hawaii—15 reptiles and amphibians, Mexico and Central America; Mr. Borys Malkin, Seattle, Washington—inland mollusks, Europe; Dr. J. I. Menzies, Sierra Leone—17 frogs, 3 lizards; Mr. John C. Poynton, Pietermaritzburg, Natal—a frog; Mr. Kim T. Rawlinson, Greencastle, Indiana—8 fishes; John G. Shedd Aquarium, Chicago—3 fishes, Iowa; Walter Suter and John Wagner, Evanston, Ill. — 10,919 feather-wing beetles, Eastern United States; Mr. Robert W. Tansill, Evanston, Ill.—sea shells, Yap Id., Carolines; U. S. Fish and Wildlife Service, Rogers City, Michigan—2 fishes; Dr. Conrad E. Yunker, Ottawa, Ontario, Canada—4 lizards, Egypt

Rarest Waterfowl

The nene or Hawaiian goose, a peculiar species that evolved from a colonization of the islands by Canada geese in the long ago, is probably the rarest species of waterfowl in the world. In 1950 there were only 17 in captivity and another 17 in the wild. Since then, the wild birds have increased to perhaps 50 birds, and in addition 36 young have been raised in captivity in Hawaii and 53 in England. The nene's breeding grounds were discovered only in 1957, and a study made of the possibilities of management of the species to ensure its further increase and safety

NEW MEMBERS

(March 7 to April 4, 1960)

Associate Members

Mrs. John W. Allyn, E. Henry Blume, Joseph E. Brunswick, Robert S. Burrows, Carl Cervenka, Mrs. David L. Coghlan, Dr. Lorne Costello, Ralph Cowan, Glenn R. Curtis, Theodore C. Diller, Walter Erman, Allyn J. Franke, Frank Gall, Harold S. Guetzkow, Mrs. Burton W. Hales, Myron A. Hecht, John S. Hutchins, Howard J. Jeffers, R. J. Kennedy, Leslie S. Larson, Robert E. Levin, Sidney D. Levin, Mrs. William Lippman, Hervey L. MacCowan, E. S. Marsh, Dr. W. Harrison Mehn, Paul H. Mesenbrink, Mrs. Wilbur C. Munnecke, George Nielsen, John B. O'Connor, Benjamin Franklin Olson, Roy J. Pierson, O. Trumbull Scalbom, Robert W. Smick, Bruce M. Smith, Dr. Simon L. Sprtel, Mrs. C. Conover Talbot, Munroe A. Winter, Edward H. Yonkers, Mrs. Alma M. Zivin.

Sustaining Members

Jerome R. Sebastian, F. C. Shafer

Annual Members

Dr. John H. Abelson, Robert A. Abrahamson, Elliott N. Adams, F. Denby Allen, James Alter, W. A. Anderson, Mrs. Roy E. Andrews, Dimitri T. Argoe, Willard Ayres, E. Bachrach, William S. Baltz, Dr. C. J. Barasch, Arthur K. Baxter, Robert W. Beart, Dr. Allison Burdick, Jr., Walter W. Caddell, Milton Cohen, Arthur F. Connelly, Hayden F. Conway, Dr. Maxwell M. Corbett, Harry I. Coy, Jr., J. H. Donovan, Mrs. A. D. Davis, Dr. John J. Eichstaedt, Morton C. Eden, F. Fahey, Daniel Gallagher, Dr. Benjamin J. Gans, Joseph Getlin, Edward Gudeman, Robert A. Hardt, William T. Hocking, William C. Howell, Harold Jackson, Sidney R. Johnson, Robert E. Johnson, James W. Karstens, Edwin M. Katz, M. G. Kaufman, Daniel Wilson Keatinge, John F. Keefe, Ralph Keller, J. Edgar Kelly, John J. Kelly, Jr., Thomas F. Kelly, Michael M. Kenyon, Ben H. Kessler, Paul T. Kessler, Jr., M. G. Lipinski, Marshall Long, Palmer G. Lykken, John L. Marley, Jr., John L. Means, Robert C. Meissner, Miss Ruth Miller, R. R. Minor, Robert W. Mundstock, C. Frank Newburg, A. J. Newhagen, Mrs. Peter A. Pershing, Walter J. Peterson, William Pinsof, J. Louis Plocek, Dr. George J. Porter, Robert Quayle, Mrs. Irvin F. Richman, Harold Richter, Frank Rutherford, W. Norman Schultz, Henry L. Seaman, Dr. Sid John Shafer, Mrs. Robert R. Sheehan, Roy J. Succa, Irvin Swartzberg, George Swope, Dr. Henry A. Szujewski, Vernon Travers, Irwin R. Tucker, Dr. Willard Van Hazel, Eugene R. Ward, Henry L. Warshell, Dr. Harold H. Was, Mrs. Harriet P. Webber, Gene Wedereit, Dr. Leon H. Weiss, Harold A. Williamson, Joseph J. Wilson, C. Harry Youngquist, Dr. Fred R. Zeiss.

CHINA—
LAND OF THE DRAGON
JOURNEY
Continues Through May

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO NATURAL HISTORY MUSEUM **Bulletin**

Vol. 31 *June* *No. 6* *1960*

MUSEUM NEWS

Members' Night

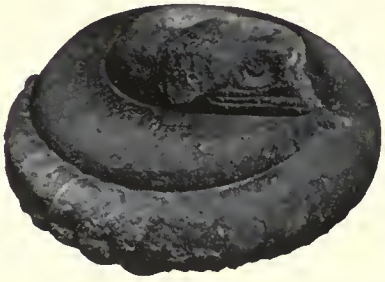
On the evening of April 29, a gala assembly thronged up the Museum's floodlighted steps and into Stanley Field Hall. Expectantly they scanned their printed guides, and then surged toward the variety of programs and exhibits that were being featured on every floor of the Museum. It was Members' Night 1960, and Chicago Natural History Museum was playing host to the largest Members' Night crowd in its history.

Museum personnel welcomed 1,767 guests—147 more than last year's record-topping number. Hundreds of these guests began their evening's tour with Nickolas Muray's visually exciting photographic display, "Peoples of the World," on loan from the Wenner-Gren Foundation for Anthropological Research. Dr. Robert F. Inger, Curator, Amphibians and Reptiles, twice led a standing-room-only crowd on a "Congo Safari," by means of colored slides and the recorded sounds of insects, frogs, and jungle drums. Some visitors took advantage of their last opportunity to see the exhibit that had been prepared in honor of Darwin's centennial celebration, while many others investigated "Soundtrek," the Museum's pioneering radio guide system.

Featured on the ground, first, and second floors were the re-installation of Halls 7 and 8, Indians of the Southwest, Mexico, and Central America; the series of exhibits on the archaeology of Etruria and Rome, which are now completely re-installed on the ground floor; and the new additions to the Birds of the World exhibit in Hall 21. On the second floor the newly completed hall of North American trees, and the re-installations of several huge fossil mammals drew particular attention. Areas "behind the exhibits" also attracted capacity crowds, who saw a diversified array of objects on display ranging from mysterious Tibetan books through unique rock formations, rare deep-water fish, poisonous plants, and octopus teeth. Over and over again, the scientific staff explained the special exhibits they had prepared illustrating their research to new groups of people who seemed to find it hard to tear themselves away from exquisite plant models, giant beetles, fossil sharks in process of being uncovered, and primitive musical instruments. Many visitors were attracted by the variety of intriguing titles displayed in the Library, and lingered to discuss them over a cup of coffee with the hospitable library staff. Others were impressed by the scope and quantity of the Museum's scientific publications produced during the past year. Before the evening was over, almost everybody traipsed up to the fourth floor to see taxidermy work in progress and to marvel at the magnificent array of animal skins.

As last reminiscences were exchanged around the refreshment tables, snatches of conversation drifting through Stanley Field Hall indicated that everyone had experienced a memorable evening.

THIS MONTH'S COVER



Our cover does *not* show a coiled-cephalopod fossil nor a portion of a nautilus shell, which a first glance might suggest. We see the ventral plates or scales of a coiled rattlesnake, which was carved by an Aztec sculptor in the fourteenth century A.D. Views of the top and the complete underside of this serpent, with its thirteen rattles, are shown above. The coiled mass of the snake, which is of red basalt, is 24 inches in diameter and weighs about 300 pounds. Additional examples of Aztec sculpture are shown on pages 4 and 5.

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WAbash 2-9410

THE BULLETIN

EDITOR

CLIFFORD C. GREGG ..... *Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN ..... *Chief Curator of Anthropology*
JOHN R. MILLAR ..... *Chief Curator of Botany*
SHARAT K. ROY ..... *Chief Curator of Geology*
AUSTIN L. RAND ..... *Chief Curator of Zoology*
THEODOR JUST ..... *Curator Emeritus of Botany*

MANAGING EDITOR

PAULA R. NELSON ..... *Public Relations Counsel*

ASSOCIATE EDITOR

MARILYN JINDRICH ..... *Associate in Public Relations*

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

Conference Participation

Dr. Paul S. Martin, Chief Curator of Anthropology, *Dr. Donald Collier*, Curator of South American Archaeology and Ethnology, and *Dr. George I. Quimby*, Curator of North American Archaeology and Ethnology, last month attended the Annual Meeting of the Society for American Archaeology at Yale University. Dr. Martin was chairman of a study section entitled "Southwestern and Iowan Archaeology" and Dr. Quimby presented a paper on "The

(*Continued on page 7*)

By ALAN SOLEM, Curator of Lower Invertebrates

Rocks, Snails, and Cactus Spines

During the last two weeks of March, Munroe L. Walton of Glendale, California, and I searched the foothills and mountains of Southern Arizona for land snails.

The desert seemed an unlikely place for the soft-bodied, moisture-loving snails, and living specimens were few and far between. After moving an estimated twenty tons of desert rocks, I decided I'd be happier counting snails obtained than rocks moved, although the rocks greatly outnumbered the snails!

Of course, the snails didn't move into the desert; the desert came to the snails. Thousands of years ago, many areas of Southern Arizona were humid river valleys which had an entirely different flora and fauna from what we see today. As the climate gradually changed the moisture-loving creatures died out, retreated to the still humid mountain tops, or found some hidden niche that stayed wet for at least a few days each year.

Today, the mountain masses of Arizona are separated by miles of flat, grass-covered or desert tablelands. The sides of the mountains are sculptured by tortuous canyons—some wide, some narrow. Huge piles of rocks and boulders provide evidence of landslides, wind and frost erosion, and occasional torrential rains, which produce the turbulent flash floods.

An adult and young "Sonorella dalli," known only from Tanner Canyon in the Huachuca Mountains, are clinging to the rock. The white rings show where the snails have cemented themselves to the rock during dry spells. These rings may last 200 years in the dry climate, and usually 200 or 300 rings will be seen before even the first dead snail is found.

On the fringes of these rock piles a few scraggly plants survive, shedding leaves that sift down to the bottom of the slides. Each year, the brief showers wash in soil among the leaves and moisten the atmosphere. Under the sun's glare, the surface water soon evaporates, but deep in the dark slides it lasts just long enough for a few hardy snails to move about, eat, and multiply. Most of the year they are inactive, sealed to the rock. Occasionally they are discovered and eaten by some small rodent, but with better luck they may live fifteen or twenty years before an extraordinarily long dry spell kills them. In the recesses of the rock piles, decay is slow and the "bones" of dead snails may accumulate for who knows how many hundreds of years before being disturbed by a collector's searching hands.

Isolated, as they have been, for century after century by impassable desert waste lands between mountain masses, and restricted in the drier areas to a single canyon or even rock slide, a bewildering number of species and varieties have evolved. Arizona has perhaps 200 named kinds of land snails, more than any other mainland state except California. This great proliferation of species is directly traceable to the drying climate and long isolation of relatively small populations of snails.

EARLY COLLECTORS

Little was known of this vast fauna until the late 1880's and early 1890's. A Congregational missionary preacher, E. H. Ashmun, and E. A. Mearns, an Army surgeon attached to the Mexican boundary survey of 1890, sent back the first few species to interested scientists. Intrigued by these remarkable shells, a Joliet, Illinois, newspaper publisher, James Ferriss, collected for the first time in the Chiricahua Mountains in 1902. Again in 1904, Ferriss made another collecting trip with Henry A. Pilsbry, the greatest malacologist of this century and Curator at the Academy of Natural Sciences of Philadelphia. From then until 1919, mountain range after mountain range were explored for shells by Ferriss; Pilsbry; A. A. Hinkley, an Algonquin, Illinois collector, and an Indiana resident, L. E. Daniels.

These arsenals, whose weapons range from slender prickles to large daggers, guard the nearby rock piles.

Pilsbry and Ferriss, in eleven papers totaling 504 printed pages, reported on the results of these field trips and described most of the presently known species. The deaths of Hinkley and Daniels, the ill health of Ferriss, and Pilsbry's other duties ended the survey before it could be completed. When Pilsbry died in 1957, his collection remained in Philadelphia. Hinkley willed his to the University of Illinois, Daniel's went eventually to the University of Michigan,

(*Continued on page 8*)

1. Head of a pulque god

2. The calendrical glyph "Four Rabbit"

3. Ehecatl, the wind god

14. Goddess of water

15. Goddess

AZTEC SCULPTUR

The stone carvings shown on these pages and the cover are rep objects may be seen in two recently installed exhibits in Hall 8.

Aztec sculptors were concerned mainly with the depiction of shown immediately to the left (No. 15) represents Chicomecoatl trayed deities was Quetzalcoatl ("Quetzcal Snake"), god of crea having both human and plumed-serpent forms. Variations in t 8–11). No. 8 shows his face in the jaws of a serpent; on the side of from his ear lobe with a bone skewer. No. 3 portrays Quetzalcoatl wearing a bi in No. 2 was carved on a stone box used by priests to store sacrificed human he

Another strain in Aztec art, typified by the dog in No. 5, was naturalistic ra than symbolic. Probably the realistically portrayed sculptures of human bei animals, and insects were created primarily for pure pleasure, although som these animals also had religious significance.

13. Plumed warrior from a wall relief

12. Seated man

11. Quetzalcoatl

4. Head of a serpent (note large poison fang)

5. Young dog

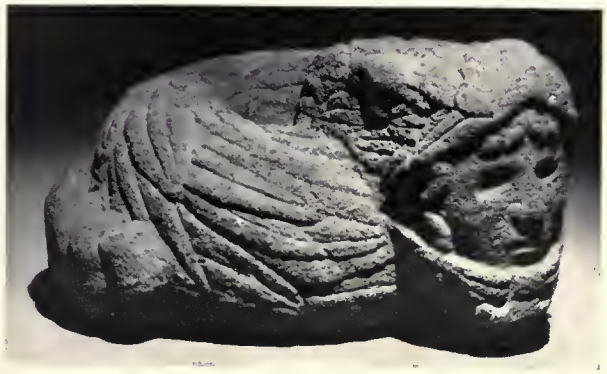
7. King of Coatlinchan

6. Rain god

DONALD COLLIER
Curator of South American Archaeology and Ethnology

sentative of the Classic Aztec style dating from A.D. 1400–1520. These

ities and the dramatic portrayal of religious symbolism. The figure
Seven Serpent"), goddess of maize. One of the most frequently por-
on, learning, winds, and the planet Venus, who was conceived of as
depiction of this god are shown in the accompanying pictures (Nos.
is stone is carved a man sacrificing to Quetzalcoatl by drawing blood
-beak mask in the guise of the wind god. The glyph
s.
er
s,
of

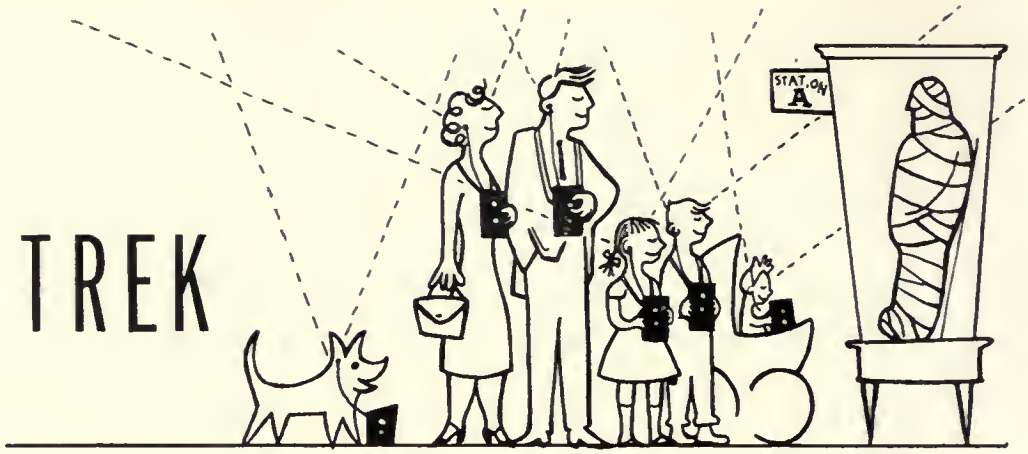


10. Quetzalcoatl

9. Plumed serpent from a stone column

8. Front and side of carved boulder

SOUNDTREK



By MARILYN JINDRICH
Associate Editor
Illustrations by Marion Pahl

Visitors to Chicago Natural History Museum are cautioned not to be disturbed if they observe some rather unusual behavior taking place in the exhibition halls these days. Throughout the building, people with little black boxes around their necks pass by with a faraway expression in their eyes. They appear, in fact, to be guided by some mysterious force as they walk, turn, and stop in almost synchronized precision before exhibit after exhibit.

Unusual? Yes. But there is no need to be alarmed, for at the bottom of this phenomenon is an exciting innovation designed to make a trip to the Museum more memorable, enjoyable, and educationally rewarding. It's Soundtrek, a new closed circuit radio guide system. First introduced to our members on April 29, Members' Night, it is the only operational radio guide system in Chicago, and one of the very few in the world.

THE SOUNDTREK SYSTEM

Soundtrek consists, first, of a receiver, which is a light, portable plastic box to which an ear piece is connected. The receiver is equipped with a dial that enables the Museum visitor to tune in the proper channel for each hall. Commentaries on the exhibits are recorded by the Museum staff on tapes which are played continuously in each Soundtrek equipped hall. The purpose of the commentaries is to give Museum visitors a more exciting and purposeful introduction to the exhibits by providing the next best thing to a personally escorted tour by a Museum scientist. For a touch of additional realism, some of the tapes include actual sounds of nature—the calls of wild animals, birds, frogs and reptiles, and even the rarely heard whisperings of the ocean and underwater life—as well as authentic Indian ritual drums and ceremonial music.

The idea of radio guides for museums originated in Europe in Amsterdam, where in the Rijksmuseum a one-channel installation was developed which lacked additional radio frequencies. This meant that adjacent halls could not be wired for sound because two commentaries, each operating in nearby halls on the same radio frequency, would be picked up simultaneously on the receiver as a mere jumble of sound. In spite of this limitation on the number of halls that could be wired, the Amsterdam experiment was a success. In a short time the idea spread across the ocean, and a few similar, one-channel radio guide operations were installed in museums in the United States.

One of the first to use the system was the American Museum of Natural History in New York, which today has six exhibit halls wired for one-channel reception. Similar operations were also installed in Washington's National Art Gallery and the Detroit Institute of Art. All of these early guide systems have two things in common: they operate on a single channel or radio frequency, and they can be used in only a limited number of exhibition halls, since none can ever be adjacent to one another. It is here that Soundtrek has imparted a new approach to museum closed-circuit radio guide systems. By expanding the number of radio frequencies used for the taped commentaries, Soundtrek has accomplished something new—the wiring of adjacent halls.

The result is that 18 exhibition halls at Chicago Natural History Museum now offer Soundtrek commentaries—a record-breaking number. In addition, in many of these halls visitors may choose between two distinct narrations, each offered on a separate channel. One is shorter and less detailed, while the other is longer and more scientifically explicit.

PUBLIC RESPONSE

What has been the public reaction to Soundtrek during its infancy and first growing pains in the Museum over the past few weeks?

Almost without exception, visitors have been fascinated, delighted, and very much enlightened through the radio guide system. In talks with many of them, it has been discovered that there are a number of subsidiary benefits of the system that had not been realized when it was in the planning stage. For example, a mother of eight lively

and inquisitive young boys found in Soundtrek the means of keeping her brood in tow, so that for the first time she was able to really enjoy a trip to the Museum. And there is the little girl who, upon returning her radio guide, announced that she had listened to the commentary on the Museum's prehistoric man restorations no less than twelve times! She was writing a school paper on that subject and did not want to miss a single detail.

On the humorous side, impartial observers have been heard to comment: "Soundtrek users look as though they are tuned in on outer space." Or there is the sympathetic reaction of the woman who somehow missed seeing the Soundtrek booth at the main entrance to the Museum, but did see a young boy with a radio receiver: "Did you see that poor little boy? Imagine having to use such a powerful hearing aid at his age!" Then, of course, there are always some who quickly return to the booth lamenting they can't hear a thing, only to discover they haven't turned on their radio set.

SOUNDTREK'S FUTURE

What of the future of Soundtrek? Envisioned is an ambitious plan to wire the halls for additional channels that will carry commentaries on the exhibits in other languages, for the benefit of Chicago's linguists as well as foreign visitors to the Museum. In addition, it is hoped that every hall in the Museum might eventually be included in the system. But no matter how long it takes for these long-range plans to materialize, there is no question that Chicagoans *now* have the opportunity, for the nominal fee of 50 cents (25 cents for children), to avail themselves of the most advanced radio system in the world . . . and it's right here, at Chicago Natural History Museum.

MUSEUM NEWS—

(*Continued from page 2*)

Old Copper Culture and the Copper Eskimos and Hypothesis" . . . *Mr. John R. Millar*, Chief Curator of Botany, attended the Conference of Directors of Scientific Collections held May 9–11.

Citation

Research Associate *Harry Hoogstraal* has received the Department of Defense Distinguished Civilian Service Award, the highest honor conferred on D.O.D. civilian employees, for his research on ticks and tick–borne diseases of man and animals. The citation reads: "His unique work is not only of major significance to military medicine but to the welfare of all the peoples of regions where tick-borne diseases are a serious health problem."

New Staff Member

Mrs. Paula R. Nelson joined the Museum staff on May 1 as Public Relations Counsel. To this position, Mrs. Nelson brings a background of nearly ten years' experience in editorial work, public relations, and adult education.

Mrs. Nelson attended the University of Chicago and Roosevelt University, and did graduate work in adult education at the University of Chicago. In the Radio and Television Office of the University, she edited the Round Table pamphlet, developed educational radio programs, and assisted with the publicity program of the committee of educational institutions (of which Chicago Natural History Museum was a member) that was instrumental in securing Channel 11 for educational broadcasting in Chicago. Later, Mrs. Nelson was editor for the University's Orthogenic School—its publications comprising scientific books and monographs as well as articles prepared for wider distribution in popular magazines.

At the University of Chicago's Downtown Center, as Assistant Director of the Informal Program, Mrs. Nelson worked with community groups and university faculty to develop adult discussion courses. Under a grant from the Fund for Adult Education, she was in charge of a sociological study of the Downtown Center's student body of more than 5,000 persons; handled all publicity for the Center's Informal Program; and directed two unique courses for women, "Know Your Chicago," and "The Board Member Training Institute."

"In a society that has grown increasingly organized and compartmentalized," Mrs. Nelson believes that "the arts of communication and interpretation perform a necessary service. The increase in leisure time available to adults today provides new opportunities for our educational and research institutions. A balanced public relations program, in touch with a variety of media and community resources, can communicate a multi-dimensional image of the Museum to the diversity of publics it wishes to reach and serve. We shall work to build such a program."

Scientific Meetings Here

Scientists from 53 leading universities, museums, and research laboratories in the continental United States, Alaska, Canada, and Pakistan, will converge at Chicago Natural History Museum during June for the annual meetings of the American Society of Ichthyologists and Herpetologists. The Museum's welcome to these distinguished guests will be given by E. Leland Webber, Assistant Director.

During the three-day meetings, scientific papers will be read reporting a wide variety of research on fishes, reptiles, and amphibians. Among the subjects to be presented are: "Piranhas—Fact and Fiction," "A Technique for Fish Photography," "Anesthetizing and Operating on Large Sharks," "Case Report of a Bite by a Red Diamond Rattlesnake," "Opportunities for Ichthyological Research in National Parks," "Vocal Variation in Two Species of Chorus Frogs," "Effect of Temperature on Development in Snakes," "Pattern of Replacement in Frog Teeth," "Fishery Survey in Arctic Canada"—as well as many other titles of a more technical nature.

Field Research

Dr. Paul S. Martin, Chief Curator of Anthropology, accompanied by *Dr. John B. Rinaldo*, Assistant Curator of Archaeology, departed on May 14 for a four-months' cxpedition to Arizona. Assisted by seven high school and college students, the two Museum curators will direct exploration of a number of sites for ancient Pueblo ruins.

Dr. Fritz Haas, Curator Emeritus of

Lower Invertebrates, will leave in early June for the Southwestern Research Station in Portal, Arizona, where he will conduct the 1960 Arizona Zoological Field Trip.

Children's Journey

"Thar she blows," signals the start on June 1 of the Museum's summer Journey for children. Entitled "Whales—Monsters of the Sea," the Journey focuses on the strange things that have happened to these largest animals ever to live on the earth, who long ago left the land to go back to the sea. The "whale hunt" is available to all children during regular Museum visiting hours during the months of June, July, and August. Travel instructions and special Journey questionnaires prepared by the Raymond Foundation are available at the north and south entrances to the Museum.

New Exhibit

Prize-winning entries in the Tenth Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition sponsored by the Chicago Lapidary Club, are on display from June 6 to July 6.

The exhibition features an array of nearly 60 handcrafted gems and jewelry by talented amateurs. Included are cabochoned and faceted gems; gem collections; individual pieces of jewelry and jewelry sets; polished stones and slab collections; and enameled stone work. These fine examples of lapidary art were selected by a panel of professional jewelers from hundreds of gem and stone exhibits.

Many gems and jewelry appearing in the Museum exhibition represent the culmination of years of work by the amateur lapidaries. Oftentimes they begin with a hunt for slabs in upper Michigan or Wisconsin, or a search of the southwestern part of the country, which yields an abundance of lovely stones. Other stones may be purchased from the Chicago park district or from private firms. Agates, jades, sapphires, quartz, and African tiger-eyes are included in the exhibits, and even a collection of polished dinosaur bones has been known to appear in the show.

ROCKS, SNAILS, CACTUS—

(Continued from page 3)

We excavated a six-foot-deep hole in this rock slide to find 204 dead shells, but not one living specimen.

while Ferriss's wound up at a Joliet public school. In 1955, Dr. Fritz Haas arranged for its transfer to Chicago Natural History Museum. My first job on joining the Museum staff was to work on this collection.

One could, of course, continue the survey where these pioneer collectors had stopped, adding to the information already compiled. But perhaps more interesting to an evolutionary biologist was the question of what had happened to these snail colonies after half a century. Did they still exist? Could they be located? If found, would the snails be the same as those collected fifty years earlier? Some colonies sampled in 1904 seemed to be in the middle of rapid evolutionary change. How far had these changes progressed in the nearly sixty years since then?

MAPS GUIDE NEW FINDS

Pilsbry and Ferriss had often published crude maps in an effort to pinpoint localities where they had collected. Thus, with luck and perseverance, there was a chance that I might locate the very rock slides they had visited.

In this task, I had been anticipated. A Los Angeles shell collector, Munroe L. Walton, had been making trips after Arizona land snails for thirteen years, and had managed to collect about 80 per cent of the named species and subspecies. We were introduced at the American Malacological Union Meeting in Redlands last summer, and he soon agreed to accompany me on an Arizona trip this spring.

We met in Tucson during the latter part of March and in a busy two weeks' period collected more than one-third of the known species. What had to be done was to quarry three to five feet into old rock slides. Constantly, the slides would cave in on us just as we sighted a shell, and more than once the only living individual seen would get crushed by rocks. At times we found 100 dead shells for each live one. Localities were often miles apart, and of neighboring slides, one might be good collecting while the next was barren. We found that some areas were snowed in, while many others could not be visited in the time available. The work of the two weeks was possible only through Mr. Walton's sharing of his hard won knowledge and patient help in the field. I might add that not the least of his aid was help in cactus spine extraction!

COLLECTION COMPLETED; RESEARCH CONTINUES

The work of cleaning and processing the more than 5,000 specimens taken is now under way. It was possible to identify most specimens in the field, since only one kind is generally found in one place, but this material will now have to be compared with the original collection in the Museum. We already know that we have rediscovered a "lost" species of land slug. Originally collected in 1913, the specimens were lost before they could be adequately studied. We also obtained a number of new locality records, and even a few species that Munroe Walton had been unable to locate in his earlier searches. The knowledge of techniques gained from this trip will greatly aid future work, while preliminary results indicate that this research will be well worth while.

Moving rocks is unquestionably hard work, but there is a fascination to these desert snails which is hard to resist, despite bruised fingers from rock slide cave-ins, sore muscles, and cactus spines!

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO NATURAL HISTORY MUSEUM
Bulletin
Vol. 31 No. 7
July 1960

MUSEUM NEWS

THEODOR K. JUST
1904–1960

News of the death of Dr. Theodor K. Just, for many years Chief Curator of the Department of Botany, was received at the Museum with deep regret. Dr. Just was taken ill early in January and since that time had been continuously ill at Billings Hospital and at his home in Oak Park. Death occurred at his home shortly after noon on June 14.

Theodor K. Just

Dr. Just was born in Austria on October 27, 1904, and was educated in that country, receiving the degree of Doctor of Philosophy at the University of Vienna in 1928. After a year with the Museum of Natural History in Vienna, he came to the United States and joined the faculty of the University of Notre Dame, beginning as an instructor and finally becoming head of the Department of Biology of that institution. He joined the staff of the Museum in August of 1946, becoming Chief Curator of the Department of Botany in January of 1947.

In addition to his research and writing in the fields of botany and paleobotany, Dr. Just served as contributor or editor of a number of scientific journals, including the *American Midland Naturalist; Lloydia*, founded by Dr. Just and published by the Lloyd Library and Museum of Cincinnati; *Plant and Animal Communities*, published by the University of Notre Dame; and *Chronica Botanica*.

He was a consultant to the Office of Strategic Services in World War II. He also served as chairman of various committees of the National Research Council and the National Science Foundation.

Dr. Just was a Research Associate in the Department of Biological Sciences at Northwestern University and had conducted seminars at Northwestern University and St. Louis University.

He will be missed at the Museum not only because of his outstanding scholarship but because of his consistently cheerful personality.

Honors

Melvin A. Traylor, Jr., Associate Curator of Birds, has been awarded a $12,000 grant by the National Science Foundation for support of basic research in ornithology. The grant will be applied over a two-year period to the compilation of a check-list of the birds of Angola, a research project of special significance for its contribution to an understanding of the stages of evolution of many African birds. Part of the government grant will be used by Mr. Traylor for a five-months' study trip to the Portuguese colony on the west coast of Africa. He will also make a critical study of some 5,200 specimens of Angola birds now in Chicago Natural History Museum.

In June, 1959, a Maori carving of a tattooed face from the Museum's famous Fuller collection appeared on the cover of the WFMT Fine Arts Calendar. In addition to the cover picture, a number of other photographs of art objects from the Museum's Pacific collections appeared throughout the issue. Last month the June, 1959, issue of the WFMT guide was honored by the Society of Typographic Arts by being selected for exhibit in its 33rd Annual Exhibition held in the Art Institute.

New Museum Service

A new service awaits Museum visitors at the north end of Stanley Field Hall, which will streamline the visitor's trip to the Museum. It is the Museum's Information Booth staffed by *Mrs. Angela Womble*, formerly of the Charleston, North Carolina, Museum and a graduate of Winthrop College. At the booth visitors may rent Soundtrek radio guides, purchase Museum guide books, and obtain information about the exhibits that is not readily apparent by a quick scanning of a Museum floor plan. Museum Journey instructions and questionnaires formerly kept only at the north and south doors are also available at the desk. (*Continued on page 5*)

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

THE BULLETIN

EDITOR

CLIFFORD C. GREGG.....*Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
JOHN R. MILLAR.....*Chief Curator of Botany*
SHARAT K. ROY.....*Chief Curator of Geology*
AUSTIN L. RAND.....*Chief Curator of Zoology*
THEODOR JUST†.....*Curator Emeritus of Botany*

† deceased

MANAGING EDITOR

PAULA R. NELSON.....*Public Relations Counsel*

ASSOCIATE EDITOR

MARILYN JINDRICH.....*Associate in Public Relations*

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

THIS MONTH'S COVER

Three men from Mars? No, the right-hand two are actually Museum staff members while the figure on the left is, of course, not a man at all, but a primitive ceremonial mask. What has drawn the strange gathering together is the poisoning of one of the storage rooms in the department of anthropology's Pacific Research Laboratory. The room is filled with a highly poisonous gas, a mixture of carbon tetrachloride and ethylene dichloride, used to preserve valuable Museum collections. The masks worn by the two men in the picture are a self-contained canister type, one of two kinds in use at the Museum.

The feather ornamentation on this katchina makes it a likely victim for insect destruction, therefore it is stored in a Museum "poison room."

INVADERS, BEWARE!

BY MARILYN JINDRICH

WHO would ever guess that within seemingly placid Chicago Natural History Museum there rages a serious and unabating war—a war whose persistence over many years has led to the development of ingenious means of retaliation and defence, including poison gas!

The battlefields? . . . approximately 500 Museum exhibit cases and a large number of rooms storing research collections.

The aggressors? . . . moths and insects called *dermestidae*, both insect enemies possessing the secret weapon of being able to rapidly reproduce offspring who have voracious appetites.

The defending forces? . . . Allen Liss, custodian of anthropology collections, Walter Reese, anthropology preparator, and the Museum's entire maintenance department.

The precipitating factor in the Museum's unusual war probably was the discovery by a few "insect-adventurers" that Chicago Natural History Museum housed some succulent morsels for insect consumption. For a museum whose collections are in most instances both priceless and irreplaceable, the danger posed by such a development demanded stringent measures. Experimentation was begun to find effective means to exterminate the insect pests. The answer was poison gas.

Now, exhibit cases and storage rooms containing specimens vulnerable to insect damage—fine textiles, feathers and animal skins are favorite prey—are protected with a poisonous gas composed of carbon tetrachloride and ethylene dichloride. For the past few weeks (and for a number of weeks to come) Allen Liss has been engaged in "poisoning" the anthropology department's eight storage rooms and approximately 300 exhibit cases. Poisoning the exhibit cases is a relatively simple operation, with each case generally requiring only a pint of the liquid carbon tetrachloride and ethylene dichloride. The mixture is poured into a container at the top of the case by means of a quart bottle with a copper pouring tube. The tube is inserted in a small hole that may be opened and closed at the top of the case, and reaches down into the poison container. It takes only a few minutes for the liquid to empty from the inverted bottle into the poison container, from which it eventually evaporates to permeate the case interior, rendering the contents of the case safe from insects. The special construction of the cases, which are nearly air-tight, insures that almost none of the gas can escape. However, even if it did, it would be diluted with air in the larger exhibit hall, and lose its potency. It is only when it is confined to a small area and in a concentrated form that it may cause asphyxiation.

Museum visitors often view the poisoning of cases with questioning stares, since it appears rather as though the cases are being transfused with a special kind of plasma. But visitors never see the even greater drama and interest that accompany the poisoning of the

(*Continued on page 8*)

Bushman, one of the world's all-time animal favorites, was brought to the Museum after he died. His exhibit case is filled with poison gas for protection against damage by insects.

Especially popular with the children is the giant panda, Su-Lin, who, like Bushman, is protected from insect damage by the carbon tetrachloride and ethylene dichloride gas mixture.

DEAD ON ROAD

by ROBERT F. INGER
CURATOR, AMPHIBIANS AND REPTILES
ILLUSTRATED BY JOHN PFIFFNER

AS A BOY I remember whiling away the miles on long auto trips by counting white horses. Today, white horses are scarcer along the roads than they were in the early thirties. But my interests still focus on animals (I grew into a zoologist) and on auto trips now, I look for DOR's—animals Dead On Road.

One summer my wife and I drove from our home, in a suburb of Chicago, to the Colorado Rockies and eastern Wyoming. We kept a record of all the mammals we saw dead on the road. Because we couldn't stop to inspect each DOR on a busy highway, we slowed down when we saw one ahead and made an identification at reduced speed. If the DOR was just a bloody mass with fur, we recorded our entry as "unidentified." On the whole, I think our identifications were reasonably accurate. We didn't bother with anything smaller than a rabbit. But whenever we spotted an especially interesting DOR, or whenever there was little danger to ourselves from the kind of predator we rode in, we stopped for a good look.

Few predators are equally adept at catching prey in all kinds of country. Some are better adapted to mountains than to plains; others do better in forest than in grassland. In this respect, the automobile is like any other predator. It racks up more animal kills in flat, sparsely inhabited country on paved, relatively straight roads, where its speed finds few restrictions.

Wyoming was a good example. We spotted 166 DOR's in 425 miles of Wyoming highway, or one for every two and one-half miles of travel, while in Illinois only eight DOR's were seen in 370 miles of highway. The difference is undoubtedly accounted for by the greater distance between towns in Wyoming, which provides the predator with the opportunity for the kind of speed build-up that exacts a greater toll from the natural population.

Again, for the mountains of Colorado, our records show an average of only one DOR every 19 miles; while in the relatively flat country east of Denver on US 34, and north of Rifle on state route 13, we noticed one DOR at least every six and one-half miles.

An important factor in the life of any predator is the distribution of prey animals. Obviously, a predator can feed only on those animals living within its geographic range. If the predator has an extensive range (as does the automobile), its diet may vary from one area to another. For example, the automobile cannot possibly kill a yellow-bellied marmot in Illinois, Iowa, or Nebraska, but it can and does kill this woodchuck-like creature in central Colorado, its eastern limit. For the same reason, the automobile can get the porcupine in Colorado but not in Iowa or Illinois. Or take the case of the opossum, which occurs from Nebraska eastwards. We saw one DOR in Nebraska and one in Iowa, but none in Colorado or Wyoming.

Generally, the diet of a non-specialized carnivore, that is, one that feeds on a variety of animals, will reflect the relative abundance of the various kinds of prey found in the environment. If rabbits are the most numerous of the potential prey in a given area, then more rabbits will be eaten by coyotes, say, than any other food animal. The kill of the automobile follows the same principle. The most abundant mammals on the plains are the rabbits—jack rabbits and cottontails. Of the 64 DOR's whose remains we were able to identify in Wyoming, 58 were rabbits. And of the 102 DOR's recorded as "unidentified," we estimated that 75 per cent were probably rabbits.

The statement that rabbits are the

most abundant mammals in the plains needs qualification. We were concerned only with those animals that could actually be considered as potential prey. The species that a given predator will attack fall within certain size limits. A lion, for example, does not bother with mice, which are too small to warrant the effort; nor will a lion attack an adult elephant. Similarly, when we arbitrarily decided not to try to identify mammals smaller than rabbits, we were placing a lower limit on the size of the automobile's prey. As for the upper limits, although cattle are occasionally run down, they are large enough to damage seriously any passenger car that tangles with them. Consequently, drivers make strenuous efforts to avoid this kind of prey. We saw no dead steers on the road.

A fundamental principle of biology is that a system of checks operates to control the population size of any animal. If a species becomes too numerous, it may be reduced by a lack of food or breeding sites. Also, as its numbers increase, the species is attacked more often by predators. This principle was expressed very neatly by the elderly gentleman who acted as caretaker of Ayer's Natural Bridge State Park east of Casper. We had been astonished at the number of rabbits dead on the road in Wyoming and mentioned this mortality to the caretaker. "Well," he said, "some of the sheep ranchers around here lost a lamb or two to coyotes. So they got after the government and the game men poisoned and trapped out the coyotes. Then we had a plague of rabbits. Finally the state put in the hard top and the cars started getting the rabbits. You know, Nature has a way of taking care of these things."

MUSEUM NEWS

(*Continued from Page 2*)

Field Research

Mr. Harry Changnon, Curator of Exhibits, conducted a field trip on May 21st for the Chicago Academy of Sciences to Thornton, Illinois, for the purpose of studying the limestone bedrock of the Chicago region. . . . *Dr. Fritz Haas*, Curator Emeritus of Lower Invertebrates, left on June 6 for a three weeks' field trip to Arizona to study the snails of the Chiricahua Mountains.

Resignation

Effective with the close of business, June 17, *Mr. Robert Reich* resigned as Custodian of the Herbarium, in order to further his education.

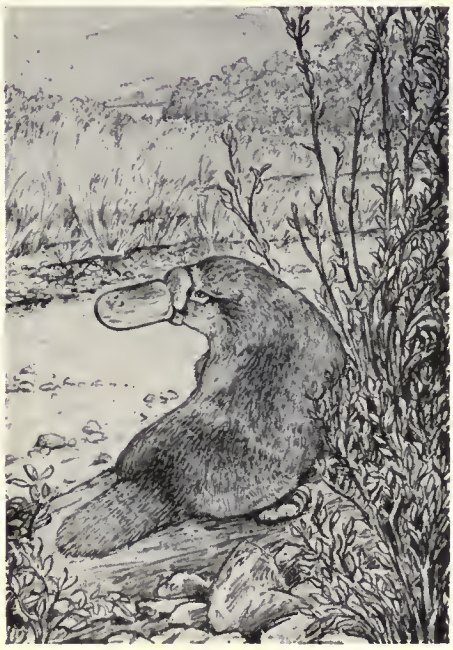
Meetings Attended

Mr. John R. Millar attended meetings of the newly formed Association of Science Museum Directors (as representative of Dr. C. C. Gregg) and attended the annual meeting of the American Association of Museums, both in Boston, Massachusetts, May 24–27. . . . *Mr. Philip Hershkovitz*, Curator of Mammals, *Dr. Karl Koopman*, Assistant Curator of Mammals, and *Miss Sophie Andris*, Osteologist, attended the 40th annual meeting of the Society of Mammalogy at Tacoma, Washington, June 20–22. . . . *Mrs. M. Eileen Rocourt*, Associate Librarian, attended the Convention of Special Libraries Association in Cleveland, Ohio, June 5–8. Mrs. Rocourt has served as Chairman of the Museum Division of the Association during the past year, and in this capacity presided at the Division's annual business meeting, which included a round-table discussion on "Rare Books and other Special Materials in Museum Libaries."

From the Bookstore

The Story of the Platypus

By Alfred G. Milotte. A Borzoi Nature Study Book published by Alfred A. Knopf Inc., New York. 114 pages, 23 illustrations (by Helen Damrosch Tee-Van). Clothbound $2.75.



From "The Story of the Platypus"

New Exhibit

The historic panorama of "Eleven Centuries of Icelandic Culture" is portrayed in a new photographic exhibit in Hall 2 opening July 1 in the Museum and continuing through August. The photographs, assembled by Cyrus T. Brady, Jr., depict "The Land and the People," "Iceland's Cultural Development," its "Architecture and Industry," and its "Contemporary Art and Life." The exhibit comprises 50 large photographic prints of unusual interest, many drawn from rare sources.

Longer Museum Hours

During the months of July and August, and through September 4, the Museum will remain open from 9 a.m. to 8 p.m. on Wed., Fri., Sat., and Sun., and from 9 a.m. to 6 p.m. on Mon., Tues., and Thurs. The 9 to 8 p.m. hours occur on the evenings of the free Grant Park concerts, thus providing Chicagoans with a cultural twin-bill for the summer. The Museum's cafeteria will be open from 5 p.m. to 7:30 p.m. for those who would like to dine conveniently.

Press Covers Museum

Members of the press photographed "prospectors" swarming through the Museum's department of geology last June 21, armed not with picks and shovels, but with a berylometer. They were

(*Continued on page 8*)

THE MUSEUM'S NEWEST EXHIBIT

By MELVIN A. TRAYLOR, JR., Associate Curator of Birds

The newest bird screen in Hall 21 adds the families from Sandgrouse to Owls to the systematic series of the Birds of the World.

SINCE THE PURPOSE of the most recent exhibit to appear in the bird halls is to entertain and stimulate as well as to instruct, pride of place has been given to the colorful family of parrots. The parrots, which include the various groups known as macaws, cockatoos, parrakeets, lovebirds and lories, show a great diversity of size and color, and there are few that can be considered dull. As pets they have always excited interest and amusement because of their "human" qualities: they learn to talk well, they use their feet to feed themselves (not a truly human characteristic, but the effect is like that of using their hands), and, having a longevity beyond that of most birds, they make almost lifetime pets. The finest talkers are the African Gray and the Amazons; at times they seem almost capable of carrying on a conversation. We must be docile in the face of facts, however, and admit that this is not a sign of real intelligence but of their ability and delight in mimicry. On the other hand, it is hard to deny them intelligence when you discover, as I did on my first trip to Mexico, that they easily learn to speak excellent Spanish!

Two of the least typical but most interesting parrots are the Kea and the Kakapo, or Owl-parrot, of New Zealand. The Kea was originally a vegetarian, as are most parrots, but after the arrival of the English settlers it developed the habit of eating meat, and will now occasionally attack and kill sheep. In areas where the habit has become general the bird is a serious pest and must be killed off, but fortunately the majority of Keas live in relatively inaccessible country above the timberline and there is little present danger of their being exterminated. The Owl-parrot is the only member of its family that has lost the power of flight. To reach the top of the trees on which it feeds it must climb up using its beak and claws; from there it can glide down to the foot of the next tree, but then must start climbing all over again.

The other families on the screen are also of interest, though less spectacular in appearance. The sandgrouse inhabit the arid regions of the Old World, which seems a strange choice since they must have water at least once and usually twice each day. Since water holes are scarce in the desert, each will draw birds from hundreds of square miles around. At dawn and dusk there are spectacular flights of birds coming to water. The sandgrouse share with pigeons the unbird-like habit of immersing their bills and sucking up water like a horse or a man, rather than dipping up a few drops and then tilting back their heads to let the water run down their throats.

The young cuckoo on the nest has ejected its rightful occupants. Meanwhile, the smaller foster parent works hard to satisfy the usurper's voracious appetite.

Painting by Staff Artist John Pfiffner for the newest bird screen in Hall 21, which adds the families from Sandgrouse to Owls to the systematic series, "Birds of the World." The birds were mounted by Taxidermist Carl Cotton and Assistant Taxidermist Peter Anderson. The exhibit was designed by the Museum's Division of Birds.

Pigeons and doves (or doves and pigeons, for there is no difference between them) comprise a family almost as numerous and diverse as the parrots. They have been deliberately scrimped in our treatment here, however, since we already have two wall cases showing the variation in wild and domestic pigeons. The extinct Dodo was a close relative of the pigeons, although the resemblance is difficult to see now. When the Dodo lost its power of flight it also lost its incentive to keep its slim, streamlined shape, so that by the time it was discovered in the 1500's it was the size and shape of a turkey.

The cuckoos are as widespread as either the pigeons or parrots, but as a rule much more soberly clad. Cuckoos are mostly remembered for their parasitic breeding habits; the female lays her egg in the nest of some other bird and then goes off, leaving the foster parents to hatch and feed the young. This habit is found mostly in typical cuckoos of the Old World and is not confined to this family, for we find it, among others, in the Cowbirds of North America. It is among the cuckoos, however, particularly the European Cuckoo, that we find the greatest disparity in size between host and parasite. As you can see in the figure, the foster parent seems almost in danger of disappearing down the young cuckoo's throat as it tries to satisfy the youngster's clamorous appetite.

Although in this country a warbler may often be seen feeding her own young along with the parasitic cowbird, that seldom happens with the cuckoo. When just hatched, the young cuckoo's first instinct is to eject any other object from the nest. This it does by crawling beneath it, then humping its back and working its way up the side of the nest till the other object, the egg or young of its host, falls over the edge. As a further method of insuring the success of their young, individual cuckoos seem to specialize on one host species and will lay eggs that match in color those of the host.

Touracos are a small family of brightly colored birds confined to Africa. They were formerly called plantain-eaters, but recent studies have shown that they feed on almost any fruit and berries *except* plantains, so the name is being discarded. Most members of the family have a brilliant red patch on the wing. It is caused by a pigment with a copper base, called turacin, found nowhere else in the bird world. For a long time it was thought that turacin was soluble in water and that birds soaked by a heavy rain would lose their color. This is not true, however, and washed-out birds are never seen.

The last two families on the screen are the Barn Owls and the typical Owls. Superficially they are much alike and are usually lumped together in people's minds although there are well-marked anatomical differences to separate them. The barn owl is one of our most familiar owls because of its habit of nesting near human dwellings. Despite its eerie calls it is a good neighbor, for it feeds exclusively on mice and is a boon to the farmer. Recent experiments have shown one reason for its success as a hunter: when placed in a pitch black room a barn owl is just as capable of catching mice by sound as it is by sight.

The big horned and eagle owls are the real "hoot" owls of song and story and are the source of the many superstitions about owls as birds of ill omen. The source of the "wise old owl" probably traces back to the sacred owl of Athena; in fact, the epithet *Glaukopis*, meaning "keen-eyed" in Homer, may have originally meant "owl-faced." The snowy owl is a form of the high Arctic that we get to see only occasionally around Chicago. Irregularly, when their food supply fails in the north, there will be an eruption of snowy owls that brings them to these latitudes in considerable numbers. The last year that happened I spent my spare time combing the beaches and fields trying to find one. When I had just about given up hope, I arrived at work one morning to find my elusive bird sitting on the roof of the Museum!

After you have seen the new bird exhibit described by Associate Curator Traylor, why not revisit these?

A unique exhibit in this Museum is that illustrating the cultures of the people of Madagascar, who are of mixed Asiatic and African origin. The collection is the only one of importance from this island in the United States, and is one of the most complete in existence.

The largest, and one of the most spectacular habitat groups in the Museum, is the African waterhole in Carl E. Akeley Memorial Hall (Hall 22). Representing a scene in southern Ethiopia, it includes twenty-three animals of six different species.

Distension of ear-lobes, often with large round objects as much as three inches in diameter, is a fairly common form of personal ornamentation in northeast Africa. In Hall E are shown examples of wooden ear-plugs and fine metal chains of the Akikuyu tribe.

Antiquities of the Roman Empire, recovered from ancient Pompeii and Boscoreale where they were buried by an eruption of Vesuvius in A.D. 79, are exhibited in Hall L.

*Long before the United Nations was organized, representatives of the peoples of the world were gathered together in this Museum's Chauncey Keep Memorial Hall (Hall 3—Races of Mankind).

Now largely irreplaceable, the Museum's Melanesian collection in Hall A, most of which was obtained by an expedition in 1909–13, is considered the finest and most complete in the world.

---

*Salmon fishing as practiced by Indians of the Northwest from about A.D. 1000 to 1800 is illustrated in an exhibit in James Nelson and Anna Louise Raymond Hall (Hall 4).

Primitive jewelry, both ancient and modern, as well as productions of the modern jeweler's craft, is shown in H. N. Higinbotham Hall (Hall 31).

The anatomy and some amazing structures of bats are illustrated by models exhibited in Hall 15 (Mammals in Systematic Arrangement).

**Soundtrek tours available*

INVADERS, BEWARE!—

(*Continued from page 3*)

storage rooms that house some of the research collections. As our cover picture shows, to observe that operation is almost like watching a scene from a science fiction movie.

Gas-masked and rubber-gloved, the poisoner enters the storage room, immediately shutting the specially constructed, tightly sealed door behind him. The poison is contained in a 55-gallon drum from which it is poured through a hose into a number of large pans distributed throughout the room. There are no openings in the room other than the door and an exhaust vent. The exhaust vent is turned on to ventilate the room when a research project requires that a member of the Museum's scientific staff remain there for a prolonged period. When this occurs, the staff member does not enter the room for eight to ten hours after the exhaust fans are started. However, in most instances, rather than exhaust the rooms entirely, gas masks are used.

The mask shown on our cover is a self-contained canister-type, which gives protection for about 30 minutes. Another kind of mask used covers more of the face and is hooked up by an air hose

The Museum's valuable mummy collections are stored in special "poison rooms," entrance to which requires use of a gas mask.

to an air compressor, allowing longer periods of exposure in the poison rooms.

As a precautionary measure it is a rule in the use of either of the masks that the person working in the room report at regular intervals to a colleague who remains outside, within call.

The department of anthropology has eight storage rooms for research collections—one houses mummies; another, the Museum's Far East collections; two more, collections based on North American Indian cultures; and another, specimens collected from Central and South America. The remaining poison rooms are in the Museum's Pacific Research Laboratory on the ground floor, which contains the Museum's unusually fine oceanic collections.

And so, through the use of poison gas, the Museum has been able to gain the upper hand in the battle to preserve both its outstanding collections of specimens from the animal world and some of the rarest and finest artifacts of man's diverse cultures.

Press photographers and young "tourist" friends both enjoyed the Soundtrek publicity opening.

MUSEUM NEWS—

(*Continued from page 5*)

surveying the department's collections for beryllium, an essential metal used in space vehicles, missiles, atomic reactors, automatic computers, and X-ray tubes. Beryllium is a metal that has not yet been found in great quantities in this country. The berylometer, a detection instrument built around a unique nuclear characteristic of beryllium, is owned by International Minerals and Chemical Corporation, which has also examined collections at Northwestern University and the University of Chicago for possible new sources of the metal.

Soundtrek, the Museum's radio guide to the exhibits, was officially introduced to Chicago on Friday, June 10, when members of the press, radio and television, and the educational world gathered at the Museum to try out the revolutionary sound-tour system. Stanley Field, president, and Dr. Clifford C. Gregg, director, were present to greet the guests. Soundtrek originators Eugene Miller, John Orr, and Rudolph Gans answered many questions from the press and public concerning their electronic achievement, while an NBC mobile television unit video-taped a delighted group of children and adults enjoying their Soundtrek tour.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

HICAGO
ATURAL
ISTORY
USEUM

Bulletin

Vol. 31 No. 8
August 1960

NUMBER 12

MUSEUM NEWS

Membership Growth

Two nation-wide trends are illustrated by new membership figures just released by the Museum—the public's increasing awareness of the importance of basic scientific research, and the growing demand for opportunities to continue education into the adult years.

In keeping with these national trends, Museum membership now stands at 7,302 persons, the highest in the institution's history. "In the majority of cases," states Mrs. Gloria Pagano, head of the Membership Division, "the outstanding reason why people become members is their keen awareness of the essential value of the research being done by the Museum's scientists, both in the United States and in many other areas of the world. People feel a sense of responsibility toward the continuation of basic research, and know that their contribution to the Museum is helping to support it." There is also evidence that the growth in Museum membership reflects increased public interest in adult education activities—an interest arising out of the vital need for continuing education in a complex world and maintained through the greater amount of leisure time available to adults today.

In the last two years alone, more than 2,000 persons have been added to the Museum's membership rolls. Mrs. Pagano reports that the greatest percentage increase has occurred in the associate category (those who contribute $100 to the Museum). Not only do a large number of first-time members give this amount, but many annual members transfer to associate membership at the end of the year. The majority of Museum members live in the Chicago area, but applications also come from cities all over the United States and a number of countries abroad.

The Musem's categories of membership are: *Benefactors:* those who contribute $100,000 or more; *Contributors:* those who give $1,000 to $100,000 in money or materials; *Life Members:* representing contributions of $500; *Associate Members:* $100 contributions; *Sustaining Members:* who give $25 for six years, and then become associates; and *Annual Members:* who give $10 annually. The Museum also recognizes honorary, corresponding, non-resident, and corporate members, as well as patrons.

All Museum members are kept informed of the institution's activities and research through the *Chicago Natural History Museum Bulletin.* In addition to receiving the *Bulletin*, members are entitled to:

1) Free admission to the Museum (families, too!) at all times.
2) Free use of Soundtrek, the Museum's new radio guided sound-tour system.
3) Reserved seats at all Museum lectures and film showings.
4) Discount privileges at the Museum's Book Shop, which carries popular books on the natural sciences for adults and children, as well as unusual gift items from all over the world.
5) Use of the Museum's library—one of the largest scientific libraries in the country.
6) Museum publications, such as the Annual Report and certain scientific publications issued during the period of membership.

THIS MONTH'S COVER

Our cover portrays two important elements in anyone's enjoyment of a balmy summer evening in Chicago—a visit to Chicago Natural History Museum capped by a free concert under the stars at the Grant Park Bandshell. This double treat is made possible by the Museum's summer evening hours of 9:00 A.M. to 8:00 P.M. on the days of the concerts—Wednesday, Friday, Saturday, and Sunday. We suggest that you get the family together some evening soon, come downtown to the Museum for dinner between 5:30 and 7:30 P.M., enjoy a Soundtrek tour or two until eight, and then go on to the concert. But hurry—summer hours end September 4. The cover photograph featuring two of Chicago's cultural landmarks was designed by Staff Photographer Homer Holdren.

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WAbash 2-9410

THE BULLETIN

EDITOR

CLIFFORD C. GREGG.....*Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
JOHN R. MILLAR.....*Chief Curator of Botany*
SHARAT K. ROY.....*Chief Curator of Geology*
AUSTIN L. RAND.....*Chief Curator of Zoology*

MANAGING EDITOR

PAULA R. NELSON.....*Public Relations Counsel*

ASSOCIATE EDITOR

MARILYN JINDRICH.....*Associate in Public Relations*

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

CHESSER M. CAMPBELL 1897–1960

The Museum noted with regret the death on July 10, 1960, of Chesser M. Campbell, a member of its Board of Trustees. Mr. Campbell had been elected to the Board of Trustees on January 19, 1959, and during his relatively brief term of service had shown an outstanding interest in the work of this institution.

Chesser M. Campbell

Mr. Campbell was born at Sault Ste. Marie, Michigan, December 12, 1897, and entered the newspaper profession in that city immediately after graduating from high school. Subsequently, he attended the University of Michigan where he made an outstand-

ing record, being elected a member of Phi Beta Kappa. He served as an Ensign in the United States Navy during World War I.

He was associated with the Chicago Tribune since 1921, becoming President of the corporation on April 5, 1955. At that time, he also became publisher of the Chicago Tribune.

Mr. Campbell was widely known in Chicago business and civic circles. It would be redundant to list his many achievements in this publication. His loss will be deeply felt by his fellow members of the Board of Trustees.

Lions in the Museum

"It's wonderful!" said Professor Isaac Budnik, president of a Mexican cosmetics laboratory, and a delegate to the Lions International Convention in Chicago. "I have never seen anything like it." He was talking about Soundtrek, the Museum's new radio guide to the exhibits.

Professor Budnik and a large group of Lions conventioneers and their families from Monterrey, Mexico, spent three and one-half hours at the Museum last month, taking a Soundtrek tour *in Spanish*. Special sound-tours in Spanish and in French were part of the red-carpet treatment extended the city's guests from Latin America and Europe by the Museum. The response from the Lions was so overwhelming that all the Museum radio guide receivers were in continual use, while long lines of conventioneers waited for fellow Lions to return their sets.

Honors

Clifford C. Gregg, Director of the Museum, has just been honored by an invitation extended by Mr. Glen A. Lloyd, Chairman of the Board of Trustees of the University of Chicago, to join that University's Citizens Board. In his letter welcoming Dr. Gregg to membership in this distinguished group, Chancellor Lawrence A. Kimpton of the University writes that the function of the Citizens Board is to broaden the acquaintance of its members with the scholars and scientists on the Midway. This is accomplished through a series of programs and luncheon meetings featuring the scientific and scholarly work being done at the University.

fish names

PROBABLY FEW PEOPLE KNOW, even in a general way, the identity of such names as hogchoker, lumpsucker, fat sleeper, popeye catalufa, glassy sweeper, stargazer, rainbow runner, and toothless blindcat. Most would go far astray in trying to identify, out of context, a California smoothtongue, Florida smoothhound, brown Irish lord, senorita, molly miller, Amazon molly, warty poacher, Atlantic torpedo, or bar jack.

All these, along with the more familiar cod, trout, darter, pike, shark, minnow, and shiner, help make up the list of 1,892 common names of the fishes of the United States and Canada just published by the American Fisheries Society, of which our Curator of Fishes, Loren P. Woods, is one of the authors.

When people begin to talk about the subject matter of a science, we have one criterion as to its progress. The science has entered the public domain and become a part of everyday conversation and interest. For this to happen, there must be some appropriate words to use. An ichthologist discusses *Stizostedion vitreum*, *Menticirrhus saxatilis* and *Lepomis gibbosus*, but a fisherman tells of catching walleyes, kingfish, and pumpkinseeds.

The best common names grow out of the language. Colorful, romantic, fanciful, and otherwise distinctive and original names add richness and interest to the nomenclature—names like Dolly Varden, madtom, flier, angelfish, and chilipepper. Indian names have also been incorporated, such as muskellunge, eulachon, mummichog, chinook, tautog, Cui-ui (pronounced kwee-wee) menhaden and cisco. Some well known names have been introduced by fishermen of various other nationalities: barracuda, grouper, pompano (Spanish), bocaccio (Italian), capelin, and inconnu (French).

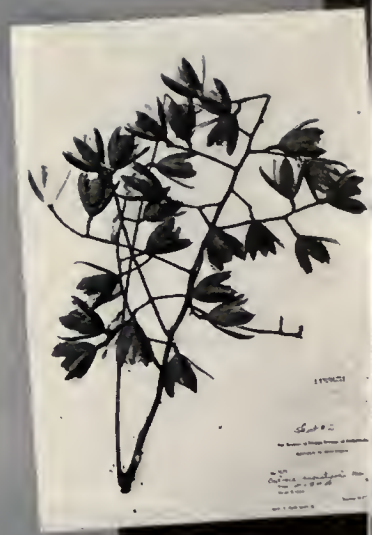
Other names stick in one's mind because they are descriptive of form, of habitat, or of habits—sail fish, halfbeak, needle fish, cave fish, seahorse, croaker, opaleye, and tripletail.

But sooner or later the same name appears in different places for quite different fishes. The trout of Eastern Canada is not the trout of Georgia and the name perch is used in at least nine different families of fishes. Sometimes the same fish may be known by two different names, which become firmly entrenched in common usage: red fish and ocean perch for *Sebastes marinus* and cisco and lake herring for *Coregonus artedii*. Here the layman as well as the scientist needs scientific names.

The present list of 1,892 freshwater fish and ocean fish living in shallow water down to 100 fathoms, all in the United States and Canada, supersedes the earlier list of 570 names compiled in 1948.

A List of Common and Scientific Names of Fishes from the United States and Canada by Reeve M. Bailey *et al.*, 1960, pp. 1–102 may be obtained from E. A. Seamen, American Fisheries Society, Box 483, McLean, Virginia; $1.00 paper cover; $2.00 cloth cover. A. L. RAND

AMAPA
tabebuia palmeri



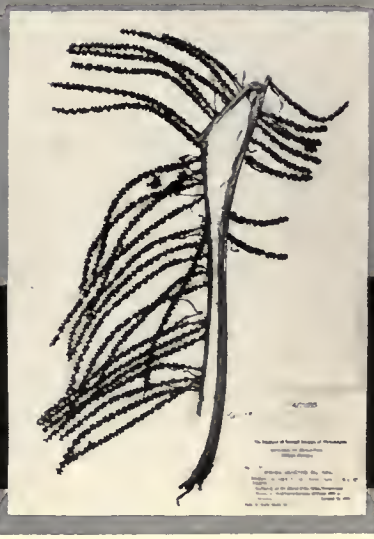
BIRNAM WOOD COMES TO DUNSINANE

by C. Earle Smith, Jr. associate curator of botany

Traditionally, the botanist working on the nomenclature of plants studies the outer appearance of the individual plant. For practical reasons, many plants cannot be collected in their entirety. In herbaria throughout the United States, pressed and dried plants are mounted on sheets of paper 11½ by 16½ inches. It immediately becomes apparent that some leaves will be larger than this, and only a few of the plants of the world can be folded so that an entire plant can be mounted.

On many kinds of plants, the foliage is so nearly alike that other features, such as the flowers and fruit, must be studied to distinguish one kind from another. To illustrate the necessary features as completely as possible, several herbarium specimens from different parts of the plant are prepared. Amapa, a tree from the dry hills of Mexico, can be effectively classified from the flowers alone. Hoja de pantano, a giant herb from the moist forests of the Andes in South America (see C. N. H. M. Bull. vol. 30, N herbarium. Because the additional parts of the c collected so that size and foliage of the fleshy plata herbarium sheets.

Illustrated on this p "bureau of standards" fo tory Museum. The herb in more than 750 steel c plants from Central and botanists have specialize small birns.



CEDRO
cedrela angustifolia

PLATANILLO
heliconia wagneriana

4), must be divided into five separate specimens for the
dividual parts of plants frequently are widely variable,
o, a common timber tree from Mexico to Brazil, are
nape comparisons can be made. The flower head and
lo from the wet forests of Panama are shown by three

e are some of the vouchers which comprise the large
plant names in the herbarium of Chicago Natural His-
ium has grown to more than 1,500,000 sheets housed
es, and is undoubtedly the finest collection known of
Western South America—areas in which the Museum's
Truly, Birnam Wood is come to Dunsinane—but in

HOJA DE PANTANO
gunnera magnifica

Museum scientists take seriously their responsibility to the lay public

When Encyclopedias Ask the Experts

By Paula R. Nelson

WHEN YOU CONSULT Encyclopaedia Britannica, or any other standard reference work, on subjects related to anthropology, botany, geology, or zoology, chances are good that you are reading a definitive article by one of the research scientists at Chicago Natural History Museum.

We called on John V. Dodge, Executive Editor of Encyclopaedia Britannica, to get the story behind the Britannica certificate. "We have always enjoyed excellent relations with the Museum," Mr. Dodge told us. "One of my first projects as an editor was the planning of the insect page, which we photographed right in the Museum some years ago. Just recently, Loren Woods, your Curator of Fishes, worked very closely with our artist, Tom Dolan, to assure that the paintings of fishes in Britannica Junior are scientifically accurate in every detail. We are quite proud of these color plates, and grateful to Mr. Woods for his help."

Dodge continued, "The Britannica relies on Museum scientists in many ways. In addition to the fact that your staff contributes a large number of articles each year, two of your scientists are advisers to our editorial board. Our group of advisers is composed of a number of scholars from the United States, Canada, and other parts of the world. Each adviser is responsible for a subject-matter area—we call them classifications—such as zoology or botany. From time to time, the adviser plans the reorganization of the classification for which he is responsible, so that we have a blueprint for the necessary revision of each section before our Chicago or London editorial offices begin to solicit contributors.

"The adviser also nominates the persons whom he would like to see write the articles needed for each subject-area. He selects these writers both on the basis of their knowledge, which must be foremost in their field, and on the basis of their ability to put their knowledge into good writing. Britannica contributors are not writing for a learned publication, but for the intelligent layman who wishes information outside his own field of interest or specialty. The legal articles should be comprehensible to the physician, and the medical articles helpful to the attorney, engineer, astronomer, or business man."

Rupert Wenzel, the Museum's Curator of Insects, is the adviser to Encyclopaedia Britannica in the field of entomology. His job is to keep track of the more than 200 articles covering approximately thirty world orders of insects. He recommends when articles should be revised, brought up-to-date, or completely re-written. He suggests that illustrations be changed or introduced. When a manuscript is sent to him, he reviews it critically, advising, where necessary, on problems of organization or emphasis to be given to the various topics. His task requires an overall knowledge of the field of entomology—both of its history and of the research currently being published throughout the world.

Because Wenzel feels that the Britannica should be an appropriate reference not only for the intelligent layman but for the more advanced student as well, he takes seriously his responsibility to recommend the best specialists in his field. "This means that sometimes we have to go outside the English-speaking countries. For example, for a recent article revision, I recommended three top scientists: the officer in charge of entomological activities for the Army Medical Service Corps, a member of the British Museum, and a member of the Berlin Zoological Museum. If the entomologist from the Berlin Museum does the article, the contact will be handled through Britannica's London office, and they will provide a translation."

Dodge and Wenzel both emphasize that the ability to write for the lay public is an important consideration in selecting a contributor. On the other hand, scholars are most at home in writing for scientific and learned journals. Dr. Austin L. Rand, Chief Curator of Zoology, excels in both kinds of writing. His file of contributions to encyclopedias goes back to 1952, and includes a number of articles on birds and mammals for the American Peoples Encyclopedia, as well as the colorful revision of World Book's bird section.

"If you really understand your subject," Rand says, "there is no reason why you can't put it out so other people can understand it, too. I learned how to simplify my popular writing a great many years ago when somebody asked me how to stuff birds. I told him at great length the technique of removing the body parts, of filling the skin with excelsior, and the proper way to place the delicate wires that hold the excelsior in place. 'Ah!' this fellow summed up, 'you rip out the guts and stuff 'em with straw!' So for my encyclopedia article on birds, I started out the section on flight by saying: 'Birds fly by flapping

their wings.' Which is precisely what they do.

"The advice I often give to people writing for the general public is to imagine that someone is sitting across the table from you, listening to you talk. You don't want that person to be stifling yawns, or looking at his watch. So you try to use sentences that mean something and hold his interest."

Rainer Zangerl, Curator of Fossil Reptiles, compares writing for the general public with the preparation of an exhibit. "The same problem is involved in attracting people and holding their interest long enough so that they will take at least one reasonably profound look." Zangerl enjoys writing for different audiences, and points out that "the level of writing is not the same even for all encyclopedias. When you write for the Britannica, you write for the general lay public. The new McGraw-Hill Encyclopedia of Science and Technology is intended primarily for people in the technical professions, while the Reinhold Encyclopedia of Biological Sciences is for professional biologists." Zangerl has contributed to all three reference works, as well as to the two-volume *Treatise on Marine Ecology and Paleoecology* published by the Geological Society of America, a compilation of scientific information, used as a reference by scientists themselves. Of his three-page lead article "Cretaceous System" for the Britannica, Zangerl says, "I had in mind a reader who may never have heard of the cretaceous system, so I held technical terms to a minimum and presented as general a picture of the topic as possible. On the other hand, when an engineer looks up a subject in the McGraw-Hill Encyclopedia, I assume that he has more scientific background than the general public and that the level of the writing can be more specific and technical. In an article for Reinhold, I go still beyond this to use the technical biological terms and concepts that professional biologists understand. However," Zangerl emphasizes, "even when writing for the general public I don't think that the article should be scaled down to the point where it is no longer communicating anything important about the subject. There must be scientific validity at every level."

One of the devices a writer can use to help communicate scientific information is illustration. Maidi Wiebe, Geology Artist, drew the maps that illustrate Zangerl's text on the cretaceous system, thus making an important contribution to the layman's understanding of the material.

Philip Hershkovitz, the Museum's Curator of Mammals, points out that the effort involved in writing for the layman is as great as in writing for a scientific audience. "Whether the article is 50, 500, or 1000 words, almost the same amount of effort is involved in writing it. I gather together all the data and arrange them in a certain sequence. The larger articles permit me to use most of the material the intelligent reader wants, but the shorter articles force me to make difficult and painful decisions between what goes in and what gets left out. Sometimes the encyclopedia editors ask me to write an article that presents a challenge I can't resist. But I much prefer to spend the same time doing the basic research which results in the source materials for both encyclopedia articles and textbooks."

Donald Collier, Curator of South American Archaeology and Ethnology, also makes this point. "Although I have written for the encyclopedias, within the last year I have had to turn down requests to do articles because I didn't have the time. I cannot simply sit down and dash something off. It takes just as much effort to do an encyclopedia article as to write for a professional journal, and frankly, I would rather spend my time on a technical article which I hope will make a contribution to my field.

"On the other hand, from time to time some really basic scientific work has appeared in encyclopedias. In the 1929 edition of the Britannica, for example, Edward Sapir, then the leading anthropologist-linguist in the United States, wrote an article on American Indian languages and their classification which remains a classic. He put together language families that had never been related before, and though he couldn't give in an encyclopedia article all the evidence and insights which made his synthesis possible, it is considered a brilliant piece of work. Usually, however, the results of original research or the really great syntheses appear in the scientific journals. On the other hand, encyclopedias are valuable, and there is both a demand and a need for them. Since the need exists, they ought to be good."

What makes an encyclopedia article good? Rand began his answer to this question by talking about what makes such an article bad. "So many writers, instead of boiling down all the material on their subject and using the concentrate, skim off the froth that comes to the surface and use this instead. This tends to happen to writers who do not really know their subject. They will use the highlights, the embroidery, and lose sight of the animal himself. Any encyclopedia article, particularly in the 400 to 800 word category, is a challenge to see if you can present the animal and its life so that the article is intelligible and reasonably complete. The thing you have to watch out for is to avoid the exceptions as much as possible. It's the main characteristics of the group that you have to get across, so you say that birds fly, and only mention at the

end the ones that don't fly. Of course, just because there are so many exceptions, you must be careful not to make your general statements all-embracing."

Zangerl agrees. "The important thing in popular writing is not to overemphasize relatively unimportant aspects of a topic. The cretaceous system is not a particularly glamorous topic, for example. I could have tried to make it more exciting by emphasizing the volcanic action that occurred and the dinosaurs. But these are only two of many aspects which should be brought out about this period which lasted so long and during which so many events took place. I feel that it is not justified in a Britannica article to single out the more popular aspects and forget the rest, just because you know the general public will take to it. Of course, you are always limited by space. But within that framework, an encyclopedia article should present as balanced a picture of the subject as possible. That usually means that any single sub-topic can be treated in only a relatively short paragraph. In that paragraph you have to say all the essentials."

Rand suggests that the problems arising from lack of space impose a discipline that provides good writing practice. "There is no space to ramble. You have to pick out the gist of the matter, express it coherently and concisely, choose words with care, and make one word do the work of two."

What are the sources of the information that goes into an encyclopedia article? Hershkovitz states that a "competent scientist does not get his basic data from such secondary sources as textbooks. He gets his facts from the animals themselves or from the original publications about them. This is the principle difference between the methods of a scientist, or a specialist in a particular group of animals, and a general writer of encyclopedia articles. The specialist routinely keeps abreast of the knowledge in his field. A mammalogist, for example, is particularly concerned with the number and kinds of mammals in the world, their origin, distribution, interrelationship, habits, economic importance, and so forth. This is the sort of information that the specialist here at Chicago Natural History Museum is charged with collecting and adding to through his own research, observations, and field expeditions." Hershkovitz adds, "My meaning of the term 'information' includes specimens of animals with complete field documentation. In this sense, the information available to us at the Museum through our collections is vast, comprehesive, and world-wide in scope.

"Our library, which is one of the finest of its kind in the world, is also charged with collecting information. It exchanges scientific literature written by our Museum staff and published by our own press, for similar literature published by scientific institutions all over the world. As individual scientists we also receive published reports of the latest discoveries from our colleagues everywhere. This scientific literature is not ordinarily seen by the layman and is too technical for him to bother with. In writing an encyclopedia article we must translate this literature into a prose and style that the average reader understands. Writers who lack training or experience in evaluating and translating scientific literature can easily give a misleading and distorted concept of the subject."

"Or they tend to emphasize the wrong points altogether," Zangerl continues. "Writers for children, for example, often seem to think that nothing is very exciting about animals except their size and voraciousness. But other aspects are at least equally interesting and more important scientifically. For instance, the mode in which animals live today, or have lived in prehistoric times. Or the way in which the flipper of an ichthyosaur is the equivalent of a shark's pectoral fin. A writer or teacher can point out to a child of almost any age that the ichthyosaur was a reptile that at one time walked on land and then for some reason gradually became a sea dweller. In the course of this transition, its body became modified into the shape of a fish. Its limbs, which had been walking limbs, were modified into flippers that looked and acted at least superficially like fish fins. If this kind of material is presented properly almost anybody can understand it and find it interesting."

All the scientists at Chicago Natural History Museum who write for, or advise, various encyclopedias do so on their own time, after the Museum working day is over. These activities cut into their leisure hours. For most of them, too, writing for the general public requires as arduous an effort as writing a scientific article. Why, then, do they undertake the task? Many of the staff —Quimby, Davis, Turnbull, Blake, Richardson, Denison—express similar views to those of Hershkovitz who says, "I regard writing for encyclopedias as a contribution. I do it because an encyclopedia is consulted as an authoritative source of information, and I feel an obligation and a responsibility to see to it that the public gets the most accurate information possible." Hershkovitz adds, "Part of this is in self-defense, you know. The better informed the public, the better the climate we work in, and the less time we waste arguing misleading and false information out of students!"

The scientist's sense of responsibility to the public and the community was deeply felt by the late Karl P. Schmidt, for many years the Museum's Chief Curator of Zoology. Dodge names him as "one of Britannica's most distinguished advisers." In Schmidt's early days at the Museum, he found himself an amused victim of the very authoritativeness that Museum staff members consider essential in their articles for standard reference works. Clifford C. Gregg, Director of the Museum, tells the story.

"Karl had a fine association with Dr. Wilfred Hudson Osgood, who preceded him as Chief Curator. But as one must expect, there are points of disagreement even between scientists. Sometimes the exact meaning of a word came into question. Again and again when they couldn't agree on a definition, Dr. Osgood would say, 'Look it up in the dictionary, Karl, and see for yourself.' And it seems that Dr. Osgood was always right.

"And," Karl added, "that went on for ten years before I learned that Dr. Osgood had written the zoological defitions for that dictionary!"

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Vol. 31 No. 9
September 1960

MUSEUM NEWS

Archaeological Discovery

A unique sacred image—the first of its kind ever to be unearthed—which was of key importance in the religious ceremonies of Pueblo Indians living in Arizona between 1250 and 1350 A.D., has just been discovered by Chicago Natural History Museum's Southwest Archaeological Expedition under the direction of *Paul S. Martin*, Chief Curator of Anthropology.

This is a copy, made on the site, of the sacred stone image found in a secret crypt of a rectangular kiva being excavated by Dr. Paul Martin in Arizona. The kiva was used by Pueblo Indians living about 1250-1350 A.D. The right arm of the image, which was found broken off, has been restored in the model.

Dr. Martin reports that the stone image, very probably a katchina, was found in a secret crypt within one of the largest rectangular kivas, or religious ceremonial chambers, ever excavated in the Southwest.

"This may well be one of the important discoveries of the 20th Century in Southwestern archaeology," Dr. Martin writes from the site of the excavations near Vernon, Arizona. "To my knowledge no one has ever before found a katchina of either wood or stone in a kiva. As far as I can determine, the image is unique."

Present-day Hopi Indians carve wooden katchina figures to represent various deities, and use them in the religious education of their children. But while the figures are more than playthings, they are not, in themselves, sacred. However, masks and other paraphernalia used by men who impersonate the katchina deities are extremely sacred and are stored in kivas when not in use. The fact that the stone image was hidden in a secret masonry vault within an unusually large kiva suggests that this image possessed god-like sacredness and power in its own right.

The three-dimensional sacred image, nine inches high, is carved in sandstone and painted with gay colors—black, orange, green, blue. The right arm is broken off and was not found in the crypt—perhaps indicating that it was broken intentionally in order to curtail the powers of the katchina when the Indians using the kiva moved away from the pueblo. With the image in the foot-square stone vault was a tiny jar painted in red and black crosses, and containing a few beads of stone, shell, jet, and turquoise. "These two objects," continues Dr. Martin, "the stone figure and the little jar, were probably of indescribable sanctity."

The crypt in which the religious objects were found appears to duplicate on a small scale the architecture of the great kiva itself. It has been suggested that the crypt may have symbolized the entrance to the underworld—in the religious belief of the Hopi Indians, it was through such a passage that their ancestors emerged into the world from their place of origin in the underworld. Thus the stone figure may be related to underworld ceremonies that are still a part of the religion of the Hopi people today. Other preliminary interpretations place the unique stone katchina figure as an ancestral cult deity. "We expect," reports Dr. Martin, "that further research will reveal more of the full import and significance of this sacred object, which has remained mute and buried in its secret crypt for the past six or seven centuries."

This is the fifth season in which Dr. Martin has conducted archaeological work at the site near Vernon, Arizona.

(*Museum News continued on page 6*)

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

THE BULLETIN

EDITOR
CLIFFORD C. GREGG.....*Director of the Museum*

CONTRIBUTING EDITORS
PAUL S. MARTIN.....*Chief Curator of Anthropology*
JOHN R. MILLAR.....*Chief Curator of Botany*
SHARAT K. ROY.....*Chief Curator of Geology*
AUSTIN L. RAND.....*Chief Curator of Zoology*

MANAGING EDITOR
PAULA R. NELSON.....*Public Relations Counsel*

ASSOCIATE EDITOR
MARILYN JINDRICH.....*Associate in Public Relations*

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

THIS MONTH'S COVER

September—and it's summer's end. But while the livin's still easy, these youngsters are making the most of it. They linger at will before their favorite exhibits, knowing that in a few weeks their teachers will be bringing them back to the Museum to absorb more formal learning from the well-organized school programs planned by the Museum's educational division, the Raymond Foundation. Altogether, more than 400,000 children visited Chicago Natural History Museum last year. Of these, 206,583 came in organized school groups. About 78,000 students, or more than 2,000 groups, were given programs and tours by the Raymond Foundation. Many other students found that Soundtrek, the Museum's radio guide system, provided them—and their teachers—with an excellent educational tour of the Museum's major exhibits.

A "Case" of Mistaken Identity

By ERNEST J. ROSCOE, Division of Lower Invertebrates

IN 1830 ISAAC LEA, Philadelphia publisher and naturalist, described a new species of snail which he called *Valvata arenifera*. In his paper presented before the American Philosophical Society, and subsequently published in the Society's transactions for 1830–31, Lea wrote, "This snail has the singular property of strengthening its whorls by the agglutination of particles of sand, etc. by which it is entirely covered. . . ." He further pointed out the resemblance it bore in this respect to certain marine snails (the Xenophoridae, or carrier shells) which attach small rocks or other shells to their own exoskeleton.

Unfortunately, Lea's "discovery" was all a mistake. What he had thought was a snail shell was in reality the larval case of a group of insects known to entomologists as Trichoptera. You probably know them under their common name, caddis flies. Or if you are a fisherman you may call them case flies. On several different occasions, despite what might seem obvious differences between insects and mollusks, these larval cases have been described as new species of snails by both American and European naturalists.

Lea may perhaps have been misled in his identification by the apparent analogy between his specimen and the carrier shells. In fairness to him it should be noted that, so far as I can determine, he had never observed a living specimen of his "*Valvata*." However, when one of these cases is crushed, there is no evidence whatever of any shelly material. The sand grains covering the surface of the case are held together entirely by the salivary secretions of the larval insect. This is in distinct contrast to the carrier shells, in which the extraneous matter is attached to a definite calcareous shell. One other interesting fact with regard to the carrier shells. Certain individual snails seem to exhibit a preference for particular types of material with which to adorn their shells. Some use *only* rocks, and so have been called "mineralogists" (I like to think of them as the first rock hounds); other snails use *only* shells, and thus are called "conchologists." Curiously enough, there actually is a parallel to the shell collecting mollusks among the caddis flies. One group (not the pseudo-snail shell-builders we have been discussing) builds more or less cylindrical cases out of small, fresh-water bivalve and gastropod shells—so we have not only mollusk, but insect conchologists!

Lea also described his "snails" as having a "striated, horny operculum." Now an operculum is a structure characteristic of the gill-breathing snails (the Prosobranchiata), to which the true *Valvata* belongs. This operculum is attached to the posterior part of the body of the snail and serves to close the aperture of the shell when the snail retracts inside. Here Lea may have mistaken the operculum for the mouth parts of the larval caddis fly, or he may have misinterpreted the membrane with which the larva seals off the opening of its case just prior to pupation. In any event, he knew that his "snail" should have an operculum, and he managed somehow to observe one.

I have been unable to determine who first discovered the true nature of these larval cases. Certainly by the early 1840's some American (DeKay for example) and European naturalists were aware of their true identity. In the summer of 1862 the American conchologist, Thomas Bland, kept specimens of Lea's "*Valvata arenifera*" alive in an aquarium. During the ensuing autumn and winter he observed the habits of the larvae, and in the spring of 1863 he collected the adults as they emerged from their cases. Bland then published his correct observations in 1865. At about the same time the entomologist, Hagen, also noted that these cases had been mistaken for mollusks and that similar mis-identification had been reported from Europe and New Caledonia as well as America.

Yet, these observations notwithstanding, in 1864, R. J. Lechmere Guppy described another caddis fly case from Trinidad as a new species of *Valvata*. "This fresh description," commented the Philadelphia Academy of Natural Science's conchologist, George Tryon, in 1865, "is amusing; naturalists seem resolved to consider them Mollusca!"

These true mollusks attach either small stones or other mollusk shells to their own shells. We might call them the first rock hounds and conchologists.

After the mid-1860's, however, there appear to have been no further misclassifications of these larval cases.

The reader may be interested in a short account of the caddis flies themselves. The adult is a rather small (seldom exceeding an inch in length) dull-colored, moth-like insect not often observed on the wing unless disturbed. They are most commonly found in the vicinity of the ponds and streams in which the early stages of their life cycle are passed. The eggs are laid in masses, covered by a gelatinous coating, in or near water. The larvae are aquatic, generally living in cases made of some foreign material—leaves, twigs, gravel, sand, or mollusk shells—held together by salivary secretions. The larva is attached to the case by hooks on the last body segment. Most of the cases are tubular, generally tapering toward the posterior end. Only the members of a single genus, *Helicopsyche*, construct the

(*Continued on page 8*)

". . . in the middle of one of the finest forests in the world . . . a large arched cavern, several hundred feet broad and over two hundred feet high; huge stalactites were pending from the ceiling and a fringe of vegetation drooped from its outer edge [while] many coloured rays of light [cast] a dim . . . light over the scene . . ."

THE GREAT CAVE OF NIAH

By Paula R. Nelson

TINY fossil fragments—bits of reptilian limb bones; the pharyngeal teeth of an as-yet-unknown fish—found in the Great Cave of Niah on the island of Borneo, are now being studied and identified at Chicago Natural History Museum by Dr. Robert F. Inger, Curator of Amphibians and Reptiles. The Niah cave, located 300 miles up the coast from Kuching, Sarawak, and a few miles inland from the sea, is the oldest home of man known from South Asia. From this stone age site, fossils of the reptiles, amphibians, and fish that undoubtedly were used as food by these prehistoric cavemen have been collected and sent to the Museum. When these fossil fragments have been identified, we shall know significantly more about the environment in which paleolithic man lived and struggled to survive.

It was Alfred Russell Wallace who first suggested that the caves of Borneo might be important places to search for evolutionary evidence. In 1855, while living at Santubong on the Sarawak River delta, he wrote "The Law which

has Regulated the Introduction of Species"—the first in a series of papers that culminated in his classic exposition of natural selection and evolution theory. Taking up Wallace's suggestion, T. H. Huxley recommended in 1864 that an expedition be sent to Borneo, but nothing was done in this area of the world until A. Hart Everett, animal collector and naturalist in the service of the Sarawak government, explored the Niah caves in the 1870's. In a colorful report published in the *Sarawak Gazette* for July, 1873[1], Everett described the rugged jungle trek that led to his first glimpse of the awesome cavern that came to be known as the Great Cave of Niah:

> "After my [former] experience of jungle walking, I was prepared to meet with difficulties [Everett writes] and I was not disappointed. In all the walks I had yet made there was nothing to compare with this. We started through swampy jungle, black mud holes had to be crossed on small sticks, the ends of which only were visible; there was not time to speculate as to whether it was a trap or not, but with a blind faith in the existence of the other part of the stick which you do not see . . . you make a dash; a false step and you find yourself up to your middle in mud and water, much to the amusement of your native followers, who have no sympathy with the unfortunate traveller; you are dragged out of this and started across tangled roots of trees, and as you are covered with mud, it is not long before you slip off with a jerk which sends you up to your knees in soft black mud, whilst your feet are caught in a trap of interlacing roots below. After a great deal of exertion and strong language, you get out of this without your boots, which are produced after a prolonged search. Away you go again with extra steam to catch up your guide, who does not condescend to wait; and now by way of variety you have to cross ravines on batangs (felled trees) lying at an angle of 30 degrees. . . . After about two hours of this work . . . I came up to my guide dripping with perspiration, but was disgusted to find he had not turned a hair."

And there, "right smack dab in the middle of one of the finest forests in the world," as Dr. Inger describes it, was an enormous cave. Everett reports his own reactions to the sight in the following words:

> "We found ourselves standing at the mouth of a large arched cavern, several hundred feet broad, and over two hundred feet high; huge stalactites were pending from the ceiling and a fringe of vegetation drooped from its outer edge; across a beautifully wooded valley rose a small limestone hill. . . . Through rifts in the mountain side stole many coloured rays of light, throwing a dim religious light over the scene. Through this ghostly dimness, the black mouth of branch caverns could be seen."

Inside the cave were human remains; Everett found a skull "in good preservation . . . [and] after a great deal of persuasion, I prevailed on [the native guide] to allow me to carry it off. He was, however, quite aghast at my temerity, as he felt convinced that I should bring down vengeance dire on my head by offending the evil spirits. . . . I had to carry the head myself, [as] all my followers [were] afraid to touch it . . ."

This fear on the part of the native people of Niah prompted them to confine their cooperation with future explorations to those caves containing only a minimum of removable relics. These, unfortunately, were of more recent date. Thus, in spite of continuing sporadic explorations by European scientists and prospectors, it was believed for nearly seven decades that the Bornean caves were barren of remains of high antiquity.

Tom Harrisson, Government Ethnologist and Curator of the Sarawak Museum made the first discoveries that eventually proved the Great Cave of Niah to be a habitat of prehistoric man. His explorations at Niah in 1947 turned up human bones and "ancient looking" pottery on the floor of a small grotto close to the Great Cave. Although these did not appear extremely old, he persisted in his conviction that the Niah caves held promise for future archaeological work. In 1954, two small trial pits were dug under Harrisson's direction as leader of a Sarawak Museum field expedition to reconnoitre the caves and determine the value of full-scale excavation. Within the month, he was rewarded with appreciable evidence of human occupation during Neolithic and Mesolithic times. By 1957 sufficient support was obtained to begin wide-scale excavations at the most promising site, the Great Cave itself. In succeeding years, human bones were found in association with cultural artifacts and fossil animal remains. Carbon 14 tests have now established that the earliest human remains in the Great Cave date from the Middle Paleolithic, or 40,000 to 50,000 years B.C.

Among the objectives of the present program being undertaken at Niah is a faunistic study of reptiles, amphibians, and fishes found in or near the Great Cave. This study is being carried out in conjunction with Chicago Natural History Museum. Not only fossil material, but specimens of the present fauna of the cave region are being sent to Dr. Inger for identification and comparative studies, which will make possible a reconstruction of the environment of the prehistoric cave people.

We asked Dr. Inger how he became involved in the Sarawak cave studies. "I think Harrisson asked me to work on the faunistic material," Inger replied, "because he knew I had been in Borneo and am writing a monograph on the reptiles and amphibians of the region. When the Museum sent Dwight Davis[2] and me to North Borneo in 1950 to make general zoological collections and observations on the ecology of the forest, Harrisson helped us a great deal with labor and transportation in the field. I didn't work in Sarawak on that trip, but in 1956 I went to Borneo again for the Museum, and this time I did get to work for about a month in Sarawak itself. At that time we were trying to extend the collections and information gathered in 1950, building on what we had learned during the earlier trip and visiting additional areas. This summer, Mr. Chin Phui Kong, Fisheries Officer of the Agriculture Department of North Borneo, is here at the Museum working on the fishes and fish fossils with me.

"Harrisson is interested in the history of the cave people. I am interested in the history of the fauna. In the Borneo fauna of today there are elements that look as though they are remnants of an ancient fauna now found only on the fringes of the oriental tropics. The best

(*Continued on page 7*)

[1] pp. 59–60. Quoted by Tom Harrisson, "The Caves of Niah: A History of Prehistory," in *The Sarawak Museum Journal*, Vol. VIII, No. 12 (New Series); Kuching, Sarawak: December, 1958. We are indebted to this article for the historical and descriptive material given here regarding the Niah cave discoveries; and to Mr. Harrisson for making available to us the photographs illustrating this article.

[2] D. Dwight Davis, Curator, Vertebrate Anatomy.

MUSEUM NEWS

(*Continued from page 2*)

Fall Hours

Beginning September 6, the Museum will be open from 9 A.M. to 5 P.M., seven days a week.

Free Film Series for Children

The fall schedule of free motion pictures for children begins on Saturday, October 1, at 10:30 A.M., and will continue each Saturday through November. The first program presents some favorites of past series—four motion pictures based on well-known folk tales. "The Steadfast Tin Soldier," is a film made in Denmark from the Hans Christian Andersen story of a one-legged toy soldier who has many adventures while under the spell of a goblin jack-in-the-box. "The Town Musicians" tells the story of a donkey, dog, cat, and rooster who set out for Bremen to become town musicians. A third film portrays the familiar tale of the race between "The Tortoise and the Hare." And the final movie, "The Loon's Necklace," is based on a charming Indian legend of how the loon received its "necklace" pattern.

The second children's program, to be presented on Saturday, October 8, is "The Great Adventure," a beautiful nature film about two Swedish farm children's adventures with animals. Made by Arne Sucksdorff in Sweden, this film classic has won outstanding awards from *Parents Magazine* and the Cannes International Film Festival.

Fall Lecture Series for Adults

The free lecture series for adults also begins on October 1, at 2:30 P.M., with a showing of the color motion picture, "New England in All Four Seasons," narrated by Don Shaw. On October 8, "Island Treasure," a film portraying wildlife on a dot of land in the Mississippi's northern waters, will be presented by Walter J. Breckenridge, director of the Minnesota Museum of Natural History.

The complete schedule of free fall programs for children and adults will be printed in the October issue of the BULLETIN.

Chamber Music Concerts

Pianist-composer Lucas Foss and his Chamber Ensemble improvisation group will be presented in the Museum's James Simpson Theater on October 24, in the first of a series of eight concerts to be given during the 1960–61 season by the Free Concerts Foundation, Inc. The ensemble of five players will be heard in their specialty, which is improvisation within a framework described by Foss as "a system of controlled chance." With Foss at the piano, the group includes Robert Drasnin, flute, Richard Dufallo, clarinet, Howard Colf, cello, and Charles DeLancey, percussion. Free tickets for the first concert in this series are available on written request to Free Concerts Foundation, Chicago Natural History Museum, East Roosevelt Road and Lake Shore Drive. A stamped, self-addressed envelope should be enclosed. Mailing of tickets will begin during the latter part of September.

Distinguished Visitors

Two important visitors from China, Chiang Fu Tsun, director of the National Central Library, Taipei, Taiwan, and Professor Mao Tzu-Shui, of the University of Formosa, a member of the Academia Sinica, were greeted by *Dr. Hoshien Tchen* of the Museum's Department of Anthropology on Monday, July 18. The two noted scholars came to Chicago from Seattle, where they had just participated in a conference on Sino-American intellectual cooperation.

An interesting example of such cooperation is the research project on Chinese rubbings now being carried out by *Kenneth Starr*, the Museum's Curator of Asiatic Archaeology and Ethnology, at the National Central Library in Taiwan.

In addition to seeing Chicago Natural History Museum's extensive Chinese and Tibetan collections, our visitors were impressed with the Museum's American Indian collections, with The Stanley Field Collection of Plant Models exhibited in Hall 29, and with the presence in the Museum of many interested children.

Conference Participation

Donald Collier, Curator of South American Archaeology and Ethnology, participated in three important scientific meetings in Vienna and Paris this summer. In Vienna, the Wenner-Gren Foundation for Anthropological Research sponsored a symposium organized by Professors Robert J. Braidwood, of the University of Chicago, and Gordon Willey, of Harvard University, on the subject: "From 1500 B.C. to the Threshhold of Urban Civilization: A World-Wide Consideration of Cultural Alternatives." Twenty anthropologists from several countries were invited to submit papers reporting on different world areas under this general heading, and these monographs were circulated to all conferees in advance of the meetings. The meetings themselves were held in the Foundation's European Conference Center—an Austrian castle in which the conferees lived and worked for eight days—and consisted of discussions of each scholar's contribution. Collier's paper was entitled: "To the Threshhold of Civilization in the Central Andes."

Also in Vienna, Curator Collier attended the 34th annual International Congress of Americanists and presented a preliminary report of the results of his 1956 Museum expedition to the Valley of Casma in Peru. During this expedition, investigations were made of over sixty prehistoric sites, and a large collection of ceramics, textile fragments, organic materials from refuse deposits, and wood samples for radiocarbon dating, were shipped back to the Museum for detailed study. Painstaking research has now made it possible to begin to reconstruct the lives of the ancient farmers and town dwellers of the Casma Valley.

In August, at the International Congress of Anthropological and Ethnological Sciences in Paris, Collier gave an illustrated lecture on "Recent Archaeological Exhibits in Chicago Natural History Museum," featuring the American

Indian exhibits in Halls 4 and 8. His lecture illustrated the aesthetic aids which make these exhibits colorful and attractive, and the various didactic devices used to explain cultural processes or the ways in which archaeologists work —such as the display of artifacts, vignettes, photographs, full scale and miniature models, labels, dioramas, comic strips, and the like.

While he was abroad, Collier visited museums in Munich, Vienna, Basel, Paris, London, and Cambridge, under a travel grant from the National Science Foundation, and studied the famous prehistoric art of the Lascaux Cave in the Dordogne River valley in France.

Sharat K. Roy, Chief Curator of Geology, and *Bertram G. Woodland*, Associate Curator of Petrology, represented Chicago Natural History Museum at the International Geological Congress held during August in Copenhagen. As an integral part of the scientific conference, which was attended by geologists from all over the world, a program of field trips throughout northern Europe was planned. Dr. Roy studied metamorphic rocks in the vicinity of Oslo, Norway, while Mr. Woodland observed rock formations near Bergen. Dr. Roy was also especially interested in the research on meteorites that was presented at the meetings. The International Geological Congress takes place every four years and has not been held in the United States since the 1930's.

C. Earle Smith, Jr., Associate Curator of Vascular Plants, presided at a symposium on regional and local floras at the annual meeting of the American Institute of Biological Sciences in Stillwater, Oklahoma, during August. Dr. Smith also presented a paper on *Cedrela* (Spanish cedar) before the joint meetings of the American Society of Plant Taxonomists and the Systematic Section of the Botanical Society of America.

Honors

Roland W. Force, Curator of Oceanic Archaeology and Ethnology has been elected 2nd Vice President of the Central States Anthropological Society for the year 1960–1961.

Henry S. Dybas, Associate Curator of Insects, was appointed Research Associate in the Department of Biological Sciences of Northwestern University.

Staff Changes

Albert W. Forslev, Associate Curator of Mineralogy, resigned from the Museum in August to take up a position as Associate Professor of Geology at the College of William and Mary in Norfolk, Virginia. As part of his new duties, he will help to set up a geology department for the college. Mr. Forslev had been with the Museum since 1956. Readers of the BULLETIN will remember his interesting articles on tektites and diamonds for this publication.

The new Associate Curator of Mineralogy for the Museum is *Edward J. Olsen*, who comes to this institution from a position as Assistant Professor of Geology at Case Institute of Technology and Western Reserve University. Dr. Olsen was born in Chicago and did both his undergraduate and graduate work at the University of Chicago, where he received his Ph.D. in 1959. In 1953 he was field assistant for the Geological Survey of Canada, and in the following year, field

(*Continued on page 8*)

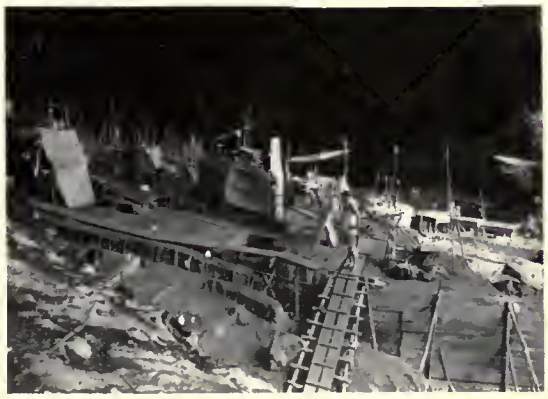
THE GREAT CAVE OF NIAH

(*Continued from page 5*)

example among the Bornean reptiles is a single species of glass snake which, of course, is really a lizard. This species is widely separated from all the rest of its living relatives in the temperate zone. Perhaps among the Niah fossils we will find species that no longer live on Borneo. It is to get at questions regarding the historical changes in the Bornean fauna that I am interested in the material from Niah.

"One of the things that has turned up already among the living species Harrisson sent us," Inger continued, "is a new species of lizard from the Great Cave itself. When we have compared this and other contemporary fauna with the fossil remains, we will be in a position to make some evaluations as to what the environment was like at Niah in paleolithic times."

The Great Cave at Niah is indeed providing a fruitful opportunity for museum scientists to enrich man's knowledge of human and animal history in prehistoric, stone age times.



Tom Harrisson views excavating equipment at main entrance to Niah Great Cave.

Ancient human burial found in Great Cave.

Photograph by K. F. Wong

A "CASE" OF MISTAKEN IDENTITY

(*Continued from page 2*)

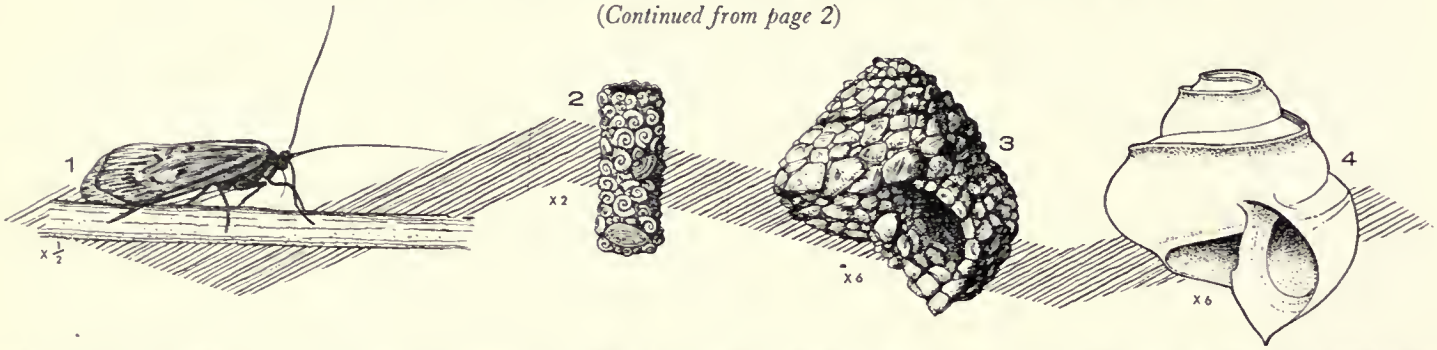


Fig. 1: An adult caddis fly. Like the may flies, its adult life is brief. Fig. 2: Some caddis flies construct these more or less cylindrical cases out of small fresh water mollusk shells. Fig. 3: The larval case of the caddis fly "Helicopsyche." Similar "shells" have repeatedly been described as a new species of mollusk, but are actually the larval cases of an aquatic insect. Fig. 4: "Valvata," the mollusk with which the larval case of the caddis fly "Helicopsyche" has often been confused.

pseudo-snail cases that deceived even trained observers. Caddis fly larvae have well developed mouth parts and feed on plants and small aquatic animals. In turn, they are an important element in the diet of fish. During the pupal stage, the cases are sealed at both ends. A pair of well developed mandibles enable the pupae to cut their way out of the case. The pupal skin is cast at the surface of the water or nearby. Little if any food is taken in the adult state which, like that of the may flies, lasts for a relatively short period of time.

About 3,500 species of caddis flies are known, of which about 800 are found in North America. Herbert H. Ross, of the Illinois Natural History Survey, states that four species of the snail-case makers (*Helicopsyche*) are known from the United States.

MUSEUM NEWS

(*Continued from page 7*)

geologist for the U. S. Geological Survey. Before joining the staff of Western Reserve, he was employed by the Canadian Johns-Manville Co., Ltd. He is a member of Sigma Xi, the Geochemical Society, and the Mineralogical Society of America.

Dr. Olsen is interested in research on the physical chemistry of magnesium silicates—serpentine, olivine, and pyroxene. "I am delighted," he states, "with the Museum facilities available for the study of these minerals, and expect to make good use of the X-ray diffraction equipment in the Chalmers Mineralogical Laboratory."

Miss Dolla Cox has resigned from the Raymond Foundation to move to San Francisco, California. She has been associated with the Museum since 1952 and with the Raymond Foundation since 1953. Many school programs and tours in the field of geology and related subjects were ably planned and executed by Miss Cox during this period.

New Book

The University of Chicago Press has announced publication in the fall of *Indian Life in the Upper Great Lakes:* 11,000 *B.C. to A.D.* 1800, by *George I. Quimby*, Curator of North American Archaeology and Ethnology. Museum members have already had a preview of some of the fascinating material presented in this book, since several chapters were first published in the BULLETIN. These chapters form a part of Curator Quimby's authoritative treatment of the archaeology, ethnology, and geography of the Upper Great Lakes region—a region of 200,000 square miles.

The documented history of this area, beginning with the appearance of white explorers, fur-traders, and missionaries in the seventeenth century, is comparatively well known. But much less is known of the prehistory of the region, which goes back some 13,000 years. Now this prehistory has been reconstructed from data written in the land forms, glacial deposits, and plant and animal fossils, and in the unintentional records left by the Indians themselves in the form of fragments of tools, weapons, and ornaments. Drawing on his own original research in addition to that of other specialists, author Quimby tells the story of the Indian of the Upper Great Lakes—from the earliest comers who followed the retreating glaciers into the woodlands and shores of the Great Lakes and hunted mastodons with stone-pointed spears; through the Indians of the Old Copper culture, the first in the hemisphere to fabricate metal; up to those tribes originating about A.D. 800 whose names are so familiar and evocative: Huron, Fox, Ottawa, Chippewa, Sauk, Menomini, and Winnebago.

It is particularly fitting that Mr. Quimby's new book should be published by the University of Chicago Press, since he is also Lecturer in that university's Department of Anthropology.

Soundtrek

We were pleased to learn that Soundtrek, the Museum's pioneering radio-guide to the exhibits, is now being installed in Milwaukee's Public Museum.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO NATURAL HISTORY MUSEUM Bulletin

VOLUME 31 NUMBER 10 october 1960

MUSEUM NEWS

New Staff Member

The Museum announces the appointment of *Louis O. Williams* as Associate Curator of Central American Botany. Prior to joining the staff here, Dr. Williams was botanist, Plant Introduction Section, New Crops Research Branch, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Maryland; and before that, botanist and sub-director at the Escuela Agricola Panamericana near Tegucigalpa, Honduras. In that position he was engaged, over a period of more than eleven years, in developing reference botanical collections for south Mexico, Central America, and Panama. At the same time he built up a reference library covering all phases of natural history, exploration, and travel for that part of the world. His extensive field experience in the tropics of both North and South America especially prepare him for the duties he will undertake in his present position, particularly in the completion of the *Flora of Guatemala*.

Dr. Williams was born in Wyoming, received his bachelor's and master's degrees at the University of Wyoming and his doctor's degree at Washington University. For ten years he was a Research Assistant at the Ames Orchid Herbarium of Harvard University. He has engaged in extensive expeditionary work in Mexico and Brazil, and has made repeated study trips to all Central American republics. Most recently he spent four months collecting for the U. S. Department of Agriculture in west central and southern Africa. When he was with Escuela Agricola Panamericana he founded the publication, *Ceiba*, and was its editor until 1957. For three years prior to the second World War, he was editor of the *American Orchid Society Bulletin* and was instrumental in strengthening the position of that journal and converting it from a quarterly to a monthly *Bulletin*. The list of his published papers and books is a lengthy one including such titles as *A Monograph of the Genus Mertensia*, *The Orchidaceae of Mexico*, and *Enumeration of the Orchidaceae of Central America*.

Expedition

Chicago Natural History Museum has officially joined Sir Edmund Hillary's Himalayan expedition in search of the "abominable snowman." A grant from the World Book Encyclopedia, sponsors of the expedition, has made it possible for *Dr. Robert L. Fleming*, field associate in the Museum's department of zoology, to accompany Hillary and his expeditionary party on their ascent into the Himalayas this fall.

Dr. Fleming, a medical missionary who has lived in Nepal for the past seven years, brings to the expedition an extensive knowledge of the animal life—and particularly the birds—of the region. In the past, Fleming has made several trips from the lowlands of Nepal to far above timberline in the Himalayas in search of specimens for the Museum's collections. Readers of the BULLETIN will remember his report (December, 1954) of the expeditions he has directed for the Museum in the Himalayas and in other parts of India, as a result of which many fascinating and unusual birds were sent back to the Museum. Now it is expected that the Museum's study collections, as well as its exhibits of Asian birds and other animals, will be enriched again by the addition of rare specimens from the higher reaches of the Himalayas.

The Hillary party began its nine-month high-altitude expedition at Katmandu, capital of Nepal, a small independent state between India and Tibet. Focus of the expedition is Mt. Makalu in Nepal, fourth highest mountain in the world. The mountain is located 170 miles from Katmandu.

Objectives of the expedition, which is officially known as the "1960 World Book Encyclopedia Scientific Expedition to the Himalayas Led By Sir Edmund Hillary" are: (1) to carry out extensive physiological research into the acclimatization of the human body to extreme altitudes, (2) to pursue exploration, mountaineering, mapping, and glaciology in the ranges to the east and west of Mt. Everest, and (3) to sustain an impartial search for evidence to prove or

(*Museum News continued on page 8*)

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

THE BULLETIN

EDITOR
CLIFFORD C. GREGG ..... *Director of the Museum*

CONTRIBUTING EDITORS
PAUL S. MARTIN ..... *Chief Curator of Anthropology*
JOHN R. MILLAR ..... *Chief Curator of Botany*
SHARAT K. ROY ..... *Chief Curator of Geology*
AUSTIN L. RAND ..... *Chief Curator of Zoology*

MANAGING EDITOR
PAULA R. NELSON ..... *Public Relations Counsel*

ASSOCIATE EDITOR
MARILYN JINDRICH ..... *Associate in Public Relations*

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

This Month's Cover

On a remote string of islands in the southwest Philippines live the Mohammedan Sulus. Strategically located on one of the world's major trade routes, the Sulus for centuries plied the seas as traders. When the Spaniards conquered the Philippines, the proud and independent Sulus refused to accept either Spanish Christianity or Spanish domination of their seas.

Instead, they turned to piracy. In their swift and silent "vintas" and "prahus," the Sultan of Sulu's motley fleet terrorized the shores of the Spanish-held isles, burning, killing, and seizing food and slaves. Then, with the coming of the Americans, piracy declined. Today, the Mohammedan Sulus are a peaceful, sea-going people, whose boats still sport the striped sails that once inspired terror.

Lucie Palmer, artist and geographer, lived among these Sulus for six months. In approximately fifty oil sketches on public exhibit at the Museum during October, she vividly portrays the dazzling hues of sky and sea, the gaily colored sails set against a backdrop of palm trees and mountains, white-costumed participants in Moorish ceremonies, and the lonely, spindly-legged "Badjow," or Sea Gypsy, houses shown on our cover.

Snow-topped mountains reflect their beauty in the clear water of a Norwegian inland lake. From Hjordis Kittel Parker's "Norway, Changing and Changeless" to be presented November 5.

Adult Travel Programs

Chicago Natural History Museum's 114th series of free, illustrated travel lectures begins Saturday, October 1, in the Museum's James Simpson Theatre.

Last summer more than 500,000 American tourists traveled to Europe in the greatest tourist invasion of that continent in history. Similarly, resort centers in the United States report unprecedented numbers of visitors during the past summer. For Chicagoans who were not able to go traveling this year, as well as for those who would like to relive the excitement of their vacation excursions, the Museum's fall series focuses on those two continents. All lectures are narrated in person by well-known lecturer-photographers.

The programs will be presented each Saturday in October and November at 2:30 P.M. under the auspices of the Edward E. Ayer Lecture Foundation. Members of the Museum may claim reserved seats by presenting their membership cards before 2:25 P.M. on the lecture day.

Following is the complete schedule:

October 1—New England in All Four Seasons

Donald Shaw

All the beauty and tradition, the historic and scenic panorama, of the cradle of American civilization—New England—are revealed in this color film by Donald Shaw. Visit locations hallowed by history and legend—Plymouth, Concord bridge, the homes of Revere, Emerson, Hawthorne, Thoreau—and see them come alive in scenes recreating the landing of the Mayflower, life in an authentic pioneer village, and the tracing of the story of the Revolution, from the first shot heard 'round the world to the new-born country's shrines in Boston.

October 8—Island Treasure

Walter J. Breckenridge

Just a dot of land, almost lost in the broad expanse of the great Mississippi. But explored through the discerning camera of Dr. Walter J. Breckenridge, director of the Minnesota Museum of Natural History, that dot discloses a treasure-house in microcosm. This world-famous naturalist has studied his island as man has rarely done. He knows the age of every soft-shelled turtle; he has watched the beaver cut a cottonwood twenty inches in diameter; he has captured in color film the dramatic arrival of the great blue heron, who comes each spring to fish the lagoon.

October 15—Romantic Old New Orleans

Phil Walker

Spanish moss veiling trees and telephone wires; wrought iron balconies; plantation homes still sturdy with their original framework and neoclassic columns of swamp-bred cypress; gourmet, creole cookery; and—Mardi Gras! All these spell New Orleans. In this exciting film, not only are the city's French-Spanish flavor and gay holidays portrayed, but the viewer thrills to the mysterious beauty of outlying swamps and bayous, as he goes afield with the camera for crawfish, tarpon, and alligators.

October 22—Pika Peaks

Emerson Scott

No, it's not a typographical error! "Pika Peaks" focuses the color camera, not alone on Pike's Peak in Colorado, but on the entire Western Rockies, home of the elusive "pika," or "rock rabbit." While following the "pika," the viewer adventures with an experienced guide along the trails of the San Juan Mountains of Colorado, sometimes called the Switzerland of America; through Glacier National Park, a refuge for countless wilderness creatures; and on to Jackson's Hole, Wyoming.

October 29—Voici L'Amérique (Here is America)

Arthur F. Wilson and Frederick J. Keiffer

Two French children enjoy the red carpet treatment in a delightfully fresh and "different" journey across the United States. The children are the guests of Arthur F. Wilson, who is returning the kindness shown him by their family when he was stationed in France as an American G.I. The film renews the thrill of your own first trip west as it records the unsophisticated joy of these young travelers at their first sight of our majestic scenery from the plains states to the coast and then back again to New York.

(*Continued on page 8*)

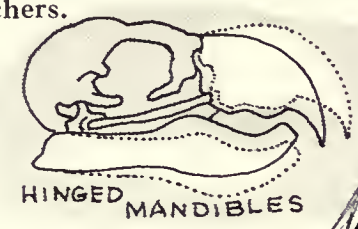
PARROT

BY M.A. TRAYLOR, ASSOCIATE CURATOR OF BIRDS
AND E. JOHN PFIFFNER, STAFF ARTIST

The large and colorful parrot family, which ncludes the cockatoos, macaws, parakeets, ories and lovebirds, numbers 316 species. These re distributed throughout the tropics and oc- asionally in temperate regions. With their arge heads, powerful, hooked beaks and short egs, parrots are easily recognizable; and their ttractiveness as pets has made them one of the nost familiar families of birds.

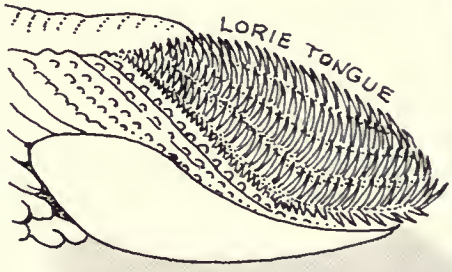
Parrots were mentioned by Greek writers as arly as 400 B.C., but the first live birds (prob- bly the Indian Parakeet) were brought into Greece by Alexander the Great's soldiers about 28 B.C. They quickly became popular as pets.

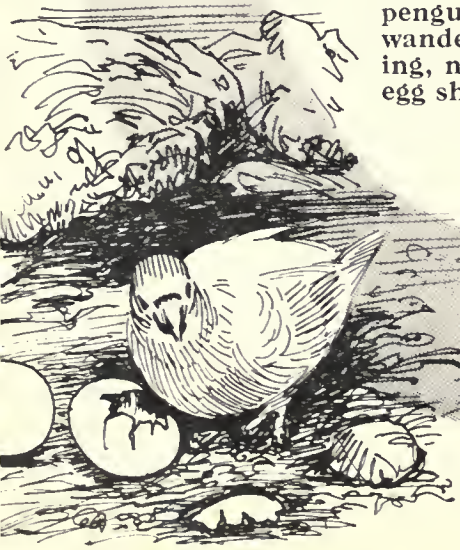
Parrots vary in size from the tiny, three-inch pygmy parrots of New Guinea to the giant, three-foot Scarlet Macaw of South America. However, all parrots share a common structural peculiarity of the beak: the upper as well as the lower mandible is hinged at the base, producing a much wider gape and more powerful crushing action than in most other birds. The beak also serves as a third "foot," being used to grasp perches unattainable by the short legs. In feeding, the feet are frequently used as "hands," and individual parrots are as definitely right- or left-"handed" as baseball pitchers.

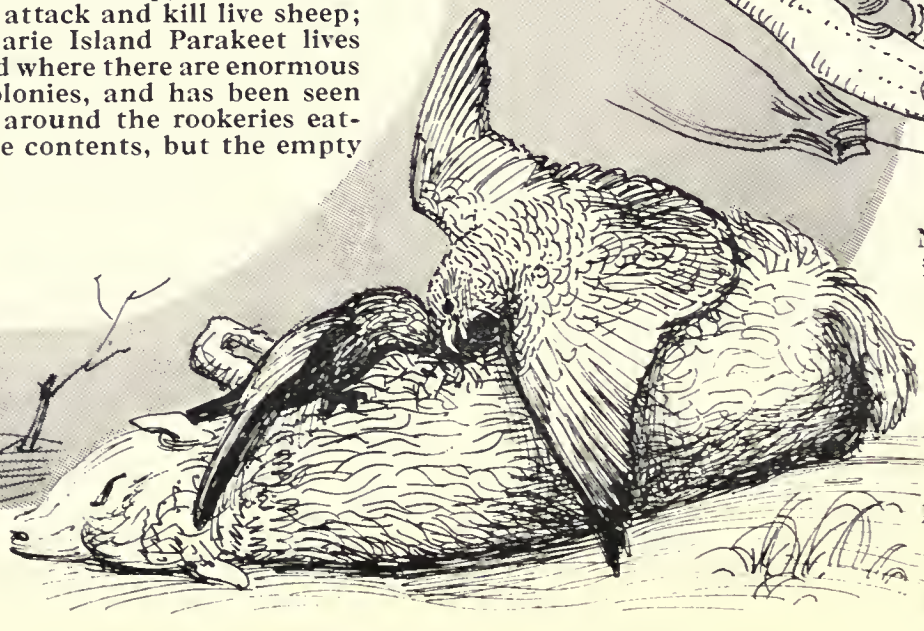


feeding

Parrots may be divided into two groups, those feeding on seeds, nuts and buds and those feeding on fruits and nectar. The former have strong, blunt tongues and powerful bills; this group is best exemplified by the macaws, which are capable of crushing a Brazil nut. The latter types, including the lories, have brushy tips to the tongue, which they use to lap up soft fruits and nectar. Some parrots have developed quite peculiar tastes: the Kea of New Zealand has become partly carnivorous through feeding on the discarded offal of sheep, and will now sometimes attack and kill live sheep; the Macquarie Island Parakeet lives on an island where there are enormous penguin colonies, and has been seen wandering around the rookeries eating, not the contents, but the empty egg shells.







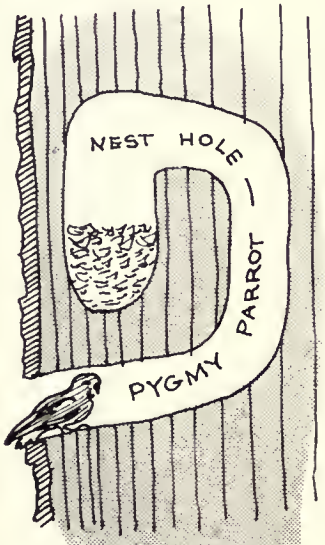
Numb
in rep

New

North
Eu
Nort

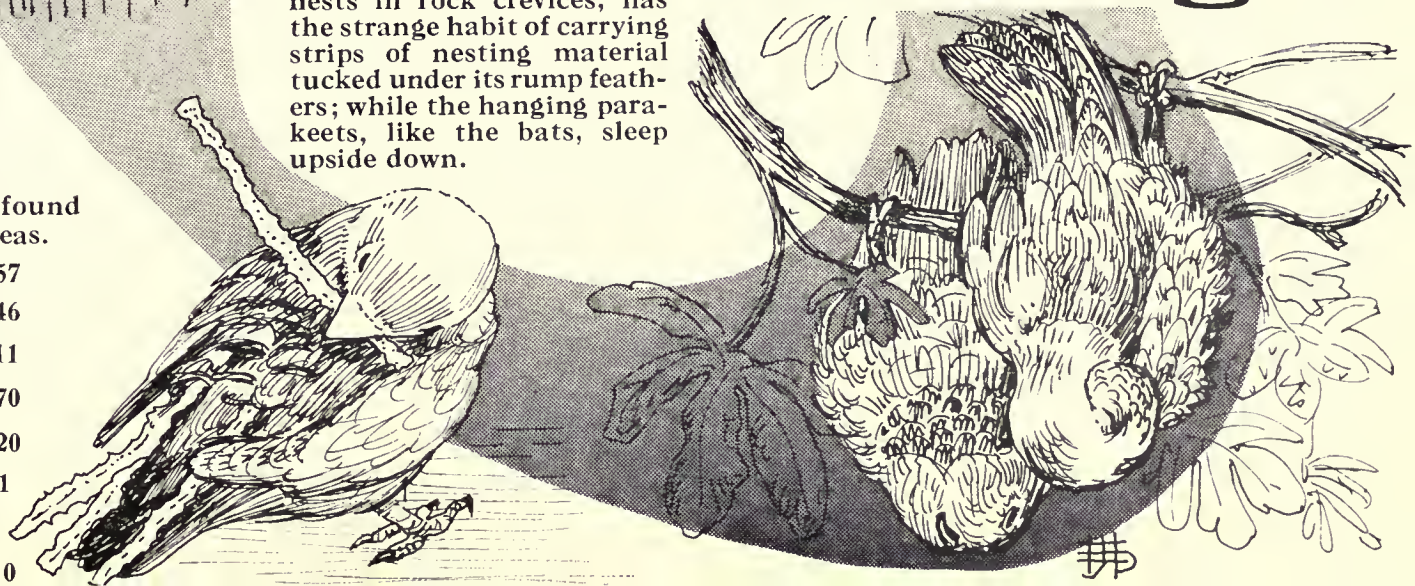
The only parrot that ever reached the northeastern United States was the yellow-headed Carolina Parakeet. It is now extinct, the last unquestionable record of a wild bird being 1904, while the last zoo bird died at Cincinnati in 1914. The main cause of extirpation was almost certainly persecution by man, but the early settlers should not be judged too harshly since enormous flocks would virtually destroy grain fields and orchards. Now the only United States parrot is the Thick-billed Parrot, which occasionally is found in southern Arizona and New Mexico.

The most aberrant and interesting of the parrots is the flightless Owl Parrot of New Zealand. Before the coming of the white man and his carnivorous pets there were no serious predators on New Zealand, and the Owl Parrot was widespread; now it is confined to the forests of North Island. Here it keeps to dark forest glades, clearing trails along which it forages, and feeding on rootlets, tender twigs and fruits. It occasionally climbs trees, using its rudimentary wings to assist it in hopping from limb to limb.



The vast majority of parrots nest in hollow limbs or holes in trees, and less frequently in crevices in rocks. Odd variants occur, however. The Pygmy Parrot of New Guinea, rather than have his tunnel run down from the nest hole, has it run up, so that the nesting chamber is above the entrance. Even more peculiar are the large communal stick nests of the Monk Parrot of South America: not only do several pairs of these parrots nest together, but they have been reported to tolerate ducks and opossums as guests. The Rosy-faced Lovebird, which nests in rock crevices, has the strange habit of carrying strips of nesting material tucked under its rump feathers; while the hanging parakeets, like the bats, sleep upside down.

nesting

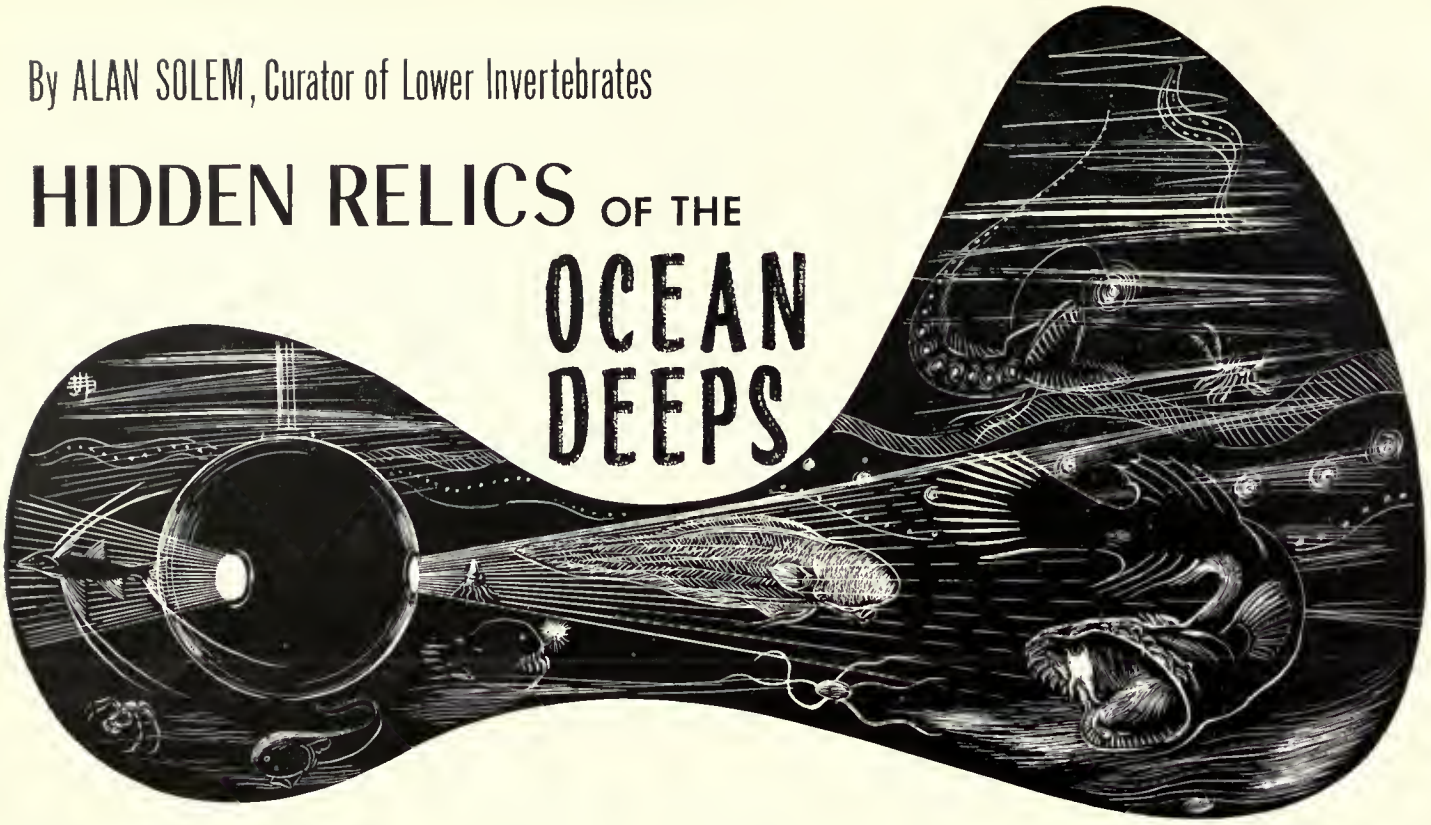


f parrots found
ıtative areas.

ralia	57
inea	46
ndia	11
razil	70
frica	20
ıerica	1
and	
Asia	0

By ALAN SOLEM, Curator of Lower Invertebrates

HIDDEN RELICS OF THE OCEAN DEEPS



MAN has climbed the highest mountains, peered through telescopes into the farthest corners of the universe, hurled his rockets past the moon, sent sound waves racing to record the contour of the ocean floor. Now he is even trying to communicate with life on other worlds. Yet much of the life of man's own planet is shrouded from him in mystery and unseen by human eyes.

Naturalists have scoured the forests and fields, the lakes and tide pools, for new animals and plants. Geologists have chipped rocks and painstakingly reconstructed fossil fragments, to reveal a surprisingly detailed picture of life in past eras. Over 1,500,000 living animals and plants have been named and classified, and untold thousands of fossil organisms similarly recorded.

Much of the scientist's work in the museum is to collate new facts about a few of these organisms, to name and classify some of the perhaps 1,000,000 still undescribed species, and to prepare new summaries about certain small groups.

In field and forest an unusual creature is occasionally found, but the great frontier of research is the ocean. Though the ocean covers 70 per cent of the earth's surface, man's penetration of it has been limited to a few feet unaided, 300 feet with an aqualung, and 500 feet with a diving suit. Only encased in a steel sphere can man briefly explore the sea's dark depths.

Our knowledge of deep ocean life is based upon tantalizing flash pictures; the catch of the scientist's blind gropings with dredge and sampler, and of the fisherman's trawl; the refuse of storms on ocean shores. Despite this pitifully inadequate sampling, the two major zoological discoveries of this century have come from the ocean.

A five-foot blue fish, *Latimeria*, is now familiar to the general reader. It is a coelacanth, a group not far removed from man's own ancestry, which was believed to have been extinct for 75,000,000 years. A much more recent discovery is a rather ordinary looking one-and-one-half-inch mollusk, *Neopilina*. This animal belongs to a group supposed to have been extinct for over 350,000,000 years! Moreover, while *Latimeria* provided striking confirmation of prior conclusions by palaeontologists in regard to the evolution of vertebrate life, *Neopilina* is forcing a complete revision of our ideas of molluscan evolution, and has upset our definition of a whole phylum of animals.

The chance discovery of *Latimeria* is quite well known, but a brief résumé of the story can point out the important contribution sometimes made by non-scientific personnel to scientific discovery. On December 22, 1938, a fisherman brought up his trawl from 234 feet of water off the mouth of the Chalumna River near East London, South Africa. A strange blue fish caught his attention, and he took it to the local museum. There, the decaying soft parts were removed and the skin was stuffed. Unable to identify the specimen, a staff member at the museum called in a zoologist from a local college for help. J. L. B. Smith immediately recognized the fish as a living coelacanth, a group thought to be extinct since the Cretaceous Period. Meeting a dinosaur would not have been more startling.

Circulars describing the new fish were widely distributed among fishermen in Madagascar and South Africa in hopes of obtaining a whole specimen. Many fishermen claimed to know the fish, but not until December 21, 1952, was a second coelacanth captured. The very isolated Anjuan Island, in the Comorros group northwest of Madagascar, radioed news of the capture, which was flashed around the world. Such was the interest in this living fossil that the premier of South Africa dispatched an Air Force plane with *Latimeria*'s describer, Dr. Smith, aboard to save the specimen for study.

Since then several more coelacanths

have been captured, and a magnificently illustrated monograph of its anatomy is being published.

What is the scientific significance of this rather unprepossessing fish? Several generations of geologists had been studying the bones of extinct animals which they had carefully chipped out of various rock strata. From the fragmentary evidence available, a gradual outline of the path of vertebrate evolution had been charted, and the probable tree of man's ancestry traced. It was known that amphibians, and eventually all higher vertebrates, arose from a branch of the lobe-finned, or crossopterygian, fishes. The coelacanths (to which *Latimeria* belongs) were crossopterygians, and the public immediately labeled *Latimeria* a "missing link between fish and man." Actually the coelacanths were a side branch of the crossopterygians, while the higher vertebrates were derived from the main crossopterygian line, the Rhipidistia.

Prior to the discovery of *Latimeria*, information about the evolutionary ancestry of man had been based on studies of skeletal parts alone. The opportunity to study other systems is thus a marvelous one for students of vertebrate evolution, and the anatomy of *Latimeria* will yield much data. While it is not a "missing link" at all, *Latimeria* does rank as one of the important zoological finds of the century.

In contrast, the discovery of *Neopilina*, though of even greater scientific significance, received no immediate fanfare of attention. The Danish Deep-Sea Expedition undertaken around the world on the "Galathea" in 1950–52, was the fourth world marine biological voyage. Among its achievements was the collection of living organisms from 10,100 meters below the ocean's surface, the deepest catch ever recorded. But our interest lies in a less spectacular haul. On May 6, 1952, the "Galathea" dredged off the west coast of Costa Rica at a depth of 3,570 meters. A rich haul of many species was sorted, washed, and preserved in alcohol and formalin.

Thirteen specimens of a brownish, conical, thin, one-and-one-half-inch shell, ten collected alive with the soft parts, did not attract immediate notice. Until 1956 they lay, unstudied, in bottles of preservative. Then, routine examination at once revealed their unusual characters. In early 1957, the British weekly, *Nature*, carried the first description of the most unusual mollusk ever found by scientists.

About twenty to thirty major types of structural arrangement among animals had long been recognized. These patterned groupings, called phyla, represent basic stages in evolution and differing plans of physical organization. For example, all animals with a dorsal nerve cord and internal body support, or skeleton (fishes, amphibians, reptiles, birds, mammals, and a few primitive marine organisms), belong to the Phylum Chordata. Similarly, all animals with a ventral nerve cord, an external skeleton, and jointed legs (insects, spiders, scorpions, crustaceans, mites, and the like) belong to the Phylum Arthropoda. Other groups, such as the echinoderms, mollusks, segmented worms, flat worms, round worms, sponges, coelenterates, protozoans, lamp shells, and a number of less familiar groups, *each* represent a different basic pattern of structure and form a separate phylum.

In other words, the difference between a fish and an amphibian, or a reptile and a monkey, is much less than the difference between an insect and an earthworm, or a flat worm and a mollusk.

The marvelous thing about *Neopilina* is that it provides a "missing link" between *phyla*. It shows conclusively that the mollusks were derived from a worm-like ancestor, since it still preserves certain primitive, worm-like features within its own anatomy. Not only that, but the fossil records of *Neopilina*-like mollusks are all older than 350,000,000 years.

The annelid, or segmented, worms and the arthropods have long been known to be related. Their bodies have hard external coverings and are divided into a series of more or less modified segments. Primitive insects can readily be compared with certain worms, and one small group of organisms is almost intermediate between the annelids and arthropods. Because of similarities in the structure of their larval forms, the mollusks have usually been considered as distantly related to the annelids and arthropods. Yet this has always been difficult for beginning zoology students to understand. What possible similarity does the soft-bodied, slimy mollusk with its shell of calcium carbonate bear to the segmented worms and insects with their chitinous exoskeleton?

Neopilina provides the answer. Its soft parts show definite signs of segmentation, proving that mollusks were originally derived from a segmented ancestor. The structures are much modified from the simple pattern of an earthworm, but the presence of five pairs of gills, six sets of nephridia (nephridia are kidney organs), several very complex paired muscles, and many other details, shows that *Neopilina* and its early fossil relatives were partially segmented and that mollusks were derived from a segmented ancestor.

Subsequent to the news of *Neopilina* in 1957, the research vessel, "Vema," dredged another species of *Neopilina* from 3,183 to 3,201 fathoms off the coast of Peru. This shows that *Neopilina* is fairly widely distributed, and of course raises the question of what other "missing links" are likely to be found in the sea.

Few people realize what a rare accident it is for an animal to be preserved as a fossil. Certain unusual conditions must take place, and even then only a tiny percentage of the organisms present will be preserved. Of organisms living in water, only those living in or washed into shallow waters can be fossiled. We have no records of deep sea organisms as fossils.

Thus, whenever a group of organisms, under the spur of competition for food and shelter, leave shallow waters for the ocean deeps, they disappear from the fossil record. The ancestors of *Neopilina* made the change 350,000,000 years ago; the ancestors of *Latimeria* "only" 75,000,000 years ago. No one knows what other groups may still be found. Each deep trawler's net may contain a startling fish or other large animal; each scientist's dredge may pull up another missing link in the pattern of evolution.

Man will continue groping blindly on the ocean bottom, taking temperatures, sampling mud, collecting specimens, and divising better chambers in which to invade this realm. Life forms from other planets will hardly be more exciting to scientists than the organisms still to come from the sea.

ADULT LECTURES—

(*Continued from page 3*)

Winter Wonderland: Fresh snow against a brilliant winter sun in New England. Scene from Donald Shaw's "New England in All Four Seasons," program for October 1.

November 5—Norway, Changing and Changeless

Hjordis Kittel Parker

The dramatic landscape of Norway from rocky peak to the sea, spine-tingling scenes of mountain scaling by the country's most famous mountain climber, expert skiers skimming across virgin snows, a day spent on a mountain-side farm inhabited by three generations of a 1000-year-old family, and an absorbing study of the primitive, nomadic Laplanders—all these document a fascinating, comprehensive picture of Norwegian life.

November 12—Water World

Stanton Waterman

Going beyond the standard subjects of color photography, this photographer-lecturer has chosen to master an environmental medium that presents a whole new range of challenges to his skill with a camera. Four years in the making, the finished motion picture emerges as a unique study of undersea life. Highlights are a rare encounter with massed barracuda, the exploration of modern and ancient wrecks, and a descent into one of the mysterious Bahamian "blue holes." Occasionally the camera "surfaces" for a dazzling glimpse of Nassau, Bimini, Cat Cay, the Berry Islands, and Abaco Cays.

November 19—Portrait of London

Curtis Nagel

Sprawling, "grand old dowager" city of the world, London has entranced visitors for hundreds of years with its characteristic charm. Now, the motion picture camera distinguishes all the components of that charm—beginning with a sunrise over the Tower Bridge, and from there following each corner and turning of the city's physiography—Trafalgar Square, Picadilly Circus, No. 10 Downing Street, Hyde Park, Kensington Gardens, Petticoat Lane open-air market, Windsor Castle—recording for our pleasure the colorful, stirring ceremonies for which England is famous.

November 26—Venice and the Italian Lakes

Thayer Soule

To Thayer Soule, people are as important as buildings, and the present as vital as the past—even when portraying a city as beautiful and ancient as Venice. His motion picture, therefore, not only traces the city's beginnings as an island refuge from barbaric invaders to its heights as a Renaissance world power, but also shows us the practical problems of a modern city afloat—the market, the omnipresent coffee machine, the arts of lace and mosaic making. Finally, the camera throws the city's essence into bold relief through the magic of contrast, as the viewer is transported from the lowlands to the Alps and the Italian Lake Country.

MUSEUM NEWS—

(*Continued from page 2*)

disprove the existence of the Yeti, or "abominable snowman."

Dr. Fleming is Superintendent of the Medical Mission to Nepal of the Board of World Missions of the Methodist Church. In a delightful BULLETIN article for March, 1960, Dr. Fleming followed the calendar through the colorful Nepalese year. We are looking forward to publishing his personal report of the "snowman" expedition.

Audubon Lectures Start

The Illinois Audubon Society opens its 1960–61 lecture season at the Museum on Sunday, October 9, with a panoramic screen tour of our youngest state, Hawaii. In color film, Fran William Hall of Northfield, Minnesota, pictures the natural history, the people, the lavish beauty of the island state. The program begins at 2:30 P.M. in the James Simpson Theatre. The general public is cordially invited.

Pete E. Winter, 16, [right] of 2310 Burr Oak Road, Northfield, knew just what to do when he came across this giant puffball while walking on the bridle path in the Nixon Forest Preserve. He picked it up and brought it down to the Museum. Measuring 16¼ inches long, 11⅜ inches wide, and 12 1/16 inches high, the puffball, though not a record size, turned out to be the largest that members of the Museum's Department of Botany had ever seen. Pete and his brother Bill, 13, [left] enjoyed comparing his find, which he has donated to the Museum's study collections, with the model on exhibit in the "Hall of Plant Life" in Hall 29.

VOLUME 31 NUMBER 11 november 1960

CHICAGO NATURAL HISTORY MUSEUM Bulletin

SACRED IMAGE OF THE PUEBLO INDIANS

1250-1350 A.D.

for picture story see pages 4-5

MUSEUM NEWS

Adult Lecture Series

Color motion pictures narrated in person.

November 5 **Norway, Changing and Changeless**
Hjordis Kittel Parker

November 12 **Water World**
Stanton Waterman

November 19 **Portrait of London**
Curtis Nagel

November 26 **Venice and the Italian Lakes**
Thayer Soule

James Simpson Theatre. Saturday afternoons at 2:30. Free.

Children's Programs

November 5 **Nature's Half Acre**
(*Museum Traveler Day*)

November 12 **Fantastic Alaska**
(*Simeon Oliver, "Nulchuk," in person*)

November 19 **Getting Ready for Winter**
(*Also a cartoon*)

November 26 **Toys of Many Lands and Children**
(*Plus a cartoon*)

James Simpson Theatre. Saturday mornings at 10:30. Free.

TOYS OF MANY LANDS AND MANY CHILDREN will be the last of the Fall Series of motion picture programs for children on Saturday, November 26, 10:30 a.m. This will lead into the Winter Journey on TOYS available to all boys and girls in December, January, and February. The above photograph shows a preview of some of the toys the youngsters will be directed to in the Winter Journey.

Honors

The American Malacological Union, consisting of more than 800 professionals and amateurs, has an exclusive category of membership, called Honorary Life Member, which is restricted to a maximum of five individuals. At the recent meetings of the Union in Montreal, *Dr. Fritz Haas*, Curator Emeritus of Lower Invertebrates, in recognition of his outstanding contributions to malacological research, was elected an Honorary Life Member.

Free Concert

The Festival String Quartet will be joined by Kerstin Meyer, leading mezzo soprano of the Royal Opera, Stockholm, on Dec. 7 in the Free Concert Foundation's second chamber music concert of the 1960–61 season. It will be Miss Meyer's first Chicago appearance. The program will begin at 8:30 P.M. in the James Simpson Theatre. Tickets may be obtained by writing Free Concerts Foundation, Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive; and enclosing a stamped self-addressed envelope.

New Staff Member

Mrs. Bertha Gibbs has been appointed to the position of Cataloger on the staff of the Museum Library. She was formerly on the library staffs at Harvard University Library, Boston University Library, and more recently at Armour Research Foundation of Illinois Institute of Technology, where she organized a library for the Fluid Dynamics and Systems Research Division. Mrs. Gibbs was graduated from Fisk University and the University of Illinois Library School.

(*Museum News continued on page 8*)

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

THE BULLETIN

EDITOR
CLIFFORD C. GREGG.....*Director of the Museum*

CONTRIBUTING EDITORS
PAUL S. MARTIN.....*Chief Curator of Anthropology*
JOHN R. MILLAR.....*Chief Curator of Botany*
SHARAT K. ROY.....*Chief Curator of Geology*
AUSTIN L. RAND.....*Chief Curator of Zoology*

MANAGING EDITOR
PAULA R. NELSON.....*Public Relations Counsel*

ASSOCIATE EDITOR
MARILYN JINDRICH.....*Associate in Public Relations*

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

By ERNEST J. ROSCOE
Assistant, Lower Invertebrates

A SNAIL'S PACE

At the end of the day's work, you're anxious to get home. The elevator carries you swiftly to the ground floor. On the street you get into your car and pull out into the line of traffic. Catching up to the car ahead, you stop, move on a short distance, and then brake again as the line of cars slowly inches forward. After a few minutes of this rate of progress you are ready to protest vehemently that traffic is moving "at a snail's pace!"

But how fast, exactly, is a snail's pace? Several years ago, John Oughton, then on the staff of the Royal Ontario Museum of Zoology, ran a series of tests on a number of common North American land snails and slugs. When we convert his results, which were reported in centimeters per minute, into more familiar measurements of speed, we find that the *slowest* snail was clocked at about ½ inch per minute (0.000192 miles per hour). The *fastest* gastropod was a slug, or shell-less snail; it was able to make about 20 inches per minute (0.00758 miles per hour). On the other hand, when the recorded speeds of sixteen kinds of North American land snails and slugs were compared, the *average* "snail's pace" was found to be 6.5 inches per minute (0.00248 miles per hour).

Many factors affect the speed at which these animals move. Some are physical—temperature, humidity, type of terrain, direction of travel with respect to the pull of gravity, and the like. Other factors are biological, and relate to the condition and habits of the animal itself. That there are differences between individuals is demonstrated in my own work with *Oreohelix strigosa depressa*, one of the largest land snails of the intermountain region. I found considerable variation between individuals of comparable size tested at the same time under uniform conditions. Another investigator has reported that young snails move more rapidly than adults of the same kind. He also thought that snails having a secretive mode of life moved more quickly. And several writers have stated that carniverous forms are more active than herbiverous ones.

One of the most interesting questions centers on the influence of the snail's shell on its rate of locomotion. In the study that compared the speeds of sixteen species of North American land snails, with two exceptions all snails with shells were slower than the shell-less slugs. Apparently slugs are not as "sluggish" as shelled snails. It would seem reasonable to conclude that the additional weight of a shell slows the snail down. But some biologists are inclined to believe that just the reverse is true—that sluggish habits are a cause, not a result, of having a shell. The argument, in brief, runs that sluggish gastropods cannot get rid of excess calcium as well as active ones. The sluggish animals, therefore, tend to deposit calcium in the form of a shell or other skeletal structure. The interested reader will find a thought-provoking discussion of this "sessile" theory of the origin of calcareous skeletons in Percy E. Raymond's *Prehistoric Life* (Harvard University Press, 1947). The question is far from being resolved, but it does provide an excellent illustration of the fact that, in science, one cannot always jump to the obvious conclusion.

Kind	Shell Diameter (mm.)	Air Temperature (°C.)	Speed: Inches per Minute	Speed: Miles per Hour
SNAILS				
Stenotrema fraternum	6 (immature)	23.2	9.1	.00346
Triodopsis tridentata	12.5	23.5	12.7	.00480
Euconulus chersinus	2.5	23	4.1	.00154
Vitrina limpida	4.2	21	6.9	.00259
Vitrina limpida	adult	23	7.9	.00298
Zonitoides arborea	4.0–5.3	29	6.1	.00230
Zonitoides arborea	4.9	23.5	5.8	.00221
Zonitoides nitida	4.5–6.0	27	6.9	.00260
Rotinella indentata	4	22.4	6.4	.00240
Discus cronkhitei anthonyi	5	21	2.0	.00077
Discus catskillensis	3.8–5.0	..	3.0	.00115
Anguispira alternata	14.5	..	5.8	.00221
Anguispira alternata	7.0	23.5	5.3	.00202
Oreohelix strigosa depressa		..	2.0	.00077
		..	16.0	.00605
Cochlicopa lubrica	6.5 long	21	3.0	.00115
Vallonia costata	2.3–2.6	..	0.8	.00029
Carychium exile	adult	..	0.5	.00019
SLUGS	Length of animal (mm.)			
Deroceras gracile	adult	21	19.1	.00720
Deroceras gracile	18.5	26.6	20.2	.00758
Pallifera dorsalis	11–24.5	21	11.2	.00422
Pallifera dorsalis	15	23	11.7	.00442
AVERAGE			6.5	.00248

Sources: Basic data from J. Oughton, "University of Toronto Biological Series 57," except on *Oreohelix*, which is from the writer's unpublished M.S. thesis.

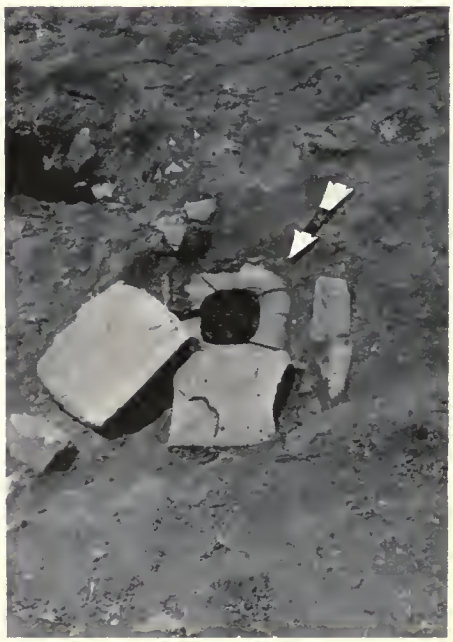
A M

Di

1—*This is the Great Kiva, or religious ceremonial chamber of the ancient Pueblo Indians, excavated by the Museum's Southwest Archaeological Expedition under the direction of Dr. Paul S. Martin. The structure's dimensions are fifty feet by forty-seven feet, making it very probably the largest rectangular kiva ever excavated. The block of dirt running diagonally across the kiva from lower right to upper left is a farm utility road that was not removed in the excavation process. At the top center can be seen the ancient ramp entrance down which ceremonial processions probably marched into the chamber. Set at the ramp's base is an unusually large stone slab that served to deflect drafts from the chamber's fire pit (the small circle half hidden by the farm road). On benches surrounding the four sides of the kiva sat the participants in the sacred rituals. To the right is a stone-lined pit over which planks may have been laid to serve as foot drums, the space underneath acting as a resonator. Encircled is the masonry vault within which lay the sacred stone effigy shown on our cover and a miniature votive jar containing eleven beads. During the excavation process, some 800 tons of dirt and rock were removed in 750 man-hours.*

Our knowledge of
between 1250 and 135
covery made by Chic
Expedition, under the
pology. On a new si
excavating for the pa
tributed significantly
Pueblo Indians. The
news and scientific n
"Bulletin" readers th

the



2—*The crypt containing the stone image was surmounted by a ring slab top. A worked stone slab covered the hole. The cover was carefully sealed into position with adobe, and remained tight enough to exclude the mud and dirt that might otherwise have washed into the vault during the next six centuries. The ring slab entry to the crypt resembles, in miniature, the ring slabs used to frame the entry hatchways on the roofs of smaller ceremonial chambers. The Pueblo Indians believed—and still believe today—that their ancestors emerged into the world through just such a passage from their place of origin in the underworld. Thus every time the god was removed from the crypt for a ceremonial occasion, it may have been a symbolical reenactment of the Indians' ancestral emergence from the underworld.*

Notable

Discovery

t culture of the Pueblo Indians who lived in Arizona 50 D. was greatly enriched this summer by a unique dis- ica Natural History Museum's Southwest Archaeological e ection of Dr. Paul S. Martin, Chief Curator of Anthro- ite within an area that the Southwest Expedition has been as ve years, a sacred image was unearthed that has con- y our understanding of the religious beliefs of the ancient e sy of this discovery, which has been reported in major m a in the United States and abroad, is highlighted for th gh the pictures and captions on this page.

This model of the stone image shows how it must have appeared to the ancient Indians of the pueblo.

4—*Here the ring slab has been removed to reveal not only the sacred objects but the construction of the crypt.*

The vault is about twelve inches square by twelve inches deep. Its sides and floor are lined with sandstone slabs carefully matched and fitted together. The image itself, nine inches in height, is carved of sandstone and painted with stripes of black, orange, green, and blue. It was found lying face down, with its right arm broken off. Such a

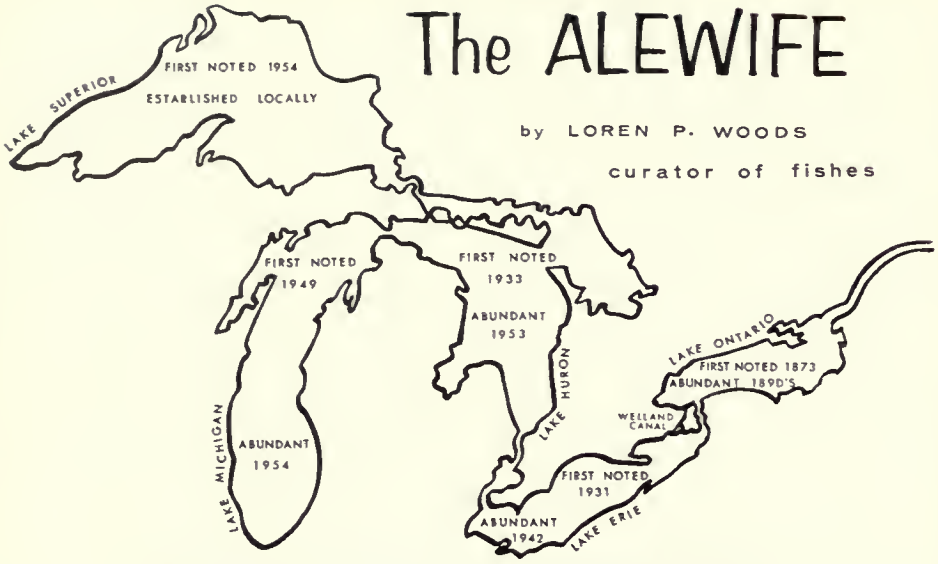
cult deity would have been placed on an altar within the Great Kiva during certain religious ceremonies, and then returned to its sacred vault, whose architecture mimics that of the smaller kivas. Possibly the ceremonies in which the effigy figured pertained to the underworld and were a ritualistic reenacting of tribal origins; perhaps they were also related to births and deaths in the tribe. The fact that the image was found face down may signify that no one dared to look at it, and that on ceremonial occasions it may have been covered or used face down. There is little doubt that the image had great sanctity and that only certain persons would have been allowed to touch it. When the priest carefully placed the sacred carving in its crypt for the last time after some powerful and moving religious ceremony, did he realize that he would never see the god again? Or could the priest deliberately have broken the arm of the effigy to destroy its power when his people decided to move from the pueblo six hundred years ago?

3*Peering within the ring slab, we glimpse h e effigy and votive vessel in the position in which they were found. The arrow points to magnetic north.*

The ALEWIFE

by LOREN P. WOODS

curator of fishes



A RECENT INVADER OF THE UPPER GREAT LAKES IS A SERIOUS NUISANCE TO RECREATION AND FISHERIES OPERATIONS AND IS COMPETING WITH MORE VALUABLE FISH FOR FOOD AND LIVING SPACE

FROM time to time during the past 75 years, fishes that were not native to the region have been found in the upper Great Lakes. Some invaded these waters by extending their ranges; others were introduced, either by accidentally escaping from connecting lakes or from an angler's bait bucket, or through a deliberate effort by man to plant some presumably desirable food or sport fish.

The "colonization" of the Great Lakes by these immigrant fishes has generally been documented, so that the approximate time and place of their arrival, their first spawnings, and their spread over the lakes can be traced with a reasonable degree of accuracy.

During the late nineteenth century, three foreign fishes became established in the Great Lakes within a few years' time. The first, and the one that has become most numerous in bays and shallow waters, was the carp. In 1877, they were introduced into Illinois; by 1880 they were widely distributed. Exactly when the first introduction occurred in Lake Michigan is not recorded, but reports on commercial fisheries of the Great Lakes for 1890 do not mention carp. During 1899, however, 25,000 pounds of carp were taken by commercial fishermen, in spite of there being only a limited market for this fish.

After the 1893 world's fair in Chicago, goldfish that had been planted in the lagoons of the fair grounds escaped into Lake Michigan. They have since been abundant in many bays and lagoons that connect with the lake as well as in the harbors formed by breakwaters along the Illinois shores. Since then, goldfish have been re-introduced many, many times by anglers, who use them for bait.

Also following the world's fair, rainbow trout that had been on display in exhibition tanks were released in the lake, and for many years afterward were reported at intervals from the water supply cribs. Rainbows were introduced, as well, into many streams of Wisconsin and Michigan. In the waters of northern Lake Michigan and Lake Superior, rainbows now are fairly abundant locally and good spawning runs occur in several streams.

The invasion of the upper lakes by the sea lamprey in the early 1920's, its subsequent spread, and its devastating effect on the lake trout fisheries are well known. The introduction of the smelt into Crystal Lake, Michigan, its escape into Lake Michigan in 1923, and its occupation, by 1936, of all the upper lakes were the subject of a previous BULLETIN article (March, 1954). Because of their numbers and habits, both the sea lamprey and the smelt have had a profound effect on many species of native fishes and on the long-established lake food chains.

In addition to these major invasions, at least twelve other species of fish have been introduced into the Great Lakes, either directly or through the connecting waters of the drainage system. None of these has become so conspicuously widespread or abundant as the five fishes named above.

However, to the growing list of foreign fishes that have successfully taken up residence in these lakes, we must now add the alewife. This is a fish of the herring family, which is closely related to the American shad. It is silvery in color, with a series of saw-like plates forming a sharp ventral surface. In the Great Lakes, the alewife reaches a size of only seven to ten inches.

Alewives have been abundant in Lake Ontario for at least 70 years. Just how they got into Lake Ontario—whether they were left there at the close of the last glacial depression of this area; whether they strayed in through the St. Lawrence River or were brought in accidentally by man—has not been determined. The only ocean fish known to migrate regularly through the St. Lawrence to Lake Ontario is the freshwater eel. In the early 1870's, however, shad were introduced into Lake Ontario, and there is a possibility that alewives were included in the shipment.

For the past 50 years, at least, they have been a conspicuous nuisance. Nearly every summer large numbers die and, drifting inshore, clutter the beaches —sometimes in such quantity that they form windrows. On occasion it has been necessary to haul them away, or bury them on the beach. The floating dead fish soon are covered with a light tan fungus (*Saprolegnia*) and are not only unsightly and unpleasant to run into while swimming, but also give the water a strong, fishy odor. I have cruised all afternoon in July along the north shore of Lake Ontario through dead and floating alewives. At any time, hundreds could be counted in a circle around our boat.

Since alewives are migratory, running upstream to spawn, they eventually arrived in Lake Erie. They were first recorded as having been found there in September, 1931. According to Dr. R. R. Miller of the University of Michigan, this was only to have been expected. Presumably their invasion

route was through the Welland Canal. Eighteen months later, in March, 1933, one was captured in northern Lake Huron, while another was found in April, 1935. Although they were now within a few miles of Mackinac Straits, they did not pass through, for none were noticed in Lake Michigan until 14 years later, in May, 1949. Perhaps they were prevented from establishing themselves by the lake trout and burbot that were abundant in Lake Michigan until about 1946. Once these fish populations were decimated by the sea lamprey, alewives could move in and survive.

Four years after being first noticed in Lake Michigan, they had spread to all parts of the lake. The first evidence of their spawning was observed in Green Bay during the summer of 1953. The first large specimen from near Chicago was brought to Chicago Natural History Museum in March, 1954. In October of 1956, the Museum received young that had hatched the previous summer. The following spring, large numbers of dead alewives were found floating in Burnham Park lagoon and in the harbor north of Shedd Aquarium. One evening near dusk in July of 1957, Mr. William Braker of the Shedd Aquarium and I saw hundreds of alewives, in schools of ten to twenty-five individuals, darting and chasing among the rocks north of the Planetarium promontory. We could not see well enough to determine whether or not they were spawning. A few days later many dead alewives were observed floating near shore. These had fungus infections but no apparent injuries. In the following year, no dead alewives were noticed, but in May of both 1959 and 1960 hundreds of dead were seen in the harbor north of the Aquarium, in the lagoon, and on the 12th Street beach.

The "Cisco," United States Fish and Wildlife Survey vessel, has been cruising the Upper Great Lakes for six years locating fish and studying the general productivity of the lakes. It is equipped with the latest in fishery research equipment, including an electronic fish-finder, modern hydrographic equipment, and research laboratory.

Alewives spend the summer in shallow water, wintering in offshore waters 72–150 feet deep. In the early spring, along with many other kinds of lake fish, they begin to migrate toward shore. The most reasonable theory to account for the death of such large numbers of alewives is that they are very slow to adjust to abrupt differences in temperature. If the inshore waters are too warm (60–68° F.) during the time of their inshore migration, there is great mortality. A day or two of calm water and bright sunshine may be enough to produce lethal conditions. Another possibility is that the springtime "bloom" of some particular plankton may cause death by poisoning, either when eaten by the alewife or merely through contact. Neither of these theories has been demonstrated. Certainly large numbers of alewives survive each year, and in some years apparently none are killed at all.

Alewives from Atlantic coastal streams and along the shore are considered excellent food, whether fresh, smoked or salted. When taken from the Great Lakes, these fish are not as large or fat as ocean fish, and very little use has been made of them. They are nothing but a pest to many gill-net fishermen, who find their herring and chub nets filled with valueless alewives. Although they can be sold as cheap food for mink and fox farms, or for fertilizer, the price is so low that it is not profitable to take them in gill nets or traps. In 1960, about half a million pounds of alewives were taken from Lake Michigan. This amount was worth only $5,426, so it is evident why the alewives are considered valueless by commercial fishermen. As for their edibility, last June I met a boy with a bucket containing a dozen or so eight-inch alewives that he had caught with hook and line in Burnham Park Lagoon.

Left: After dragging the bottom for fish, the men haul in the "otter trawl" with their catch. In the foreground is a boom for lifting the net.

Right: The catch, almost entirely chubs netted at 40 fathoms, is poured onto the deck to be examined and sorted.

Asked what he intended to do with them, his natural reply was, "Eat them." I suggested that he might find them somewhat bony and dry, but he only nodded his head and said, "I'll save them 'til Friday." Unfortunately I was unable to obtain a report on how they tasted.

It has been predicted that alewives will become increasingly abundant in the upper lakes. If this happens, ways should be found to use them profitably. There is already some indication that, where alewives have increased (as in Saginaw Bay, Lake Huron), the numbers of lake herring have decreased. This may be because the alewife and lake herring compete for food and space at some stage during their life cycle. Alewives feed chiefly on animal plankton (crustaceans) and insects. With this diet preference, they compete with the young of most other lake fishes and with not only the young but also the large whitefish, lake herring, and chubs. If large numbers of alewives die, and so become a nuisance to harbors and beaches, traps may have to be operated regularly in order to keep their numbers down. So far, the development of trawl fishing and the use of alewives as an industrial fish for processing into fish meal or fertilizer appear to offer the best solution.

[*After this article was set, we received the following urgent dispatch from Curator Woods.*]

Grand Haven, Michigan

"Stop the presses! Flash! I have just eaten an alewife! And a good thing I did, too, because it turns out that my rather disparaging assumptions about its edibility are misleading.

"To go back a bit, I went out on Lake Michigan this morning for some trawling. The wind was so strong and the seas so high that we came back into port after one drag. Fortunately our catch consisted of a tubful of alewives, so I selected the biggest one (seven inches) and fried it. To my surprise, it was quite tasty."

[*If any of our* BULLETIN *readers care to participate in this phase of the research, we'd be glad to have the results of their studies for purposes of comparison.*]

MUSEUM NEWS

(*Continued from page 2*)

Alfred Lewis Kroeber 1876–1960

The Museum has suffered a great loss in the death of Dr.Alfred L. Kroeber, Research Associate in American Archaeology. He died in Paris on October 5 while returning from an anthropology meeting in Austria. He had been appointed Research Associate in the Department of Anthropology in 1926, and held this position until his death.

Dr. Kroeber was one of the great anthropologists of his time. His book, *Anthropology*, written in 1923, was the first general textbook in anthropology. He taught at the University of California in Berkeley from 1901 to 1946, and for many of these years served both as Chairman of the Department of Anthropology and Director of the Museum of Anthropology. After his retirement, he continued until the end of his life to teach—at Columbia, Harvard, Yale, Brandeis, and Chicago—and to write, edit, and take part in symposia and conferences.

Dr. Kroeber's association with the Museum began in 1925, when he conducted the First Marshall Field Archaeological Expedition to Peru. The following year he headed the Second Marshall Field Archaeological Expedition to Peru. During these two expeditions he surveyed the whole of the Peruvian coast, carried out important excavations in the Lima, Cañete, and Nazca Valleys, and made surface collections from a large number of archaeological sites. His efforts nearly doubled the Museum's holdings in Peruvian archaeology and provided documented material that has been of prime importance for scientific study as well as display. As a result of this field work, Dr. Kroeber published two survey articles on Peruvian archaeology in the *American Anthropologist*, and prepared four monographs, which were published by the Museum, on the excavations and collections. A fifth monograph, on the excavations in Nazca, was nearly complete at the time of his death.

The passing of Alfred Kroeber marks the end of an era in American anthropology. He was not only a great figure but the last of the "universal" anthropologists in this country, his greatest achievements being in ethnology, linguistics, and folklore. He did more than any man to record and analyze the cultures and languages of the California Indians, and at the end of his life he labored to help them press their claims against the United States for broken treaties. His greatest love was for the history of culture—both of the Americas and of the whole world. Here, he was interested not only in what happened, but in finding patterns or configurations of culture growth that might contribute to a universal culture history. Although he dealt skillfully and enthusiastically with the minutest particulars, he never lost sight of the general significance of what he was doing.

Dr. Kroeber's contributions to Chicago Natural History Museum were large and enduring. The Museum has lost a great colleague and a great friend.

DONALD COLLIER

Archie F. Wilson, Associate, Wood Anatomy, and former resident of Flossmoor, Illinois, died at his home in Summit, New Jersey, on 22 August, 1960. Mr. Wilson's long and valuable assistance in developing the Museum's reference collection of wood specimens was recognized in 1954 by his appointment to the honorary position of Associate in the Department of Botany.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

VOLUME 31 DECEMBER 1960
NUMBER 12

MUSEUM NEWS

Mr. Leland Webber, Assistant Director, presents an award certificate to one of 69 youngsters honored by the Museum on November 5 for achievement in the Museum's Journey program. This was the largest number of awards earned to date in the Raymond Foundation's educational program begun in 1955, in which more than 3000 children now are active participants.

Television Participation

The Raymond Foundation is cooperating with CBS–TV to provide educational segments for one of the oldest and most popular local television programs for children, Lee Phillip's "Friendship Show," presented on Channel 2, at 8:30 o'clock each Saturday morning. The Museum's contributions to this program will center on the scientific study of man and animals. The subject for December 3, presented by *Harriet Smith*, will be "Toys of Many Lands and Many Children."

Honors

Austin L. Rand, Chief Curator of Zoology, recently was named first vice-president of the American Ornithologists' Union at its annual meeting held recently at the University of Michigan. Dr. Rand was one of two new officers and three new council members named by the organization, a group of 2,500 scientists and laymen who share a common interest in birds. Dr. George H. Lowery, Jr., of Louisiana State University was re-elected president of the organization.

Chamber Music Concert

Free Concerts Foundation, in its second free concert of the season on December 7, will present a diversified program of chamber music, including works by Haydn, Brahms, Ravel, Bartok, and Verdi. Featured soloist is the Swedish mezzo-soprano, Kerstin Meyer, who is making her Chicago debut on this occasion. The concert also marks the first appearance with the quartet of its new cellist, Robert La Marchina, first cellist with the Chicago Symphony Orchestra.

The program will open with the playing of Haydn's Quartet in D Minor, popularly known as "The Fifths." Miss Meyer will then join the quartet in "Histoires Naturelles," five songs by Maurice Ravel; two songs with viola obbligato by Johannes Brahms; and the "Eight Hungarian Folk Songs" by Bela Bartok. The program will close with Giuseppe Verdi's E Minor string quartet.

The concert will begin at 8:30 P.M. in James Simpson Theatre. Tickets may be obtained by writing the Free Concerts Foundation, Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive, enclosing a stamped, self-addressed envelope.

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WAbash 2-9410

THE BULLETIN

EDITOR

CLIFFORD C. GREGG.....*Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
JOHN R. MILLAR.....*Chief Curator of Botany*
SHARAT K. ROY.....*Chief Curator of Geology*
AUSTIN L. RAND.....*Chief Curator of Zoology*

MANAGING EDITOR

PAULA R. NELSON.....*Public Relations Counsel*

ASSOCIATE EDITOR

MARILYN JINDRICH.....*Associate in Public Relations*

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

Sewell L. Avery 1874–1960

Chicago Natural History Museum sustained a severe loss when *Sewell L. Avery* died at his home on October 31, 1960. Mr. Avery had been a member of the Board of Trustees since January, 1932, and had served on the Pension Committee continuously since January of 1933. His Life Membership in the Museum dated from 1923.

His service to the Museum was noteworthy and included the sponsorship of botanical expeditions to Guatemala and to Nova Scotia, as well as a geological field trip within the United States and a zoological expedition to British Guiana.

Mr. Avery was widely known as a champion of free enterprise, and as a courageous fighter for his beliefs. He had been in ill health for more than a year, and was 86 years of age at the time of his death.

Word was received recently of the death of Professor *Gregorio Bondar*,

(*Museum News continued on page 8*)

By KENNETH STARR
Curator, Asiatic Archaeology and Ethnology

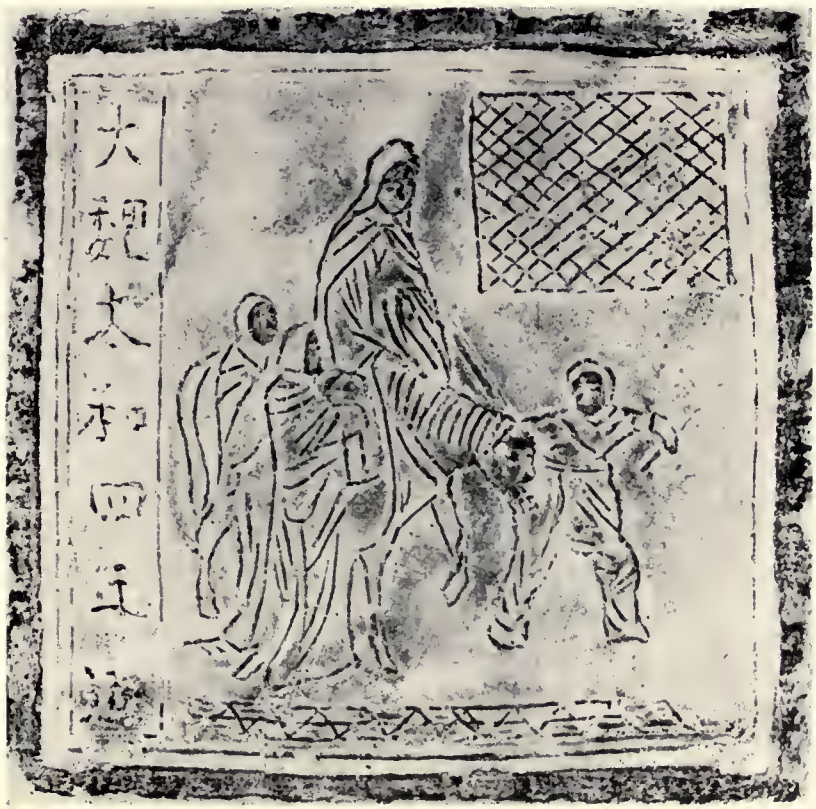
Chinese Art and Christmas

OUR cover shows a detail from a Chinese Christian painting of the Madonna and Child, which is reproduced in full on the right. This painting is in the study collections of the Department of Anthropology.

The Madonna in her flowing mantle and elegantly draped veil of light buff color stands against a dark brown background, with nimbus and bodice in rich red. The Christ Child is represented as a little Chinese boy who wears the traditional tuft of hair and carries a Chinese book. Despite this interesting representation of the subject in the Chinese manner, the painting is obviously European in origin. It has been suggested that it is a copy of a painting or engraving brought to China by the first great Jesuit missionary, Matteo Ricci (1552–1610 A.D.).

The painting has been attributed to T'ang Ying, a famous painter active at the end of the 15th century. This is unlikely, however, since Christianity in its modern form did not reach China until one hundred years later. An 18th century dating would be consistent with the information given to the Museum in 1910 when the painting was acquired, namely, that it had been in the family of the Chinese owner for six generations.

On the lower part of the page is a rubbing of a clay tile made in the fourth year of the T'ai-ho (Great Peace) reign period of the Wei Dynasty. Of immediate interest is its remarkable resemblance to the scene known in Christian tradition as the Flight into Egypt. A woman dressed in loose-flowing mantle and veil, or wimple, is riding what seems to be a donkey or ass. A groom leads the beast, while one of the two persons walking beside it very carefully carries something in his arms that could well be a baby.



The likelihood that this is a representation of the Flight is lessened, however, by the fact that the tile is datable through its inscription to a period at least 150 years before the known introduction of Nestorian Christianity to China.

Nevertheless, the scene still titillates the imagination, still suggests some Christian or Near Eastern influence, and still serves to remind us of the commingling of cultural elements—here represented by the clothing and mode of transportation—within Central Asia which has enabled it to serve since prehistoric times as a link between the Near East and Europe, on the one hand, and China and contiguous areas of Eastern Asia, on the other.

San Antonio, founded in 1650, is one of the few villages of the colonial epoch. Honduras has been relatively free of the elsewhere in Central America. The church in San Antonio the center of the villagers' Christmas celebration.

CHRISTMA IN HONDURA

by

Louis O. William

Associate Curator, Central Americ

Photographs by the autho

THE Christmas season in Honduras is a joyful time for all people. Especially in the smaller towns and villages of the interior, families still celebrate the holiday in traditional ways.

The religious theme is, of course, of primary significance in the festivities. Preparing and decorating the nativity scene, or creche, is an important activity. The creche is usually begun early in December. Much thought and care go into its assembling, whether it is simple enough to be set up on a table in the corner of the living room or so elaborate that it nearly fills that room. A small creche may contain perhaps a dozen figures. Larger re-creations of the stable at Bethlehem may be filled with a hundred or more figures, representing the Infant Jesus surrounded by the Virgin Mary, St. Joseph, adoring shepherds and Magi, oxen, asses, and sheep. These figurines, which are sometimes simply made of clay, but are usually more elaborate objects of carved wood, porcelain, or plastic, are treasured from year to year for use in the creche.

The stage setting for the manger scene also includes much plant material. Mosses from the woods, especially those that grow into great, sheet-like mats, are used to represent grass. Animals carved or molded in El Salvador, in Guatemala, in Spain, in Czechoslovakia, or in Japan "graze" contentedly on fields of moss gathered from the forests of Honduras. Together, they form a tableau representing an event that took place almost two millenia ago not far from the eastern shore of the Mediterranean Sea.

Greenery is also used in other ways to decorate the homes, the country people gathering materials that are close at hand, while city-dwellers buy what is available in the markets. In the highlands of Honduras, many bromeliads are at the height of their splendor as the short, year-end days draw near. Great basket-loads of blossoms are gathered and brought into the markets, which are like a flower garden during the Christmas season, full of mosses, orchids, bromeliads, ferns, and palms. Each year I visited the principal markets in Tegucigalpa to see what showy bromeliads the plant gatherers had found which I had not yet discovered in the country. Perhaps the most brilliant *Tillandsia* of Honduras is one that I knew for several years only from two plants "collected" in the market.

One small prostrate orchid with rather attractive flowers, *Epidendrum polybulbon*,

America that must still be very like those of
kes that have destroyed most colonial villages
' possibly not more than 150 years old. It is

is also in flower at this season and is sought for use in decorating creches. Many mule loads of this little orchid come into the Tegucigalpa market each Christmas season.

In more recent years the use of Christmas trees has become more common in many homes, especially in the highlands where pines are abundant. The use of pine needles to cover the floor in dwellings where festivities are to be held is a very old custom in Central America, coming down from pre-Columbian, and therefore pre-Christian, times. The extension of this custom to the use of pine trees in the Christmas celebration is an importation and, as such, has often been resisted by the clergy.

On Christmas Eve, late in the evening or at midnight, everyone goes to church. After returning home, families exchange their gifts around the creche or Christmas tree. Then comes one of the great, traditional feasts of the Christmas season, at which tamales or nacatamales must be the main course. Nacatamales are made from corn meal ground very fine, turkey, vegetables, spices, and seasoning. This stuffing is wrapped in banana leaves, tied, and then boiled or steamed for several hours. Nacatamales are a typical Central American dish, which I have seen nowhere else in Latin America. Each nacatamale weighs about a pound and well-prepared ones are very good. The festive meal is seldom over until two or three o'clock in the morning.

In Honduras, as elsewhere in Central America, the setting off of fireworks to celebrate the birthday of Christ is traditional. Even when a son is born, the father announces the event to the world by shooting off the biggest firecrackers that he can find or afford. On Christmas Eve, especially, the fireworks continue throughout the night.

A dead pine tree in the mountains of Honduras bears a burden of bromeliads, orchids, and ferns. These epiphytes occur mostly on the side of the pine facing the direction from which the night mists and fogs come during the dry season, which is also the direction of the prevailing trade winds that blow from about the Christmas season until May.

Indian women in the market area of Tegucigalpa sell palm leaves, bromeliads, orchids, and ferns which they have gathered in the mountains.

Collecting frankincense. Woodcut from Pare's "De Distillationibus" published in 1582.

Frankincense and Myrrh

by

John W. Thieret
Curator, Economic Botany

THE esteem in which frankincense and myrrh were held in ancient times is indicated by the Wise Men's choice of these substances to rank with gold as offerings to the young child Jesus. Frankincense and myrrh—which were used by peoples of antiquity for embalming and in cosmetics, perfumes, medicines, and incense—are resins derived from plants. They flow from wounds or natural fissures in the bark of certain trees and shrubs of the bursera family that grow on the parched, rocky hills of Somaliland and south-western Arabia, the region of the fabled land of Punt.

A detailed account of frankincense is given by Theophrastus who relates, in his *On the History of Plants*, that this commodity was produced in Saba, one of the most active trading nations of antiquity, located in southwestern Arabia. According to Diodorus, who lived in the time of Julius Caesar, the Sabaeans sold their frankincense to Arabs who, in turn, passed it to many peoples. When the army of Alexander the Great captured Gaza (333 B.C.), that antique city once so important as a junction of trade routes, 500 talents of frankincense were taken as plunder and sent to Macedonia. An inscription on the ruined sanctuary of Apollo at Miletus in Asia Minor records oblations of frankincense presented

by the monarchs of Syria and Cicilia. Frankincense may have been known as far away from its origin as China by the tenth century A.D., and surely by the twelfth.

The main use of frankincense by ancient peoples was for incense. Balls of incense found in the tomb of King Tutankhamen were identified as frankincense. The resin was prominent in Graeco-Roman materia medica. According to Celsus, it was an ingredient in many prescriptions, including those for pains in the side and chest, hemorrhoids, hemorrhages from the mouth and throat, broken heads, paralyzed limbs, bruises, ulcers, and abcesses.

Frankincense is obtained from trees belonging to the genus *Boswellia*. The main source of the resin is *Boswellia carteri*, although at least one other species contributes to the supply. *Boswellia carteri* is a small, shrubby tree, from seven to fifteen feet tall, with a stout trunk and smooth, pale brownish-yellow bark. Its leaves have several pairs of leaflets arranged along a central stalk; its flowers are white and are grouped in slender clusters. The blossoms are so fragrant that the air is redolent of them a considerable distance away.

Most frankincense comes from Somaliland but some is gathered in Arabia. No attempt is made to cultivate the incense tree. In tapping the trees, deep incisions are made in the bark, and the resin exudes from these as a whitish, viscous liquid that soon hardens into yellowish tears. A tree may be tapped in one or several places, depending on its size. After about a fortnight, the dried resin is removed and the wound is freshened. Further collections are made every few weeks until the work is halted by the advent of the rainy season. At each visit, usually only the resin found on the wound itself is gathered. Resin that runs down the stem is regarded as an inferior grade and is collected only after it has accumulated for several months.

Most frankincense eventually is brought to Aden whence it is shipped to European or American ports or to Bombay, the center of Asiatic trade in gums and resins. In transit to Aden, the tears of frankincense may fuse together because of the hot weather, making the sorting of the resin difficult and expensive. Frankincense consists of translucent, pale yellow tears or darker yellow, reddish or brownish lumps that may be mixed with pieces of bark. The resin, which usually is covered with a whitish dust, is brittle and has a pleasantly aromatic odor and a bitter taste.

Myrrh is obtained from several species of the genus *Commiphora* and is collected mainly in Somaliland. The identity of all the species involved is uncertain, but *Commiphora molmol* appears to be the principal source of the resin. Myrrh-yielding plants may be scraggly, spiny bushes or small trees ten to thirty feet tall. They have a disproportionately thick trunk and pale orange-brown to whitish-grey bark. Their foliage is in small tufts at the ends of stubby twigs. The leaves have three leaflets, with the two side-leaflets sometimes very small. The flowers are white and are borne singly or in tiny clusters among the leaves.

Myrrh exudes freely out of wounds or natural fissures in the bark. After collection it is placed in goat skins and sent to the coast for sale and export. Myrrh consists of rounded, irregular, brownish-yellow or red-brown tears or masses of fused tears that may be as large as a hen's egg. The resin usually has a dull, dusty surface. It is aromatic and has a bitter, acrid taste.

An old legend gives an interesting account of the origin of Adonis, that youth of remarkable beauty, from a myrrh tree. Myrrha, daughter of Theias, king of Syria, was inspired by Venus with an unnatural love for her father. By deceiving Theias as to her identity, Myrrha conceived by him. When the king learned of the deception, he exiled his daughter to the barren deserts of Arabia, where the gods transformed her into a myrrh tree. After a time the tree burst asunder and from it came forth Adonis.

Turning from myth to history, we learn that about 1,500 B.C., Queen Hatshepsut of Egypt, who acquired everlasting fame through her magnificent terrace-temple at Dehr el Bahri, sent a treasure hunting expedition to Punt. Paintings in the temple illustrate some of the booty gained, including not only an abundance of myrrh but also live myrrh trees growing in tubs. Inscriptions in the temple state that Hatshepsut rubbed myrrh on her legs to impart fragrance. During the feast of Isis, the ancient Egyptians made a burnt offering of an ox whose carcass was stuffed with myrrh and frankincense so that the aromatic fumes of these resins would mask the smell of burning flesh. Myrrh was the incense used on the altars of the sun god at Heliopolis, the city of sun worship. Persian monarchs wore the resin in their crowns. The author of the *Periplus of the Erythrean Sea*, a 90 A.D. geography, mentions that myrrh was an export of Avalites, Malao, Mundus, and Mosyllon, ancient ports on the African coast below the straits of Bab-el-Mandeb, the southern outlet of the Red Sea.

One of the best-known ancient uses of myrrh was in embalming. According to Pliny, the embalming of Nero's wife, Poppaea, was said to have taken a "whole year's production" of myrrh. In Egypt, the resin had a role in the process of mummification: Herodotus tells us that myrrh was one of the substances with which the eviscerated and cleansed body was filled. Some ancient medical uses of myrrh can be learned by again consulting Celsus, where we are informed that this resin was prescribed by Graeco-Roman physicians in the treatment of quartan fever, dropsy, earache, eye diseases, bladder stones, abscesses, and broken heads.

Of the use of myrrh in mediaeval Europe there are only a few records but they show that the resin was highly regarded. Myrrh was recommended in superstitious medical practice of the eleventh century and was used by the Welsh "Physicians of Myddfai" in the thirteenth. In accounts of Edward I of England is an entry dated January 6, 1299, for gold, frankincense, and myrrh, which were offered by the king in his chapel on that day, the Feast of Epiphany. Myrrh and frankincense were purchased for the funeral of the infant King John I, posthumous son of Louis X of France, in 1316. Myrrh was among the presents that the king of Cathay sent to Pope Benedict XII at Avignon about the year 1342. This shipment never reached its destination but was plundered enroute.

In the modern world, frankincense and myrrh are still articles of trade although they are not so highly valued as in former

Frankincense from the Museum's study collections. It is in two forms: fused masses of tears and select tears.

times. Frankincense is an important incense material and is said to be good for fumigating. In most countries its use in medicine has become obsolete. Myrrh has antiseptic properties and acts as a local stimulant. It is used in certain mouth washes and in tincture of myrrh, which is vividly, albeit somewhat gruesomely, described by the *United States Dispensatory* as "a local application to stimulate spongy gums, aphthous sore mouth, and ulcerations of the throat." Some myrrh goes into incense. Essential oils of myrrh and of frankincense, obtained from the resins by distillation, are valued ingredients in perfumes of the oriental type. To find data on the amounts of frankincense and myrrh imported into the United States is no easy task. In recent years our imports of myrrh have varied from 19,040 to 43,607 pounds annually. Data on frankincense could not be obtained.

Today, the collection of these resins in Somaliland and Arabia goes on much as it did centuries ago when these aromatic plant-products were valued on a par with gold. Their contemporary role is a minor and prosaic one. But not so their past. Resins derived from plants are many, but few can boast so colorful a history as frankincense and myrrh.

MUSEUM NEWS

(*Continued from page 2*)

Research Associate in Insects, in February, 1959, in Sao Paulo, Brazil. Professor Bondar was trained as an agronomist and entomologist in Russia and in France. In 1920, after narrowly escaping execution for his activities in the anti-communist government headed by Admiral Kolchak, he fled to Brazil from Russia. He soon entered the services of the Department of Agriculture of the State of Bahia and held various posts in that department, later becoming Technical Counselor of the Central Institute of Economic Development of Bahia. He was elected a Research Associate in Insects in 1942 in recognition both of his scientific achievements and of his close cooperation with the Chicago Natural History Museum's Department of Botany and Division of Insects.

Professor Bondar published several hundred technical and scientific papers in the fields of agronomy, botany, and entomology. He was an authority on economically important plants.

Holiday Hours

On Christmas and New Year's Day the Museum will be closed to permit all its employees to enjoy the holidays with their families. These are the only days in the entire year on which the Museum is not open to the public. The Museum will be open on December 26 and January 2.

Research

C. Earle Smith, Jr., Associate Curator of Vascular Plants, visited Harvard University late this fall to photograph the handwriting of various 18th century botanists in connection with the research he is conducting on the Muhlenberg Herbarium. Gotthilf Henry Muhlenberg was the first American botanist to assemble a herbarium of American plants, and his collection is presently on loan to the Museum from the Academy of Natural Sciences in Philadelphia. In many cases the collectors and original locations of plant specimens in the herbarium were incompletely identified by Muhlenberg. Since complete information is essential in using the herbarium for comparative study purposes, Dr. Smith is attempting to fill in the gaps by identifying the handwriting of the unknown collectors through comparisons with the known handwriting of botanists who collected between 1775 and 1815. This information then also provides a clue to the area from which the plants were originally obtained.

John W. Thieret, Curator of Economic Botany, and Dr. Robert Evers of the Illinois State Natural History Survey, Urbana, Illinois, recently made a research trip through Nebraska and Kansas for the two-fold purpose of studying and collecting specimens of the grasses that grow in those states, and observing the prairie vegetation in its autumnal aspect.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS