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Mary Cynthia Dickerson, *Editor*

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DR. JOEL ASAPH ALLEN

One of America's foremost naturalists and dean in seniority and accomplishment of the American Museum's scientific staff

— "Dr. Joel Asaph Allen: An Appreciation," page 18

The American Museum Journal

VOL. XII JANUARY, 1912 No. 1

QUOTATIONS FROM AN EXPLORER'S LETTERS

THE MUSEUM'S ARCTIC EXPEDITION[1] REPORTS SURVEYS OF RIVERS AND LAKES IN THE FROZEN NORTH AND THE DISCOVERY OF A "NEW PEOPLE," AN ESKIMO TRIBE WHICH HAS NEVER SEEN A WHITE MAN

THE main aim of the Museum's Arctic Expedition, which left New York in 1908, was to investigate the Eskimo both west and east of the Mackenzie River, especially those to the east, little-known tribes in the region of the Coppermine River thought to be more or less uninfluenced by white men.

The difficulties in the way of the work have been great, sometimes almost insurmountable; but at last success has been realized both in the work in ethnology for the American Museum and in collateral work undertaken for the Geological Survey of the Canadian Government. In the words of Mr. Stefánsson:

...."We have covered the last mile geographically that we set out to cover, and have found what we set out to find—a 'new people,' less contaminated, more numerous than anyone thought possible. In 1906 authorities thought Victoria Land probably uninhabited. I shall be surprised to find its population less than two thousand. We have taken physical measurements, photographs and notes everywhere and have secured and brought to a place of safety a large ethnological collection."

Most of the letters come from the expedition's headquarters in an area of spruce (about ten acres) on the Barren Grounds, Upper Dease River (lat. 67° N., long. 117° 30′ W.).

....April 27, 1910, I started east from Cape Lyon, the most easterly point at which Eskimo houses were seen by Dr. Richardson on his Franklin Search Expedition and the most easterly point known to have been visited by the Western or Baillie Island Eskimo. I hoped to reach by sled people supposed to occupy the coast and islands of Coronation Gulf north and west of the Coppermine. Our progress was slow on account of numerous bad pressure-ridges on the sea ice and a rocky coast which made land travel impracticable. The ice was usually in motion and open water could be seen less than three miles off shore. Between Cape Lyon and Cape Bexley are traces of former occupation by Eskimo, ruined villages—

[1] The history of this expedition is found in the November JOURNAL, 1910. Extracts from the letters of Mr. Anderson, the zoölogist of the expedition, will be given in a later issue, as well as further facts regarding the work of Mr. Stefánsson. The photographs were taken in March and April, 1911, on Mr. Stefánsson's second trip to the Coppermine from Langton Bay (this time accompanied by Mr. Anderson). The plates were exposed under extremely variable light conditions and developed in most unfavorable quarters.

Four-year-old Eskimo girl experiencing the new sensation of having her picture taken. She is wearing a coat of long-haired winter caribou skin

perhaps abandoned twenty-five to fifty years ago. The inhabitants of these apparently engaged in whaling to judge by the number of whale vertebræ scattered about.

THE DISCOVERY OF ESKIMO WHO HAVE NEVER SEEN A WHITE MAN

At Point Wise we found the first evidences of this year's travel — pieces of wood cut in two and portions carried off, as material for sleds and bows, no doubt. At Cape Bexley, May 12, we came upon a village of over forty snow houses. These had apparently been recently abandoned. Sled-trails led north toward Victoria Land, which is visible across the strait everywhere east of Point Wise. As the explorers of the last century never found people near here, I supposed village and trail evidences of visits of Victoria Land people who had come across the strait to get driftwood. After an hour on the trail, we saw another village and people out sealing — approximately in the middle of Dolphin and Union Strait.

Through neglecting the conventional peace signal of the Central Eskimo (extending the arms horizontally) our messenger, who preceded us by a few hundred yards, came near being knifed by the man whom he approached, who took his attitude (the arms down) for a challenge or rather a posture of attack. After the first parley however, everything was most friendly, and we found them the kindly, courteous and generous people that I have everywhere found the less civilized Eskimo to be.

We were fed with all the best they had, choice parts of freshly killed seals and huge musk ox horn flagons of steaming blood soup. There was no prying into our affairs or into our baggage; no one entered our house unannounced, and when alone at home the first visitor always approached our house singing so that we had several minutes' warning of his coming. At this time they had not enough meat to give their dogs more than half-rations, yet ours never wanted a full meal, and our own days were a continual feast.

There were thirty-nine individuals in this group, a small part of the A-kū-lī-a-kattág-mī-ūt. Neither they, nor their forefathers as far as they knew, had ever seen a white man, an Indian, or an Eskimo from the west. They considered the Indians bad people as also the Eskimo to the west, but the white men (*Ka-blū-năt*) they considered good people. That their notion of *Kablunat* is vague may be seen in that none of them recognized me as one, considering me the older brother of one of my Eskimo.

The winter home of the Akuliakattagmiut is in the middle of the strait north of Cape Bexley, but in summer they hunt inland south of Cape Bexley. The territory of these people has been supposed by geographers to be definitely known as uninhabited. Their isolation has been complete and largely self-imposed because of their

ITINERARY OF THE STEFÁNSSON ARTIC EXPEDITION FROM APRIL, 1910 TO APRIL, 1911

In late April, 1910, Mr. Stefánsson left Langton Bay and Cape Lyon, the latter the most easterly point known to be visited by the Western Eskimo, and traversed the coast of Dolphin and Union Strait to Cape Bexley encountering no Eskimo until the end of the journey when he found a tribe that had never seen a white man. This coast has been skirted by water four times, by Dr. Richardson in the twenties and again in the forties and Captain Collinson in the fifties of the last century and by Amundsen in 1905. These expeditions however, saw little of the land

In May Mr. Stefánsson crossed over to Victoria Land, where he discovered a Scandinavian-like people, and then proceeded southward from Liston Island entering the mouth of the Coppermine River in early June. He spent the summer on the Coppermine and Dease Rivers and Dismal Lake. In early November he went to Langton Bay to communicate with Mr. Anderson, crossing one of the largest unexplored regions in Canada. In April, 1911, Mr. Stefánsson and Mr. Anderson returned to the Coppermine region

ESKIMO SNOWHOUSE WITH A TENTLIKE ROOF OF FURS

All the coast of Dolphin and Union Strait has been inhabited by Eskimo in former times, but now the most westerly group is the A-kū-lī-a-kat-tág-mī-ūt, wintering off Cape Bexley. Eskimo camp sites are found on every hilltop east of the Coppermine, where ponds and rivers abound with Arctic trout, although there are few birds and but a small number of caribou

ESKIMO HELPING MR. STEFÁNSSON BREAK CAMP AND PACK THE SLEDS FOR THE JOURNEY

The one thousand Eskimo on the two sides of Coronation Gulf and Dolphin and Union Strait contain no more than twenty men who have ever seen a white man, thus representing less contact with the white race than do the people of any other part of the explored Arctics

The Eskimo as a people are exceptionally generous and hospitable. They share their food to the last with one another or with guests; however, food in quantity is more difficult to obtain each year in the Arctics. The Cape Parry region, full of game sixty years ago, is now gameless and deserted. The Coppermine region has not ten per cent of the number of caribou of Richardson's time. Caribou were so plentiful then that Eskimo dressed in fawn skins, and are so rare now that the people are forced to use hides of bull caribou, wolf skins, fox skins and even the skins of birds. In ten years it will be practically impossible to live on the country while traveling in these districts

"Skipping the rope" in the Arctics

Arctic expedition camp near Kendall River. The camp meatrack is built high to protect from foxes and wolverines

Group of Eskimo helping Mr. Stefánsson to break camp and pack. It is said that no Eskimo of the Coppermine region can count beyond five

fear and distrust of white men, of Indians and of the Eskimo to the west. Of one thing I am glad, that I have had an opportunity to see that all the best qualities of the civilized Eskimo are found more fully among their uncivilized countrymen.

SOME ETHNOLOGICAL RESULTS OF THE EXPEDITION TO THE COPPERMINE RIVER

We are able to assign a population of about one thousand to the sea coasts lying between Kent peninsula and Cape Bexley — of these we have seen about two hundred and fifty persons, but we have seen some representative of every group.

We are able to extend the geographic range of the Eskimo west of the Coppermine considerably to the south and to the west on the mainland beyond what was previously known to any explorer, and to show that this is not a recent spread or extension of territorial limits, but that owing to the choice of seasons by previous travelers it was not possible for them to know when they were within the limits of contemporaneous Eskimo occupation.

We can show a correspondence in culture greater than hitherto known between the Central (Coronation Gulf) Eskimo and the tribes who are their neighbors to the south. It seems likely that the evidence, when sifted, will show a focal point farther west than formerly believed, from which the Eskimo have spread east and west in former times.

We are able to extend the range of the wood-and-earth house, of permanent villages and of bowhead whaling some seventy-five or one hundred miles farther east than the limit assigned by the only previous observer, Dr. Richardson.

We have seen the manufacture and use of "primitive" hunting implements before the people knew firearms.

From our knowledge of the Western Eskimo and our experience this year to the east, we can adduce more numerous and stronger proofs than known before to show the extreme, almost unbelievable conservatism of the Eskimo — apart from what our collections, ethnological and archæological, may show. For instance, an Eskimo woman will always turn over pieces of boiling meat, believing they will not cook well on both sides although completely immersed in water. This belief comes from the days several generations back when cooking was done in shallow stone pots where the pieces of meat were seldom more than half covered and had to be turned over.

THE DISCOVERY OF A SCANDINAVIAN-LIKE PEOPLE IN VICTORIA LAND

We have found (May 17, 1910) a North European-looking people, the Ha-nĕ-rág-mī-ūt of Victoria Land north from Cape Bexley. Their total number is about forty, of whom I saw seventeen, and was said not to have seen the blondest of the group. They are markedly different from any American aborigines I have seen; they suggest, in fact, a group of Scandinavian or North European peasants. Perhaps better than my characterization of them was that of my Alaskan Eskimo companion, who has worked for ten or more years on a whaling vessel: "They are not Eskimo, they are fo'c'sle men." Two of them had full chin beards to be described as light, tending to red; every one had light eyebrows; one — perhaps the darkest of all — had hair that curled slightly.

The Eskimo physical type varies considerably from Greenland to Siberia. It may be that all these variants are due partly to blood mixture, and that the earlier, purer type was more "European" in character than we have been thinking. On the other hand, there may have been direct admixture of European blood. In the fifteenth century there disappeared from Greenland the Icelandic (Norse-

Keystone of dome of snow house about to be put in place

Earth-shod iced runners of Coronation Gulf sled packed in snow to prevent ice from melting

Teutonic) colony in its entirety. This colony had a bishop of the Church of Rome, two monasteries, a nunnery, fourteen churches and over three thousand inhabitants, who at one time sailed their own ships to Norway, to Iceland and to America. [Leif Ericson was one of these Greenlanders, and to the general public best known of them all.] This colony was in a fairly prosperous condition as late as 1412 and we have Vatican documents of a later date referring to it; when Hans Egede came there in the seventeenth century he found only house ruins to tell the story, and no sure trace of Scandinavianism in the language or blood of the Greenland Eskimo. Either the colony had been massacred by the Eskimo, had disappeared through famine or pestilence, or had emigrated in a body. This last view many scholars have favored from the first, and if they did emigrate they may be represented in part by the present inhabitants of Victoria Land.

There are many philological points to suggest Scandinavian origin of these people. For instance, their word for "wolf" is *arǵ-lūk*, a word conveying no analogy to any of my companions, even after they understood its meaning. Now the common Old Norse word for "wolf" is *varg-ur*. Not to go into fine philological reasoning, it is enough to say that an Eskimo is as likely to attach a *-lūk* to a foreign word as an Italian is to attach a final *-o*. One of the characteristics of the Hancragmiut dialect is the dropping of initial consonants. Thus the Icelandic *vargur* becomes *arg-ur;* change the final syllable to *-luk* (as Herschel Islanders change Cottle to *Karluk*) and you have *arǵ-lūk*.

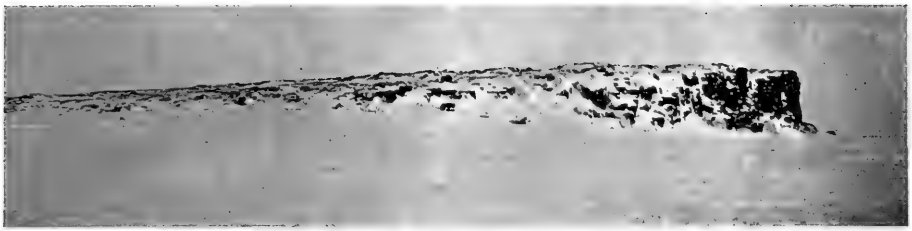
We heard here also a song alliterated in much the Old Norse scaldic style. This sort of alliteration and *anklang* is unknown to me personally or through books as a feature of Eskimo songs anywhere.

Again, in the forties of the last century Franklin's expedition with its full complement of men was lost near the east coast of Victoria Land. Some of these men are accounted for by journal entries of officers who themselves later perished, and others by graves and unburied skeletons along the route toward Back's River. Franklin's men must have known there was a boat route to the Hudson Bay Company's posts on the Mackenzie River, for Franklin's own three expeditions had discovered and mapped it chiefly by boat voyages. Is it unlikely then that some of his men attempted this route? And even if they did not, might not a few of his men have found their way to the Eskimo of Victoria Land and have had sufficient adaptability to learn Eskimo methods of self-support? A readily apparent objection to this hypothesis is that

Eskimo family approaching snow house village. Far at the left is seen the snow house built for Mr. Stefánsson by these Eskimo, who served him as an honored guest

Deserted winter village on the ice of Dolphin and Union Strait off the mouth of the Coppermine River. Eskimo snow villages melt in summer and even when built on shore leave little trace

Nauyak, an Eskimo of the expedition, moving camp. The dogs are harnessed in pairs



Coronation Gulf Island. Islands of the Coppermine region invariably present a vertical cliff on the southern side and slope to the water's level at the north

Ivarluk with the frame of his kayak. Much of this country gives an impression of measureless expanse of snow

Mud cliff along the Coppermine River, one half mile south of Bloody Fall. The summer of 1910 spent in the Coppermine region brought great discomfort because of mosquitoes. The dogs' feet were protected from becoming sore from the stings by boots of caribou skin — when the dogs could be persuaded not to eat them off

even Franklin's whole complement of men would be, if amalgamated with the entire body of Victoria Land Eskimo, insufficient to produce the markedly European type actually found to-day. The validity of this objection can be judged only after we have a complete census of the island and know how far the new type is present in some localities above others.

In regard to the possibility of Franklin's men having survived for a time, there is the interesting contributory evidence that there are at various places people said to be "named with the names of white men." One name in particular we have found in practically every community: "Nĕrk." This is, at Herschel and farther west, the Eskimo pronunciation of the English "Ned."

OBSERVATIONS AND SURVEYS IN ONE OF THE LARGEST UNEXPLORED AREAS IN CANADA[1]

Eastward from Cape Lyon open water was continually seen from three to ten miles off shore till we reached Inman's River, when the edge of the flow made off diagonally toward Prince Albert Sound, Victoria Land. There were heavy pressure-ridges close inshore. In my opinion, if a sled journey were attempted from Cape Parry to Nelson Head, Banks Land, as has been proposed, it could be more safely and easily accomplished (and probably more quickly as well) by crossing the strait east of Inman's River rather than by going directly across between the mentioned headlands. East of Point Wise the ice of Dolphin and Union Strait is always comparatively level and on it the Eskimo of the strait have their winter houses.

Although this is the first time the coast of the strait has been traversed in winter, it has been four times skirted by water — by Dr. Richardson in the twenties and again in the forties and Captain Collinson in the fifties of the last century and by Amundsen in 1905. Amundsen saw little of the land, of course. Dr. Richardson's geological notes of the coast, on the other hand, are full and beyond addition by me at present.

The prevailing winds in the strait and Coronation Gulf in winter, as clearly shown by the snowdrifts are northwest. For this reason there is plenty of drift-wood along the mainland coast east beyond Cape Bexley but none on the Victoria Land coast.

Entering the Coppermine, we found the first spruce shrubs a mile north of Bloody Fall. The fall itself, by the way, is no fall at all, but a rapid about six hundred yards long that reminded me somewhat of the Whitehorse Cañon of the Yukon. From the appearance of trees, the tree-line is within four miles east of the river till one passes the Musk Ox rapids; here a stream (about the size of Kendall River) enters from the east, and up this are trees for about ten miles. Of this river I made a compass survey some fifteen miles up. Eskimo camp sites east of the Coppermine and north of this small river are on practically every hilltop, "buttes" they would be called in the American Southwest. Numerous ponds and some creeks and rivers abound in Arctic trout; there are no geese, cranes or swans, few ducks and few birds of any kind as compared with other Arctic districts I know; caribou are in some number.

Dismal Lake I found to be about as charted by Hanbury and not as on previous maps. The eastern branch of the Dease River has its source in a small creek that heads about eight miles SW. (true) from the narrows of Dismal Lake (lat. 67° 24′). This creek runs SW. some seven miles into a lake called by the Eskimo "I-ma-ĕr'-nĭrk". The lake is some four by seven miles, its long axis SW.–NE. Of this and the

[1] Quotations from a letter to Director R. W. Brock, Geological Survey, Canada.

Upper Dease and the portage route from Dismal Lake to Imaernirk I have made a survey.

I have obtained specimens of what I think is rich iron ore from Victoria Land north of Cape Bexley. Copper is picked up almost anywhere by the natives in the whole Coronation Gulf district, each family having its favorite place to search for material for knives and arrows. The spot most in repute however is a short distance north of Dismal Lake. I have several of these copper specimens.

After spending several months on the lower Horton River and a like period on the Coppermine, I am of the opinion that Horton River is fully as large a stream. Mr. Stefánsson made a compass survey in December, 1910, of Horton River from the point nearest Langton Bay to within seventy miles of Bear Lake, taking also a collection of rock specimens.]

The expedition's opportunities for ethnological study in this region are thought to be better now than they are likely ever to be again; the expedition is well placed in regard to outfit and food supplies, while sophistication and changes in the material life of the Eskimo will progress rapidly, due to the trade relations which have been opened with the Bear Lake Indians during this summer of 1911. To the regret of Mr. Stefánsson, the expedition itself has helped to hasten the end of the isolation of the Eskimo. They came to trust him, a white man, also his Eskimo from the West, and learned from these Eskimo that Indians are a harmless people nowadays and besides have an abundance of iron and other articles valuable to possess. Therefore it is the desire of the expedition, notwithstanding the homesickness of the men, to remain in the field still another year because of their great opportunities for work.

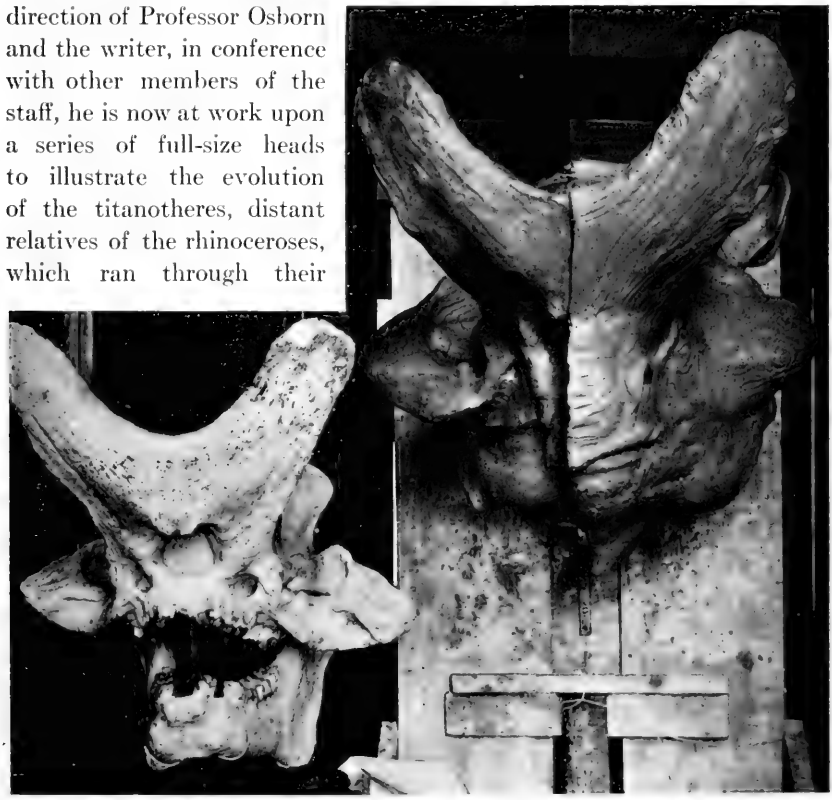
White fox in trap; photograph taken at a distance of six feet. A white fox skin is worth about six dollars in the Arctics and seventy-five skins, the equivalent of four hundred and fifty dollars, is a large number to be taken in one year. The present shortage on the market in Russian white fox will cause rapid destruction of the species in Arctic America

A NEW RESTORATION OF A TITANOTHERE

By William K. Gregory

ONE of the chief objects of the American Museum's department of vertebrate palæontology is to let the public discover that fossils are not necessarily dry and unprofitable, but on the contrary full of interest and meaning. Every legitimate resource of science and art is employed to clothe, as it were, the dry bones with flesh — to picture the jolly ichthyosaur disporting once more in the waves, or the tyrannosaur harassing his sluggish foe.

Mr. Erwin S. Christman has recently made some very effective restorations, especially those of the primitive "elephants," *Mæritherium* and *Palæomastodon*. Under the direction of Professor Osborn and the writer, in conference with other members of the staff, he is now at work upon a series of full-size heads to illustrate the evolution of the titanotheres, distant relatives of the rhinoceroses, which ran through their



Titanothere skull and model of full-size head in process of preparation. The skull is first copied exactly in a clay model. Additional clay to represent the flesh is then added to the outside of the skull model. The photograph shows the right half of the model completed and the left half still revealing the clay skull which makes the foundation

MODELING A TITANOTHERE

The mouth as represented here is probably too large. The angle of the mouth in herbivorous animals does not extend usually behind the first grinding tooth

Mr. Erwin S. Christman, who has made for the Horse Alcove a series of models of living horses in full action, is now at work on a series of full size heads to show the evolution of the titanotheres, extinct distant relatives of the rhinoceroses

known evolutionary history in the first half of the Age of Mammals. The last and greatest member of the titanotheres is the flat-horned *Brontotherium platyceras*, and a brief review of our reasons for representing this animal as it here appears may serve to illustrate one or two principles in the art of restoring extinct animals. The skull was first modeled in clay from a well-preserved fossil specimen. The clay to represent the flesh was then laid in on one side of the skull model, the other side being left exposed temporarily to show the supposed relations between skull contour and external form.

The top and sides of the head offered no especial difficulty, since the location of the principal muscle-masses of the temporal region and jaws could be inferred by comparison with the corresponding parts in the skulls of recent rhinoceroses and other distant relatives of the brontothere. The flattened "horns" (bony outgrowths from the skull) for various reasons were represented as covered with very tough hide rather than with true horn. The nose and nostrils were restored after careful comparison with many animals, especially the "black" rhinoceros, whose bony nasal region is essentially similar to that of the brontothere.

The most difficult part is the mouth and here present-day animals offer some at first rather contradictory evidence. In both the "black" and the "white" rhinoceroses of Africa the front teeth of the upper and lower jaws are lacking in the adult and the corresponding bony parts are reduced. From this similarity we might be led to expect that the lips of the two were also similar. And yet, as a matter of fact, the "black" rhinoceros in adaptation to its habits of plucking up roots and shrubs, has a pointed or prehensile upper lip; while in the "white" rhino, which feeds exclusively upon grass, the upper lip is very broad and square. The Asiatic rhinoceros, which feeds in the "grass jungles," has large cutting upper incisors and divergent lower tusks; its upper lip is pointed, but less than in the "black" species. These examples indicate that at least in the rhinoceroses the shape of the upper lip depends less upon the form and arrangement of the front teeth than upon the nature of the food and the mode of tearing it up from the ground.

The grinding teeth of the brontothere seem to be fitted to crush and cut up vegetation of a somewhat coarser nature than the tender shrubs and roots which form the principal food of the "black" rhino. Still less was the brontothere a true grazer, for in comparison with the "white" rhino, its grinders had low crowns and lacked the "cement" which is so characteristic of the teeth of grass-loving ungulates. Also its front teeth were feeble, their prehensile function being very possibly usurped by a heavy upper lip. Hence it seems probable that the brontothere fed on coarse shrubs and roots and had a heavy, prehensile upper lip; accordingly it is this type of lip which Mr. Christman has given to his model.

DR. JOEL ASAPH ALLEN: AN APPRECIATION

THE JOURNAL congratulates itself on the privilege of publishing as its frontispiece the portrait of Dr. Joel Asaph Allen, dean in seniority and accomplishment of the American Museum's scientific staff. While the past quarter of a century has swept by with its political problems and its economic struggles, one man has sat at his desk in the American Museum content to do the work that crowded before him. To-day this man is one of the country's great men of science with but few who can equal him in achievement.

Dr. Allen came to the American Museum in 1885 from the Museum of Comparative Zoölogy at Cambridge where he had been assistant in ornithology and mammalogy and for many years a student under Agassiz, having been fortunate enough to accompany Agassiz on the Thayer expedition to Brazil and the Amazon. He is one of the men to whom has passed the spirit of devotion for natural history that Agassiz felt and the inspiration Agassiz gained in early comradeship with Carl Schimper and others and later from Oken and Cuvier.

Dr. Allen on leaving Cambridge was already a scientist of renown, but it is at the American Museum that he has done the bulk of his work leading the institution to honor through the high character of his researches and receiving in return unusual opportunity — in this case opportunity that forced much of his investigation into the definite lines of the systematist. Zoölogical classification however is a far different thing to-day from what it was in the time of Linnæus or even of the great naturalists of a century ago, for the lines of descent and blood relationship can be drawn close in accordance with very extensive knowledge in comparative anatomy, histology and embryology, palæontology and geographical distribution. But the man who rises to first rank must have a master mind that can make a wide sweep of this modern horizon as well as the keen eye of the master observer and the discriminating judicial power by which to disentangle the contradictions of a multitudinous bibliography.

Dr. Allen has been one of the men to shape zoölogical classification and keep it in line. He has described new families and genera and many hundreds of new species and through a close study of geographical distribution in relation to species formation, has also drawn the distinctions clearer in many series of intergrading subspecies. His researches have been published under some fifteen hundred titles, some of which like his *American Bisons*, 1876, and *History of North American Pinnipedia*, 1897, are in book form and others in articles and monographs appearing in the Bulletins and Memoirs of the Museum of Comparative Zoölogy and of the American Museum of Natural History, and also scatteringly in the Proceedings of the Biological Society of Washington, U. S. National Museum, Boston Society of Natural History, Philadelphia Academy of Sciences and U. S.

Geological Survey. He has also been a constant contributor to *Science* and the *American Naturalist*, always making his points in strong, clear English and with a simple and forceful style. The same powers of mind which make him a great naturalist give him success as editor. He has had in charge the Bulletin and Memoirs of the American Museum since 1887, has edited the Bulletin of the Nuttall Ornithological Club for eight years and for a period of twenty-eight years has been editor of *The Auk*, the official publication of the Ornithological Union. It has been the quiet, continual and thorough work of Dr. Allen as editor of *The Auk* and in the council of the American Ornithological Union that has proved one of the most important factors in keeping alive in America the interest in ornithology aroused at the time of the publication of Coues' *Key to North American Birds*.

Although perhaps not conscious of the fact, Dr. Allen is a great force in the American Museum. At the head of the department of mammalogy and ornithology for twenty-seven years, neither the possible official power of the position nor the necessary routine have kept him from continual and arduous scientific investigation and from giving with great broad-mindedness equality of opportunity to those working with him; as a result the department has set an example as a producing power and enforced the truth emphatically set forth in the lives of eminent naturalists heretofore — that definite scientific knowledge, the summation of which constitutes the basis for the world's progress, can be gained only by single-mindedness of purpose that is forgetful of self.

SHELL AND PEARL FISHING ON THE MISSISSIPPI

By W. P. Herrick

Dr. Herrick is engaged in a study of the fresh water pearl clams and the pearl fisheries of the United States, especially in such questions as the number of pearls secreted relative to hardness of the water, and to distortion of the shell and other diseased conditions of the clam. He spent several months at the Mississippi pearl fisheries during the past summer and has recently been making use of the Museum library in his work. He has engaged to supply the new Shell Hall with materials for a display illustrative of the pearl industry.— Editor.

A YOUNG workman in Germany, who had served an apprenticeship in making buttons from bone and from the marine mother-of-pearl, received a present of some shells said to have come from the rivers of America. These lay in a dusty corner of his shop until finally he determined to work up a few into buttons. He found the material desirable, and the price of marine shell being high, started at once for the United States, taking with him his small foot-power machine. On arrival he worked his way slowly westward examining the rivers for shells. One day a man watching his work said, "You ought to go to the Mississippi where

you can get those shells by the cartload." He proceeded to the Mississippi. There shells were gathered, a few buttons finished and taken to Chicago. A little perseverance found a market at a good profit, but reluctance at handling the small output of one workman. A partner was enlisted, more machines purchased, workmen personally instructed and the button industry was established — which has made the city of Muscatine on the Mississippi.

This was about 1890. The young man, Mr. J. F. Beopple, is now government shell expert at Fairport on the Mississippi, and the present size of this fresh water pearl and button industry although difficult to state exactly is estimated at about seven million dollars annually. The surroundings, the element of chance in pearl fishing, and the enormous growth and kaleidoscopic changes in the button industry all lend romance to the work.

The Mississippi at Fairport is about a mile wide, with large islands and baylike sloughs, and although the winding channel is twenty feet deep, there are flats which may appear when the river falls a few feet and considerable areas of country of such level that it may be covered quickly by a corresponding rise. The water is very muddy (with about one hundred and ten parts hardness to the million) and has an average current of three miles an hour increased after a heavy rain and often emphasized by the wind, while the spring ice sweeps away any ordinary dock. Under these conditions the methods of obtaining the shells are three: Wading proves effective in shoal water or when the river is low; raking from an anchored skiff is a method much used in deeper water by skillful fishermen, although laborious and impossible when the river is rough; while dredging, "drifting with a brail," is probably the method most generally in use.

The "brail" or crow foot dredge is dragged astern and the so-called "mule," a three or four foot square of boards with a wooden handle on top, is dropped flatside to the current off the bow of the boat and held in this position by ropes to give power and steadiness to the craft. When the down river side of the bed is reached, both dredge and mule are hauled aboard, and the clams removed from the hooks of the dredge. Then the fisherman "chugs" with his motor or rows to the up current side and the drift is repeated hour after hour.

The mollusks lie partly buried in the mud at the bottom of the river and the hooks of the dredge brush between the shell's two open valves, which snap shut in a grasp so tenacious that their edges are often broken in getting out the hooks. An average of three or four hundred pounds daily is considered a good haul. The work may be carried on by a single fisherman near his home, or by one or more families which camp on the river bank, shifting location when the catch proves poor.

After being brought to the shore the mollusks are steamed that the valves may open and the meats may be more or less separated from them. Then the shells are thrown into a pile and the meats are put on the sorting-

board for the search for pearls. There are so-called "pearlers" who do not steam the clams but open them with a knife, but these are few. Admitted that in "cooking out" pearls occasionally drop to the hot bottom of the pan and are burned and that some experts believe that the steaming injures the lustre of the pearl, the former rarely happens in reality as the finest round pearls are apt to be imbedded in the flesh of the body of the mollusk, and as regards the latter, the verdict is by no means unanimous. Both fishermen and shell buyers agree also that the shells — which have a market value fully equal to the pearl find — are cleaner and better when "cooked out" than when "soured out" or when cleaned with a knife.

The work of going over the meats by hand for pearls is often done by the women of the family while the fisherman is making his next day's catch. Locally the name of "pearl" is reserved for the pieces which have a complete skin and are symmetrical, those spherical being called round pearls, those flattened button pearls — "balloon," "pear-shaped" or "drop" as the case may be. The white pieces are now especially in demand for ladies' ear studs, and thus when perfect and of fine lustre are of considerable market value. Other forms though typical and not attached to the shell, are called "slugs." There are almost limitless varieties of these in size, shape, color and lustre, and they have many names such as "nuggets," "points," "wings," and "angel wings." The ordinary slugs are usually sold to local or traveling pearl buyers, bringing from two dollars and a half to forty dollars an ounce.

Thus the raw material is obtained. When several tons of the shells have been accumulated, they are sold, usually to a representative of the nearest button-cutting factory. Good shells during the past summer were bringing about twenty-three dollars a ton. It is considered that the shells give the necessary wage, the pearls furnish the fascination and give the profit — if there is any. This summer one pearl was found valued at nineteen hundred dollars, while there are quite a number of fishermen in the vicinity who have worked many years without finding one worth fifty and are still expecting the perfect pearl.

EXHIBITION OF THE NEW YORK AQUARIUM SOCIETY

By Bashford Dean

Photographs by Dr. Fritz Bade

THE New York Aquarium Society held its second annual exhibition at the Museum during early December, its first annual meeting having been held in the New York Aquarium. It was evident that the exhibition appealed to people of many kinds, quite beyond the technical circle of aquarists — which is already large. Thus there were

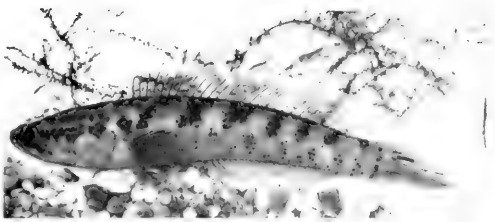
many young visitors, who came and observed the fishes critically as a result of their first experiments in aquarium keeping; on the other hand, there were professional zoölogists who came to see some of the fishes alive which they had known only on the shelves of museums.

The aquaria were nearly a hundred in number, mainly small ones, balanced (still water), attractively displayed, showing besides fishes, rare aquatic vegetation and a number of curious invertebrates. Popular exhibits there were, of course, in number: gold fishes of many forms — "fantails," "telescopes," "comets," "fringetails," some admirable specimens both Chinese and Japanese, including some of the variety which is short and heavy of body and blunt of tail, especially prized by the Japanese fanciers. Then there were paradise fish (*Macropodus*) of all sizes, which is sib to the famous gourami, the most delicately flavored of all East Indian food fishes, as well as to the Bengalese *Trichogaster* common in the Calcutta market — here also shown living.

But the feature of the exhibition was the number and interest of the exotic forms represented, creatures which one is apt to know only from pictures in textbooks. Thus there was the water butterfly, *Pantodon* (African), said to be a "flying fish," although judging from the habits of the fish in the aquarium, the stroke of its filmy tail does not allow it to spring far out of water. There was *Mastacembelus*, an Indian "eel" which is not an eel. There was an Indian *Ophiocephalus* which can live beneath sun-baked mud and which under ordinary conditions breathes partly by means of a "lung," and resembles outwardly the American ganoid *Amia*, which, by the way, is also more or less of an air breather. There were several genera of cichlids, perchlike fishes, tropical American, and of characinids which replace the tribe of carps in Africa and South America, and include the most formidable fresh water fishes in the world. There were tropical catfishes which are rarely seen out of their native waters, among them *Macrones* (East Indian) with bright bands of color and exaggerated "feelers," also a South American *Dorad*, its body half covered with armor, and its fully armored cousin, *Callichthys*, which is probably the most eccentric of all catfishes. There were forms whose habits of reproduction are extraordinary, like *Gambusia*, *Girardina*, *Pœcilia*, which bear living young, and were exhibited beside their youngsters. Finally, there was not lacking the pla-kat, or Malayan fighting fish, *Betta pugnax*, a veritable aquatic game-cock reared for shows of fish-fighting which in Siam draw throngs of spectators.

Especial credit in bringing together many of these exotic and rare forms is due to Mr. Isaac Buchanan, an amateur who devotes much time to the study of aquarial fishes, and it was similar interests which led Mr. Richard Dorn, president of the society, to organize the present display. The society

itself is made up mainly of amateurs; it includes nearly a hundred members, a number of whom are German-Americans who have brought over the sea their love of this form of nature study; for in Germany the aquarium societies are old and widely-spread institutions, attracting and training many naturalists. The present society may even be regarded as a *filiale* of the widespread German organization "Triton."



A fish (*Ophiocephalus*) of India which can live under sun-baked mud

East Indian catfish (*Macrones*), bright colored and with long feelers

The present exhibition demonstrates again, and in an attractive way, the value of keeping an aquarium, not as a hobby merely, but also as a means of studying the habits and development of many aquatic forms which would otherwise be inaccessible to naturalists. It even puts within range of its owner some of the large questions which these forms illustrate, as for example the variation of aquatic animals and plants under artificial conditions, and the way in which these variations are passed on to the young, questions which lead far into the field of Darwinism. Nor can we leave out of account the experimental value of the aquarium, in testing how fishes can be reared, and what are the best conditions for breeding them, questions which touch practical fisheries. The success of the present exhibition leads one to hope that similar displays will be held annually.

Water "butterfly", *Pantodon*, from West Africa

In Siam rival specimens of *Betta pugnax* are pitted against each other like game cocks

THE SUN DANCE MEDICINE BUNDLE

A POWER IN APPEALS FOR LIFE. OPENED ONLY IN SACRED CEREMONIAL FOR THE FULFILLMENT OF A WOMAN'S VOW

By Clark Wissler

AMONG the exhibits for the Plains Indians may be found the bundle for the medicine woman in the Blackfoot sun dance, a simple outfit far more sacred than even the medicine pipe. The chief object is a headdress built on a strip of rawhide in the form of a lizard. On the headdress in front is what is spoken of as a doll, which contains a prairie turnip. All this together with certain paints is kept in a cylindrical rawhide case, in fact is never taken out except when the appropriate ritual is performed. Attached to the case is a digging stick, woman's primitive tool and with these Indians the symbol of her fall.

As their old sacred story runs, a virgin loved the morning star and was carried by him to the home of his heavenly parents, the sun and moon, where she took up the domestic duties of a wife. As on earth, she gathered roots for the table with her digging stick, but one large fine prairie turnip she was forbidden to dig up. Now like the woman of our own sacred story, she yielded to curiosity and thrust her stick under the turnip. Sorrow and grief for her people below were now her portion and she was banished to earth, but directed to teach the lesson and confer a medicine bundle on her descendants. Since the bundle came from the house of the sun, it symbolizes much of his power and might.

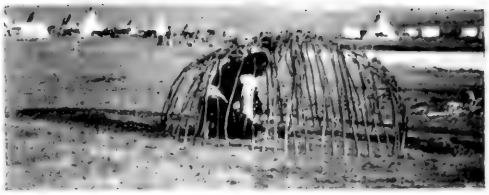
This medicine bundle finds its chief function in the fulfillment of a vow — a woman's vow. If a dear one is near unto death, a woman may stand before the sun and say, "Hear me, I am virtuous, I have been true to my marriage bond; if our dear one is spared, I will open the bundle at the sun dance." A medicine man is usually called to take formal note of the vow and to direct the unhappy one. Now the sun is not deceived and if an unworthy woman so address him, retribution is certain. Further, this woman must at the next sun dance make public confession of all temptations she has experienced. Yet more, this public confession is also a challenge and it is the duty of every bystander to impeach her, if there is aught to impeach.

Following the vow are months of preparation. At the time of the sun dance the woman fasts four days and on the last day the bundle is opened, the headdress placed on her brow and the digging stick on her back. The ritual is long, requiring most of the day for its many songs and prayers. In one place a solemn medicine man while dancing with the stick rehearses

the digging of that first forbidden turnip. At last the woman is conducted to the sun dance place where her confession is made. The bundle she cares for until some other woman makes a vow.

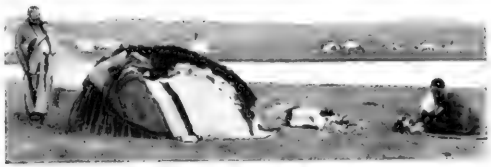
The whole tribe has an interest in this ceremony. They camp in a great circle and await the issue of those four days, for should there be a fault, all would suffer. The appearance of the woman with this regalia is the great ceremonial moment of the tribe, all are there to see and stand in reverent silence.

That the bundle is here is due to our late friend The Bear-One. One day we received a letter in which he stated that the bundle owned by a certain woman could be had for the cost of a few presents to her family. We learned later that the husband of the bundle-owner had died. During his illness the woman prayed to the bundle and made a vow to the sun. Now if such a plea is of no avail, the woman is released from her obligation, but more, she is then under the displeasure of the sun and should get clear of the bundle. Because of the disrepute this bundle was now in, no one would care to take it and the poor widow looked upon it as the real cause of her husband's death. The reader must know that the taking of a bundle is like entering into marriage, one cannot escape the bonds without scandal and crime, except in the regular manner. Even one so powerful as our friend could not have ventured to give us such a bundle under normal conditions; as it was, the risk was great. Misfortune and sudden death were predicted for him; in fact his end recently, some two years after the events of this story, was regarded as proof of the sun's displeasure.



Building the frame of willows

Procession of holy men in sun-wise direction



Entering for the purification rites

The Blackfoot sweat house ceremony is a part of the sun dance ritual[1]

[1] Through a mistaken transference of captions on page 299 of the December JOURNAL, the discovery of the Blackfoot sun dance was accredited to Dr. Pliny E. Goddard. The investigations of Dr. Goddard concerned the sun dance of the Plains Cree.

THE MUSEUM'S COLLECTION OF LIFE CASTS

WITH PHOTOGRAPHS ILLUSTRATING THE METHOD OF MAKING DUPLICATE CASTS FOR EXCHANGE WITH OTHER INSTITUTIONS

THE origin of the primitive races of the New World and their possible relations to the geographically isolated races of the Old World is one of the most interesting questions of ethnological research, which if it ever comes to anything must needs reach its results through comparative study of the races themselves in their physical types and their cultures. In this country especial interest has attached to study of the Indian tribes of the northwest coast of North America for comparison with northern Asiatic tribes, with a view to establishing proofs of the derivation of the western tribes from the eastern, or at least of a mingling of the two

Model of a head of which duplicate casts are desired. The model is covered with a half-inch thickness of clay [a small part of the clay is cut away to show the face of the model underneath] and a two-piece plaster mold is made over the clay. When the plaster has hardened, the mold is taken off, and the clay is removed from the model

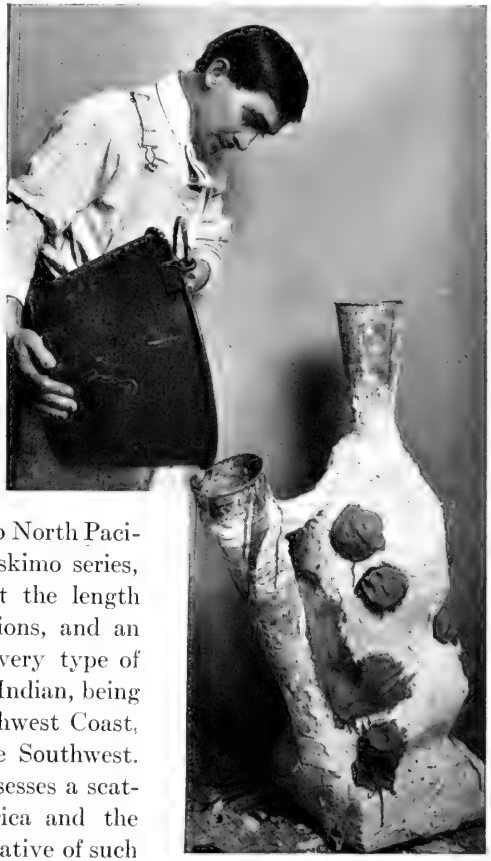
The mold is like a jacket or hood, separated from the model by just the thickness of the clay. Model and jacket are given a coat of shellac and one of oil, then are put back in position and the space between them filled with glue

The glue hardens to form a mold within the plaster jacket, the model of the head having been removed. [The photographs illustrate the process in connection with three different busts.] A glue mold is firm enough to give an accurate cast, yet yielding enough to allow its removal from about the cast, however many undercuts the plaster surface may present

during the age of land connection of the two continents. Interest has centered also in an investigation of the tribes of the Southwest and of the islands of the Pacific with reference to establishing possible connection between the Old and New Worlds at this point through the widespread Polynesians.

The American Museum has unusual hopes for the future of this research because of large equipment for the study in life casts of physical types. In 1906 the institution possessed more than five hundred masks from life, and the number has steadily increased until it has become a very complete collection. There is a full series of Siberian casts, actually made in the field on the Jesup North Pacific Expeditions a complete Eskimo series, made pretty much throughout the length and breadth of the Arctic regions, and an elaborate series representing every type of culture of the North American Indian, being especially strong for the Northwest Coast, the Plains, California and the Southwest. In addition the Museum possesses a scattering series for South America and the South Pacific Islands, representative of such races as Patagonians, Maori, Samoans, and Filipinos. Almost without exception these stand for actual field study of the given race and are accompanied by a long series of photographs and careful color studies for many subjects.

Ethnology draws many conclusions from skull study but these results must of necessity be incomplete as compared with records based on casts from life which give perfect



Mr. James C. Bell, expert worker in plaster, making a glue mold of an Indian head. Glue is poured into the funnel, the lower end of which opens into a half-inch space between the original model and the plaster jacket fitting over it. As the glue rises in this space about the model, holes previously cut in the jacket to allow the escape of air are plugged with clay. Finally the funnels at the top and side are capped with clay and the glue is allowed to set for twelve hours

contour of head and accurate detail of feature. The accuracy of the casts has steadily risen during recent years with the perfecting of methods of technique. Formerly the man who allowed a plaster mold of his head to be taken was subjected to considerable discomfort, which resulted in a cast in which the features were so distorted that it could serve only as a basis from which the sculptor modeled the finished bust; but since the paraffin method has been in use the cast can be gained without distress to the subject, therefore the expression remains true to life and all measurements are accurate. This removal of the necessity of doing any modeling on the casts and therefore of the sculptor's temptation to conventionalize his work has been a most important factor for truth in the ethnological investigations underway.

In addition to this largest research value of the Museum's several hundred casts, lesser values are continually realized. Exhibition is of course one of the immediate purposes of the casts. If it is desired to study any given tribe, the exhibition hall shows not only the articles of its culture but also accurate representations of the people themselves. And furthermore, the Museum has continual demand for duplicate casts from universities and colleges and other museums, as well as from artists and various private parties interested in Indian or other primitive types of man. Thus the collection extends its usefulness through sale, exchange and gift.

A large number of duplicate casts, to serve for study, exhibition or exchange, can be made from a glue mold

A NOTE ON POISONOUS SNAKES

By Mary Cynthia Dickerson

A snake group recently put on view in the reptile exhibit of the second floor represents a small part of a South Carolina swamp with its logs and stumps, vines and water hyacinths, the last of interest because often an obstruction to navigation in southern rivers. The group shows side by side poisonous snakes, the water moccasin (*Ancistrodon piscivorus*) and non-poisonous, the brown water snake (*Natrix taxispilotus*). It also exemplifies the viviparous type of snake, the brood of sixty representing the offspring of one of the water snakes.

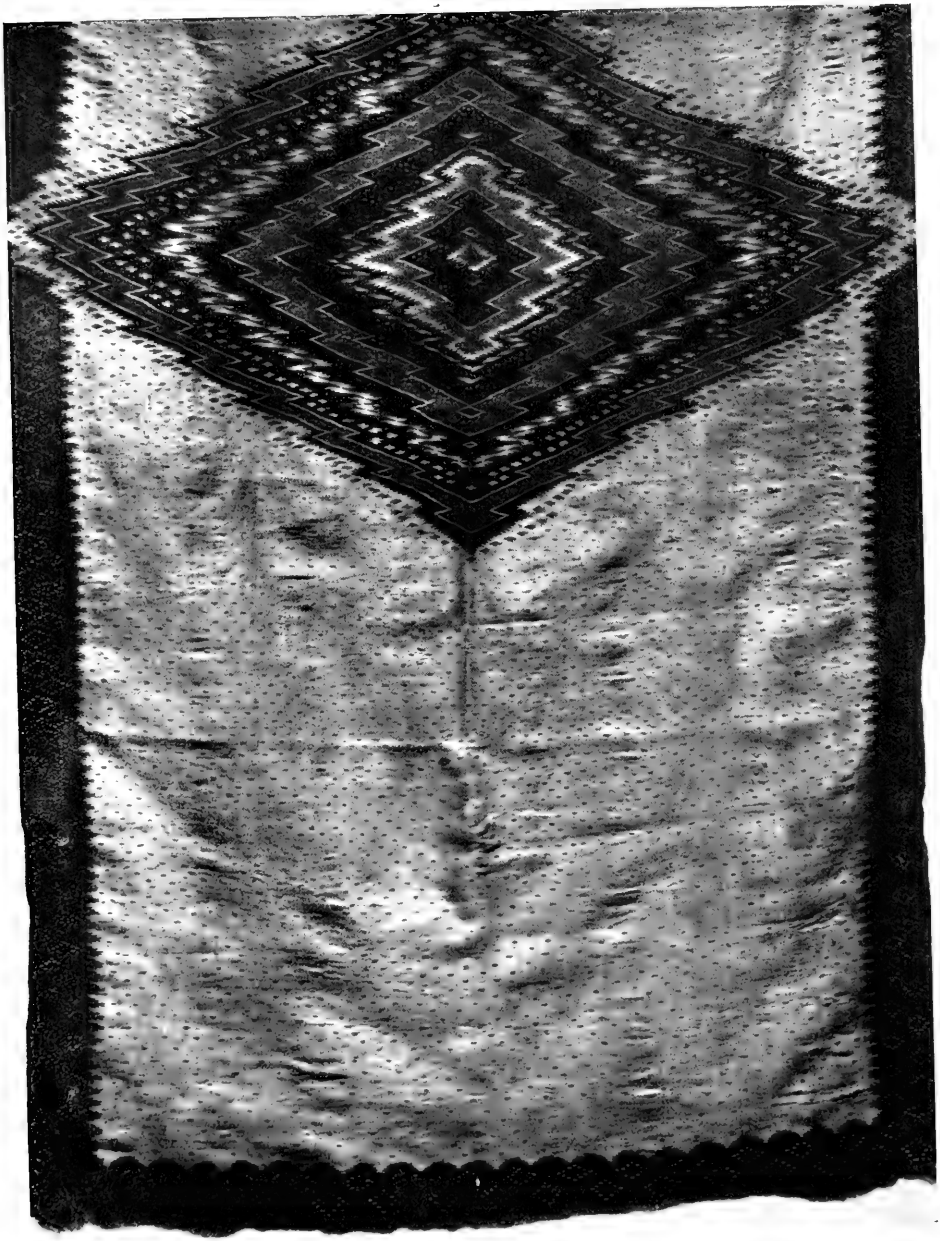
IT would be fortunate if there were some certain rule for distinguishing a poisonous from a non-poisonous snake. That the non-poisonous has large scales on the head is not an infallible guide since the cobras and their allies are quite as innocent looking; that the poisonous has usually a triangular head distinct from the neck is again untrustworthy as many harmless species, like the water snakes, when under the influence of fear, inflate the sides of the head to a semblance of concealed poison glands. Neither does an antagonistic manner tell much because certain harmless forms, like the hog-nosed snakes, so-called "spreading adders", are aggressive in a higher degree than many deadly species.

This lack of distinction is not, for North America at least, the grave misfortune it would seem however, for there has been exaggeration in the popular mind as to the number of poisonous species. In India to be sure,

where people go with bare feet and legs through the jungle, the time has been when mortality from snake bite reached twenty thousand annually. This was before the discovery of antivenin, a serum prepared in the same way as germ disease antitoxins and now for sale in India, as in other countries where branches of the Pasteur Institute have been established. As early as 1887 experiments proved that repeated inoculations of snake venom put an animal into a condition resistant to the venom, but not until 1894 was a serum dispensed for practical use.

In North America accident from snake bite has always been a rare happening, the dangerous species being few — namely, two moccasins, the copperhead and the cottonmouth (*Ancistrodon*), two coral snakes (*Elaps*), small brilliantly colored allies of the cobras, and thirteen rattlesnakes (*Sistrurus* and *Crotalus*). With the exception of the coral snakes, these are all "pit vipers" and can be recognized when seen near at hand by a peculiar deep depression, of questioned function, between the eye and the nostril and also by a vertical pupil. But for snakes in general the venomous species is marked by no peculiar structure except the poison apparatus itself, and many non-poisonous snakes even possess the poison glands in a primitive stage of development, lacking only the poison-conducting fang. Therefore in North America where out of about one hundred and ten species only seventeen are dangerous to man, and of these not often more than two occur in a given district, the problem of safety even for extended expeditions into the wilderness demands merely a knowledge of the appearance of the few given forms.

Portion of a new snake group that gives acquaintance with the deadly water moccasin of the South [the snake in the foreground; wax cast by James C. Bell, color work by Frederick H. Stoll]



MEXICAN SERAPE REPRESENTING EXTINCT WEAVING WHICH CANNOT BE IMITATED BY MACHINERY

The pattern is in two colors of indigo on a tan-colored ground. Old Saltillo serapes have a beauty of color and design rivaling the fabrics of Persia and India and comparable with fine old mummy-cloths of Peru

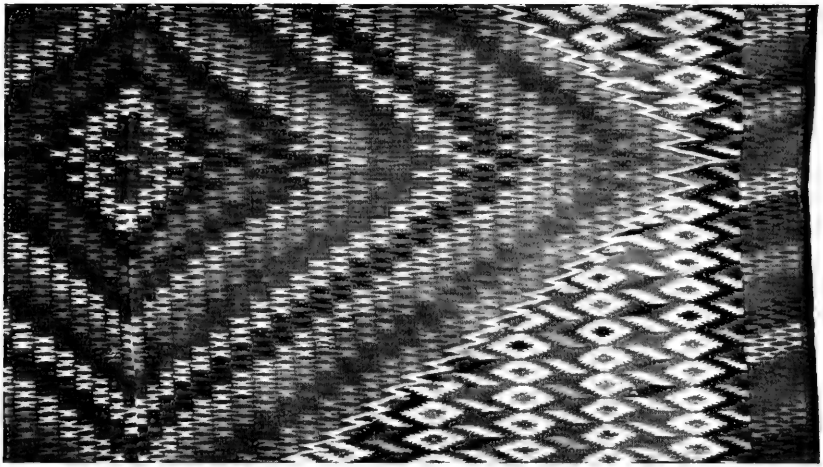
THE ANSON W. HARD COLLECTION OF SALTILLO AND CHIMAYO BLANKETS

SOME very wonderful examples of American aboriginal weaving are displayed at the northern end of the hall devoted to the Indians of the Southwest. The exhibit consists of twenty-five Chimayo and Saltillo blankets known as Mexican "zarapes" or "serapes," purchased for the Museum by Anson W. Hard in 1910. The weaving represented in these blankets is now extinct and there is no way by which it can be imitated exactly by machinery. Fine examples of the blankets are difficult to obtain having received practically no attention from museums and collectors, probably because thought until recently of Spanish origin instead of Indian.

It is well-known that the Navajo are the only extensive blanket-weaving Indians of North America to-day. It is believed however, that if the full story of weaving in this country prior to the coming of the white man were known, we should find that the art was widespread through eastern, southern, middle and western North America. This is thought to be the fact not from the existence of samples of this weaving but from the evidence of impressions of patterns of weaving on pottery preserved in these regions, and from the relationships of the various North American tribes. Textiles cannot long survive in a moist changing climate. It is only in dry regions such as the Southwest and the coastal parts of Peru that delicate fabrics could have been preserved.

Throughout Mexico serapes were formerly much worn as ponchos or simply carried over the shoulder. The great market for them was the town of Saltillo in northern Mexico. Chimayo blankets made by Chimayo Indians of northern New Mexico, who are now practically extinct, are thought to be the connecting link between Navajo and Saltillo weaving. Four types of blanket weaving have been known — namely, among the people of Peru, the Pueblos of New Mexico, heirs to the art of the Cliff Dwellers, the Navajo of Arizona and New Mexico, and the Indians of Alaska. Little has been known of the textile art between Peru and the more northerly centers. It is fortunate therefore that these examples of aboriginal weaving from Saltillo have come into the possession of the Museum.

Saltillo blankets are large, often measuring seven by ten feet, and show very minute patterns for North American hand weaving. They are often covered with a delicate tracery of design made by the combination of small figures in harmonizing shades, although a few of the blankets have



Small section of a red serape with an unusually effective design carried out in white, light yellow, rose, indigo, green and black

bolder designs in more contrasting colors. Most of them present a splendid diamond medallion of concentric design in the center while the border develops delicate patterns, usually minute geometric motives. San Miguel blankets differ from the Saltillo in having a rosette medallion. The colors are fast and while brilliant are harmonious in their combinations. Some of the blankets are red in tone with the designs carried out in shades of green, blue and yellow, while other very beautiful specimens consist of two or three shades of blue in combination with white only or with white and brown.

Although not so prized as the finest Navajo nor at present carrying so high a money value, some of these blankets have a beauty of color and design which makes them rival the work of Persia and India. In fact they are among the finest examples of weaving to be found in any country or in any age and should be compared with fine old mummy cloths and other pre-Columbian textiles of Peru.

Small section of a beautiful serape of finest wool, thin and of light weight. The design is woven in two shades of indigo, with white, brown and black

MUSEUM NOTES

Since the last issue of the Journal the following persons have been elected to membership in the Museum:

Life Members, Mrs. Charles L. Bernheimer, Mrs. Cleveland H. Dodge, Mrs. D. Willis James, Miss D. Greer, Miss Caroline Constantia Ward, Miss Alice Delano Weeks, and Messrs. Sam. Sloan Auchincloss, S. A. Goldschmidt, George Gordon King, A. M. Post Mitchell, William H. Moore, Robert Rogers, C. Ritchie Simpkins, Robert E. Tod, and Elmore A. Willets;

Sustaining Members, Messrs. Howard Huntington, Samuel Kraus, Jacob W. Mack and Alfred Nathan;

Annual Members, Mr. and Mrs. Edward T. H. Talmage, Mr. and Mrs. Chas. Gouverneur Weir, Mrs. James Hoyt Benedict, Mrs. Jacob S. Bernheimer, Mrs. Virginia Danziger, Mrs. Simon Flexner, Mrs. Theo. A. Kohn, Mrs. H. A. Mayhon, Mrs. Henry S. Redmond, Mrs. C. F. Street, Mrs. Lionel Sutro, Mrs. Ezra Ripley Thayer, Mrs. E. Van Raalte, Mrs. John I. Waterbury, Miss Jessie M. Brinkley, Miss Anna E. Chaires, Miss Helen Sears, the Misses Scofield, Rev. Isaac S. Moses, and Messrs. Herman Behr, Wm. M. Benjamin, Max E. Bernheimer, Sidney Blumenthal, Alexander Deutsch, Ludwig Dreyfuss, J. M. Ellsworth, Abraham Erlanger, Kaufman George Falk, Moses J. Freund, Wm. Tod Helmuth, Jr., Morris J. Hirsch, B. Kaufmann, Julius Kaufmann, Samuel Knopf, Ephraim B. Levy, Julius A. Lewisohn, C. M. Loeb, J. Loeb, Robert H. Mainzer, Samuel Mather, Oscar Michael, Simon Miller, Theo. Obermeyer, J. Oppenheim, Myron H. Oppenheim, Z. H. Oppenheimer, Howard Palmer, Wm. Ross Proctor, K. J. Rahlson, John D. Reynolds, Isaac L. Rice, Isaac Riegelman, Simon R. Riem, Hubert E. Rogers, Sol. G. Rosenbaum, Alfred S. Rossin, Fred. Sauter, Jr., J. Louis Schaefer, W. Schall, Jr., Arthur L. Selig, Albert J. Seligsberg, Francis Smyth, Leo Stein, Nathan B. Stern, Theodore Sternfeld, Sylvan L. Stix, Charles Strauss, Joseph Stroock, Benjamin Tuska, Donald Seymour Tuttle, B. Ulmann, L. A. Van Praag, John L. Wilkie and Bronson Winthrop.

Dr. Frederic A. Lucas was made Corresponding Member of the Zoölogical Society of London at its meeting of December 20.

Mrs. Isabelle Field Judson has succeeded to the patronship of the late Cyrus W. Field and Mr. Charles S. Shepard to the patronship of the late Edward M. Shepard.

Dr. Walter B. James has been elected patron of the Museum in recognition of his contributions for the preparation of marine groups in the department of invertebrate zoölogy.

Professor George Grant MacCurdy of Yale University spent part of the past month in the classification of the Museum's collections from prehistoric Europe. An exhibit of this material is being arranged in the tower room of the North American archæological hall, second floor west.

A series of models of bacteria is under preparation by the department of public health. They will illustrate recent discoveries in the structure of these minute organisms, including all the more important bacterial enemies of man, such as the tubercle bacillus, the typhoid bacillus, the plague bacillus, and the spirillum of cholera, with killed and preserved colonies showing actual growth.

The collection of living bacterial cultures has grown rapidly during the year. There are under cultivation 479 cultures, representing 322 different types, and forming what is probably the most complete collection of bacteria in existence, with the single exception of the Kral collection at Vienna. Also 577 cultures have been sent out from the laboratory to fifty-three different institutions in the United States and Canada, representing a somewhat unique service to American bacteriological teaching and research.

Mr. N. C. Nelson, instructor in anthropology in the University of California, has been appointed assistant curator in the department of anthropology. His best-known work has been the exploration of shell mounds on the California coast. He will assume his duties here next June and will give especial attention to North American archæology.

Mr. George Borup, who was in charge of the third supporting party of Admiral Peary in his last polar expedition, has been appointed assistant curator in the department of geology and invertebrate palæontology.

The Orizaba Habitat Group, which it is hoped will be completed in January, promises to be one of the most attractive in the series of bird groups thus far made. It differs from the preceding groups in attempting to present an impression of the faunal character of the region it represents, rather than the home life of some particular species or colonial gathering of birds. The foreground therefore will contain characteristic species of birds of eastern tropical Mexico, while the background, with its view of snow-crowned Orizaba, is designed to give an impressive lesson in the distribution of life as controlled by altitude. This feature will be explained by a series of photographic transparencies introduced in the panels on either side of the group, and portraying the characteristic vegetation from the tropical forests at the base of Orizaba, through the oaks of the temperate zone and the conifers of the Canadian zone, to its treeless summit above the limit of life.

THE year has closed with much work in progress, although many things are so hinged together that one cannot move without the other. For example, the section of the Big Tree in the Darwin hall has been waiting many years for a suitable place in the hall of forestry. The rearrangement of the forestry hall permits the removal of a case that provides room for the Big Tree, that in turn leaves room for the erection of a case to hold the domesticated dogs illustrating variation under domestication, and the removal of these permits a rearrangement of the mammals that will ultimately lead to the assembling of new bird groups.

Similarly the removal of the groups of New York mammals to the hall of North American mammals permits the taking down of the large cases and provides a home for the exhibits of the department of public health and the closely related department of anatomy and physiology. At the same time the cases once containing the groups of mammals will be transferred to the African hall for the extension of that part of the collection.

MR. WALTER GRANGER, associate curator of fossil mammals, has been abroad since early November engaged in part upon researches among the fossil mammals of the English and French museums, especially the Old World relatives of the four-toed horse.

THE exhibit illustrating the evolution of the horse has been reinstalled and extended. It now displays upon a single panel the principal stages in the evolution in size and general proportions, in skull and feet, teeth, brain and limb-bones, all arranged in accordance with the successive geologic formations in which they are found. The panel is to the right of the entrance of the mammal hall. The Amblypoda, gigantic quadrupeds of the early Tertiary Period are being reinstalled upon the panel system at the opposite end of the hall. Other recent additions to the fossil vertebrate collections are the Fort Lee reptile and the skeleton of a smaller relative, the Rutiodon, from the coal fields of North Carolina, displayed in the corridor opposite the elevator; and in the quaternary hall, skeletons (casts) of the extinct South American quadrupeds *Macrauchenia* and *Toxodon*, with a number of small models illustrating the extinct animals of the Quaternary Period in South America.

DR. WILLIAM H. HOLMES, curator-in-chief of the anthropological division of the National Museum, visited the Museum December 19 to view the North American archæological collections. Dr. Holmes is generally recognized as the leading archæologist in America.

PROFESSOR CHARLES-EDWARD AMORY WINSLOW will represent the American Museum of Natural History at the forthcoming International

Congress of Hygiene and Demography to be held in New York September, 1912.

The Executive Committee has created the office of assistant librarian and has appointed Miss Ida Richardson Hood to fill the position.

The Colombian expedition has thus far sent collections of birds and mammals numbering between three and four thousand specimens, which prove to be exceptionally rich in species new to the Museum collection as well as new to science. Preliminary study of the birds, for example, shows that the wrens and thrushes are represented by eighteen species and subspecies all of which are practically unknown to the Museum collection, while several appear not to have been described. The single family of flycatchers further illustrates the richness of the avifauna of the region in question, the collection containing no less than fifty-nine representatives of this family, or nearly twice as many as are found in America north of Mexico.

Mr. J. Pierpont Morgan has presented to the gem hall a small but very interesting and valuable collection. It consists of large crystals of benitoite — the beautiful new gem stone of California, a double colored polished beryl section, a euclase crystal associated with yellow topaz, and three remarkable tourmalines from Madagascar. The most prominent specimen is a really wonderful mass of aquamarine weighing thirteen pounds, which is only a small portion of a crystal that weighed 246 pounds. It is deceptively like glass, possessing a perfect texture, and having the typical and always fascinating aquamarine tint, delicately blue with interior greenish reflections.

Among the groups in preparation for the Darwin hall is one illustrating the complex relations of animals to one another and to man, which it is hoped will be on exhibition within a few months. A museum has been likened to an iceberg seven-eighths of which, so far as the public is concerned is not in view. The visitor sees the finished product; he does not see the varied steps that lead up to it from collection in the field through the work of preparation. The public reads with interest of extended exploration in Colombia, of fossil hunting in Alberta: a year, or two years afterward appears a note or an article to the effect that such a group or such a specimen has just been placed on exhibition. Even the visitor to the workrooms cannot realize how long and tedious much of the preparation really is nor the pains necessary to secure seemingly simple results.

Dr. P. E. Goddard, associate curator of anthropology, has just returned from the Southwest. About a month was spent on the Kiowa-Comanche

reservation in the region of Anadarko, Oklahoma. A fairly representative collection, which included a number of excellent buckskin garments and ceremonial objects of interest, was obtained from the Kiowa-Apache and Kiowa. A collection of metal-work and other objects was obtained from the Caddo; and from the Wichita, who still occupy their large grass houses, were obtained among other old and valuable specimens two buffalo skin robes and a buffalo skin bag. During the stay a large number of myths and folk tales were recorded in the Kiowa-Apache dialect. These will furnish much needed information concerning the folklore of the region and a basis for linguistic study. This is a matter of unusual interest since the Kiowa-Apache have been believed to be more closely connected with the Athapascan peoples of the North than with their other relatives, the Apache and Navajo of the Southwest. It was discovered however that they are linguistically closely related to both the Lipan and the Jicarilla Apache. About two weeks were spent with the Jicarilla Apache of northern New Mexico checking up the proofs of the forthcoming Museum publication on the Apache.

The United States Geological Survey has established with great accuracy the astronomical position of the Museum building and its elevation above mean sea level. An observer from the United States Coast and Geodetic Survey spent some weeks here during the past summer, making observations of the stars while getting direct telegraphic reports on the apparent movements of the same stars from the Naval Observatory in Washington; also an engineer from the New York City department of surveying ran a series of levels from several known points to two points at the Museum. We learn that the central point of the foyer is in latitude 40° 46′ 47.91″ N., longitude 73° 58′ 40.46″ W., and that the floor of the foyer is almost exactly 83 feet 6 inches above mean sea level.

The department of preparation is constructing for the Darwin hall a series of models of Tahiti and other islands of the Society Group. These show various stages in subsidence and wearing away of volcanic peaks in the ultimate formation of coral atolls.

In revising the installation of the New Guinea material in the South Sea hall, Dr. Lowie is making extensive use of the sketches secured by the Museum with the Finsch collection. Dr. Otto Finsch, the celebrated naturalist and traveler, provided with the collection a very full series of illustrations accurately picturing many phases of native life. These are highly desirable, as many aspects of aboriginal culture, such as house and boat types cannot always be readily transported or even secured in model specimens, although often they form the most characteristic elements of

the culture of a tribe. This applies even more emphatically to social and ceremonial life, which can be studied very inadequately, if at all, from museum specimens. It also applies in large measure to objects of personal adornment and clothing. For instance, it would not be at all obvious to the average visitor how the aborigines wore a profusely decorated heart-shaped object conspicuously exhibited in one of the New Guinea cases. A glance at the sketch now beside the specimen shows it to be a warrior's breast ornament. Similar results have been accomplished with other articles of dress which otherwise could not readily be understood except with the aid of long explanatory labels.

ERRATUM. The time necessary for the formation of the stalagmite in the Copper Queen mine was given in the December JOURNAL (page 306) as 67,000 years instead of 17,000 years. Those interested in the matter will kindly make the correction.

LECTURE ANNOUNCEMENTS

PEOPLE'S COURSE

Given in coöperation with the City Department of Education

Tuesday evenings at 8:15 o'clock. Doors open at 7:30.

The first five of a course of lectures on "Travels in the Orient for the Purpose of Scholarly Research" by PROFESSOR A. V. WILLIAMS JACKSON. Illustrated by stereopticon views.

January 2 — "India and its Historic Sites."
January 9 — "India and its People."
January 16 — "Delhi, the Mogul Capital and Scene of the Durbar."
January 23 — "India and its Literature."
January 30 — "Baluchistan, a far-off Land in the Orient."

Saturday evenings at 8:15 o'clock. Doors open at 7:30.

The first four of a course of lectures on "The Doctrine of Evolution and the Problems of Human History" by PROFESSOR HENRY E. CRAMPTON. Illustrated by stereopticon views and by exhibits.

January 6 — "Common Animals and their Story."
January 13 — "Animal Development and its True Meaning."
January 20 — "Extinct Animals and the Testimony of the Rocks."
January 27 — "How Nature Works in Evolution."

LEGAL HOLIDAY COURSE

Fully illustrated. Open free to the public. Tickets not required.
Lectures begin at 3:15 o'clock. Doors open at 2:45.

January 1 — MR. ALBERT E. BUTLER, "Travels in the Rocky Mountain Region."
February 22 — PROFESSOR HENRY E. CRAMPTON, "In the Wilds of British Guiana and Brazil."

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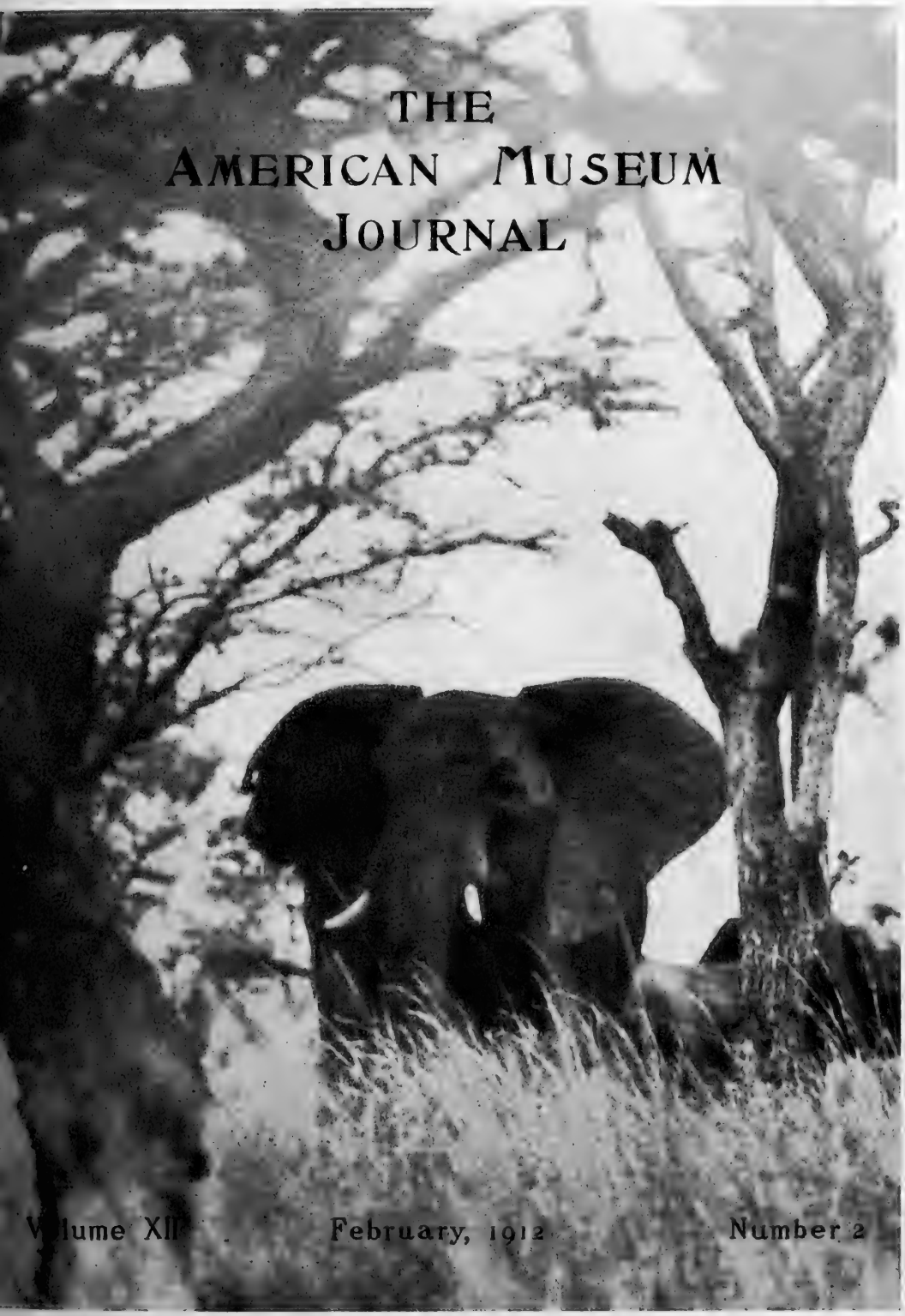
ELEPHANT HUNTING IN EQUATORIAL AFRICA



THE AMERICAN MUSEUM JOURNAL

Volume XII February, 1912 Number 2

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Annual Members	$ 10	Fellows	$ 500
Sustaining Members (Annual)	25	Patrons	1000
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THE MUSEUM PUBLICATIONS are issued in six series: The American Museum Journal, Annual Report, Anthropological Papers, Bulletins, Guide Leaflets and Memoirs. Information concerning their sale may be obtained at the Museum Library.

GUIDES FOR STUDY OF EXHIBITS are provided on request by the Department of Public Education. Teachers wishing to bring classes should write or telephone the Department for an appointment, specifying the collection to be studied. Lectures to classes may also be arranged for. In all cases the best results are obtained with small groups of children.

WORKROOMS AND STORAGE COLLECTIONS may be visited by persons presenting membership tickets. The storage collections are open to all persons desiring to examine specimens for special study. Applications should be made at the information desk.

THE MITLA RESTAURANT in the east basement is reached by the elevator and is open from 12 to 5 on all days except Sundays. Afternoon Tea is served from 2 to 5. The Mitla Room is of unusual interest as an exhibition hall being an exact reproduction of temple ruins at Mitla, Mexico.

The American Museum Journal

CONTENTS FOR FEBRUARY, 1912

Mary Cynthia Dickerson, *Editor*

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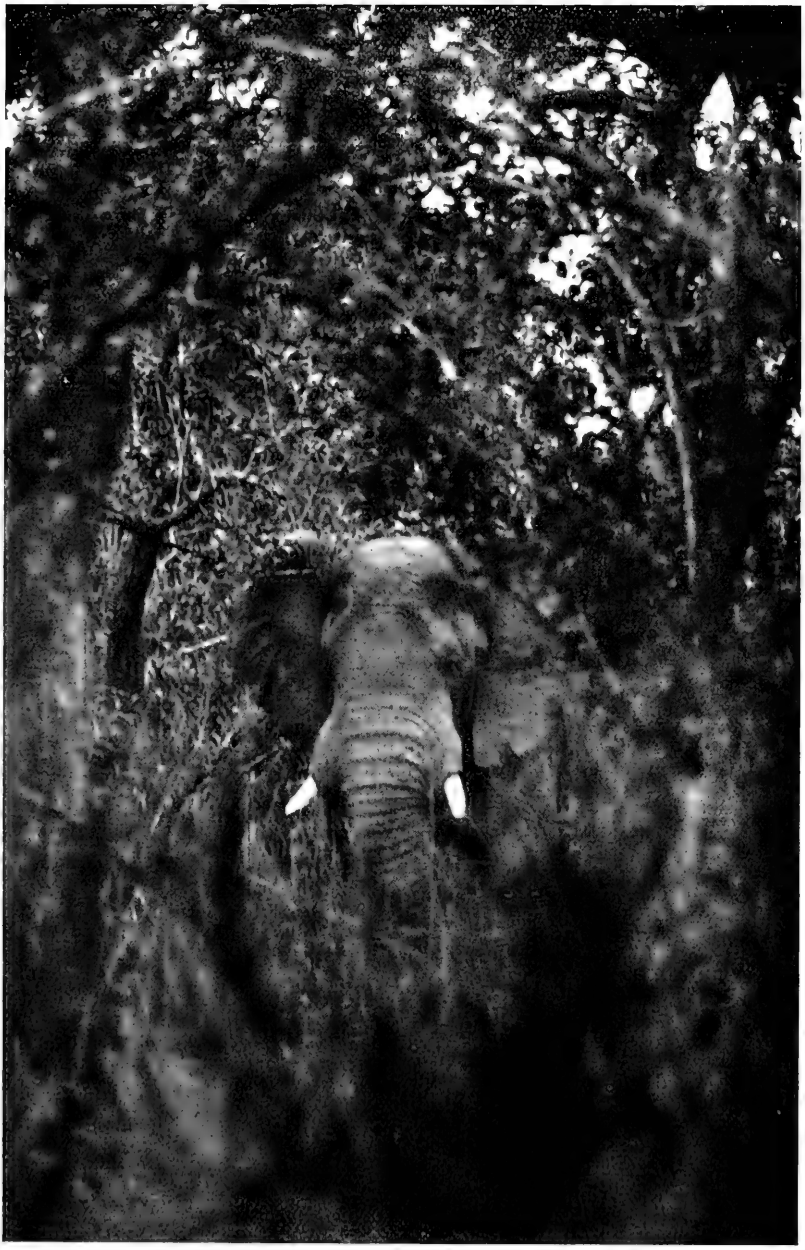


IN THE FORESTS OF UGANDA

Elephant hunting brings much that is fascinating. Never to be forgotten was that moment when, after hearing the scuffling of great feet among leaves, we came face to face with one of the great beasts in the dim recesses of the jungle. The photograph shows this young elephant, which was about the size of "Jumbo"; his small size and short tusks did not warrant the use of the rifle.

The American Museum Journal

Vol. XII FEBRUARY, 1912 No. 2

ELEPHANT HUNTING IN EQUATORIAL AFRICA

With photographs by the Author

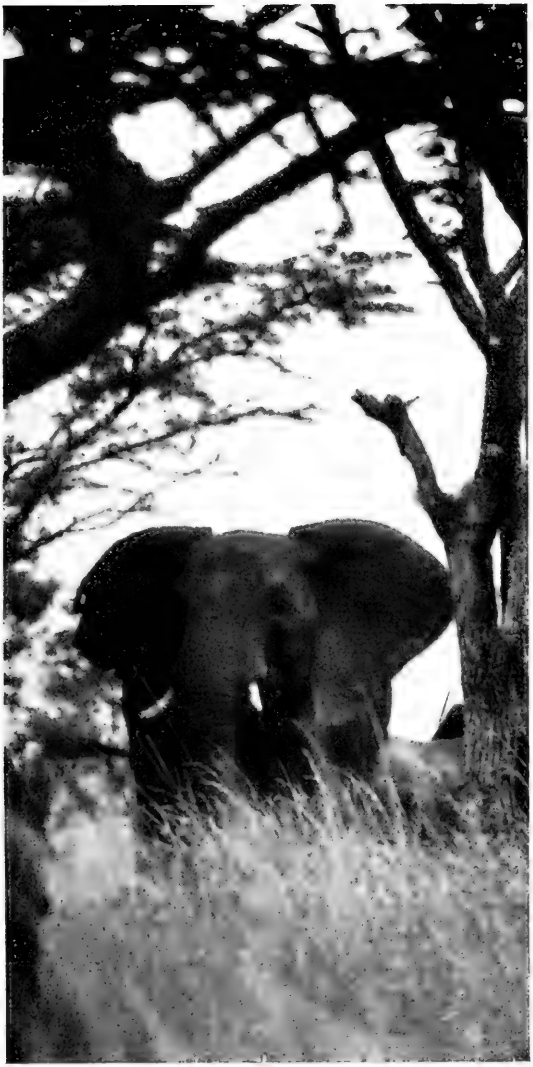
By Carl E. Akeley

ONE evening in Uganda when rather discouraged after a day of unsuccessful effort to locate elephants, we suddenly heard the squeal of an elephant far to the east. The squealing and trumpeting increased in frequency and distinctness until in an hour's time we realized that a large herd was drifting slowly in our direction. By eleven o'clock they had come very close, some within two hundred yards of camp, and on three sides of us. The crashing of trees and the squealing and trumpeting as the elephants fed, quarreling over choice morsels, resulted in a din such as we had never before heard from elephants.

Our men kept innumerable fires going for fear that the elephants might take a notion to raid the plantain grove in which we were camped, and at daylight I was off for the day's hunt. The herd had drifted down to the forest side, forty minutes from camp, in fact many of them had entered the forest. For a couple of miles we traveled through a scene of devastation such as a cyclone leaves in its wake: eight-foot grass trampled flat except for here and there an "island" that had been spared; half of the scattering trees twisted off and stripped of bark, and of all branches and leaves.

We approached within a few hundred yards of the forest, where the grass was undisturbed except for trails showing how the elephants at daybreak had trekked through in small bands, single file. When about to cross a little wooded gulley, we thought it wise to stop and look over the situation. From the top of a mass of rocks, we discovered a cow feeding only twenty yards away and others all about in the high grass between us and the timber. There was clear passage to a rocky elevation one hundred yards to the left, for which we made, and while standing there, seventy-five feet above the level, I received an impression of Africa that must remain with me to the last.

There was not a breath of wind, and the forest, glistening in the morning sunlight, stretched away for miles to the east and to the west and up the slope to the north. Here and there in the high grass that intervened between our perch and the forest edge, three hundred yards away, were scattered elephants singly and in groups feeding and loafing along, to be swallowed by the dark shadows of the dense forest side. From the gulley which I had started to cross a little time before, there stalked twenty-five



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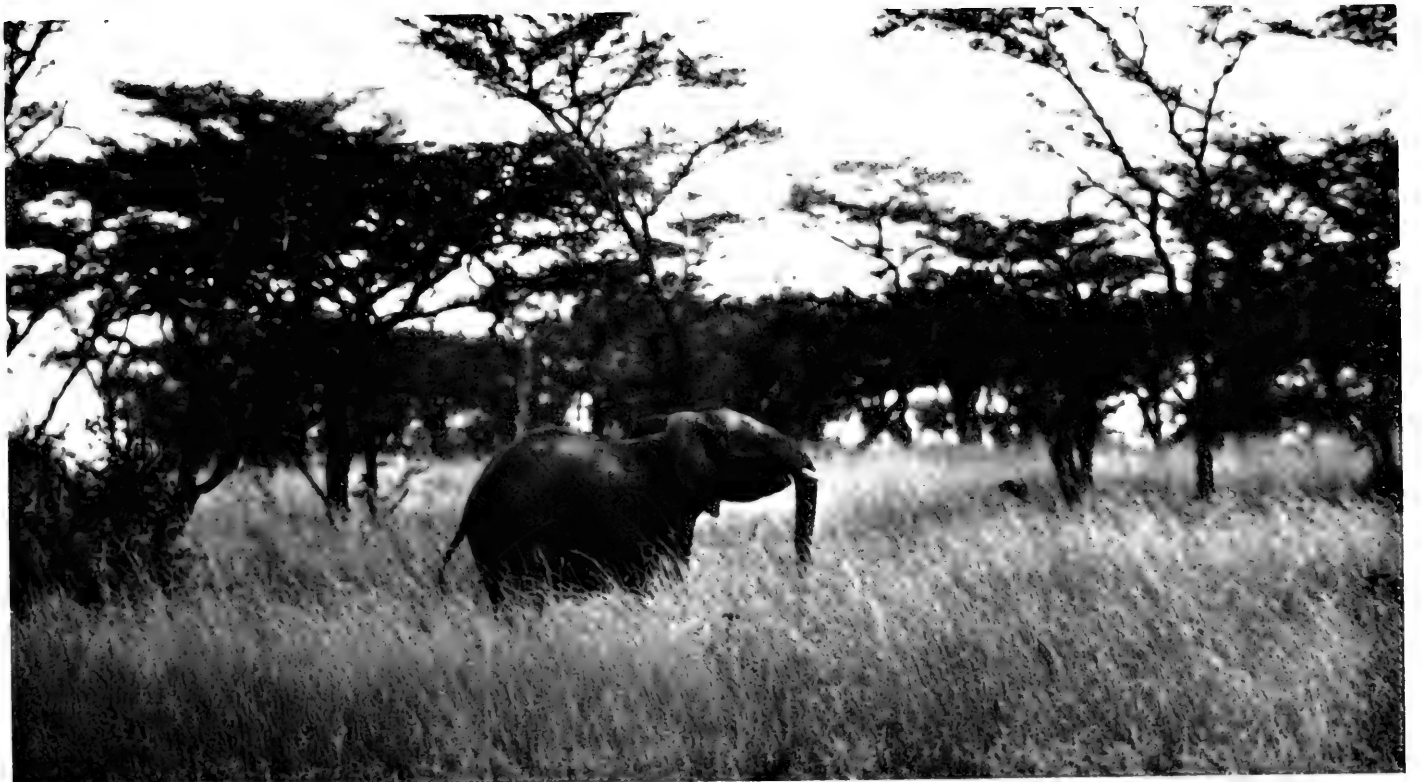
When approaching this cow from the rear, some slight noise was made, at which she wheeled and charged, paying the death penalty in consequence. The next cut shows the offspring of this cow, a youngster three or four years old and quite able to take care of himself

or thirty of the great beasts, their bodies shining with a fresh coating of mud and water from the pool where they had drunk and bathed. As is usual with big herds, they had broken up into small bands on entering the forest, and now as the last of them disappeared into the cover of the trees, a fuller appreciation of the surroundings suddenly dawned upon me. From a mile or more in either direction there came a reverberating roar and crash as the great hordes of monsters ploughed their way through the tangles of vegetation, smashing trees as they quarreled, played and fed all regardless of forestry regulations.

Where the little stream at the bottom of the gulley entered the forest, troops of black and white Colobus monkeys were racing about the trees, swearing at the elephants. From the tree tops deeper in the forest two or three troops of chimpanzees yelled and shouted at one another or everything in general, baboons barked, and great hornbills did their best to drown all other noises with their discordant rasping chatter. Suddenly, a cow elephant at the edge of the forest just in front of us uttered her peculiar shrill scream of warning. Not only the elephants but all the other forest folk paid heed



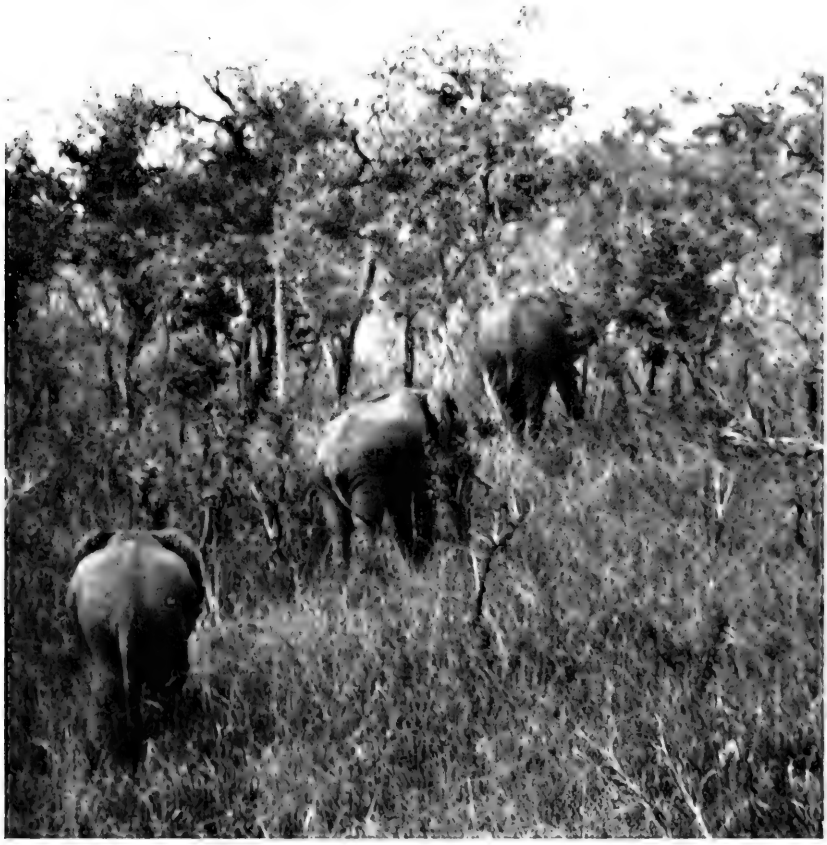
TYPICAL ELEPHANT COUNTRY

This young elephant, whose mother had just charged the members of the expedition, remained some time deciding whether or not to take the chance of following. Thus he gave an opportunity for some good photographs

TREKKING THROUGH ELEPHANT COUNTRY

Elephant trails are easy to follow through grass, which shows plainly where the animals trekked in single file

and instantly were silent; a moment before the noise had been appalling, the silence now was even more so. Then there came a gentle rustling sound like that of leaves stirred by a breeze, increasing in volume until it sounded like a mighty windstorm in the trees. I looked about to see whence it came. With my glasses I scoured the forest far and near, but not a visible leaf seemed to stir. Then I realized that the sound was made by elephants



Part of a herd of seven bulls that we tracked all day only to find that there were no large-sized tuskers among them

on the move, hastening away from danger — the scuffling of their feet among the dry leaves on the ground and the scraping of their sides against the equally dry leaves of the bushes. In a way this was even more impressive than the great din or the deathlike silence preceding.

The old cow had caught a whiff of air tainted by man and all obeyed

her warning. In a few moments the rustling subsided, the monkeys and birds returned to their normal state. The elephants had evidently settled down without going far; but only at rare intervals during the rest of the day did we hear the squeal of a chastised youngster or the breaking of a tree.

With my gun bearers I went down into the forest. Trails crisscrossed in all directions so that it was impossible to follow a given trail any distance. A band of a dozen or so got our wind and passed us in confusion at close range, but the bush was so dense that I had but small glimpses of them. A mile into the forest brought us to an irregular clearing, two hundred by five hundred yards in extent, almost bisected by a "peninsula" of forest. At the base of this peninsula I nearly ran against a young bull, one of a considerable number as I soon discovered. The whole herd began working toward the point of the peninsula and I ran along the outer edge to head them off. Just as the leader emerged from the point, they saw or winded us — shifty, uncertain breezes had sprung up — and they turned back. I ran into the timber to try for a better view of them. I soon found myself facing a cow who, solicitous for her very young calf, had wheeled about, all attention and menacing. Fortunately at the moment we were partially screened behind a clump of small trees, and as we remained motionless the cow's fears were soon allayed and turning, she gave the calf a boost with her trunk and followed the herd, which was moving off toward the clearing on the other side.

Hurrying out and around the point, I found the herd in the clearing, rounded up in close formation, conscious of the presence of an unseen enemy. There were about twenty-five elephants, mostly cows, and just as I was on the point of backing off to a safer distance, thinking there were no big bulls in the lot, a fine pair of tusks appeared at the near side. A clump of bushes offered cover for a near approach and I went in quickly to within twenty yards of him, and as his front leg was thrust forward offering a good opportunity for a heart shot, I fired both barrels of the double rifle in quick succession.

All was commotion as I seized my second rifle, and seeing that there was no direct charge, retreated some fifty yards to the top of an ant hill from which I could see what was going on. I then witnessed a scene such as I had heard described and which I had been keen to verify. A number of cows were clustered about the bull, for he had fallen thirty yards from where he was shot, and with their tusks and trunks were doing their best to get him upon his feet; the remainder of the cows were doing patrol duty, rushing about in an increasing circle, searching for the source of trouble. That meant me, so I retired to a safe distance and waited for the atmosphere to clear. This bull stood eleven feet, four inches high at the shoulders, and the tusks weighed ninety-five and one hundred and ten pounds respectively, while the circumference of the front foot around the sole was sixty-seven and one-half inches, the largest recorded, I believe.

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Bulls in a make-believe fight. When this picture was taken there were elephants on three sides of the photographer, which explains the inaccurate focusing of the camera

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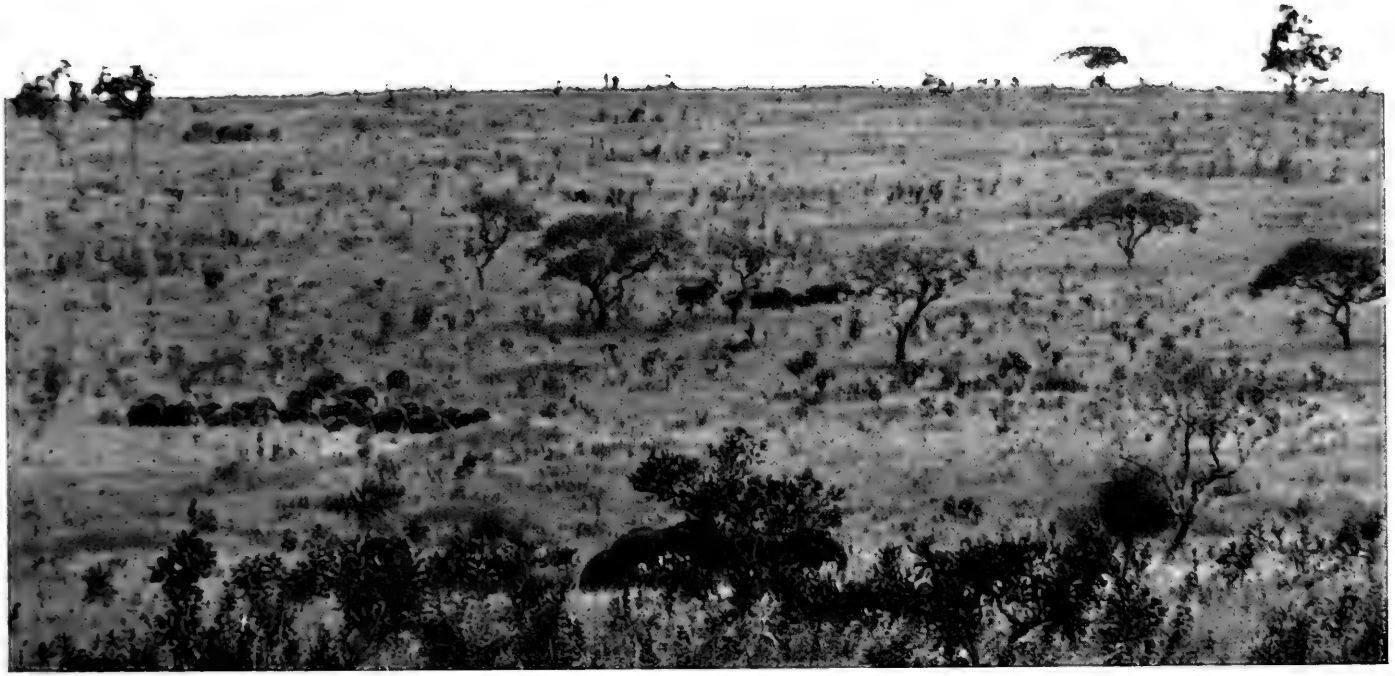
A number of cows did their best with trunks and tusks to get this fallen companion to his feet. He was one of a herd of 700 elephants; height at shoulders 11 feet, 4 inches; circumference of front foot (sole) 67½ inches, the largest recorded; weight of right tusk (showing in picture) 110 pounds. The oldest bulls are those which have long been protected in large herds of aggressive cows and young animals



THE PLATEAU TO THE EAST OF MOUNT ELGON

Four herds are in sight, consisting of cows and young animals of inferior grade. Mr. Akeley inspected more than one hundred elephants in the Mount Elgon district without discovering a single large specimen, all the valuable elephants having been killed off by ivory hunters; the herds remaining, having been unmolested for some years, are unusually vicious in temper

On the Elgon Plateau Mr. Akeley joined Colonel Roosevelt and his party in a short but successful elephant hunt

A SMALL HERD WITH ONE YOUNG BULL FACING READY TO CHARGE

"I ran around a clump of bush to head off this band of young bulls, and found myself closer to them than I expected. One of them saw me and I was expecting trouble when the camera should click, but they bolted and I got a second picture as they turned"

ELEPHANT COWS AND CALVES RESTING IN THE FOREST

They are quietly enjoying the midday siesta. A gust of wind blowing toward them from our direction would have been certain to result in a charge

The following day I went into the forest again and soon came up with a herd, but in cover so dense that an inspection could not be made. We worked with them for hours and finally succeeded in driving them out into the open, but unfortunately the grass was high and I had not succeeded in gaining a point of vantage, when with angry grunts they doubled back to the forest. As I turned to follow, my attention was called to a commotion in the bush at the edge of the forest some four hundred yards to the left. Another herd was coming out into the grasslands and from the top of an ant hill I saw them distinctly as they passed over a rise fifty yards away. There were eleven cows. I waited a few moments thinking that as often happens, a bull might follow in their wake. The cows had passed on to a distance of three or four hundred yards and I was about to leave the ant hill and return to camp, when from the direction of the cows there came a low, ominous rumble like distant thunder. It was not very unlike the angry rumbling sounds we had so frequently heard when with elephants, but it was plain talk and meant trouble. A hasty glance around convinced us that there was but one thing to do, to stand and meet the charge from the elevation where we were and from which we could see. If we tried to escape to one side or to the forest, we could not see them over the high grass before they were upon us. The rumbling was repeated two or three times, increasing in volume, and was then followed by the wild shriek of one angry cow and immediately taken up by ten others as they charged toward us. They came halfway and stopped for a moment. They had lost the wind, but immediately caught it again and roaring and screaming with redoubled energy, came into view over a slight rise. It was a disconcerting spectacle. Their great ears at full spread, trunks thrashing wildly, a roaring, screaming mass, forty tons of frantic female elephant vengeance. I remember that I felt homesick.

Were they to continue in a straight course they would pass at forty yards; then a dash on our part to one side and we could lose them and be safe. When they were nearly opposite us however, they either saw or winded us afresh and wheeled straight in, with a burst of shrieks. A shot from the big cordite

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A forest bed where a young elephant was born and cared for during the first week or ten days of its life. This was found by the expedition while traveling by compass on Mount Kenia, well away from all trails

rifle stopped the leader, but encouraged by the others she came on, only to be knocked down by the second shot. The others crowded about her, sniffed and—bolted. The old cow slowly regained her feet and staggered away while we in deep gratitude returned to camp.

It was in August, 1909, that we left New York commissioned by the American Museum of Natural History to secure specimens for a group of African elephants. We began serious work on the Uasin Gishu Plateau knowing that there we should be able to secure the smaller specimens, cow and young elephants, and we had reason to hope that a large bull might be found on the plateau or in the forests of Mount Elgon, for in former days great numbers had inhabited the rich feeding grounds of the Elgon forest as evidenced by the old pits (traps), scarred trees and decaying bones. We inspected more than a hundred elephants however, without finding a trace of a single large specimen. Soon after reaching the plateau we met Colonel Roosevelt and party, with whom we made a short but successful elephant hunt, the result of which was two cows shot by Colonel Roosevelt and one calf shot by Kermit Roosevelt. Later a young bull shot by John T. McCutcheon of our party was preserved.

We journeyed to the summit of Mount Elgon from the south and down to the east without finding the least recent trace of elephants until we had returned to the bush country of the plateau. Then we proceeded to Uganda, secured porters at Entebbe, marched along the Hoima Road to the Kafu River, down the Kafu to where the old Masinde-Kampala Road crosses it, then to Masinde, seeing no elephants during the two weeks' journey. We then devoted a month to hunting in the region of the Victoria Nile between Masinde and Foweira. This is a region of big elephants where many splendid tuskers have been taken in the past, but really good ones are now very rare. On this occasion we shot two bulls enormous in size but with tusks weighing only from seventy-five to eighty pounds each.

About the middle of April as I was suffering from physical disabilities that made the preparation of an elephant skin impossible, we decided to return to the Uasin Gishu Plateau where in the more healthful highlands I might hope for recovery. Though the rains were on at this time we found no elephants on the plateau, so we devoted twenty days to lion-hunting with a party of Nandi warriors for the purpose of making motion picture records of the spec-

A few years ago great herds were to be found in the forests of Mount Elgon but they have either been killed or have deserted because so harried by ivory hunters

An open waste in the bamboo jungles of Mount Kenia. The cows and calves spend much of their time in such jungles, feeding on the succulent roots of young bamboo. Many photographic studies were made by the expedition to help in the construction of a natural habitat for the elephant group to be set up at the American Museum

tacular sport of lion-spearing. About the middle of May we trekked across country to Mount Kenia for the purpose of making studies for the setting of the elephant group.

The forests of the southern slopes of Mount Kenia are inhabited by forest elephants, who seldom if ever leave them except to make short night excursions into the gardens of the Wakikuyu natives. Wishing to learn something definite in regard to the limits of their range on the mountain, we made the ascent from the south through the timber and bamboo belts on to the snow fields at the base of the pinnacle. We found that the elephants regularly work up to timber line (12,000 feet) and we found comparatively fresh tracks in the sphagnum marshes at 14,500 or more feet.

It was while on this excursion we found the "maternity bed" of an elephant. Under the protection of a great mass of aërial roots and the foliage of a great tree on the point of a densely forested ridge, accessible

from only one direction, there was a deeply trodden bed of dry earth where the baby elephant had been born and had spent the first week or ten days of its life, while the mother watched over it or fed on the abundant vegetation near at hand. Later we found a second bed precisely similar as to situation. These beds were well off the lines of elephant travel.

Upon returning from the summit of Kenia to the native gardens at the edge of the forest, I went back again to the bamboos to make photographic studies for the background and gather materials for accessories for the group. While thus engaged I met a bull elephant which left me much the worse for the experience and necessitated my return to the base camp on a stretcher. This event postponed work for several months and it was not until January, 1911, that we resumed active work in the field. From then until the first of June we worked in Unyoro from the Victoria Nile on the east and north to Lake Albert on the west northward of Masinde.

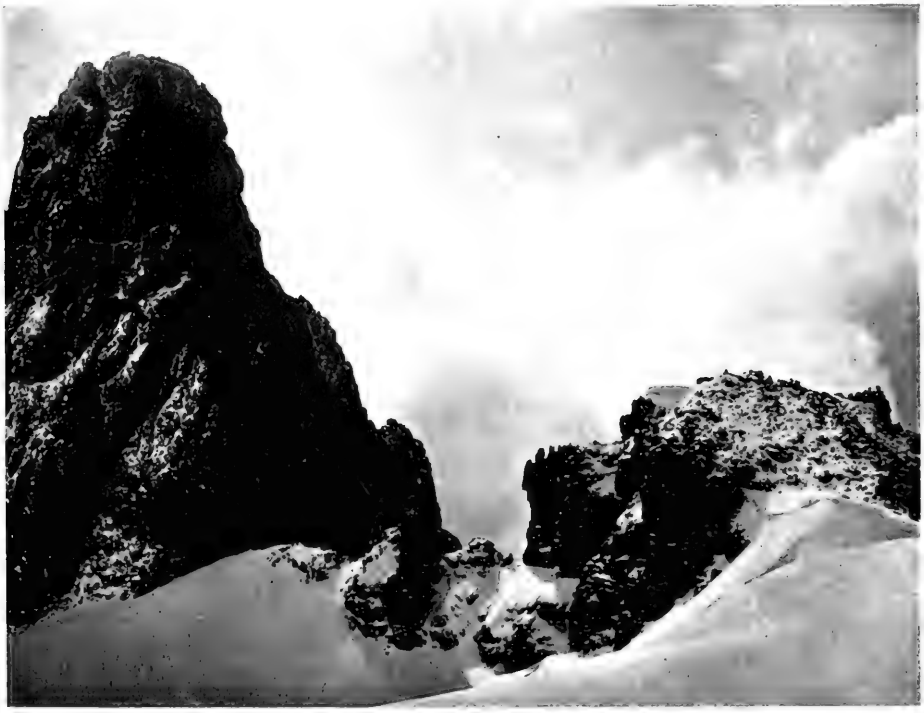
This district has now been closed because of sleeping sickness and thus becomes an elephant reserve. During the time we were there we saw much of the results of this awful disease, whole villages in which not a living being was to be found, those who had escaped alive having abandoned all household utensils and stored food together with the huts and gardens to the mercy of the elephants, who had come in great herds, destroyed the plantain groves and bark cloth trees, completing the work of devastation.

The elephants do not always, by any means, wait for the natives to go. We saw many cases where they had raided a garden at night and completely destroyed all crops and in some instances when angered by the natives' attempts to drive them away, had destroyed the huts also. The amount of damage that a herd of five hundred elephants can do to forests and native cultivation is enormous. In following a herd of two hundred and fifty we were led through a garden where the night previous elephants had destroyed a large plantain grove and broken down fifty or more bark cloth trees averaging a foot in diameter. This was a herd from which all good bulls had been killed and the remainder, enjoying immunity from sportsmen and ivory hunters, had become contemptuous of man. When we approached the herd and they became aware of our presence, they surged down upon us, keeping us at a distance, and not until I climbed a tree in advance of them did I get a chance to look them over as they approached and passed. The average value of ivory in this herd would not have exceeded twenty dollars per head, not enough to cover the damage done by them in one year.

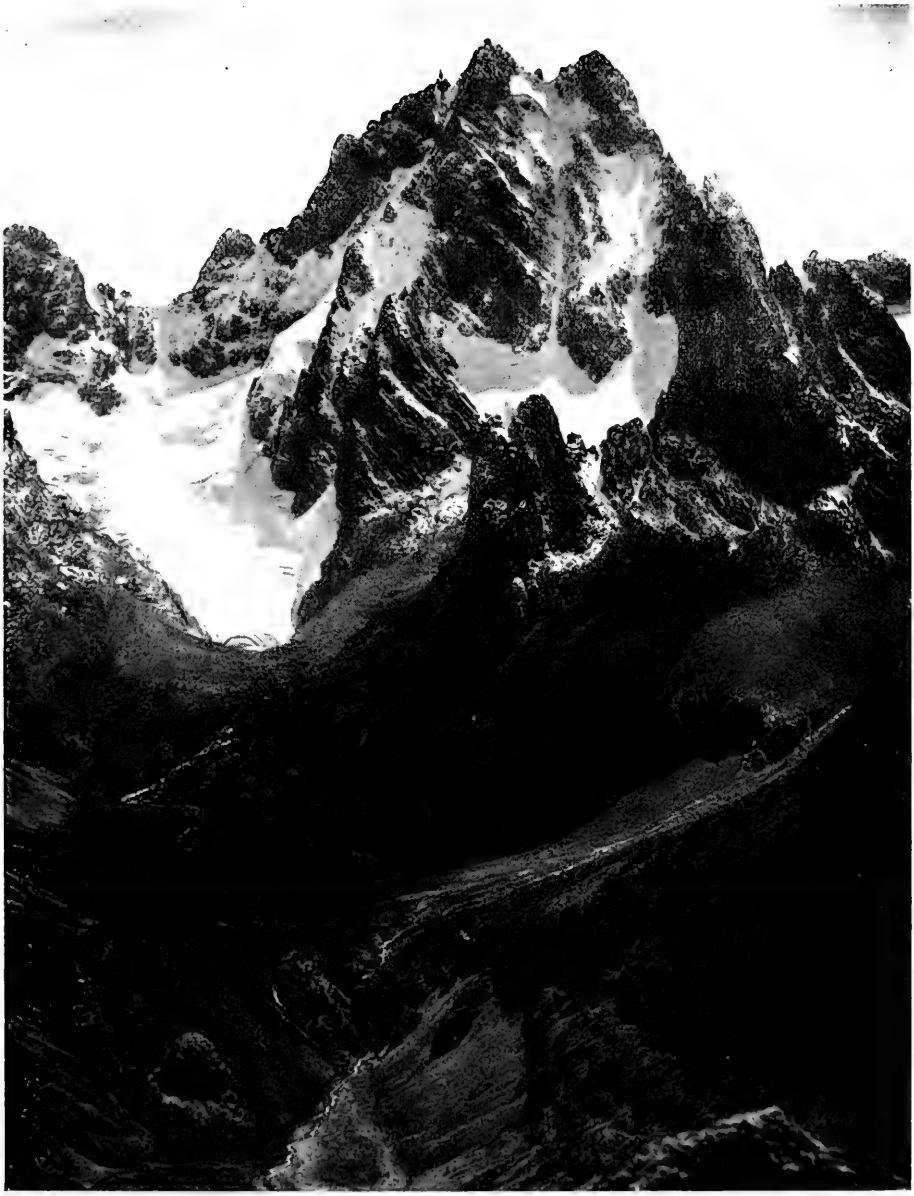
Coming south from the neighborhood of Murchison Falls we were resting at the summit of the pass over Poduro Hills when we detected a herd of about one hundred elephants at rest some two miles to the south. As we watched them they began moving in our direction and ultimately reached the base of the hills, where we met them. In the meantime a second herd of more than a hundred appeared, traveling rapidly to the north passing within

MOUNT KENIA, AN OLD DENUDED VOLCANO OF BRITISH EAST AFRICA

Photograph taken from a position southwest of the mountain in the village of Chief Gwandero, a Kikuyu



Batian, Mount Kenia's highest pinnacle (17,007 feet) viewed from Lenana (16,300 feet), the snow dome above Lewis glacier



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THE SUMMIT OF MOUNT KENIA

The glaciers are Tyndall at the left, Darwin, the small one in the center, and Lewis which is largest at the right [see cut on opposite page]. The pinnacles are Batian, the highest, and Nelion, second in size

The ascent of Kenia was made by the expedition to know the exact limit of the range of the elephant. The animals were found up to timber line (12,000 feet), and comparatively recent trails were discovered in the sphagnum marshes at 14,500 feet. The journey led from the south through the timber and bamboo belts on to the snow fields at the base of the pinnacles

The monkey, named "J. T. Junior," was captured on the Tana River in the first month of the expedition's travels and remained a member of the party throughout the two years — often the most helpful member in the good cheer he furnished. In the climb of Mount Kenia he was stricken with mountain sickness at 15,000 feet elevation and had to be sent back

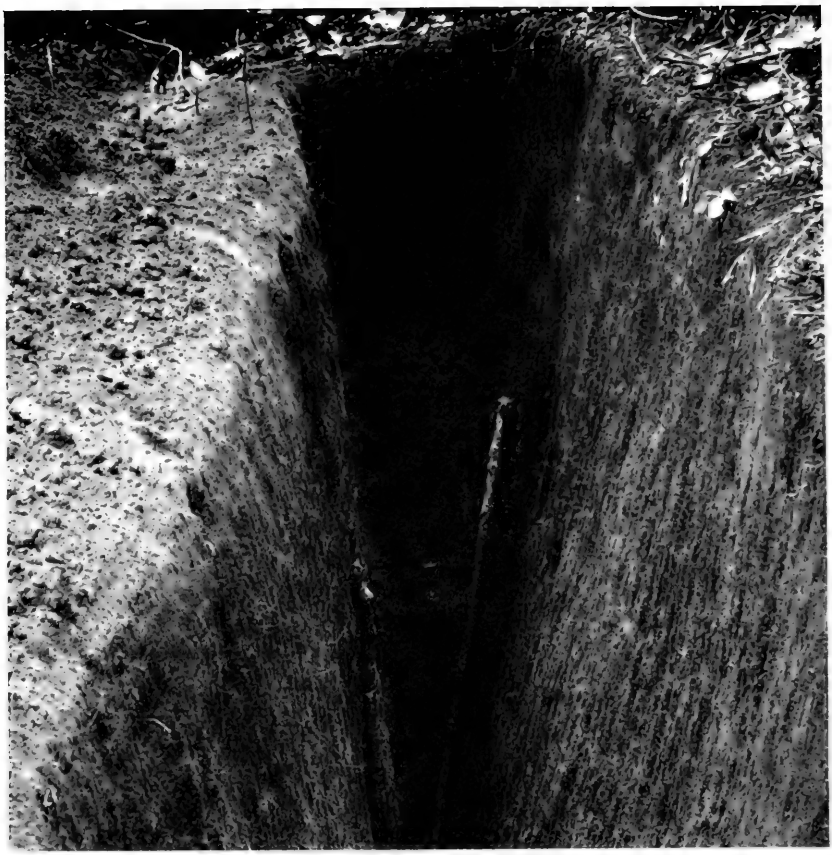
easy inspection range of our outlook. During the time we were engaged in watching these elephants, the middle ground was occupied by two herds of buffaloes and as we went down to look the elephants over at the foot of the hills, we jumped the third herd of buffaloes in the bamboos. There were over three hundred in all.

It is generally understood that large bull elephants are more frequently to be found apart from the herds, but our experience does not bear this out. Three bulls that we have shot having tusks each weighing one hundred pounds or over, have been herd bulls. In Uganda we often found bulls unaccompanied by cows, singly and in small herds numbering up to fifteen individuals, but it was not among these that we found the largest tusks. We have found the large old bulls enjoying the society and protection of large herds of cows and young animals.

One splendid old bull well-known in Uganda, who has been seen by many hunters, is so well protected by a large herd of most aggressive cows, who charge at the slightest intimation of danger, that he still survives. These

In this garden during the night previous, elephants had destroyed a large plantain grove and broken down fifty or more bark cloth trees averaging a foot in diameter. Elephants come in herds to villages deserted because of sleeping sickness. The damage is usually accomplished by herds containing no large ivory and which consequently have been unmolested by hunters until they are contemptuous of man

This was one of a herd of eight or ten bulls. He charged ferociously three times and nearly caught one of the boys of the expedition. He was a heavy, thickset elephant, with short tusks of eighty pounds each. His ears were extremely large, six feet, five inches in depth



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A freshly dug elephant pit. The top will be covered with cross sticks and concealed by earth loosely thrown over the sticks. The unwary elephant crashes through this cover, its great feet are wedged in at the bottom of the pit and it suffers a lingering death. An elephant pit is usually 9 feet deep, is large at the top (3 to 4 feet wide and 10 to 12 feet long) but tapers to a width of only 6 to 12 inches at the bottom. Pits are often made in groups of three, one in the trail and one a few yards at either side

old bulls are very rare, for when a bull has developed tusks of fifty pounds, which is at quite an early age, perhaps twenty-five years, he becomes the target of every hunter, native or white, who sets eyes upon him; thus it is only the more crafty or timid individuals, that seeking the protection of large herds or clinging to the more inaccessible regions such as dense forests, manage to survive to a ripe old age and develop a full growth of ivory.

The best bull at present in our collection for the group is a young adult standing eleven feet, three inches at the shoulders with tusks of one hundred and one hundred and two pounds respectively. These are young ivory and there can be no doubt that were this elephant to have lived fifty years longer, they would have attained a weight of two hundred pounds. Such tusks

are not abnormal, they are simply the tusks of a good healthy bull who has been intelligent and lucky enough to keep his life until his ivory was full-grown.

It would seem worth while that the world's permanent record of elephant life should contain a specimen that illustrates the fullest development of the African species, the finest living representative of this race of animals. Such an elephant can be secured now, but it will soon be everlastingly too late, for the remaining monster specimens will be killed for their ivory.

An elephant pit completed but a few weeks, yet effectively concealed even to the observing eye by a new growth of vegetation. The pit is a hidden menace to the hunter as well as to elephants. It is sometimes furnished at the bottom with sharp-pointed stakes but fortunately this is not always true so that a man may fall into one with no more serious result than a good shaking up

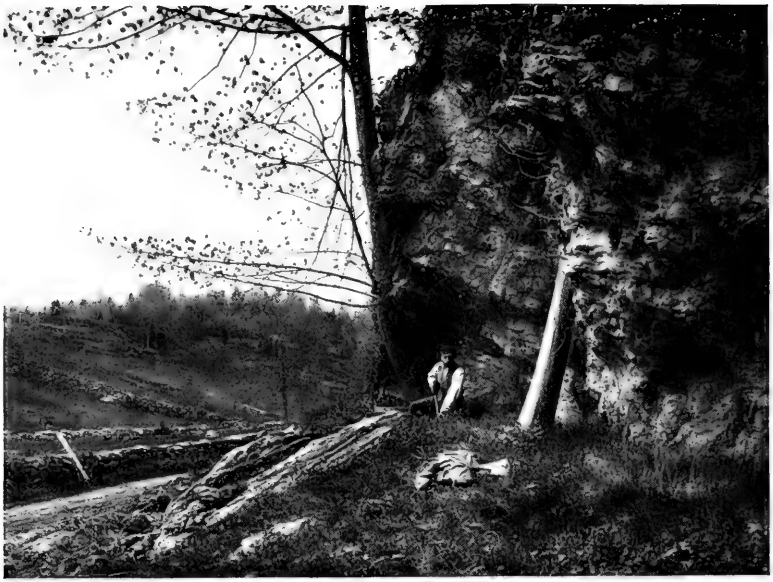
INDIAN ROCK-SHELTERS

By Max Schrabisch

THE North American Indian, after he had long ceased to be a cave-dweller and had indeed acquired considerable skill in building tipis, wigwams and huts, was by no means averse to spending a week or two in the protection of some natural rock-shelter. It is only within very recent years that such aboriginal rock-houses in the East have been systematically investigated, although in the western states they have long attracted the attention of archæologists. It is needless to say that these Indian rock dwellings — twenty-five of which I have explored since 1901 in northern New Jersey and southern New York — can occur only in mountainous districts. Here the redskin found natural clefts in the rocks, shelters under ledges or holes under large boulders and piled up masses of rock. The largest rock-shelter that I have discovered, known as Horse-stable Rock, lies two miles east of Tuxedo Park. It is at the base of a cliff, the roof of which projects from fifteen to twenty feet at an average height of eight feet above the floor, and it has a length of sixty feet. The smallest with height six feet, length six feet and projection of roof five feet, is situated in Passaic County, one mile south of Franklin Lake.

There is however many a fine rock-shelter, perfect in configuration and affording protection from boreal blasts, which has never been inhabited by the Indian, if we are to judge by the total absence of all traces of occupation. On the other hand, many apparently inferior shelters have been in great demand. The reasons for this are twofold: In the first place, a shelter to be desirable had to have a water supply in the immediate vicinity, such as afforded by brook, spring or swamp; and again, it appears that the redman preferred shelters with a more or less southern exposure, where the warmth of the sun's rays could be felt the greater part of the day. Rock-houses with water close by have apparently been avoided, probably for no other reason than that they opened northward, an apt illustration of the phenomenon of heliotropism observed throughout animate nature.

Inasmuch as our Indians were gregarious like ourselves, living together in their villages on the plains and in the valleys, it is highly probable that they used these rock-houses only as temporary stopping places to which they could repair for the sake of convenience, to feast, and to rest from the fatigues of the hunt. Besides, many of these rocks are in the wildest and most inaccessible sections of country, far away from the well-beaten trail. This being the case, it is quite certain that only the able-bodied huntsman would camp there, squaws and papoose staying behind in the settlements. The difficulties attending a journey through the trackless wilderness account also for the fact that no pottery was found in the rock-shelters which were hardest to reach, while those of easy access invariably contained pieces of



Digging for Indian pottery and weapons. This rock-shelter of Fairfield County, Connecticut, illustrates one of the most inferior of Indian shelters discovered, formed merely by an overhanging rocky ledge but in favorable position at the junction of two streams. The Indian used rock dwellings as temporary habitations, choosing the ones which combine southern exposure with a near supply of water

broken pottery, either on the ground or a little below the surface. Still it is quite possible that some of these shelters, especially those which were favorably situated, may have been occupied by whole families for months at a time, and this particularly during the winter season.

Wherever man dwells he leaves traces as evidence of his whilom presence. If scrutinized, these mute witnesses of days gone by furnish much information of archæological import. They tell us something about the mode of living and the degree of skill attained in fashioning tools. Each rock-shelter that I have investigated has presented features of its own. The arrow point has been met with in nearly all of them, a notable exception being an Indian cave near Paterson, N. J., where nothing was found but flint blades and bones of many species of animals. Scrapers and chips are of common occurrence, a fact showing plainly that the ancient occupants of these rocks devoted much of the time spent there to replenishing their stock of weapons. As already stated, pieces of pottery are generally found only under those rocks which are easy to reach. Again, some shelters are remarkable on account of the profusion of bones scattered throughout the soil, with also many indications of ancient fires — fireplaces, heat-cracked pebbles and smoke-stained rocks. The bones belong predominantly to deer but also to many kinds of animals hunted by the redman, bears, opossums, rabbits, woodchucks, muskrats and wild turkeys, some now being

An Indian rock house in Westchester County, New York. This has a cavelike form. Large at the entrance (15 feet wide by 12 feet high), it grows gradually smaller until it makes a sharp turn 25 feet from the entrance into a room 6 feet wide and 3 feet high. Examination of these shelters to-day reveals pottery, arrow heads and other weapons, and bones of many animals used for food. Two Indian fireplaces were found in this shelter

extinct in the given districts. It is evident that the profusion of bones in any one place points to the fact that here the hunter was in the habit of feasting on the spoils of the chase. The bones show that they were cracked for the marrow as was usual, and many show traces of having been in contact with the fire. It does seem strange that not a single tomahawk or hatchet has been found in any of the twenty-five rock houses thus far explored. On the other hand, three comparatively rare artifacts — namely, a gorget perforated at both ends and two pitted hand hammers used for cracking nuts were obtained in three different shelters. Most of the prehistoric objects are found buried in the subsoil covering the floor of the shelter and they often occur all the way down to a depth of three feet.

To him whose mind is of an archæological turn, the exploration of an Indian rock-shelter is an undertaking of the most fascinating kind. To such a one these places are invested with an irresistible charm, for here on the well-defined space underneath the rock he fancies to come nearer to the redman, to enter into greater intimacy with his interests and sympathy with his life. In contrast with field work which necessitates the search of ancient village sites, of ploughed fields along the banks of lakes, rivers and brooks, here everything is in one spot, narrow and circumscribed. Often the investigator wishes however that the rocks could speak and tell the happenings which once took place under their hospitable roof.

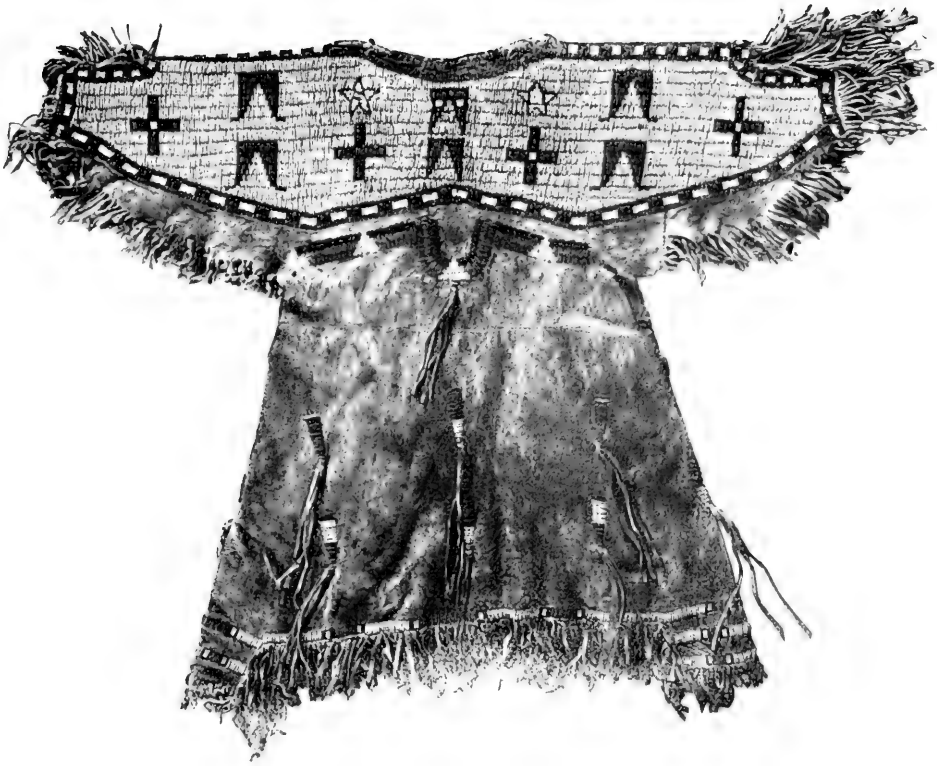
A STORY OF DECORATIVE ART

By Clark Wissler

AMONG the exhibit for the Indians of the Plains may be seen a few of those long, flowing buckskin dresses with beaded yokes so characteristic of their time, and in many yoke patterns can be seen a small *U*-shaped figure. Some old Teton-Sioux women once told me that it had been handed down to them that this figure symbolizes a turtle's head as he emerges from the lake represented by the beaded body of the yoke. In that fascinating jumble of myth, philosophy and religion from which these people derive the sanctions for their acts, the turtle stands for concepts intimately associated with woman and her ways, and hence it is fitting that the sign of the turtle should be upon the dress. The resemblance is apparent and it is natural to assume that this design was devised expressly to represent the turtle, since there is both poetry and art in the decoration of these old dresses.

Yet while we are convinced that these wrinkled old matrons of the Sioux told us what had indeed been handed down to them by their mothers, we hesitate to accept this as indicating the true origin of the design, for upon the garments of other tribes, even those speaking other stock languages, we find similar figures. The women of the Assiniboin, the Cree, the Gros Ventre, the Mandan, the Blackfoot, the Cheyenne, and others used variations of this figure on their dresses, for even the Indian belle had a weakness for the styles of foreign tribes. The simple fact that the style is so distributed does not necessarily weaken the assumption that it originated among the Sioux since from them it may well have been borrowed, while the fact that in so far as we know, not one of these other tribes has the least suspicion that the *U*-like figure represents a turtle or anything else, gives some color to its assumed Siouan origin. When however the dresses of the Blackfoot and some other tribes are examined, we note that in preparing the deer or elk hide for a dress the tanner is careful not to remove the hair from the tail. We note further that these dresses are fashioned by joining the tail ends of two elk or deer skins by a yoke or neck piece, the tail tuft by its position falling just below the center of the yoke. When the beading is laid on, the patterns are carried around the tail tuft with a sharp *U*-like turn. This is well shown on the fine old Blackfoot dress in the Audubon collection.

In some dresses the tail tuft is not as originally attached but sewed in place, making it clear that the conventions of style require the small tuft of hair on that part of the garment. When we look again at certain Sioux dresses, especially the one on the tall figure standing in one of the Museum cases, the beaded design bears even stronger resemblance to a deer tail than to a turtle. The tuft of hair is wanting, but within the beaded *U*



is a beaded design not unlike a deer's tail. Thus, it seems more likely that the simple deer's tail had its place on the dress of these Indian women before the yokes were beaded or quilled and that all for a time retained it, carrying the beaded design around its base. This in its turn became so fixed that though some tribes gave up the tail, they still kept its niche.

Unfortunately neither theory can be proved. Yet there are so many similar relations in the art of lowly peoples, that we incline to the assumption that the design is a deer's tail and not a turtle. On many objects even among our collections from the Plains may be seen a variety of identical designs symbolizing one thing to one tribe, a different thing to another, and nothing whatever to still others. Like all of us, the Indian has ideas and feelings to express, and seizes upon such symbols as come to his hand, reading into nature and art what is in his own mind.

So in this story we have one oft-repeated in decorative art: the adaptation of color and form to the contour of the decorated surface, the wide distribution of the motive because of its peculiar merit, and at last the touch of a refined personality who sees in it the symbol of some mighty thought. That the reverse order of procedure is the usual one is a theory often read in books and no doubt true in some instances, but absolute proof in either case is lacking.

A NAHANT TIDE-POOL THAT THE MUSEUM PLANS TO REPRODUCE

This pool will be copied exactly — from the brilliantly colored animals and seaweeds of the water to the barnacle-covered rocks that arch above. Thus will be given permanence to one of the most instructive of biological associations in marine life

ROCK TIDE-POOLS OF NAHANT

By Roy W. Miner

NAHANT on the north shore of Massachusetts is a region of wonderful rock tide-pools. The eastern face of the Nahant peninsula is formed by a cliff-wall of slate, granite and igneous rock occasionally rising to a height of sixty feet above the ocean. A certain pool at the foot of these cliffs, is spanned by a natural flying buttress of barnacle-covered and seaweed-draped rock which seemingly braces the precipice above. At low tide, in the water overshadowed by the arch, a marvelous profusion of animal and plant life is disclosed to view. Amid masses of "Irish moss," its finely cut lobes brilliant with purple lustre, rise the conical chimneys of gray-green sponges, while clustering groups of sea anemones, orange, brown or white, slowly unfold their petal-like tentacles. Starfishes of various sizes and contrasting colors — brilliant crimson, orange, purple and yellow — are seen everywhere on the pebble-strewn bottom or crawling slowly over ledges dotted with pink coralline and feathered with ruby-centered hydroids. Here and there is the green of sea lettuce beneath which lurk rockcrabs, while brown kelp reaches its great fingers toward the surface.

This particular pool has been selected for reproduction in the Museum and was carefully studied during the past summer by the writer, accompanied by Messrs. Matausch, Shimotori and Kirschner of the Museum staff. To transport this fairy cavern and enclose it bodily within museum walls seems a presumptuous undertaking, yet it is hoped that within the coming year an approximately faithful semblance of its beauties may form one of the new series of groups now under construction for the Darwin Hall.

AN EXPEDITION TO THE BLACK MOUNTAINS

By William Beutenmüller

THE Black Mountains being the loftiest of the Appalachians represent a region in which the remains of pre-glacial life can be studied to the best advantage. The insect life of the great Appalachian Mountain System is the most alpine of the southern Alleghenian fauna and therefore most typical of that fauna which skirted the great ice pack of the glacial epochs. The species of this fauna occupied a large part of the area of eastern North America during glacial times, when most of them became extinct. Therefore the species of the Appalachian System are a remnant of a fauna, at one time very extensive. Their present relationships are to a certain extent with the modified forms of lower altitudes, but to a far greater extent with the boreal forms found in more northern latitudes.

Two waterfalls among the tree ferns and other dense vegetation of the Roseau Gorge, Dominica

Valley of the boiling lake, Dominica, an ancient crater with many hot streams and pools

It is well known that from a faunal standpoint the southeastern United States (exclusive of Florida) is very remarkable. The fauna is not only rich in individuals and species, but also in endemic forms, that is species not to be found anywhere else. Some of these are indigenous while others are evidently fragments of an ancient and formerly widespread fauna.

The fauna of the South Appalachian System is very characteristic and the general relationship points both biologically and geographically to that of the northeastern United States and Canada.

From June to October an expedition from the Museum was engaged in field studies in the Black Mountains. The expedition was made possible by the generosity of Mr. Samuel V. Hoffman and the object was to collect butterflies and moths especially, and to obtain additional scientific data relating to the larger problems of ecology and distribution. Some four thousand specimens were collected, among which were many rare species not heretofore known from this region.

IN DOMINICA AND OTHER LESSER ANTILLES

By Henry E. Crampton

THE Lesser Antilles comprise a region interesting for biological study inasmuch as it provides the stepping-stones by which North America was in part repopulated from South America at the close of the Ice Age. The invertebrate faunas of this region were studied by three members of the invertebrate zoölogy staff in the summer of 1911.

On reaching St. Thomas khakis and leggings were donned, knapsacks and camera shouldered, and a hurried dash for specimens made into the interior, an action repeated at St. Croix, Antigua, Guadeloupe, Martinique and St. Lucia, much to the amusement of the ship's officers and to the wonderment of the inhabitants. More than two weeks, indeed more than three weeks in the case of Mr. R. W. Miner, assistant curator, were devoted to the study of Dominica, which is a magnificent field for biological explorations as well as the most beautiful of all the smaller islands. The work took the explorers from the low levels of the coast up through the lime and cocoa plantations of the narrow valleys into the dense jungle of the higher areas which are surmounted by sharp peaks rising to a height of nearly five thousand feet.

Most novel scenes confronted them on the visit to the volcanic crater whose present floor is seamed with steaming torrents, dotted with hot springs and in part occupied by a large boiling lake. So many different kinds of biological conditions have to be met by the species inhabiting this island that the thousands of insects, myriapods, spiders and other forms collected are exceptionally valuable for the study of the great laws of distribution and organic evolution.

COLLECTING IN JAMAICA

DURING the past year Mr. John A. Grossbeck and Mr. R. P. Dow, a member of the New York Entomological Society, have made large insect collections on the island of Jamaica for the American Museum. Considerable work was done at Cinchona, where is located the tropical botanical station of the New York Botanical Gardens. The town lies in the Blue Mountains about twelve miles from the coast at an elevation of 6000 feet. A luxuriant tree-fern forest was visited on the top of one of the highest peaks. The species secured from the various environments in these mountains are valuable for comparison with forms collected on lower levels of the island.

Montego Bay also furnished good collecting, with a series of cave species. For comparative study with these species at sea level, Catadupa, twenty miles inland and 3000 feet high, was also explored. More than three thousand entomological specimens representing approximately five hundred species, and about one thousand other invertebrates were secured altogether. Careful ecological data with a series of photographs illustrative of different environments give unusual value to these Jamaica collections.

Termites, or white ants, travel in covered galleries which they construct along every branch of the tree

The termite nest is made of wood-pulp and placed usually in trees, although sometimes attached to fence posts or stone walls

AN AFRICAN TRAVELER'S NOTE

THE Rev. W. S. Rainsford, who returned sometime since from an extended trip through British East Africa, has presented to the Museum a small collection of implements of war and the chase used by the Cherangang N'dorobo. In this collection are darts for killing the elephant, a quiver with iron-pointed, poisoned arrows for general hunting, and one arrow with point of wood to which Dr. Rainsford has attached a label with this legend, "For shooting men." He has also presented the Museum with a rare species of monkey.

Dr. Rainsford gives the following note regarding his gift:

"The poison smeared on the elephant darts was given me by the Cherangang N'dorobo. This small tribe has lived among the heavily wooded fastnesses of a range of mountains which border the N'zoia Plateau on the east in British East Africa, mountains called also the Elgeyo escarpment.

So far as is known the little tribe has held its own in this home for ages, constantly attacked by Nandi and Karamoja, tribes outnumbering the N'dorobo more than one hundred to one. It has always beaten them off, sometimes with severe loss to the enemy. The deadly poisoned arrow has been this tribe's all-sufficient weapon.

The N'dorobo sometimes sell the poison, but I doubt that the poison sold is as deadly as that which they use on their own weapons. Of the terrible nature of this poison I have myself been a witness. They told me it lost strength with age. The secret of its preparation is most carefully guarded. When fresh, a very slight wound with a wooden headed arrow is sufficient to kill a man almost instantly.

The monkey (*Erythrocebus whitei*) I shot on the N'zoia Plateau. It is a very shy and very active species living on a level country where there are no high trees, often no trees at all. Indeed it avoids high and thick woods, where other monkeys are usually found. This flat country is so infested with lions and leopards that all the activity and cunning of the native is frequently called into play to escape them. I have even known lions of that region to hunt down and devour a cheetah.

I saw the monkeys several times but only once did I succeed in getting a shot. I never saw more than three of them together and I found them harder to stalk than any other animal I followed in Africa."

The N'dorobo, or Wandorobo, of the deadly poisoned arrows, are a people closely allied to the Masai in physical type and many cultural traits, but differ in being a hunting not a pastoral tribe. Dr. Rainsford does not speak of the method of preparing the poison; Lieutenant Weiss of the German army states however that it is derived by boiling the roots and twigs of *Acocanthera abyssinica* into a pitch-like paste and that in this condition it is smeared on the heads of the arrows.

CROW INDIAN CLOWNS

By Robert H. Lowie

DURING the week of their July festivities the Crow Indians still indulge in an old clown performance formerly conducted in the spring. One man takes the initiative and bids his companions meet him in the brush, bringing with them leaves, gunnysack and mud. They plaster their bodies with mud instead of the usual body paint, prepare crude masks, as well as intentionally ugly shirts and leggings. Some manufacture mock-shields. One performer always masquerades as a woman. Clad in their newly made garments, they return to camp, where of course they cannot be recognized. If possible, they capture and ride the worst-looking horses to be found, and the person singing for the performance secures a miserable drum with cracked drumhead. The spectators hem in the clowns, a horseman pushes back the crowd and the dance begins. Each clown acts in his most ludicrous manner; wags in the audience make comical remarks. The clowns announce by means of gestures that they have come from very far away, from the sky for example, and have had to travel hundreds of days in order to get to the Crow. The spectators try to identify them and very likely pelt them with mud. Finally the dance is over, when the clowns run back to the brush, put on their usual garments, and come slinking back into camp.

MUSEUM NOTES

Since the last issue of the Journal the following persons have been elected to membership in the Museum:

Life Members, Mrs. W. Bayard Cutting, Mrs. A. D. Juilliard, Miss Charlotte S. Baker and Messrs. Carl E. Akeley, Bernard M. Baruch, C. William Beebe, Louis V. Bell, W. R. Callender, Hugh L. Cooper, Marcus Daly, N. W. Harris, Henry C. Phipps, Robert J. F. Schwarzenbach, Herman Simon and Master H. Martyn Baker;

Sustaining Members, Messrs. Horace Havemeyer and Robert Maxwell;

Annual Members, Mrs. E. S. Auchincloss, Mrs. Birdseye Blakeman, Mrs. Charles A. Davison, Mrs. William P. Draper, Mrs. Sarah H. Emerson, Mrs. Frank D. Harmon, Mrs. Halstead Pell Hodson, Mrs. Edwin B. Holden, Mrs. Thomas A. Howell, Mrs. R. P. Huntington, Mrs. Minor C. Keith, Mrs. James Gamble Rogers, Mrs. James R. Sheffield, Miss Emily Vernon Clark, Miss Alice Bleecker Fox, Miss Marion Erskine Platt, Miss B. G. Stillman, Miss Elizabeth B. Stone, Miss Maria Willets, and Messrs. John Achelis, Louis Akin, William C. Beecher, Clarence H. Bissell, Graham F. Blandy, B. Blumenthal, A. Huidekoper Bond, E. H. Bright, Irving Swan Brown, J. Alexander Brown, Thomas A. Buckner, Frederick V. Clowes, Frederic A. Cole, Robert H. Cook, Clarkson Cowl, Edwin Willard Deming, Chas. Dickinson, William C. Duvall, Frederick H. Eaton, Milton S. Erlanger, William L. Feeney, Elias J. Feuerstein, Edward B. Finch, Richard H. Fraenckel, Albert Gallatin, E. V. Gambier, Samuel W. Goldberg, Frederick Goldsmith, Morris Goldzier, Ramon Guiteras, Henry L. Gwalter, Daniel S. Hage, William A. Hamann, John G. Hannah, Thomas Hastings, F. C. Havemeyer, Max Held, William H. Heller, Max Herman, W. W. Heroy, James S. Higbie, Howard P. Homans, C. S. Homer, Ford Huntington, William Jay Ives, James W. Jackson, Alfred W. Jenkins, Patrick Kiernan, Edward J. Knapp, Joseph P. Knapp, Louis Krower, W. V. Lawrence, Charles M. Lea, R. Walter Leigh, George Lueders, David L. Luke, Albert G. Milbank, George A. Molleson, James G. Newcomb, Edward D. Page, Archer Vance Pancoast, Edgerton Parsons, Raymond C. Penfield, G. Lawrence Perkins, Auguste Ruffin Pottier, William J. Quinlan, Jr., George I. Roberts, J. E. Roth, William L. Rouse, Otto M. Schwerdtfeger, Dudley D. Sicher, James C. Smillie, Ralph Smillie, Theodore E. Smith, Carl Stoeckel, Harold Phelps Stokes, George C. Stone, I. F. Stone, George H. Storm, Emil L. Strobel, Charles Tatnam, Alvin Untermyer, Ottomar H. Van Norden, Arthur Williams, James V. S. Woolley.

The skins and skeletons of two Prjevalsky wild horses have been presented by the Duke of Bedford to the American Museum, and one of them has just been received and is now being prepared for mounting. The Prjevalsky horse is the only living wild species of the true horse (as distinct from the asses and zebras). Inhabiting the most remote parts of Central Asia, its existence has been doubted until recent years, and of the specimens sent to Europe and this country, several have been merely Mongolian ponies run wild or hybrid stock. The little herd in the Duke of Bedford's park at Woburn Abbey however represents the true strain of the wild species, the last survivor in nature of the numerous wild horses which inhabited the northern world in prehistoric times.

A public reading-room has been established on the second floor not far from the elevator, where visitors will find many volumes bearing upon the collections and work of the Museum. These books include a number of the more general or popular works on natural history, dealing with the haunts and habits of many of the animals, and also books of travel or those telling of the habits of the more savage races, their myths, traditions and customs, or describing what is known of the history of the earlier inhabitants of this country.

The library of the Museum, which is one of the most complete of its kind in this country, is also freely open to visitors, who may consult its many volumes and periodicals. The reading-room is by no means intended to take the place of the library, but rather to lead up to it, and its aim is promptly and readily to furnish general information to visitors who may wish to know more about the collections than can be gathered from the labels and the objects themselves.

Mr. Carl E. Akeley and Mr. C. William Beebe were elected life members of the Museum at the meeting of the Executive Committee on January 17, the former in recognition of his explorations and zoölogical studies in Africa and for his contributions to science, the latter in recognition of his scientific work and his gift to the Museum of a collection of mammals from the East Indies.

At the annual meeting of the American Anthropological Association Dr. Robert H. Lowie was elected associate editor of the *American Anthropologist*, and editor of a new quarterly to be devoted to current anthropological literature.

Prof. C.-E. A. Winslow was elected Vice-President of the Society of American Bacteriologists at its meeting in Washington during convention week.

The Executive Committee, at its meeting of January 17, appointed Mr. Charles W. Mead assistant curator in the department of anthropology, the appointment to take effect January 1, 1912.

Two volumes (XXIX and XXX) of the Museum *Bulletin* were published during the year 1911. Volume XXIX is devoted to a single subject, "A Synonymic Index Catalogue of American Spiders" by Dr. Alexander Petrunkevitch, honorary curator of Arachnida in the American Museum. The work comprises all the species known to inhabit the two American continents and their adjacent islands, from Greenland to Patagonia. It forms a volume of nearly 800 pages, and consists of three parts — (1) Bibliography, (2) List of species with synonyms and reference, (3) Alphabetic index to synonyms. Types are designated for the genera, and the localities are given from which the species have been recorded. It is thus an indispensable reference book for all arachnologists.

Volume XXX contains about 400 pages, 17 plates, and about 150 text figures, and gives some of the results of the work of the scientific staff for the year. Among the sixteen papers, one of much general interest by Colonel Theodore Roosevelt, on "Revealing and Concealing Coloration in Birds and Mammals," has been noticed in an earlier number of the Journal (Vol. XI, Oct., 1911, p. 200).

In 1908 the department of anthropology sent an expedition to James Bay, Canada, in charge of Mr. Alanson Skinner, to study the Eastern Cree Indians. The party went in by the Missinaibi River. The next year the party made a second journey, this time down the Albany River. The total distance traveled by canoe and on foot was some twenty-four hundred miles. The scientific results of these journeys have just appeared.[1] While hardships made a complete investigation impossible, this paper gives nevertheless descriptive data on almost every phase of the Cree and Saulteaux culture. The information on food habits and hunting customs is satisfactory and the collection of Cree tales and myths indicates clearly their tribal relationships. The author believes that the Cree have a culture intermediate between that of the Eskimo on the north and the Woodland Indians on the south, best designated perhaps by the term sub-arctic. Particularly interesting are the notes on the use of grooved stone axes, stone knives, and other primitive tools till recently in occasional use. It is often necessary to remind the general reader that the Stone Age was but a condition and not an absolute period. Another interesting point is full data upon typical bear-hunting ceremonies among the Saulteaux, a feature so far not adequately described. Also a unique and almost extinct type of basket weave was found.

[1] Notes on the Eastern Cree and Northern Saulteaux. By Alanson Skinner. pp. 178, plates 2, figs. 57, *Anthropological Papers*, A. M. N. H., Part I, Vol. IX.

A NEW rattlesnake group to illustrate social instinct in hibernation was put on exhibition during January. Seven banded or timber rattlers (*Crotalus horridus*) in both the black and yellow phases of coloration are represented on a rocky ledge, the poses depicting slow movement on a cool day and in the absence of enemies. Late in the fall under the influence of increasing cold, snakes which have assembled thus in September crawl away through deep crevices into concealed chambers underneath the rocks, where they sleep together throughout the winter. The group shows also color variation in two of the small broods of young banded rattlers. This species is the only poisonous snake besides the copperhead in the eastern United States.

THE department of anthropology was recently visited by Dr. Werner von Hoerschelmann on his return from Mexico, where he has been at work for over a year under the direction of Professor Seler, as holder of a scholarship granted by the Prussian government. Dr. von Hoerschelmann is especially interested in the subject of art and discovered many points of interest in the Museum's collection of Mexican antiquities.

THE Indian tipi in the new Plains Indian Hall has been mounted by Mr. Schoichi Ichikawa. The floor has been carefully laid with buffalo grass sod supplied by Dr. James R. Walker, Pine Ridge, South Dakota, so that the visitor may see, as it were, the home of the roving Indian pitched for the night upon the brown unbroken turf of the Plains as in the good old buffalo days. The tipi came from the Blackfoot tribe. Within may be seen the life cast of a Blackfoot man in the act of preparing tobacco for the pipe. Near him his younger wife is stirring up the fire, while opposite her is the older wife with an infant. The latter has her face liberally coated with earth paint as was the custom among those of her station in life. Back of the fire is an incense altar upon which daily prayer offerings are burnt and from which may be seen rising a faint column of smoke.

THE MUSEUM has received a number of bottlenose porpoises (*Tursiops tursio*) as a gift from the New York Zoölogical Society. For many years a fishery has been in operation at Cape Hatteras, where porpoises are taken for the sake of their oil and also for their hides, though how the tender porpoise skin can be tanned into tough leather is one of the mysteries of modern science. Dr. Charles H. Townsend of the aquarium has for some time wished to secure specimens from this locality, a project requiring a combination of favorable circumstances. The porpoises must be feeding near shore, which they do at certain seasons and not at others, else being caught in nets they would be drowned before brought to land; the sea must not be heavy or the same unfortunate result ensues, to say nothing of the danger of taking boats through the surf; also the weather must be neither

too hot nor too cold, because of danger of the animals dying in transit. Dr. Townsend devised an ingenious method by which the porpoises would travel comfortably and be left free to breathe, and dispatched an assistant to Cape Hatteras. After considerable work and delay half a dozen fair-sized examples were selected, packed, and started on their way to New York, only to be killed by the sudden settling down over the east of record-breaking cold.

Mr. Edward Paul, chief of the Penobscot Indians, Old Town, Me., called at the Museum in January to see the Eastern Woodland collections and especially those of his own people. Mr. Paul is an educated man. He says that notwithstanding the fact that his people outwardly conform to our mode of life, they at home preserve many aboriginal traits and customs. He thinks that this is chiefly due to the fact that his tribe still owns the island home of its ancestors, whose shores are seldom visited by white people. The Indian men work for the whites but each evening come back to the island, where they are isolated completely. Mr. Paul volunteered to assist in arranging the Penobscot section of the new Eastern Woodland Indian hall.

Dr. Edward A. Sapir, director of the anthropological survey of Canada, and H. Barbeau, a member of his staff, recently spent a few days at the Museum studying the anthropological collections.

During the fall months, Messrs. Allen and Miller, who with two native assistants now form the Colombian expedition, worked in the Central Andes, along the Quindio trail and on the paramo of Santa Isabel. In a letter dated Cartago, November 16, Mr. Miller states that sixteen hundred specimens of birds and mammals had already been secured, and that the expedition was then about to penetrate the little-known coast range to the westward. Here only foot-trails exist and all supplies will therefore have to be transported on the backs of men.

Field work in Florida carried on during November by Messrs. F. E. Lutz and C. W. Leng in company with Mr. W. T. Davis, was primarily for the purpose of obtaining information which would facilitate future work in what is an easily accessible subtropical region almost unexplored biologically. The party covered about fifteen hundred miles, incidentally collecting more than five thousand specimens which will give new records as to either date or locality or both for one thousand species. The fauna of Florida is of especial interest to the department of invertebrate zoölogy in its bearing upon problems of distribution, for Florida is the last step in the journey of such species as may have come to the United States by way of the West Indies.

It is expected that before the end of the month the northeast room on the first floor will be converted into a shipping and receiving office. The establishment of this room will relieve the building's present main entrance from the congestion of delivery trucks which has previously existed.

The department of invertebrate zoölogy has secured a series of six wax models constructed by Mr. Ignaz Matausch to illustrate some of the results of his researches upon the life histories of tree-hoppers. This series will make a valuable addition to the synoptic exhibits in the Darwin hall.

Ethnological exchange specimens received from the Australian Museum of Sydney, New South Wales, illustrate the culture of the natives of Australia in a collection of boomerangs, women's fighting poles, shields, spears, grave-markers, baskets, water-bags and fire-sticks.

LECTURE ANNOUNCEMENTS

MEMBER'S COURSE

Thursday evenings at 8:15 o'clock. Doors open at 7:45.

February 21 — Mr. Carl E. Akeley, "Elephant Hunting in Equatorial Africa."
February 29 — Mr. Paul J. Rainey, "Hunting Lions with Hounds in Africa."
March 7 — Mr. George Borup, "With Peary in the Arctic."
March 14 — Mr. Clinton G. Abbott, "Half Holidays with the Birds."

PEOPLE'S COURSE

Given in coöperation with the City Department of Education

Tuesday evenings at 8:15 o'clock. Doors open at 7:30.

February 6 — Prof. A. V. Williams Jackson, "Through Persia and Central Asia."
February 13 — Mr. Sidney Dickinson, "Picturesque New Zealand."
February 20 — Subject and lecturer to be announced.
February 27 — Prof. Henry E. Crampton, "Tahiti and the Society Islands."

Saturday evenings at 8:15 o'clock. Doors open at 7:30.

The last four of a course of lectures on "The Doctrine of Evolution and the problems of Human History" by Prof. Henry E. Crampton. Illustrated by stereopticon views and by exhibits.

February 3 — "Man's Place in Nature and its Attainment."
February 10 — "The Races of Man and their Evolution."
February 17 — "The Human Mind and its Origin."
February 24 — "Insect Societies and Human Societies."

LEGAL HOLIDAY COURSE

Fully illustrated. Open free to the public. Tickets not required.
Lectures begin at 3:15 o'clock. Doors open at 2:45.

February 22 — Professor Henry E. Crampton, "In the Wilds of British Guiana and Brazil."

Scientific Staff

DIRECTOR

Frederic A. Lucas, Sc.D.

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Edmund Otis Hovey, Ph.D., Curator
George Borup, A.B., Assistant Curator

MINERALOGY

L. P. Gratacap, A.M., Curator
George F. Kunz, Ph.D., Honorary Curator of Gems

INVERTEBRATE ZOÖLOGY

Henry E. Crampton, Ph.D., Curator
Roy W. Miner, A.B., Assistant Curator
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L. P. Gratacap, A.M., Curator of Mollusca
William Beutenmüller, Associate Curator of Lepidoptera
John A. Grossbeck, Assistant

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W. De W. Miller, Assistant Curator of Ornithology

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Walter Granger, Associate Curator of Fossil Mammals
Barnum Brown, A.B., Associate Curator of Fossil Reptiles
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Herbert J. Spinden, Ph.D., Assistant Curator
Charles W. Mead, Assistant Curator
Alanson Skinner, Assistant

ANATOMY AND PHYSIOLOGY

Ralph W. Tower, Ph.D., Curator

PUBLIC HEALTH

Charles-Edward Amory Winslow, M.S., Curator
John Henry O'Neill, S.B., Assistant

WOODS AND FORESTRY

Mary Cynthia Dickerson, B.S., Curator

BOOKS AND PUBLICATIONS

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THE
AMERICAN MUSEUM
JOURNAL
Leading Articles:
Crocker Land Expedition
Rhinoceros Hunting
The Catlin Paintings
Do Butterflies Migrate?
MARCH, 1912
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The American Museum Journal

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Mary Cynthia Dickerson, *Editor*

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THE TOUCAN AT HOME — A DETAIL OF THE ORIZABA GROUP

The great beaks of many tropical birds look strange to observers acquainted with birds of temperate climes only. All of the thirty-four birds in the Orizaba group are representatives of the tropical parts of the State of Vera Cruz, the studies for the group having been made at Cordova, altitude 3500 feet

— "Three New Groups," page 101

The American Museum Journal

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IN SEARCH OF CROCKER LAND

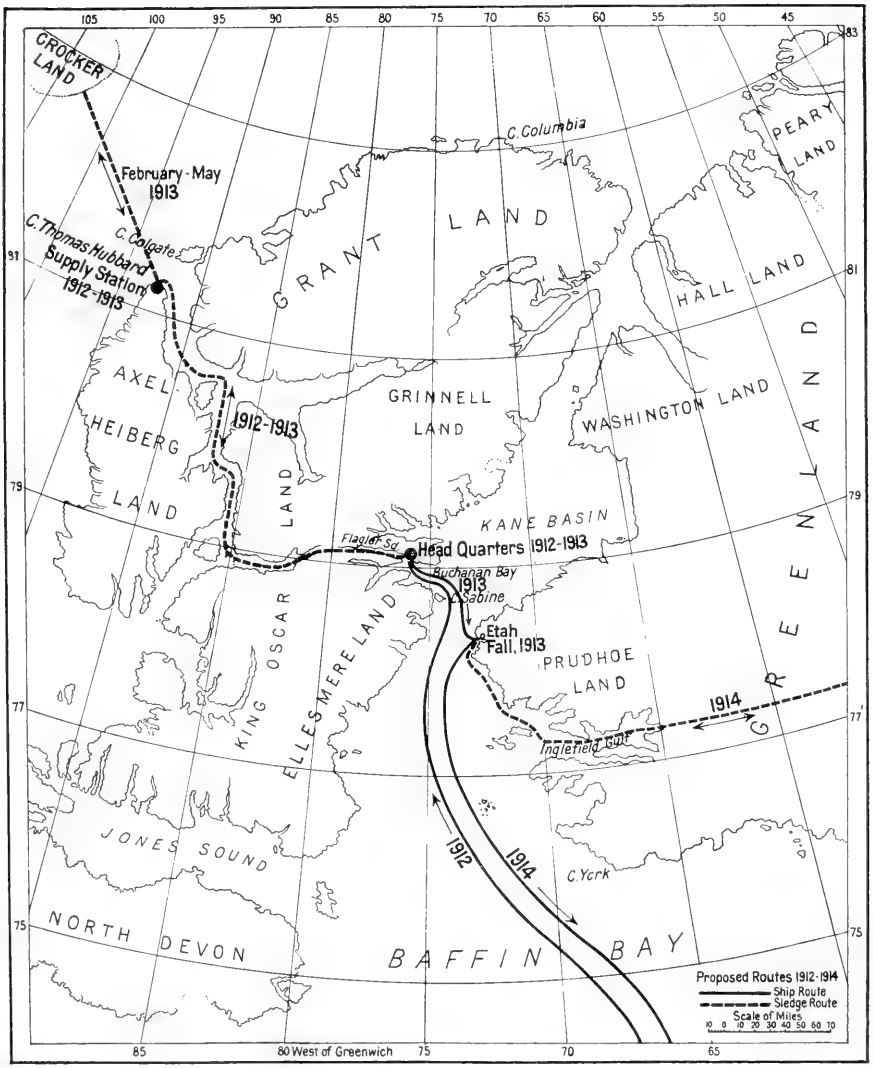
A NEW VENTURE INTO ARCTIC REGIONS — THE CROCKER LAND EXPEDITION WILL ENDEAVOR TO SOLVE THE WORLD'S LAST GREAT GEOGRAPHICAL PROBLEM — SEARCH FOR THE UNEXPLORED LAND SIGHTED BY PEARY ON HIS SUCCESSFUL DASH TO THE POLE

By Edmund Otis Hovey

IS there a "Crocker Land" in the Arctic Ocean? Admiral Peary believes that he saw such a place through his field glasses in June, 1906, whether island, archipelago or lesser continental mass, he knows not. Also from recorded tidal observations, the existence of land at the given spot has been deduced by Dr. R. A. Harris, tidal expert of the United States Coast and Geodetic Survey.

For several years this question of the Arctic Seas has been in the minds of explorers and geographers. Two men, George Borup and Donald B. MacMillan, both of Peary's successful polar party, have now volunteered to answer it, while the American Museum of Natural History and the American Geographical Society consider the question of such commanding importance that they have decided to give their support to these men in an expedition to reach and map the new Crocker Land — if it exists. The expedition will also, while en route to the unknown land, make all the geological, geographical and other scientific studies that circumstances may permit.

Admiral R. E. Peary in his book, *Nearest the Pole*, records the following observations made June 30 from the summit of Cape Thomas Hubbard, the most northern point of Axel Heiberg Land: "The clear day greatly favored my work in taking a round of angles and with the glasses I could make out, apparently a little more distinctly [than when seen a few days ago], the snow-clad summits of the distant land in the northwest above the ice horizon." Peary had previously seen this land from the top of Cape Colgate, 2000 feet above the sea level. He located the new land at about long. 100° W. and lat. 83° N., or about one hundred and thirty miles from Cape Thomas Hubbard, and gave it the name of "Crocker Land," in honor of the late Mr. George Crocker, of the Peary Arctic Club. Dr. Harris states his belief in the monograph, *Arctic Tides* (1911), that this Crocker Land is the eastern edge of a great area of land or archipelago north of western America and eastern Siberia.



PROPOSED ROUTE FOR THE CROCKER LAND EXPEDITION

Unexplored land is thought to exist north of western America. Admiral Peary believes that he sighted such land — which he named "Crocker Land" — from Cape Colgate, when he started over the ice on his successful dash to the pole. Also Dr. R. A. Harris of the United States Coast and Geodetic Survey concludes from his study of Arctic tides that this land exists

An expedition to map the unknown land will leave Sydney, Nova Scotia, in July, 1912 and proceeding through Baffin Bay will establish winter quarters on the south shore of Flagler Sound. It will transport supplies by sledge to Cape Thomas Hubbard during the winter and from this point will continue the journey across the ice to Crocker Land when the dawn comes in the spring

The verification of these observations and deductions seems the last great geographical problem left to the world for solution. Nansen, in an article on "North Polar Problems" (1907) says, "The determination of the extent of the continental shelf to the north of Axel Heiberg Land and Ellesmere Land would be a great achievement .... A satisfactory solution of this problem would be of more scientific value than even the attainment of the Pole .... The extent and shape of the polar continental shelf, which means the real continental mass, is the great feature of north polar geography which is of much more importance, geographically or geomorphologically, than the possible occurrence of unknown islands on this shelf."

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Borup, MacMillan and Kyutah, who were with Peary on his last polar expedition

The expedition plans to make continuous geological, geographical, palæontological and physiographical observations and to collect specimens through the three hundred and thirty miles across Ellesmere Land from Flagler Bay to Cape Thomas Hubbard. Then from Cape Thomas Hubbard to Crocker Land it will take soundings in order to determine whether the continental shelf extends as far as that land or reaches beyond it, and in addition will make tidal observations and temperature observations at various depths. On Crocker Land, it will spend two months mapping coast line and interior topographically and geologically, and collecting specimens. It plans to make also a study of glaciers, glacial ice caps and glacial motion, for the purpose of

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The camp oil stove on which tea was made in the Arctics

The power by which supplies for the Crocker Land expedition will be transported through the 330 miles from Flagler Sound to Cape Thomas Hubbard

Opening a can of pemmican. The expedition will procure dogs for the sledges on the way north after leaving Sydney, Nova Scotia, as well as whale and walrus meat to supplement the supply of pemmican

solving the problem of the process of land-molding under a continuous, moving ice cap, since the process is not yet understood, and the "glacial fringe" off the north coast of Grant Land offers a particularly interesting field for study. Wherever possible the expedition will collect Arctic small mammals and fishes, for these are little represented in collections, and also birds, for no habitat group of Arctic birds has been attempted in any of our museums.

The following is the itinerary as planned: The expedition will leave Sydney, Nova Scotia, by special steamer about July 20, 1912, procuring dogs for the sledges on the way northward and whale and walrus meat. It will land on the south side of Bache Peninsula (Flagler Bay), lat. 79° 10′ N., and will there establish winter quarters, sending the ship home. About the middle of September sledging operations can begin for the purpose of getting supplies to Cape Thomas Hubbard, which work can be carried on throughout the winter during the moonlight periods. With the advent of dawn in February, 1913, the journey will be made from Cape Thomas Hubbard across the ice to Crocker Land. The return trip will be begun about May first, and on reaching Cape Thomas Hubbard again, a messenger will be sent to North Star Bay with news of the expedition, to be forwarded by Danish steamer to civilization. After this, the scientific work will progress in Grant Land and along the return route to the former winter quarters on Flagler Bay, where arrival may be expected in July, 1913. Then during the summer, supplies and collections will be transferred to Etah, from which point the expedition will move in the spring by way of Whale Sound (Inglefield Gulf) directly eastward to the summit of the ice cap of Greenland, at the widest part of that island. The return to New York is planned for the autumn of 1914 and by special ship.

The leaders of the expedition will be George Borup (A. B. Yale, 1907), assistant curator of geology in the Museum, and Donald B. MacMillan (A. M. Bowdoin, 1910). They will take with them a competent physician, a cook and a veteran general assistant. Messrs. Borup and MacMillan are well-known to both the general and scientific public as members of the last polar expedition under Admiral Peary, and through Mr. Borup's book, *A Tenderfoot with Peary* and Mr. MacMillan's lectures given throughout the country. These men have received Peary's unqualified indorsement for the work in hand. Mr. Borup has been devoting his whole attention during the past two and a half years to studies in the field and at Yale thoroughly to fit himself for scientific geological and geographical exploration. He is a Fellow of the Royal Geographical Society of London and a member of the New York Academy of Sciences. Mr. MacMillan since his return from the Peary expedition, has been studying ethnology and practical astronomy at Harvard. In the summer of 1910, he was a member of the Cabot Party which was the first to cross Central Labrador from the sea to George River, and he

spent the summer of 1911 cruising along the coast of Labrador in an eighteen-foot open canoe studying the Eskimo from Hopedale to Killinek (lat. 60° N.). He is a member of the American Geographical Society and of the Appalachian Mountain Club.

The following are some of the principal items of the outfit that must be provided for this expedition: three years' provisions for five white men with their helpers and dogs, much of which, particularly the pemmican, has to be especially prepared and packed; suitable clothing; instruments for all kinds of observations and records; photographic supplies including a camera for moving pictures; a power boat for use in Flagler Bay and in crossing to Etah; salary of physician and wages of cook and helpers; a steamship to take the party to Flagler Bay in 1912 and another to go up for it in 1914.

It is estimated that not less than fifty thousand dollars[1] must be provided for the absolute needs of the expedition, in order to enable it to accomplish the valuable results that have been outlined above, and this in spite of the fact that Messrs. Borup and MacMillan generously serve the expedition without salary during the period of its absence from New York.

In addition to the appropriations made by the Museum and the Geographical Society, subscriptions have already been made or promised by Yale University, Bowdoin College, the New York Academy of Sciences, Worcester Academy and Groton School, and by the following individuals: General Thomas H. Hubbard, Admiral R. E. Peary, Mrs. C. B. Alexander, Zenas Crane, John E. Thayer, Theodore Roosevelt, Mrs. G. B. French, Harry E. Converse, Andrew G. Weeks, Richard S. Dow, Herbert Austen, Robert P. Simpson, John Larkin, E. W. Clark, L. H. Greenwood, J. Sanford Barnes, Jr., Paul B. Morgan, Samuel Rea, W. W. Atterbury and Lewis A. Platt.

The honorary committee on the Crocker Land expedition consists of Henry Fairfield Osborn, president of the American Museum of Natural History; Chandler Robbins, chairman of the Council of the American Geographical Society, and Thomas H. Hubbard, president of the Peary Arctic Club. The committee in charge comprises, E. O. Hovey, American Museum of Natural History and H. L. Bridgman, Peary Arctic Club.

[1] There remains to be raised about thirty thousand dollars, and the Museum has opened an account, known as the "Crocker Land Expedition Fund" for the purpose of receiving and caring for all subscriptions made to the expedition. Checks to further its purpose should be drawn payable to the American Museum of Natural History and forwarded to E. O. Hovey of the Crocker Land Expedition Committee, to whom, furthermore, all correspondence relating to the expedition should be addressed.

"A Dog Feast was offered by the Sioux chiefs of the Upper Missouri, in 1832, to Mr. Sanford (the Indian agent), Pierre Choteau, K McKenzie, and the author. The greatest pledge of respect and friendship the Indians can give to strangers in their country is in the 'Dog Feast,' in which the flesh of their favorite dogs must necessarily be served." [This is the artist's inscription on his painting]

THE CATLIN PAINTINGS

By Clark Wissler

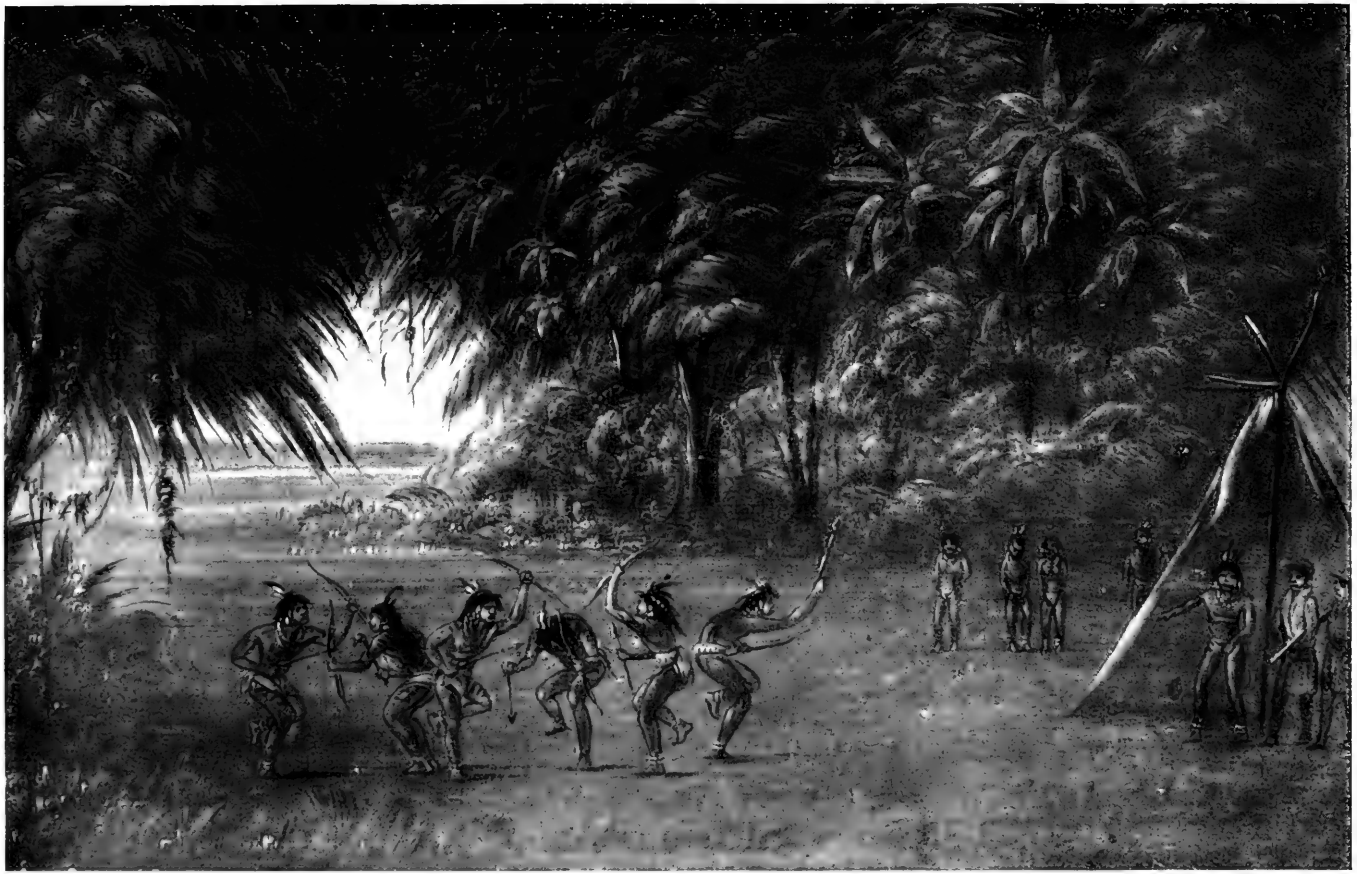
THE famous cartoon collection [1] of Indian sketches in oil made by George Catlin, the celebrated Indian writer and painter, has been purchased for the Museum by Mr. Ogden Mills. These canvases, left at the death of the artist in 1872 in the possession of his daughter, Miss Elizabeth W. Catlin, who still resides in New York City, have great historical value because they are the earliest authentic sketches representing the customs, ceremonies and habitations of the wild Indian tribes. When Catlin visited these tribes they were practically uninfluenced by civilization: it was a time when Indian life was real, not transitional as later. Mr. Deming, the well-known artist says regarding the work, "I have known Indians for forty years and have seen many who were very little influenced by contact with the white man and I can vouch for the truthfulness of these pictures. They are, outside of Bodmer's and Captain Eastman's pictures, the only record we have of the Plains Indians and are valuable as a pictorial record. I want to speak of another view which the scientist does not appreciate. These Catlin pictures are the most decorative Indian pictures

[1] The collection contains 417 pictures — 118 showing types of North American Indians, 112, customs of North American Indians, 19, ceremonies of North American Indians, 28 are landscapes and hunting scenes, and 19 depict South American natives and landscapes, while 49 treat of miscellaneous subjects. Among the latter is a series of 24 representing the life history of the famous La Salle and his wanderings up and down the Mississippi. Some 250 of the sketches portray types and scenes from American Indian life as observed among the different tribes of the Missouri Valley from 1832–1840. Many of them are the original paintings for the plates in the author's well-known books.

TURTLE HUNT BY TORCHLIGHT

A painting of the South American series, with weird color effect, the flame of the torches alone bringing out the action of the figures and the outlines of turtles, beach and sea. The men have captured the turtles and turned them on their backs on the sand; the women are approaching with knives and baskets to do the butchering and carry home the meat.

Acting upon a suggestion from Humboldt, Catlin sailed for Venezuela, passed into the interior and over into the valley of the Amazon. For six years he explored South America, visiting all the tribes on the Pacific slope, also wandering through Yucatan and portions of Old Mexico



TAPUYA WAR DANCE, SOUTH AMERICAN SERIES

The north shore of the Amazon above Obidos. The Indians are giving the war dance for Mr. Catlin who is seen at the right in the painting.

As a result of Catlin's work in South America, we have ninety canvases representing characteristic scenes among the natives. These South American sketches are perhaps the most unique portion of the collection, few of them ever having been published

"Smoking the Shield" — When a young Camanchee aspires to the title of warrior, he must have a shield. He must himself kill the buffalo and then invite the warriors, who all assemble to witness the smoking of the hide for the shield. They are shown dancing around it to ensure its hardness, and its proof against arrows

that have ever been painted. There is not a picture in the collection that I would not be proud to hang on my wall. They have a grand beauty of line composition, a great harmony of tone that makes them very valuable as works of art. They have the scenic charm of a Japanese print."

It is interesting to know that Catlin prepared this cartoon collection with the idea that it should sometime find a place in a great museum or university for use in ethnological study. The idea was suggested to him by the famous Humboldt, who seems to have taken a great interest in Catlin's work. According to Miss Catlin, it was Humboldt who suggested even the form, size and range of the collection. It seems peculiarly fitting that within the lifetime of Catlin's own daughter, this large collection of paintings should have found an abiding place in a large museum in the artist's home city, thus fulfilling his fondest dream.

The chief interest in the collection is historical and ethnological. The pictures have a place in the anthropological and library sections of the

A Buffalo chase.— Mr. Catlin and a Sioux Indian masked under wolf skins are approaching a herd of buffaloes. Mr. Catlin is seen to be making sketches or notes while the Indian carries the arrows. There are many paintings of buffaloes in the collection

Museum because they are the work of the first great Indian painter. As Miss Catlin truly says, "During eight years spent among them, he visited every known tribe in the Mississippi Valley and gave especial attention to the differences in their types, their customs, their religious ceremonies, some canvases concerning the last having now become valuable records as the ceremonies themselves have died out. In this manner he became unconsciously the first American ethnologist, publishing in the following years his collected letters from those then unknown regions in a work entitled 'Catlin's Notes Among the North American Indians' (1841), which has been recognized by the Smithsonian Institution and other scientific societies as a true history of the Indian people."

Since Catlin's day McKenna and Hall, Bodmer, Schoolcraft and Curtis have followed with similar series of illustrated publications, but so far as we know, the idea was original with Catlin. His famous two-volume book passed through many editions and is still in constant demand.

RHINOCEROS-HUNTING—A SPORTSMAN'S AFRICAN NOTES

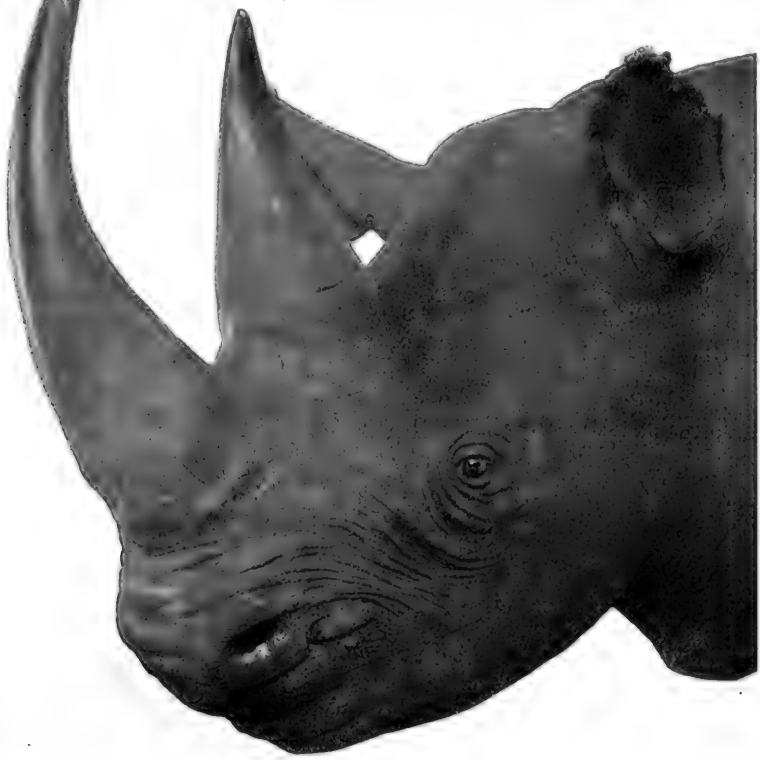
By E. Hubert Litchfield

Those who have visited the African hall during the past two years will have observed on its walls more than three hundred heads of the large game of Africa. These constitute a collection of unusual value mounted by Rowland Ward of London and loaned to the Museum by E. Hubert Litchfield, Henry Sampson, Jr. and Bayard Dominick, Jr. Mr. Litchfield's article which follows is of interest because of his conclusion as to the rapid extinction of African large game and because it furnishes personal observations on the habits of the black rhinoceros. Opinions are likely to differ among sportsmen and naturalists as to the habits or the dangerous character of any given wild animal and every new reliable record of habit accompanied by a statement of the conditions of the animal's life, the character of the country, the season of the year, helps to reconcile these different opinions in an accurate knowledge of the species.—Editor.

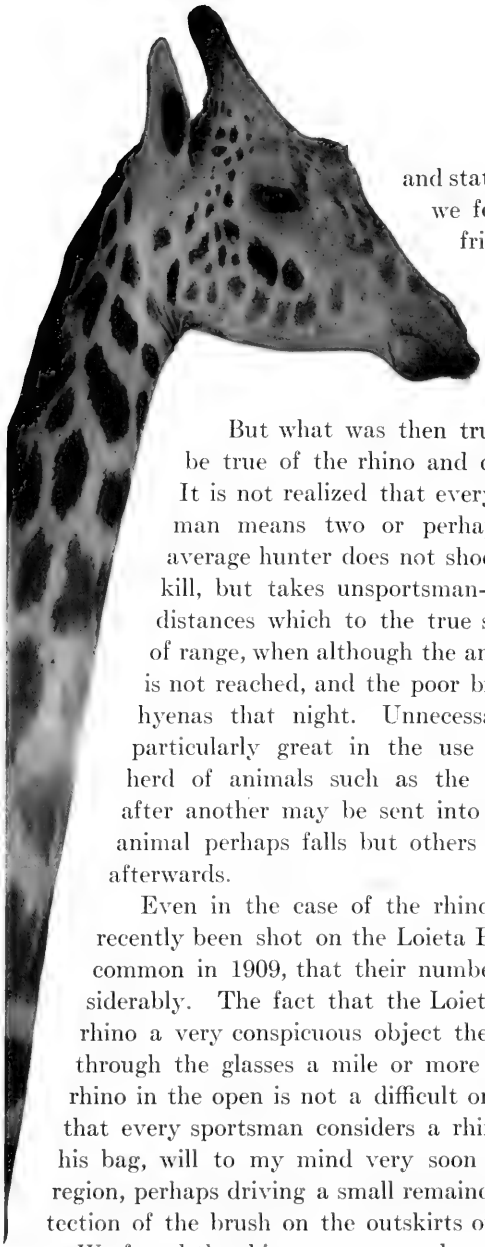
As a result of a four months' hunting trip in British East Africa in 1909, we were able to bring to New York some thirty-

Female black rhinoceros (the horns are of unusual length) shot by Henry Sampson, Jr on the Loieta Plains, British East Africa. Rhinoceros-hunting is dangerous in brush or tall grass country where the hunter may at any moment find himself confronted by a vicious-tempered rhino ready to charge. The rhinoceros is doomed to almost immediate extinction in the plains regions of Africa, since every sportsman considers a rhino a necessary part of his bag and the animals are easy to stalk in open country

eight different kinds of mammals, representing most of the African species with the exception of the elephant. That we were unable to bring back any elephants was due to the fact that large males with tusks exceeding sixty pounds in weight were very scarce. We saw three or four hundred elephants but not a single male large enough to shoot. Even on going to the Mount Elgon country, a region formerly noted for its great herds, and after remaining there a full month with the direct intention of securing specimens of bull elephants, we had to give it up, finding none large enough to furnish an excuse for killing. We did secure in the Elgon country, however, very fine specimens of the Sing-Sing waterbuck, some of the heads measuring thirty-two inches in length; and to the north of the Uganda railway in the direction of Mount Kenia, we secured unusually good specimens of the African buffalo, the largest with a spread of horns of forty-five inches. The country along the Uganda railway about Simba



Male black rhinoceros (note the curve of the horns and their thickness) shot by E. Hubert Litchfield. Rhino horns do not consist of bone or horn but of bristles closely compressed, and they are not connected with the skull. According to African superstitions, goblets made from rhino horns have been thought to have power to give health to him who drinks, even to tell him by a mysterious effervescence if any poison lurk in the draught



From the loan collection of more than three hundred heads on the walls of the African hall

and stations toward the Tsavo River we found to be the home of the fringe-eared oryx and the lesser kudu. The Loieta Plains, where we did our first hunting, about fifty miles south of the Uganda railway, proved rich in black rhinos.

But what was then true of the elephant will soon be true of the rhino and of other large African game. It is not realized that every animal shot by the sportsman means two or perhaps several killed. For the average hunter does not shoot only when near enough to kill, but takes unsportsman-like chances. He shoots at distances which to the true sportsman are decidedly out of range, when although the animal may be hit, a vital spot is not reached, and the poor brute escapes to fall a prey to hyenas that night. Unnecessary destruction of game is particularly great in the use of the repeating rifle on a herd of animals such as the antelope — many shots one after another may be sent into the herd as it retreats, one animal perhaps falls but others are wounded to die shortly afterwards.

Even in the case of the rhinos, such large numbers have recently been shot on the Loieta Plains, where the species was common in 1909, that their numbers have decreased very considerably. The fact that the Loieta country is open makes the rhino a very conspicuous object there. He can usually be seen through the glasses a mile or more away, and the stalk of the rhino in the open is not a difficult one. This, added to the fact that every sportsman considers a rhino a very necessary part of his bag, will to my mind very soon kill them off in this plains region, perhaps driving a small remainder of them to seek the protection of the brush on the outskirts of the Loieta.

We found the rhinos numerous also, in fact too numerous for our comfort, in the country between the Athi and Tana Rivers about twenty-five miles north of Donya Sabuk Mountain. This country is one of tall grass and thick brush and it is my opinion that here the rhinos may last for some years to come; they are better protected from man by the nature of the country and there is plenty of brush and grass, their natural food.

In such brush or in tall grass country the rhino is a dangerous animal to hunt, for one is apt to walk right on top of it unexpectedly and draw a charge before fully prepared. The presence of the rhino cannot be guessed till it rises in the grass or makes the puffing and

wheezing noises indicating that it is startled. A shot through the vertebræ of the neck or one through the brain will of course drop it instantly, while a shot behind the shoulder will cause it to die within a few moments. The difficulty however is to get in a suitable position to fire the fatal shot.

Fortunately for the hunter the rhino's power of vision is very bad and probably does not extend more than thirty-five or fifty yards. His hearing likewise is far below the average, and a man can often approach to within a few feet up wind if he is not seen. The animal's sense of smell however is remarkable, so that he is able to discover enemies at long distances and in this respect he is probably almost the equal of the elephant and the buffalo. The naturalist would however meet success more often in photographing the rhino, and the sportsman would more often secure opportunity for a correct shot if rhinos were not always found accompanied by the so-called "rhino or tick birds," for these birds are very clear-sighted and give warning of the approach of enemies. They perch on the huge beast's neck and back, and feed on the numerous ticks which are always to be found.

Field naturalists report that no other large game animal of Africa is more difficult to approach with a camera.

Most of the rhinos of our collection were killed in the Loieta some sixty miles south and west of Lake Naivasha, a station on the Uganda railroad. The plain is watered by the southern Guaso Nyiro River, which bounds the Loieta on the north and east. The German East African frontier lies to the south and the Amala or Olkeju Eugubi River and the thick forest country called Osero to the west. Our party hunted here about five weeks and during that time we probably saw an average of ten rhinos daily. Usually they were seen singly, unlike the more social white rhinos, though sometimes in pairs, in which case they were probably female and young. Apparently a large proportion of the animals seen were females. Why, I was unable to tell, except that possibly the males, having the larger horns had been more sought after by hunters. Of those shot by our party, five were females and one was a male. The horns of female rhinos are almost always thinner than those of the male, though sometimes fully as long. Our largest head, the one shot by Henry Sampson, Jr., was a female with an exceptionally long posterior horn. Horns of the males are usually much thicker at the base

THE WORLD'S RECORD HEAD OF JACKSON'S HARTEBEEST

This animal was shot by Mr. Litchfield in British East Africa in 1909; the length of horn along the curve is 26 inches, the distance between the tips of the horns is 14⅞ inches. Length of the horn differs greatly among the members of any species, and that certain specimens have horns of unusual length is interesting from the standpoint of individual variation and evolution, although the record head itself can have little more scientific value than any head with horns of good length

Copyright by Carl E. Akeley

Young African elephant

and more curved. In several of the so-called "Keitloa" type seen, the posterior horn was about as long as the anterior.

In this country we found that rhinos sleep during the day, usually many miles away from any drinking-pool or other water. They sleep however very intermittently, getting up every now and then to look around and then lie down again. They are likely to sleep with back to the wind which enables them to look down wind, their acute sense of smell protecting them to the rear. This habit of sleeping during the day is possibly due to their having been so persistently hunted. We were told that in unhunted countries rhinos feed a great deal during the day and sleep at night.

In the expedition of 1909 our party had permission to shoot in several districts which otherwise would have been reserved. This was through the courtesy of the officials of the British East African government. The permission was granted through letters which the American Museum of Natural History had kindly given to us and of course any animal shot in a reservation became the property of the Museum and devoted to scientific purposes. As a result of this agreement we secured some twenty specimens.

On the Usha Gishu plateau toward Mount Elgon, I believe rhinos were once very plentiful, but we saw few and a trip there would probably not now pay for the expense entailed. I understand however that rhinos abound in the Sugota and Jubaland game reserve, recently opened to sportsmen, and I am sure that a trip to the east and south of Lake Rudolf would result in securing large specimens. This ground has been very little shot over on account of its inaccessibility and the relative expense of an expedition.

THE WILD BOAR GROUP

A winter scene in the forests of north Germany. The boar group is the first group in the American Museum to have a sculptured background; the trees, hillside and distant boars are modeled in low relief. Boars presented by Walter Winans; group designed and executed by Frederick Blaschke; sculptured background painted by Albert Operti

The mother and one of the little wild boars

THREE NEW GROUPS

NEW MUSEUM EXHIBITS THAT CARRY THE OBSERVER INTO A SNOWBOUND FOREST OF NORTH GERMANY, A TROPICAL MEXICAN JUNGLE AND UNDER THE WATERS OF A MISSISSIPPI LAKE

By Frederic A. Lucas

THREE noteworthy groups have been added to the exhibits of the American Museum. One of them, the group of wild boars, given by Mr. Walter Winans, depicts a winter scene in a North German forest. A driving snowstorm has covered hills and trees with light powdery snow, and as the wind dies down toward sunset the boars are abroad for their suppers. In the foreground a big tusker has strayed into a neighbor's

A portion of the Orizaba bird group in which the Rio Blanca is seen pouring its waters down through the tropical forests of Vera Cruz. [The part of the background that pictures the Rio Blanca is at the left in the group and does not show in the general view on the following page]

domain and a bitter fight is on. The mother pig hastens up to see that no harm befalls her six months' old piglets but they, accustomed to quarrels, doze or feed unmindful of the combat going on so near them.

This group by Frederick Blaschke is in one way an innovation, in that part of the background including the trees is modeled in low relief, aiding to contribute to the apparent depth of the scene.

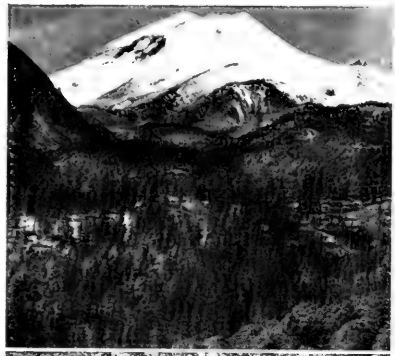
Another, the Orizaba bird group has been, like most museum groups,

GENERAL VIEW OF THE ORIZABA GROUP

From the edge of a tropical forest [the real foreground] stretch miles of similar forest far below the observer and beyond to Mount Orizaba [the painted background] Group prepared under the direction of Frank M. Chapman from field studies made in 1910. Background painted by Robert Bruce Horsfall from sketches made at Mount Orizaba by Henry A. Ferguson and Louis Agassiz Fuertes; birds mounted by Henry C. Raven; accessories made and group assembled by William Peters

Transparencies at the sides of the group [see following pages] show scenes from different altitudes in the country portrayed in the painted background, from the tropical forest to the cold summit of Mount Orizaba

Transparencies at the left of the Orizaba group.



Boreal Zone Timberline, alt. 13,000 ft.

Boreal Zone Pines and Spruces, alt. 9500 ft.

Temperate Zone Clearings, alt. 5000 ft.

Tropical Zone Rio Blanca, alt. 1000 ft.

some time in preparation, but it is well worth waiting for. From the upper side of a gorge through which runs the Rio Blanca, the observer gazes through the vine-hung tropical forest to where Mount Orizaba bathed in sunlight rises, more than 18,000 feet, its head crowned with perpetual snow.

In the foreground are tropical birds — motmots which swing their tails like pendulums, trogons, parrots, tanagers and big-beaked toucans, while here and there humming birds hover over rare orchids. On either side of the group is a series of transparencies, showing how the character of the country changes as one goes upward from the plain, passing through the dense forest to the barren higher levels of the mountain and its top capped with snow. As Mr. Chapman tells us in the label, we have here a section of country more than three miles high and to find on a level the changes to be met with in these three miles we would have to journey from Vera Cruz to Maine, a distance of three thousand miles.

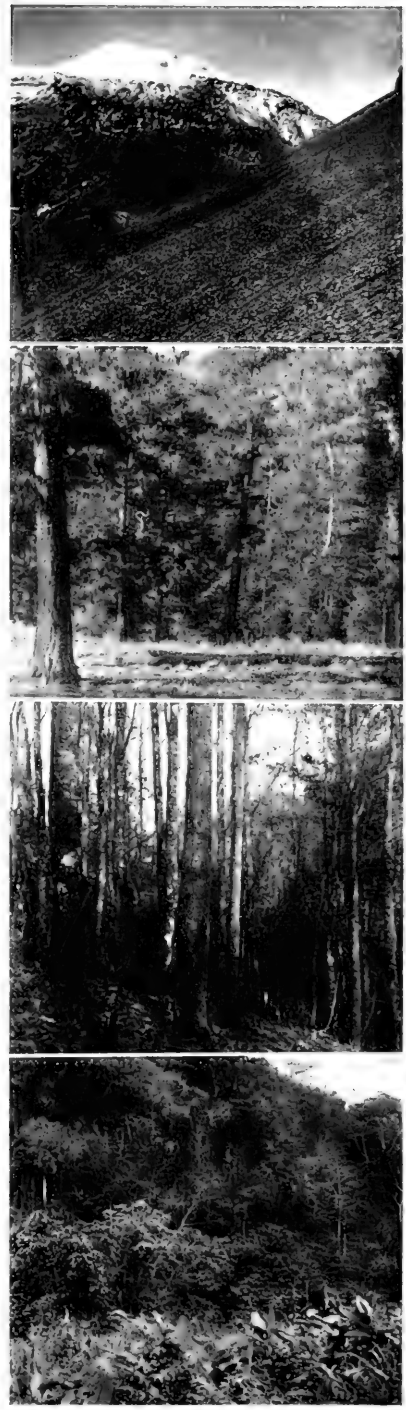
The background is by Robert Bruce Horsfall, the birds by Henry C. Raven, while the accessories were made by and under the supervision of William Peters by whom the whole was assembled.

The Orizaba group has been made possible through the North American Ornithology Fund, and the Museum's indebtedness is acknowledged to those contributors to this fund whose generous support for several years has brought into existence some of the best in the series of bird habitat groups. These benefactors of the

Museum are Franklin Brandreth, John L. Cadwalader, James C. Carter, Mrs. Louisine W. Havemeyer, H. B. Hollins, Mrs. Morris K. Jesup, Charles Lanier, Miss Carolyn Morgan, Henry Clay Pierce, Henry W. Poor, F. Augustus Schermerhorn, Mrs. Phillip Schuyler, Mrs. John B. Trevor and Mrs. Robert Winthrop.

The third is the paddlefish or spoonbill sturgeon group in the hall of fishes. It is as barren in respect to vegetation as the Orizaba group is luxuriant. A group of this character is perhaps the most difficult proposition that the preparator has to encounter. There is absolutely nothing in the way of accessories to help him and he has to solve as best he may the problem of making a school of fishes hanging in mid air look as though swimming in water. The casts of fishes were made by Dwight Franklin and James C. Bell, while Albert Operti has deftly painted the remainder of the school.

The spoonbill, which may weigh one hundred and sixty pounds, is a market fish, one of the most valuable of those taken from the Lower Mississippi. Moreover its roe makes a caviar of good quality and adds to the profits of the spoonbill fishery. The species is known only in the Mississippi and neighboring waters however, and so has not the importance commercially that it would assume if more widely distributed. The casts for the group were obtained on a Museum expedition to Moon Lake, Mississippi, in 1909 and both the field study and the work on the group have been carried on by means of the Cleveland H. Dodge Fund.



Transparencies at the right of the Orizaba group

Boreal Zone
Above timberline, alt. 13,500 ft.

Boreal Zone
Pines and Spruces, alt. 9500 ft.

Temperate Zone
Oak forest, alt. 5000 ft.

Tropical Zone
Primeval forest, alt. 1000 ft.

DETAIL OF THE NEW BUTTERFLY GROUP

Monarch butterflies travel thousands together in what seems to be a migration southward in the fall. Year after year the preparatory swarming is reported from certain given districts where they cover the trees so that the green of the leaves is obscured by the brown of innumerable butterfly wings

DO BUTTERFLIES MIGRATE?

FIVE HUNDRED MONARCH BUTTERFLIES IN A NEW MUSEUM GROUP THAT ILLUSTRATES THE SOCIAL INSTINCT OF THE SPECIES

By Frank E. Lutz

THE annual migration of birds is a fact of everyday knowledge. Similar migrations of other animals such as certain fish are also fairly well-known, but very few cases of definite migrations of insects have come to the attention of entomologists even. One of the most striking of these cases occurs in this part of the world every year and the preparatory swarming is illustrated in a group just installed in the hall of insect biology.

The larvæ of the monarch butterfly (*Anosia plexippus*) feed during the summer on various species of milkweed, protected from insect-eating birds by their "warning colors" which are thought to advertise the fact that they are ill-tasting, acrid creatures. The adults emerge in the fall in great numbers from beautiful green chrysalids decorated with black and gold, and these butterflies also are gaudy in coloring and are inedible.

Now, the mourning cloak (*Euvanessa antiopa*) and certain other butterflies do pass the winter with us as adults so that there would seem to be no reason in external conditions why the monarchs could not. In the early autumn however they begin to flutter southward and in this movement many hundreds or even thousands of individuals fly together, often remaining in one locality for several days. Curiously enough, certain definite resting places, or gathering places, seem to be used year after year. Such an one is near Clinton, Connecticut, where the specimens for a Museum group were obtained in the fall of 1911. The swarming butterflies are so numerous and clustered so thickly that the leaves are obscured and the brownish undersides of the wings of the resting butterflies give to the trees a truly autumnal appearance.

Then comes the continuance of the southward flight. In places the air is brown with fluttering butterflies. As they reach the more southern states they doubtless spread out over the country again, but we are indeed ignorant as to how far those individuals which were born in New England for instance, really go, how they spend the winter, or from whence the monarchs of the next New England spring come. No one has put on record a return flocking from the South, so that if there be a migration northward it would seem to be only by stragglers. Furthermore the specimens found

here in the spring seem to be in rather too good a condition to have made the journey. On the other hand no specimens have been found in this vicinity in the winter and as adults are fairly common in May, it is just as hard to believe that they did not come up from the South.

Long flights of butterflies and moths are not rare. One of the longest was put on record by Frederic A. Lucas in 1887 when he saw many Lepidoptera, chiefly moths, one thousand miles off the coast of Brazil. Such flights however are not migrations in the true sense. These insects had doubtless been blown out of sight of land and had simply kept on flying because of necessity.

The migratory locust is not a similar case for it moves in swarms only when the birth rate has been so large that the local food supply is exhausted. The adult monarchs are certainly not hard put to it for food as not only are flowers abundant when the migration starts but also adult butterflies take but little nourishment at any time. The so-called migration of the maggots of certain fungus-gnats (*Sciara* sp.) is, naturally, extremely limited and would not be noticed were it not that they are gregarious in habits. This too, is a movement in search of food. The swarming and migration of the monarch[1] remain a mystery in spite of the fact that they occur all about us every year.

Possibly it is on account of these roaming habits, possibly it is also on account of its protection from birds, that the monarch butterfly is now spreading over the entire earth. It has found its way to Australia, Java, Sumatra and the Philippines. A few specimens are found every year in Great Britain where the entomologist's net is an enemy not to be daunted by gaudy color and acrid taste. It is well established at the Cape Verde Islands and will without doubt shortly have conquered the earth.

[1] What is one of the most interesting, perhaps the most astounding and certainly the most inexpensive group for its size ever prepared in the American Museum has newly made its appearance in the hall of insect biology. It shows a three-foot square of ground on which grows a small white oak tree and the season is early autumn as announced by a few sprigs of white aster. The astounding sight is the presence of some five hundred of one of our largest North American butterflies clinging everywhere to leaves and twigs. This five hundred is reported by those who have witnessed the swarming and what seems to be the migration of the monarch butterfly to be a very small part indeed of the numbers that actually come together. They gather from miles about. Fifty or more can be caught by one sweep of a small net over the leaves where they rest, while those not captured but dislodged by the movement of the net are for number like a storm of falling leaves as they flutter and poise to settle lightly back on the tree. Tall slender sprays of goldenrod and aster, gradually hidden under burdens of folding and unfolding brown wings, finally bend to the ground under the weight — a fact by the way that gives a vivid idea of numbers, for weight effective in any degree is not associated in our minds with butterflies. In the swarming at Clinton, but a stone's throw from the sea beach, the butterflies gathered on the oaks and hickories to a height of twenty-five or thirty feet, on the sheltered sunny side of the grove. They were there one day and gone the next, following the coast southward.— Editor.

THE "SHOVEL-PIT" AT ELY, NEVADA

REMARKABLE SURFACE COPPER MINING SHOWN IN A LARGE CANVAS RECENTLY PRESENTED TO THE MUSEUM BY THE NEVADA CONSOLIDATED COPPER COMPANY

By L. P. Gratacap

EUREKA Cut at Ely, Nevada, referred to by the engineers of the Nevada Consolidated Copper Company as the "shovel-pit," is to-day a gigantic trench excavated in the side of a mountain. Terrace by terrace, it is gradually enveloping and destroying this mountain and when the destruction is accomplished the shovel-pit will assume the shape of an enormous basin about one mile long, one-third of a mile wide and three hundred to four hundred feet deep, a topographic feature of such magnitude that if not in a region of restricted rainfall, it might slowly accumulate waters and become a lake. Sulphides of copper, as also of iron, are scattered throughout the mountain mass and although the percentage of copper is only one to three, or about seven hundred ounces in a ton of rock so that the amount of metallic copper in any cubic foot is insignificant, the total amount that can be extracted from the mountain reaches great dimensions, probably many thousands of tons, a billion and a half or more of pounds.

The Nevada Consolidated Copper Company through its president, Mr. S. W. Eccles, has presented to the American Museum of Natural History an enlarged painting of this remarkable property. This painting is displayed on the south wall of the hall of minerals and was executed by Albert Operti. In his treatment of the subject he has adopted the French school of color and technique, producing a canvas which harmonizes admirably with the hall. While strictly maintaining the correct geological features throughout, closely following panoramic photographs and engineer's plans, Mr. Operti has at the same time not omitted artistic atmosphere, holding before himself the difficult problem of uniting illustrative with æsthetic values.

The region in which this copper property is situated has been one of extended and not always successful exploitation, and to-day its metallurgical values are practically confined to the two important mining companies at Ely, the Nevada Consolidated and the Giroux. The orebodies are found along the Robinson Cañon where evidences of the disasters that attended the earlier mining enterprises are visible in deserted smelting works, the smallness of whose slag dumps betrays the failure of premature hopes. The earlier operations continued intermittently for some years, until M. L. Requa and F. W. Bradley of San Francisco, recognizing

A new canvas in the hall of minerals — the "Shovel-Pit" of Ely, Nevada. This was painted by Albert Operti and presented to the American Museum by the Nevada Consolidated Copper Company through its president, Mr. S. W. Eccles

the wide dissemination of the copper ore, were led into a calculation of the ultimate magnitude of the resources of the area. Prof. Andrew C. Lawson of the University of California made a geological survey of the district, and under the guidance of his conclusions, these capitalists secured the more promising grounds. The company became well financed and aggressive mining was pushed with astonishing results.

As to the geology of the Robinson Cañon, the region is a limestone formation into which, at a long distant time in the past, bodies of molten rock have penetrated bringing with them copper minerals which have remained both in the intruding rock and in the limestone, especially on the south side of the cañon. These copper minerals are for the most part sulphides, although the action of the water carrying oxygen has through many sections of the hills converted the sulphides into carbonates (green malachite), and the lower layers of the formation have also from the beginning been slowly enriched by having transferred to them the copper contents of the overlying beds. Sulphides with a low percentage of copper have in this process been changed or mixed with sulphides of a higher percentage and this secondary zone of enrichment as it is called, contains the most valuable ore. Below this again are the primary beds which have not been enriched in this way and whose mining becomes a question for metallurgical economics.

The work is carried on through the agency of powerful steam shovels

Terrace by terrace this surface copper mining is destroying a mountain from which eventually will be extracted many thousands of tons of copper, probably a billion and a half of pounds. The canvas shows the workings as they were in 1910

which plow up the more or less shattered rock and dump it into trains of ore-cars, which again transfer it to the concentrators and smelters some twenty miles away. The system of work consists in stripping off the surface, which is practically barren of ore, in order to uncover the ore bodies below, the operations involving the construction of a series of ascending terraces on which the process of mining or stripping is continued simultaneously, with the highest always the most advanced in the work.

The painting represents the state of the workings in the summer of 1910, and displays instructively the relations of the geological elements to one another. The deserted diggings on the extreme left show terraces carried around an amphitheatre-like excavation through shattered rock containing the iron and copper oxides, and the commingling stains indicate the confused association. The center of the painting shows the broad convex breast of the hill which is the present focus of mining activity. The terraces rise seven stories with an equipment of cars, steam shovels and miners, and show distinctly the yellow stripping representing barren surface material to be carried by cars to the wash dumps, and the grayish white exposures underneath constituting the ore bodies to be mined with steam shovels and sent to the concentrator at McGill about twenty-two miles away. The train of cars on the extreme right is loaded with the crushed ore, described as looking like "crusted sugar," and the tracks lead away to the smelters.

Cane field with laborers and carabaos on the estate where was captured the twenty-four-foot regal python, the "Ular Sawa" of the natives

A PYTHON FROM THE PHILIPPINES

By Mary Cynthia Dickerson

AN authentic story touching a twenty-four-foot python's capacity for swallowing prey comes from the Philippines. Laborers found the snake on an estate near Iloilo, Panay, when on their way through

Photograph of wild boar swallowed by Philippine regal python. It was estimated to weigh 125 pounds. New York Zoölogical Park authorities assert that judging from the size of bones found in the stomachs of newly received pythons, a twenty-four-foot regal python could swallow a boar of 150 pounds

the forest to visit a trap set for wild carabaos. They killed the monster with their bolos, and on cutting it open found the boar, estimated to weigh one hundred and twenty-five pounds.

There has come down from ancient writers a large body of exaggerations in similar stories, the snake sometimes reaching one hundred and twenty feet and the prey the size of an elephant. The truth, however, is strange enough to leave no need for exaggeration. The New York Zoölogical Park reports that a forty-pound pig is the largest that has been given to its twenty-foot regal python, but that the snake could probably dispose of one of sixty or seventy pounds. The *Journal of the Bombay Natural History Society* for 1907 records the swallowing of a four-foot leopard by an Indian python, the world's second largest snake, and *Zoologscher Anzeiger* for 1907 says that a twenty-five-foot regal python in Carl Hagenbeck's Zoölogical Park at Hamburg swallowed a roebuck of sixty-seven pounds. Another in the same place is known to have eaten an Indian antelope of ninety pounds, and still another an ibex of ninety-seven pounds.

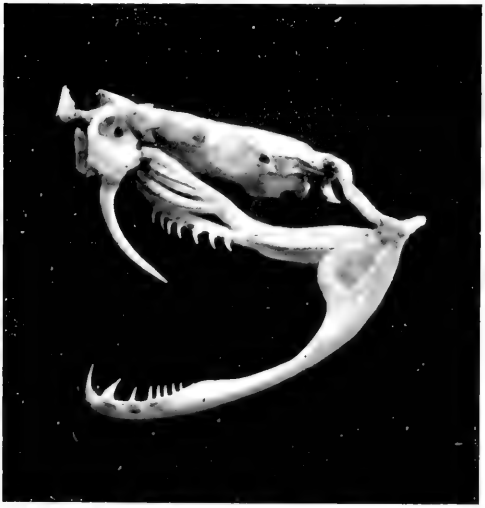
South American boa (*Boa constrictor*) at the beginning of the process of swallowing a black rabbit

The process all but completed

That these facts are possible is due primarily of course to the elastic ligaments between the bones of the snake's skull, especially those connected with the jaws. As the swallowing proceeds, the right and left sides of the jaws with their curved teeth reach forward alternately and in rapid succession to draw in the prey, the scales become widely separated on the head, which except for the presence of the eyes loses all semblance to a head, and finally what seemed the impossible has taken place and an object has been swallowed that was at least four or five times the diameter of the snake's head.

A vital question in the process concerns the breathing, when the internal openings of the nostrils, normally leading the air across the mouth to the glottis, are firmly blocked by the prey — and this perhaps for hours. The adaptation to overcome the difficulty is quite in keeping with the whole

Skull (exact length 5½ inches) prepared from the head of the twenty-four-foot python (*Python reticulatus*). It is on exhibition as representative of the non-poisonous type of serpent, showing the relatively equal teeth none of which are grooved to carry poison, but all curved backward better to hold the prey until the body is firmly coiled about it. Python presented to the Museum by Brig. Gen. George S. Anderson. Skulls prepared by Adolph Elwyn



Skull of bushmaster (*Lachesis mutus*) — actual length two inches — typical of the venomous snake. It shows the grooved fangs that carry the poison. The skull of the poisonous snake differs from that of the non-poisonous (in addition to the presence of fangs) in having the skull bone to which the teeth are attached (maxilla) movable in such manner as to throw the fangs into position for striking as the mouth is opened

astonishing matter, that is, the trachea, which lies along the floor of the throat and mouth, braced with its many cartilaginous rings so that it can be kept open notwithstanding the pressure of the prey upon it, is pushed forward until the glottis is outside of the mouth in the air, sometimes an inch and a half beyond the jaws. The wonder therefore is not so much in the swallowing performance itself as in the structures which have been evolved to meet the needs of this type of animal.

OSPREY NESTS ON GARDINER'S ISLAND

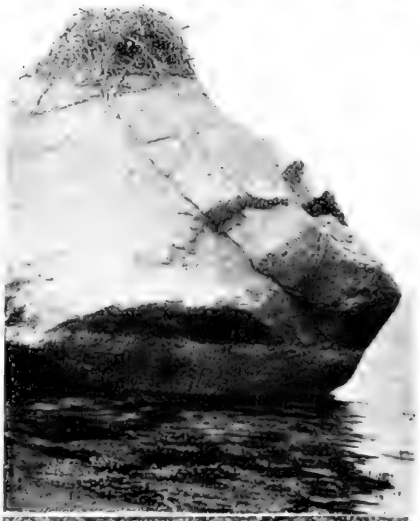
By William T. Davis

THE osprey or fish hawk, which arrives in the vicinity of New York about March 20, usually builds its huge nest in trees, as illustrated in the group on the third floor of the American Museum near the members' room. The nest is often placed in a wayside tree, sometimes close to a railroad where it is always of interest to the traveler. Not far back from the sea in parts of New Jersey, a state in which these birds have been protected by law since 1900, osprey tree nests stand like beacon lights along a coast.

That ospreys may build low nests however is proved in that Eden of theirs on Gardiner's Island near the eastern end of Long Island, where is the largest osprey colony within one hundred miles of New York City. There one may see many nests on the ground along the shore, on boulders in the rolling fields, or high in trees according to the usual habit. For there are large trees on Gardiner's Island, in fact a sufficient number in the almost original forest that still stands on parts of the island, so that all of the birds there could easily build in trees as they do on the mainland of New Jersey, were it necessary.

These ground nests have been brought about by the isolation of the birds and the absence of enemies that might destroy the eggs; and they are therefore of unusual interest as indicating a voluntary change of habit correlated with new conditions in the environment.

Osprey nest on the beach



On a rock in the sea

On the ground with no attempt at nest building

MUSEUM NOTES

Since the last issue of the Journal the following persons have been elected to membership in the Museum:

Associate Benefactor, Mr. Ogden Mills;

Patron, Mrs. Isaac M. Dyckman;

Fellows, His Grace, the Duke of Bedford, Col. Anthony R. Kuser and Mr. Grant B. Schley;

Honorary Fellows, Lieut. George T. Emmons and Mr. George Bird Grinnell;

Life Members, Mrs. Henry F. Dimock, Mrs. Arthur Curtiss James, Sir Ernest Shackleton, Dr. Emery J. Thomas, Dr. Leonard C. Sanford and Messrs. Charles Eddison, Eberhard Faber, Howard Fuguet, Garret A. Hobart, S. K. Jacobs, Edward H. Litchfield, Marion McMillin, Manton B. Metcalf, Louis A. Ripley, Quincy A. Shaw and Henry R. Towne;

Sustaining Members, Mrs. Walter Phelps Bliss, and Messrs. Eugene Meyer, Jr., and Elias D. Smith;

Annual Members, Mrs. Clinton L. Bagg, Mrs. Joseph A. Blake, Mrs. W. A. M. Burden, Mrs. Arthur K. Buxton, Mrs. Alfred A. Cook, Mrs. Anderson Fowler, Mrs. C. D. Gibson, Mrs. W. W. Herrick, Mrs. Edward Holbrook, Mrs. J. Herbert Johnston, Mrs. O. Kiliani, Mrs. Anthony R. Kuser, Mrs. John J. Lapham, Mrs. Lydia G. Lawrence, Mrs. Prescott Lawrence, Mrs. James M. Lawton, Mrs. E. A. LeRoy Jr., Mrs. Haslett McKim, Mrs. Charles E. Miller, Mrs. George Barclay Moffat, Mrs. R. Burnham Moffat, Mrs. L. R. Morris Mrs. Laura A. Palmer, Mrs. Frank H. Platt, Mrs. George D. Pratt, Mrs. Herbert Pratt, Mrs. F. C. Walcott, Miss Anna Welsh Lapsley, Miss A. P. Livingston, Dr. Philip D. Kerrison, Dr. Henry M. Koles and Messrs. Charles E. Appleby, August Belmont, Jr., John Boland, Reginald P. Bolton, Gutzon Borglum, Maxwell Evarts Butler, John E. Currier, William C. DeLanoy, Alexander P. Fiske, Henry Walker Hall, David W. Harkness, Samuel Heller, Henry Hellman, Clarence A. Henriques, Joseph Hirsch, Walter S. Johnston, W. Templeton Johnson, LeRoy King, M. Kirchberger, W. Thorn Kissel, Herman Kramer, Joseph Levi, Gustav Lewkowitz, Ludwig Littauer, R. Fulton Ludlow, Robert H. McNall, J. Varnum Mott, Hermann Norden, George B. North, Endicott Peabody, Edward Sandford Pegram, G. D. Pope, David Randall-MacIver, Coleman Randolph, Louis Ruhl, William D. Sargent, Everett B. Sweezy, Joseph T. Talbert, Charles H. Tweed, William H. Weitling, Judd Elwin Wells, and George W. Wingate.

At the forty-third annual meeting of the trustees of the Museum the following elections to membership were made in consideration of gifts or services rendered to the Museum:

Mr. Ogden Mills, associate benefactor, in recognition of his gift of the Catlin collection of Indian paintings;

Mrs. Isaac B. Dyckman, patron, in recognition of her contribution for the preparation and publication of a bibliography on fishes;

His Grace, the Duke of Bedford, fellow, for his generosity in presenting to the Museum two fine examples of the Prjevalsky horse, a species which has hitherto been unrepresented in the Museum collections;

Mr. Anthony R. Kuser, fellow, in recognition of his offer to present to the Museum a collection of pheasants of the world;

Lieutenant George T. Emmons, honorary fellow, in recognition of his services in furnishing information in regard to the Indians of the Northwest Coast and in promoting field work in this region;

Mr. George Bird Grinnell, honorary fellow, in recognition of his services in the development of the Museum's department of anthropology;

Sir Ernest Shackleton, life member, in recognition of his splendid achievements in the field of exploration, as well as for his generosity in presenting to the Museum a collection of minerals from the South Polar region;

Dr. Leonard C. Sanford, life member, in recognition of his generosity in placing his superb collection of birds of the world at the disposal of the curators of the Museum for study and reference.

The Museum has secured, through the generosity of Mr. J. P. Morgan, Jr., the collections of minerals and meteorites left by the late Stratford C. H. Bailey of Oscawana-on-Hudson. Mr. Bailey had been an indefatigable collector for many years and had assembled representatives of nearly three hundred falls and finds of meteorites, at least twenty-one of which are new to the Museum's already great foyer collection. The gem of the Bailey collection is the aërolite or stone meteorite known as Tomhannock. This is a small mass weighing about three and one-quarter pounds, but it is nine-tenths of the entire stone that was found in 1863 on Tomhannock Creek in Rensselaer County not far from Troy, N. Y. It was first described by Mr. Bailey in 1887 and has always been highly prized.

The clay model for a bust of Peary has been executed by William Couper and is now on its way to Florence to be cut in Carrara marble. The bust is a gift from Mrs. Morris K. Jesup and will take its place among the other marble busts in the niches in memorial hall.

A new group for the Darwin hall will shortly be placed on exhibition. It is designed to illustrate the struggle for existence and the complexity

of biological interrelationships of animals. The center of interest is a family of meadow mice. They are surrounded on three sides by various characteristic enemies — skunk, weasel and cat among the mammals, hawks and owls as representatives of birds, and the black snake among reptiles. In the remaining space are shown the food organisms to which the meadow mouse stands in the position of an enemy.

Mr. C. W. Leng has put his valuable collection of "long horned" beetles at the Museum's disposal for use in filling gaps in its collections. This means a gift of some 870 specimens covering nearly 300 species not hitherto acquired.

Mr. John A. Grossbeck, who has been specializing for some time on the Geometridæ, has given to the Museum his entire collection of these moths in addition to the series previously donated. This gift places the American Museum in the front rank as regards this division of Lepidoptera. The collection includes about 6000 specimens among which are more than 150 types.

The Museum's new members during the year numbered 349, bringing the total membership on December 31, 1911 to 2,656. About 250 new members have been added to the mailing list since January first.

The Museum has recently obtained by exchange with the University of Cambridge, England, some rare ganoids, the eel-shaped *Calamoichthys calabaricus,* which fill gaps in the synoptic series. The same exchange provides specimens of the young of the African lungfish, *Protopterus annectens.* The latter is an important addition to the Museum's series of growth stages of lungfishes, which was also recently enriched by a large collection of young *Ceratodus* from Queensland.

The Annulate group has recently been completed. It displays a number of marine worms and worm tubes in their natural biological settings, together with hermit and fiddler crabs, whelk, scallops, minnows and other organisms which live in the mud or amid the eelgrass of shallow sea water. The group shows three sections: Above is the ocean as man sees it with the harbor of Woods Hole, Massachusetts, in the distance; below this, the sea as aquatic marine animals know it, where are seen, reproduced in wax or glass, the marine forms living there; and still below, a section of the sand and mud at the bottom of the sea with its population of burrowing animals. The group correlates with an adjoining case of annulates arranged in systematic series, and shows in natural size, living position and natural habitat many of the same species displayed in the case as enlarged models for structure study.

Among the accessions of interest received in the department of ornithology since the first of January are a mummified falcon from a tomb at

Thebes, a black-capped petrel found in Central Park, an apteryx presented by Robert Hill and Sons, and forty-five birdskins from Samoa presented by Mr. J. T. Lloyd and including two tooth-billed pigeons.

The International Congress of Hygiene and Demography which meets in Washington next September has invited the Museum to contribute its public health exhibits dealing with bacteria, water supply and waste disposal to the exhibition which is to be held in connection with the Congress. Mr. Felix M. Warburg will defray the expense of transportation and installation.

Among recent accessions in herpetology is a specimen of the curious South American toad, *Pipa americana*, whose eggs are carried and hatched in pouches on the back. While the toad itself is not uncommon in collections, a perfect specimen carrying eggs or young is rare. A series of alligator embryos has also been received as a gift from Professor Albert M. Reese.

Mr. A. D. Gabay has presented to the department of invertebrate zoölogy a valuable series of sponges from the Mediterranean Sea and from the Bahama Islands. The collection numbers more than a score of unusually fine types showing characteristic methods of growth and other significant details. Certain valuable crustacea have also been donated by Mr. Gabay.

In view of his valuable services Mr. Harlan I. Smith has been elected honorary curator of archæology.

Dr. John W. Churchman of Johns Hopkins University has been spending two weeks at the Museum, using the collection of bacterial cultures for special studies in which it was necessary to test the comparative behavior of a large series of forms.

Mr. Edward Payson Mathewson, general manager of the Anaconda Copper Company, and a life member of this Museum, has been presented with the gold medal of the Institution of Mining and Metallurgy, London. This medal was given "in recognition of his eminent services in the advancement of metallurgy generally and especially in regard to copper."

Only once in several years is there such attendance as was brought out by the lecture on February 29 by Paul Rainey, when more than four thousand people were not able to gain entrance to the lecture hall. Usually this hall's seating capacity of fourteen hundred is sufficient notwithstanding the fact that each member receives four tickets, making a total issue of some twelve thousand. The Museum regrets that all its members could not secure seats and arrangements have been made for a repetition of the lecture on March 13.

LECTURE ANNOUNCEMENTS

PUPILS' COURSE

These lectures are open to school children when accompanied by their teachers and to children of members of the Museum on presentation of membership tickets.

Mondays, Wednesdays and Fridays at four o'clock.

March 18 and April 22 — Mr. R. W. Miner, "History of New York City."
March 20 and April 24 — Mr. C. E. Akeley, "A Monkey on Safari" [A Natural History Lecture].
March 22 and April 26 — Mrs. A. L. Roesler, "Early Explorers in America and the Indians."
March 25 and April 29 — Dr. L. Hussakof, "Views in Europe."
March 27 and May 1 — Miss S. Wilds, "Fairy Tales of Indians and Eskimo."
April 12 and May 3 — Mr. A. E. Butler, "One of the Great Industries of the United States."
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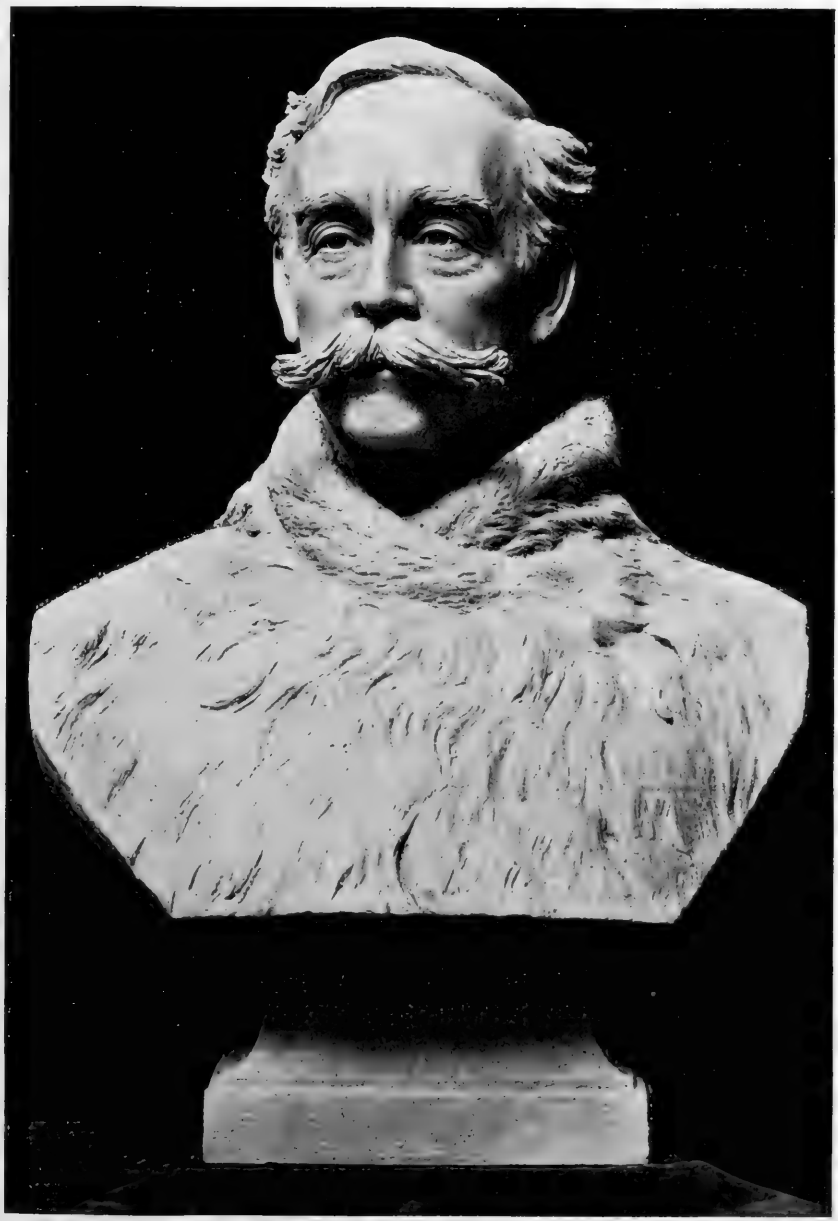

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The American Museum Journal

CONTENTS FOR APRIL, 1912

MARY CYNTHIA DICKERSON, *Editor*

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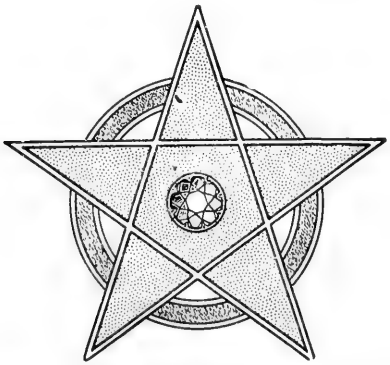
REAR ADMIRAL ROBERT E. PEARY, U. S. N.

Clay model of bust given to the American Museum by Mrs. Morris K. Jesup.



Medal of honor presented to Admiral Peary by the Peary Arctic Club on the third anniversary of the discovery of the North Pole. The star is made of polished fragments of the Ahnighito meteorite set in gold about a central diamond. On the circle of gold five of Peary's Arctic achievements are inscribed: "The Crossing of Greenland, 1892"; "Securing the Great Meteorites 1897"; "Insularity of Greenland, 1900"; "Farthest North, 1906"; "North Pole, 1909." The medal has been deposited with other Peary medals in the National Museum.

— "A Name for History: Peary," page 128

The American Museum Journal

Vol. XII APRIL, 1912 No. 4

PRESERVATION OF THE WORLD'S ANIMAL LIFE

By Henry Fairfield Osborn

AS a palæontologist I have a convincing sentiment toward conservation. In every student of the history of life, from its beginnings until to-day, there is born a sentiment for conservation. It springs from a long and intimate even though imaginary acquaintance with the world's animal life during vast periods of time. Every hunter of fossils puts himself backward in time and lives in imagination with his plants and animals. How could one trace the birds or the mammals through their arduous ascent from reptiles, through the vicissitudes of geographical and geological changes, without acquiring a peculiar admiration and sympathy for them? Thus through following its structural evolution from fragments preserved in the rocks, each creature gains historical and architectural as well as æsthetic value. Each becomes a living monument of adaptation and of beauty, which connects the past with the present.

All lovers of architecture regard the destruction of the Parthenon of Athens by Turkish cannon in the year 1687 as an act of barbarism. Yet it would be possible for modern archæologists and architects to restore this temple of Greece to a large measure of its former beauty and grandeur. It is far beyond the power of any men however, of all the naturalists of the world, to restore a single forest, a tree or flower, a bird or mammal, even a single vanished individual, let alone a vanished race: once lost, the loss is irreparable. Only nine years were required to build the Parthenon; it has taken millions of years to produce any single offspring of Nature. When an ax or a bullet penetrates the delicate living tissue, replete with this long history of contact with sunshine, oxygen, water and soil, a temple is torn to pieces.

Although done in the name of civilization, we may hold it an act of barbarism when we destroy a forest of spruce and grind it up into wood pulp to pass beneath the press of the "yellow journal." The progress of conservation marks the advance of a true, as distinguished from a false civilization. The conservation sentiment, feeble in its inception a few decades ago, becomes daily more powerful, owing in part to the general altruistic spirit of the times, in part to the direct efforts of associations like the Audubon Society, and to the writings of nature poets, like John Muir and John Burroughs, as well as of field naturalists, like Frank M. Chapman of our own Museum. Substitution of the camera for the shotgun is exerting its influence: the work of Kearton, of Shiras, of Schilling, Dugmore and Rainey, has spread a new knowledge of living animals.

In every part of the English-speaking world the principle of conservation is taking firmer hold on public opinion, as shown both in expression in literature and action in legislation. The lobbyist is becoming powerless because contending with a growing sentiment which is fast attaining strength in commercial interests. During the past two years the legislatures of states like New York, Massachusetts and New Jersey, have enacted laws prohibiting the sale of all wild game, and in several states laws have been passed limiting the use of destructive weapons. The United States and Canada have followed up their great measures for the preservation of their forests with the creation of animal preserves in several of these forests, in addition to setting aside other especial preserves for the bison and the prong-horn antelope. Great Britain has been equally active in Africa, and it is interesting to observe Germany and Austria now taking up the animal conservation movement and forming their own especial societies. Only the Latin countries, France and Italy, seem to be behind in a recognition of the necessity for the preservation of wild animal life.

Young foxes in one of the Museum's series of groups showing the mammals of New York State

It is gratifying to realize that the American Museum of Natural History has held from the first a position as one of the centers of the conservation movement. For among the hundreds of thousands who annually pass through the institution's halls are many who gain knowledge and an abiding interest in nature, the very mainsprings of the conservation idea. It is cause for congratulation also that the Museum's influence for the preservation of animal life is continually increasing as advances are made in methods of exhibition and public education.

THE STATUS OF FORESTRY IN THE UNITED STATES

By Overton Westfeldt Price

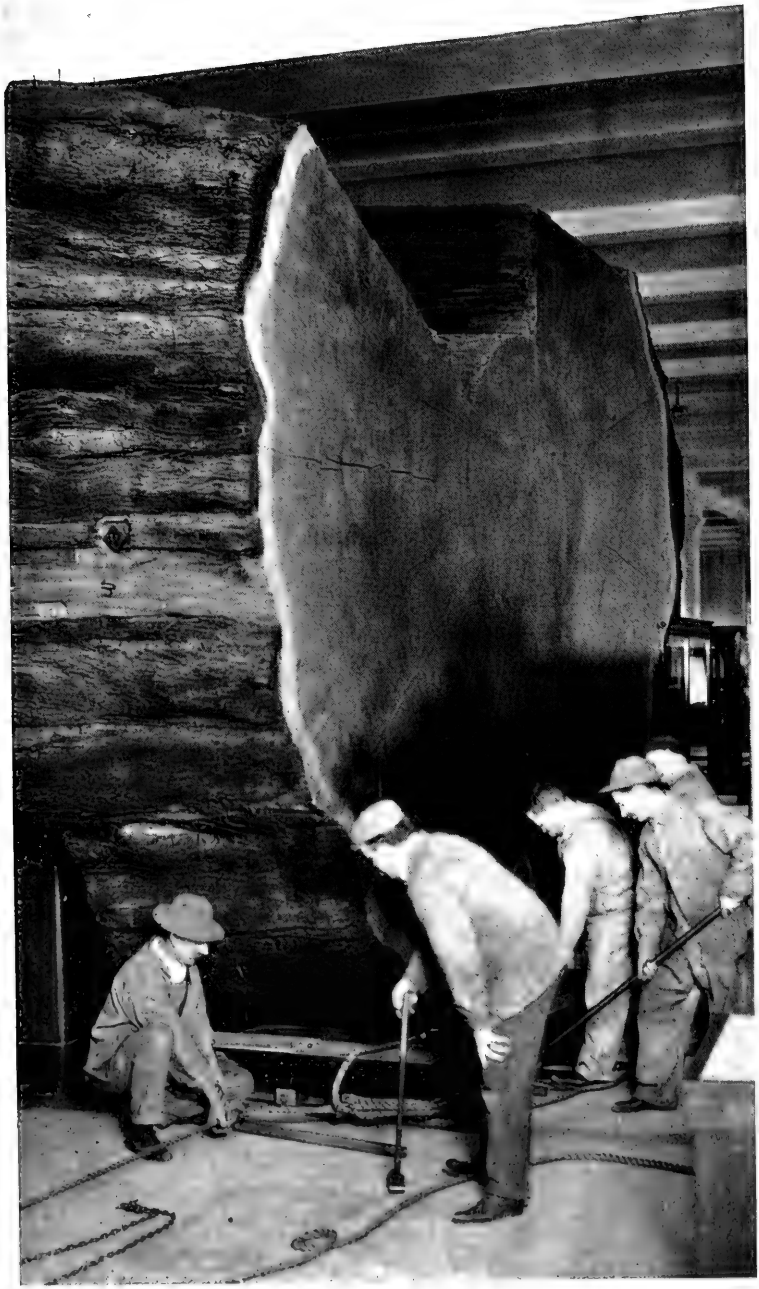
[VICE-PRESIDENT OF THE NATIONAL CONSERVATION ASSOCIATION, FORESTER OF THE LETCHWORTH PARK ARBORETUM, AND LATELY ASSISTANT UNITED STATES FORESTER]

THE fruits of the movement for forest conservation are the Forest Service, the national forests, and a public sentiment deep and strong for the preservation of all the forests of America. These are three assets for which the Nation may well be thankful, as it may be thankful for the man to whom it chiefly owes them. They constitute three of the great objects for which Gifford Pinchot has striven wisely and unflinchingly, and their accomplishment is in a very real and unusual sense a personal achievement.

What do these three things mean? The existence of our Forest Service means that the United States now possesses an organization animated by high ideals, permeated by the spirit of public service, trained and efficient, to handle the country's forests. The national forests themselves mean that two billion dollars worth of tangible natural resources are now protected and conserved by wise and regulated use. While in a public sentiment generally vigorous and informed, lies in the last analysis the surest safeguard of all for the perpetuation of the forest resources of America.

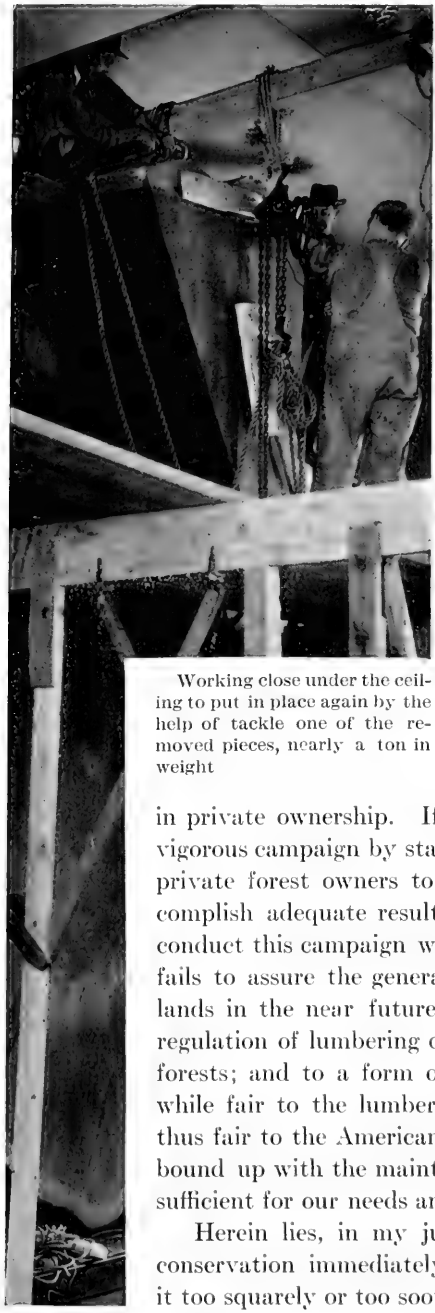
So much for the progress won in less than two decades. For twenty years ago, not a single national forest had been established; the Forest Service, now three thousand strong, contained less than a dozen persons; and except for a nucleus of devoted men and women alive to the urgent need for forest conservation, the American people were as yet in the main indifferent to the question of forestry. Now what must be added to these great accomplishments before all our forests are safe?

The Nation and all the States own about one-fourth of our forests. The other three-fourths are owned by lumbermen, farmers and landed proprietors. So far, very few of these private owners are practicing forestry. Probably less than one per cent of all the privately owned forest lands in the United States are being well protected from fire, or are lumbered carefully and wisely so that they will produce a satisfactory second crop. The reasons why private forest owners are so slow to practice forestry would make a long story, or rather a series of long stories. But there is nothing in any of them to show that forestry does not pay well enough to justify the individual in practicing it. The chief reason why it is not more generally practiced lies in personal desire for large immediate returns, in the traditional American attitude toward the forest as a thing to loot, and in disregard of the principle that the private ownership of large bodies of forest land is a public trust.



THE MUSEUM'S BIG TREE SECTION

This section, cut in 1891 and presented to the Museum by the late Collis P. Huntington, has recently been moved from the Darwin hall to the forestry hall. Standing too high (diameter, 16½ ft.) to pass through the doorway between the halls, it had to be lowered by the removal from the top of two pieces and a part of a third of the original twelve in which it was shipped from California. This left a weight of about seven tons which was supported on rollers to the new position



Working close under the ceiling to put in place again by the help of tackle one of the removed pieces, nearly a ton in weight

Unless our forests in private hands are properly protected and wisely used, we shall fail to solve our national forest problem. If forestry is not practiced generally and soon on private forest lands, then this country, well within the lives of many of us, will be in part, and possibly in large part, dependent upon other countries for its timber supply. If we do not raise enough wood for our needs, then the time inevitably will come when we must buy it elsewhere, as do England and Italy and Spain — for we cannot go without. This will mean the pinch of higher prices for wood and all its products, which all of us must feel.

So herein lies, as I see it, the next great task immediately before the movement for forest conservation in the United States — to get a prompt and real beginning made in the right handling of forest lands in private ownership. If the continuance and extension of a vigorous campaign by state and federal agencies, for educating private forest owners to the advantages of forestry will accomplish adequate results soon enough, then the money to conduct this campaign will be wisely spent. But if education fails to assure the general application of forestry to private lands in the near future, then the Nation must turn to the regulation of lumbering on private lands in order to save our forests; and to a form of regulation embodied in law which while fair to the lumberman, is also fair to the forests, and thus fair to the American people, whose welfare is inseparably bound up with the maintenance of a permanent wood supply sufficient for our needs and grown within our own country.

Herein lies, in my judgment, the urgent task in forest conservation immediately before us all. And we cannot face it too squarely or too soon.

A NAME FOR HISTORY: PEARY

A BUST OF REAR ADMIRAL ROBERT E. PEARY, ARCTIC EXPLORER, HAS BEEN PRESENTED TO THE MUSEUM BY MRS. MORRIS K. JESUP. ON THE ARRIVAL OF THE BUST FROM FLORENCE, WHERE IT HAS BEEN CUT IN CARRARA MARBLE, IT WILL OCCUPY A NICHE IN MEMORIAL HALL[1]

ON this April, 1912 marking the third anniversary of the discovery of the North Pole, there is full realization in public opinion of the imperishable record Peary made for himself in that attainment. Many had striven during more than three centuries; the triumph came to Peary, sailor, surveyor, civil engineer, and for twenty-three years Arctic explorer. Success however rested not merely on training and experience but also on the character of the man. He brought to the work the initiative and courage of executive power and a sufficient consciousness of this power to push always ahead — and it can be added, often at great personal sacrifice. It was this strength and knowledge of strength that inspired confidence in all associated with him, from the Eskimo who left his family to share the struggles against cold, fatigue and hunger, for a goal the importance of which he could scarcely appreciate, to the keen-sighted man of science or business who gave financial support to the work.

It was the grit of Peary that won the sixteen members of the Peary Arctic Club, which had its first meeting in 1899. Such was the belief in this man "of clear-eyed confidence who knew what he wanted to do and intended to do it," that the support would have been the same had his quest been the South Pole, or in the words of one of the members, "the moon or any other place." They shared the enthusiasm of this man who "put up such a splendid fight," who at one time "continued his work on crutches when the freezing of his feet necessitated the suffering attendant on the loss of seven toes."

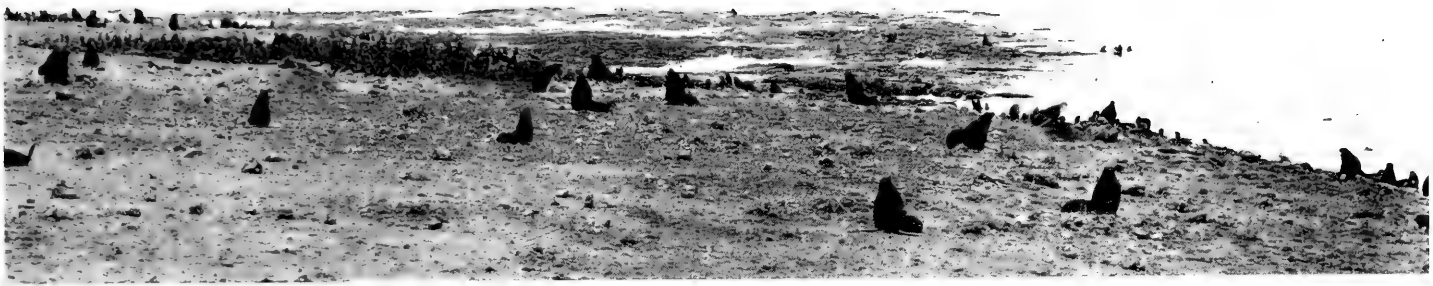
The Peary Arctic Club in the recent official recognition of Peary with its medal of honor announced its work done. The Club, Peary and the Museum have been an organization of forces unusual because of unanimity of purpose. The late Morris K. Jesup, president of the Club, was a man who stood for results; Peary's aim during the entire twenty-three years was but a tremendous effort toward the realization of a vision in results; and the Museum has always been a place where the example set by those

[1] The other marble busts in memorial hall — the work of the same American sculptor — were unveiled on December 29, 1906 and were the gift of the late Morris K. Jesup. They represent the following men of science: Benjamin Franklin, Alexander von Humboldt, John James Audubon, John Torrey, Joseph Henry, Louis Agassiz, James Dwight Dana, Spencer Fullerton Baird, Joseph Leidy and Edward Drinker Cope.

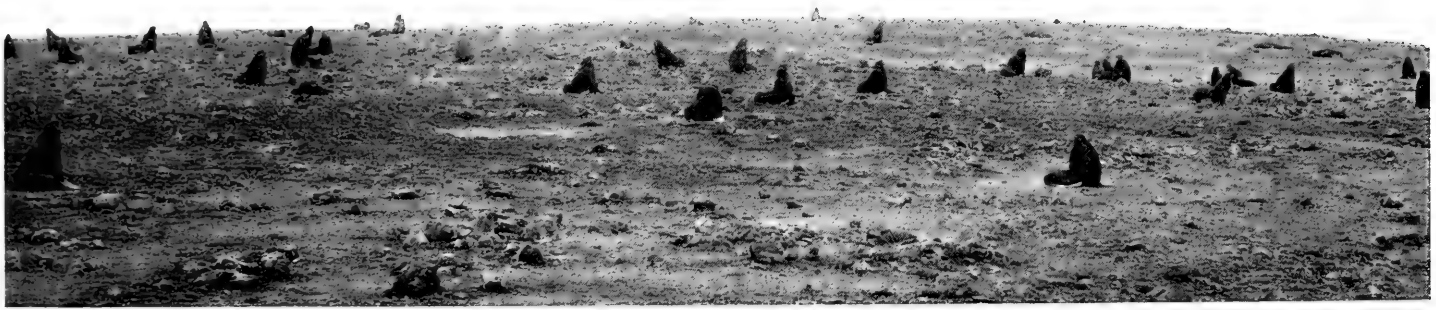
high in its organization has been followed in a pressing forward for results. The triumvirate worked together with unquestioned loyalty, the Club in its share proving constantly its breadth of view and its generosity, so that Peary planned his work without particular instructions from his supporters and the Museum was always custodian of all collections without supervision. Members of the Club give the highest credit to Mr. Jesup and to Peary: it was the faith of these two that kept the work in continuance. Mr. Peary used his own money for the early trips and Mr. Jesup was by far the largest contributor later, while other liberal supporters were General Thomas H. Hubbard, president of the Club to-day, and the late Mr. George Crocker.

The records of the Museum from 1895 to the landing of the Roosevelt after the last expedition, contain long lists of Arctic possessions, and there accompanies these lists even as far back as 1902 a note to the effect that the American Museum is undoubtedly the richest in the world in collections from Arctic America. There are musk ox, polar bear, walrus, seal and caribou, including the white Peary caribou, as well as large series of small mammals and of birds. There are various sledges, among them the "Morris K. Jesup," that strong flexible sledge which made the journey to the Pole in 1909; besides Eskimo costumes of many kinds and other objects representing the culture of the Arctics. In addition there are the clothing, rifles, and surveying and other instruments abandoned at Fort Conger by the Greely expedition. The best-known objects in the Museum representative of Peary's energy in Arctic work are the three meteorites from Cape York, Greenland, the two smaller obtained in 1895, the "Ahnighito" meteorite weighing thirty-six tons, in 1897. These constituted the secret "Iron Mountain" of the Eskimo from which the tribes obtained metal for knives before a supply reached them as a result of the visits of explorers.

The five achievements named on the Peary Arctic Club medal [Frontispiece] are of magnitude to exalt the name of Peary for all time, but moreover as long as histories are written and men love the heroic, the statement of the events will be coupled with a story of the dogged will of the man, of his pluck. The bust by Mr. Couper to be added to the other busts in the Museum's memorial hall through the generosity of Mrs. Jesup, wife of Peary's staunch supporter, shows the face of a dauntless man, one who has suffered much without yielding. Looked at by another generation, and in another perspective, it will tell the greatest story of endurance and steadfast purpose in the history of the earth's conquest of land and sea, and although the historian may explain that recognition and fame came to this explorer while he was yet in the prime of life, the stern yet chastened lines that the sculptor has given the marble will seem also to suggest the familiar story that no greatness is won without some misunderstanding from contemporaries.



Polovina rookery, St. Paul Island, July, 1897, showing close aggregation of the seals in harems, and scattered idle bulls outside. "The fur seal is highly polygamous, the average family consisting of a male and thirty females while the birth rate of the sexes is equal. There is thus a large number of bachelor seals. . . . .These bachelors keep by themselves, approaching the breeding grounds literally at the peril of their lives"



Polovina panorama showing idle bulls, to the left of the breeding ground pictured above

Two haremless bulls in controversy

THE FUR SEAL

By Frederic A. Lucas

In the hall of northern mammals is a small group of the Alaskan fur seal, the species that for many years has been the chief source of our sealskin cloaks. Forty years ago, when we purchased Alaska, the fur seal herds of the Pribilof Islands numbered between three and four millions; to-day, through the effects of pelagic sealing, there are not 150,000 fur seals left. No animal has been the source of so much profit to the United States as has the fur seal; none other has cost so many millions as have been expended in efforts to terminate pelagic sealing and preserve the seals. It has been the source of endless international disputes and voluminous diplomatic correspondence. So much has been said about the necessity of a total cessation of killing both on land and sea, that it may be well to call attention to the fact that killing on land is confined to young males of the bachelor class, whereas probably eight out of every ten seals killed at sea are mother seals whose young necessarily starve to death. The following article states some of the biological facts, from which the reader may draw his own conclusions. Dr. Frederic A. Lucas was a member of the Fur Seal Commission of 1896 and 1897, especially charged with the investigation of the breeding habits of the fur seals and the causes of mortality among them. He has since been a member of the advisory board of the Fur Seal Service.— Editor.

THE recent treaty between the United States, Great Britain, Russia and Japan, with a view to the suppression of pelagic sealing, is one phase of the conservation movement, the all but too late effort to preserve something of our wild life.

Few animals can be more readily protected than the fur seal, few would yield better results from a purely cash standpoint and few are more in need of protection. For years the herds have been decimated by pelagic sealing with its wasteful slaughter of breeding females and attendant starvation of their young.

Many things have stood in the way of protecting the seal, not the least of which is the fact that the high seas are free to all, and that it required a general agreement of important maritime powers to make protection of any value. That Canada had no fur seal herd, and that the fur seals of Japan were all but exterminated were other factors to be reckoned with, for both

An alarmed harem. The bull is at the extreme right

these countries were profiting at the expense of others by killing fur seals on the open sea.

The regulated killing of young males on land has caused no decrease in the fur seal herd any more than the systematic killing of cattle and sheep depletes the stock-raiser's herds and flocks. This is due to the fact that the fur seal is highly polygamous, the average family consisting of a male and thirty females, while the birth rate of the sexes is equal. There is thus a large number of bachelor seals (as they are appropriately called) and these it is, that under certain restrictions, are killed on land. These bachelors keep by themselves, approaching the breeding grounds, or rookeries, literally at the peril of their lives, and hang about the islands or gather on land in great bands at certain well-defined places, known as "hauling grounds," where they sleep for days at a time.

Our fur seal group in the Museum is necessarily untrue to nature because in endeavoring to give a comprehensive idea of the fur seals, it shows a

A sleeping bull with a portion of his family. Kitovi rookery, St. Paul Island, 1897

bachelor in company with an adult male and female. The little yearling belongs there, because yearlings are permitted to come to the edge of the rookeries where they play with the baby seals or pups, so-called because they suggest fat little Newfoundland puppies.

The fur seal belongs to that division or group of seals known as eared seals, from the possession, in contrast to their relatives, of useless little ears which seem to serve no good purpose save for classification. All the members of this group have long, bare front flippers and have the ability to stand on all fours and to walk about on land, somewhat awkwardly perhaps, although for a short distance even a big fur seal can sprint almost as rapidly as a man.

The best known of the eared seals is the California sea lion, which is to

Young Steller's sea lions at Ano Nuevo, one mile off the California coast opposite Pescadero. Both young sea lions and young seals are puppylike and inoffensive. The sea lion or fur seal mother will not care for other than her own offspring; thus killing at sea results in a large loss in starvelings at the rookery

be found in every zoölogical garden and of late years has become familiar to us as a performer on the vaudeville stage. It is much more tractable and intelligent than the fur seal, which is stupid and intractable though making up what it lacks in reasoning power in highly developed instincts.

The most remarkable among these is the homing instinct, the ability to return to the spot where it was born, a power much more wonderful in a creature whose course lies over the sea where there are no possible landmarks to guide it, than in birds that can at least see for several miles about them. Year after year, as regularly as the seasons roll around, the seals return to their homes on the Pribilof Islands after a six months' absence. When

they leave in November or December, they strike boldly southward[1] to the latitude of San Francisco, and then turn and work gradually northward, reaching the islands in June. Here the fur seal passes the summer, a large portion of the time on land, for of all amphibious mammals the fur seal most truly deserves that name, and here it rears its young, or rather here its young is reared, for the mother seal shows no maternal spirit towards its little one other than to nurse it.

It may seem strange that on our coasts the fur seal should be found only on two small islands and that on the Asiatic side it should be confined to a few isolated islets, but this is probably due to its habits. A creature that spends at least a quarter of its time on land, where it is readily killed, must have offered an easy prey to primitive hunters, and so centuries ago it became restricted to islands unvisited by man.[2]

The fur seal long ago would have been swept out of existence but for the fact that the breeding grounds are carefully guarded, and while the herd is but a tithe of its former size, it still comprises many thousands. If pelagic sealing can be brought to an end, the seal herd will recuperate rapidly, even though the death rate is high and not more than half the seals born in any one season live to return the next. Whether or not this desirable end can be brought about remains to be seen, and some of us are not very hopeful. The policy of many members of the present generation seems based on the famous dictum of Sir Boyle Roche, "Why should we do anything for posterity, what has posterity ever done for us?" and immediate profit is an ever-present stumbling block in the path of conservation.

[1] The females and young do this, the old males for the most part winter in the Gulf of Alaska, and are the first to return to the islands in the spring.

[2] We have a parallel case in the great auk which was found at one or two places and was promptly exterminated.

It is pelagic sealing which is disastrous to the herds, not land killing which can be controlled and includes only bachelor seals

MODERN CHINESE COLLECTIONS IN HISTORICAL LIGHT

WITH ESPECIAL REFERENCE TO THE AMERICAN MUSEUM'S COLLECTION REPRESENTATIVE OF CHINESE CULTURE A DECADE AGO

By Berthold Laufer

THE transformation of the Chinese Empire from a theocratic-patriarchal system of government into a modern commonwealth on a constitutional and republican basis, effected within the span of a few months, is sure always to remain one of the unique phenomena in contemporaneous events and certainly one of far-reaching consequence for the future history of the world. Whether there possibly is a causal connection between this singular fact of the rejuvenation of the oldest existing nation and the construction of the greatest wonder of modern engineering, the Panama Canal, is a matter to be left for individual speculation. Certain it is that the China of the future will rank as the second greatest republic, and that the completion of the canal will bring into closest touch the two foremost republics of the world. The republican idea reverberates over the waters of the Pacific from one shore to the other. The Pacific now recapitulates the spectacle seen when culture development was largely concentrated around the Mediterranean, and reached its climax in the republican governments of Greece and Rome.

The fundamental reform of Chinese government, of law, finance and education, of commercial and industrial factors will naturally result in a proportionate change of the entire culture of the country. Such a change has gradually set in since 1900 and has gone a rapid pace during the last

Masks used in mystery plays in Peking, at the left an aërial demon, at the right a graveyard ghoul. The central mask represents one of the four Great Kings of Heaven; in the gates of almost every Buddhistic temple in China are colossal clay statues showing the golden crown, the large rings in the ears, the wide open mouth surrounded by flames

Chinese ancient bronzes. Some of the bronzes in the American Museum are 3000 years old. The "flower vase of a hundred rings" represents the Sung dynasty, 960–1126 A. D.

few years. The days of antiquity which once formed the source of a delightful object-lesson for the ethnologist have thoroughly vanished, and the process of modernization is pervading all departments of activity. In this state of affairs, we are bound to raise the question, what is the present significance of ethnological collections made in China a decade ago? Nobody competent to judge will hesitate to say that the same importance is due to them as to collections secured in Japan before the era of the restoration. A scholar who recently tried to make a collection in China wrote to me on his return to Europe a short while ago: "You deserve congratulation for having seized the right opportunity; it is impossible to do at the present time what could be done ten years ago."

It should be borne in mind that the ethnology of China is a subject of greater complexity than that of primitive groups of peoples, and that the extent of a country equaling the United States in area tends to set a well-limited purpose before the eyes of the individual explorer. Something like a complete collection from China does not exist anywhere nor is it ever likely to exist in any museum; but there is ample reason for satisfaction, that we now discover in our collections many series of objects which exist no longer in China.

The Chinese collection in the American Museum illustrates the home industries and the social life of the common Chinese people of ten years ago and represents China as a living culture organism. The collection was made according to a scheme similar to the one which an ethnologist would follow up in the study of a primitive group. However simple and plausible this may sound, the fact remains that such a plan had never before been carried

In the antique cloisonné of China there were used enamels in solid pieces and in a powdered state to show thirty-one different shades. The secret of many of the colors of the Ming dynasty is now lost

out, as illustrated by all museums of Europe in which China is represented merely by a fortuitous accumulation of curios picked up at random here and there.

The most costly porcelains and the superb treasures of imperial palaces do not reveal the spirit of the Chinese people; but we see in their daily life surroundings, in their games and pastimes, in their shows and masquerades, in their domestic cult and decorative art, precious documents bearing on their psychology. The tendency to systematic effort brings out also the idea that many Chinese methods and techniques are just as primitive and surely as ancient as those of the so-called primitive races, and that it is only a comparatively higher development and a greater unity and uniformity of thought as the final result of this vast culture area, which seemingly impress upon China the stamp of a singular position. Her agricultural implements still bear the indelible character of a prehistoric antiquity and have hardly undergone any signal change during four thousand years. In the treatment of copper and iron, the ancient methods as practiced in the bronze and iron ages are still partially adhered to, and the technique of basketry may tempt the student to comparison with the productions of our California Indians. The Chinese composite bow, in all probability the best bow ever made, is the same as the one used by the ancient Persians, Babylonians, Egyptians and Greeks; and this is not the only instance where China can triumphantly furnish the real thing which we would seek in vain in the other centers of ancient civilizations. In fact up to the fatal year 1900, China was the only country where the life of antiquity was really still alive, and whence a sound basis for an attempt at its reconstruction could be derived.

These chances are now upset, the romance of China has died away with the end of the chivalrous Manchu dynasty. The products of home industries will give way to the clatter of machinery and foreign imports. In

this rapid period of transition and radicalism, most of the things displayed in our collections now belong to the past and have become, so to speak, antiquities all of a sudden overnight. For example, it would be impossible at the present time to duplicate the collections of armor, because the military examinations in which all these weapons were formerly employed have been abolished for a number of years, and the makers of them have consequently run out of business. In 1902 I chanced to meet but one man in a suburb of Peking, capable of manufacturing bows, arrows, cross-bows and halberds in compliance with the official regulations; and all paraphernalia required in the training by the competitors for military posts could then be procured even in complete sets only with a large amount of labor, study and time. These now represent precious records of the past whose primary ethnological importance cannot be underrated. In the same manner, costumes, personal ornaments, kitchen and household utensils, furniture, coins, weights and measures, means of heating and lighting, means of transportation, games and sports, religious customs have rapidly changed or wholly disappeared under the influence of the intruding foreign ideas. The flag of the new republic will doubtless complete this great movement and have many other surprises in store for us.

Chinese collections, and especially the very complete collection in the American Museum, have thus become of historical significance in that they are illustrative of the life of imperial China of bygone days. In the present stage of our political, commercial and industrial relations with the East, everything that pertains to China seems to us of paramount importance, practical and theoretical. If the manufacturers of this country had taken the trouble to study the native industries of the Chinese and their products in museum collections with a view to adapting our manufactures to their peculiar needs, American business with China would have assumed much larger dimensions. But we are confronted with more ideal tasks than that: if fate has treated us kindly in presenting us with a share of the big inheritance of Chinese culture, it seems to me it becomes also our moral obligation in the interest of the living and the future generations, to preserve the record of this story in the memory of man. Ethnologists are a life-saving crew which have the duty of rescuing perishing cultures and peoples from wreck. When China shall take her place among the nations of the world, the time will also come that students will flock to our museums to study her ancient culture seriously, and that Chinese collections made in the past will be treated with the same respect as are now Siebold's Japanese collection in Holland or the Cook Polynesian collection in London.

Editor's Note: Dr. Berthold Laufer, Oriental explorer and scholar, is curator of East Asiatic ethnology in the Field Museum of Natural History, Chicago. From 1901 to 1904 he was leader of a Chinese expedition for the American Museum of Natural History, carried on under the auspices of the East Asiatic Committee with Jacob H. Schiff the chief supporter. This time he gathered together the largest and most representative collection ever brought out of China.

CONVERGENT EVOLUTION IN ETHNOLOGY

By Robert H. Lowie

THE doctrine of evolution as commonly understood means the divergence of forms from a common point of origin, similarities of structure between different species being accepted as an indication of blood relationship. Biologists however have long ago abandoned the notion that all resemblances must be due to a common origin. Thus, Lankester has distinguished homologies that depend simply on the inheritance of a common part from homologies that depend on the action of like conditions on such homogenous parts, or on "parts which for other reasons offer a likeness of material to begin with." And Osborn has illustrated the point by the example of mammalian teeth, the primitive three cusps common to all mammals exemplifying the inheritance of common parts (homogeny) and the eight cusps that develop or may subsequently develop in different orders in a uniform manner exemplifying Lankester's second process (homoplasy). In addition of course, there may also be convergence toward a similar structure on the part of unrelated animals, or mere analogy of function without far-reaching morphological resemblances.

In ethnology, in the study of the development of human culture, the emphasis has hitherto been almost entirely on divergent evolution and resemblances have been interpreted as due either to a psychology common to all humanity or to borrowing; that is to say, in either case resemblances have been conceived as genuine homologies due to a common cause. In recent years however, several distinguished students, borrowing the concept of convergent evolution from the biologists, have shown that the older mode of reasoning should be subjected to revision. A few concrete examples will make their position somewhat clearer.

One of the most widely discussed of ethnological problems is that of exogamy — the fact that in many primitive communities the tribe is subdivided into social groups, members of any one of which are forbidden to intermarry. Transgressions are usually regarded in the light of incest and may be punished with death even where no blood relationship obtains between fellow-clansfolk. In other words, the kinship within these "clans" or "gentes" is in a measure fictitious from our point of view. Moreover as membership in a group is inherited either through the father or the mother, the clan or gens bond is a one-sided relationship that neglects to take into account either the maternal or the paternal side.

Now this type of clan or gens affiliation has been commonly supposed

to be an early form of relationship recognized in human society before the recognition of kinship by blood; and the exogamous rule has been deduced from this primitive conception of relationship. That is to say, no matter where exogamous social units have been found, the tendency has been to assign a uniform cause for their existence. Obviously this would not be justifiable if we were to discover cases in which blood relationship was recognized and where the feeling against marrying within one's own social group was simply a special application of the principle that one must not marry persons related by blood. This is precisely what Wissler has found among the Blackfoot. There is no doubt about the fact that the bands or gentes of this tribe are exogamous. The question is, "are they exogamous because the Blackfoot regard the band as the unit of relationship, or because all the members of a band happen to be real blood-relatives?" Wissler's data indicate that the latter alternative represents the facts. Here then we have an illustration of convergent evolution. The feeling of clan or gens affiliation in other tribes and the feeling of blood-relationship among the Blackfoot have produced a similar result, the rule of exogamy for definite social groups. As a matter of fact, the analogy is due to our classifying together the similar behavior of the Blackfoot band members and the clansmen of other tribes. As soon as we consider the subjective attitude involved in the two cases, the resemblance proves to be merely external.

The subject of totemism furnishes another example. Totemism is usually defined as an association between certain social groups and certain species of animals (the totems), and most theories of totemism, however different in other respects, derive the institution from some single psychological point of origin. But quite recently Goldenweiser has shown that this procedure is indefensible. Totemism in Australia has no more to do with totemism in America than the whale with fishes or the bat with birds. What has taken place is the independent development of certain superficial resemblances that are currently summarized by a common label.

As indicated by these examples, there are logically two forms of the process of convergence that may be distinguished. Either we may have the independent development of identical customs or other cultural features; or there may be merely a tendency toward superficial resemblances, which however are at first mistaken for genuine homologies. In the latter case, our problem reduces itself to that of revising the classification of ethnological phenomena. Up to the present time there has been very little evidence of genuine convergence in the sense of independent development of identical forms from distinct points of departure; but the apparent convergence due to erroneous modes of classification may be exemplified in many branches of ethnology and proves to be one of the most stimulating subjects for discussion at the present day.

The tribes of the outer Teva districts gathering at Papéete for their annual feast, bringing their gifts and their allegiance to the hereditary head chief

THE SONGS OF TAHITI

By Henry E. Crampton

During Professor Crampton's voyages to Polynesia for biological research, he visited Tahiti four times and becoming interested in the native songs made phonographic records in several districts. It is hoped that in the near future these records, some fifty in number, may be transcribed and made available for a broader usefulness.— Editor.

ONE of the most marked characteristics of all the natives of Polynesia is their love for music. Their happy adolescent character finds ready and natural means of expression in the choral singing in which they greatly delight, and in the active rhythmic dances with which they so often accompany their songs. The traveler soon becomes interested in these "arts of pleasure" that are practiced in characteristic ways by the Tahitians, Hawaiians, Samoans and Maoris above all other people of the Pacific.

It may be that their singing is first heard at night when arriving at one of their primitive villages far distant from the mixed civilization of commercial towns. In a large thatched hut or a more elaborate "church" the natives gather after the evening meal to sing perhaps all the night through. From a little distance the music sounds as though it were produced by a splendid reed organ or by an orchestra of wood-wind instruments. Through the open doorway the people may be descried in the half light, seated in rows, with the women toward the front, the older men next and the youths toward the back. The last-named drone out the full deep notes of the lowest bass, thus giving to the whole harmony the organ-point support which so impresses the hearer even at his first experience. The older men weave their tenor strains through the harmony of the song in complete accord with the other voices or, singly, they may sing a peculiar erratic strain of a few bars before they return to the conventional part which is

theirs. The women sing two and sometimes three or four parts in alto and soprano. Often a single female voice will depart from the others for a time to give a shrill, wild call like that of a piccolo, in the same way that the tenors sometimes do. No instruments are used by way of accompaniment; only the full rich tones of the wonderful voices are heard.

Three and four times a week the people so gather, impelled by sheer love of their vocal art. Scores of songs are sung, all of them known only by tradition. Very few indeed of even the better educated natives understand written or printed words. But when mere babes they go with their parents to the houses of song, and thus gradually acquire the tribal knowl-

A circle of natives beating the ground with their hands to give the rhythm for the dances of the maidens in the center

edge of music. Ordinarily it is one of the women who leads. After there has been an interval of chatting and smoking, this leader starts with two or three high notes, and then the others join with their proper parts as though an orchestral conductor directed them with movements of his baton. From the first-sung notes, all recognize the melody and know through their continual practice what are their allotted parts.

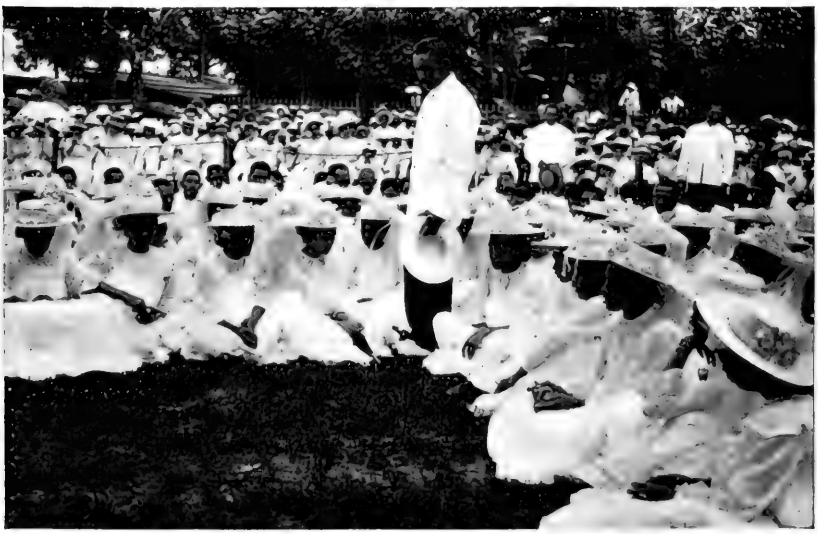
At the time of the Great Feast in July the people of Tahiti come together in Papéete for a week's enjoyment, during which they compete, village by village, for prizes bestowed for the best singing and dancing, for accuracy in throwing the spear and for other accomplishments. In preparation for this great time, singing practice has been held almost

Group of native girls of Papara in ancient costume. These were the paddlers of the great double canoe decorated for the feast

Men of a distant district of Tahiti, wearing a somewhat modernized form of the ancient costume

nightly; food has been collected for days; and with all their finery the natives come in schooners or canoes or on foot to lodge simply in the barracks of the town. On the appointed day they are called group by group into the public square which is bordered by hundreds of friends and rivals, everyone stimulated by all the circumstances to do the utmost for the honor of his district. It is at such times perhaps, when the singers may number two hundred or more, that their music is heard to best advantage; yet the setting of their own villages far away is somehow more pleasing and congruous. If the chorals are analyzed, they fall into two general classes. Most of them are in the major strain, and their words recount the prowess of old-time warriors and tribes, or describe religious personages or events, as in many of the modern chants. In these there is the quick beating rhythm of the war-time tread or of the dance. More interesting are the songs in minor key: they express the sorrow of a people wailing for those killed by cyclone and tidal wave, or mourning for the old order which has passed away forever. For well they know that the future has no place for their fast-vanishing race, and they voice their sadness in wild melodies.

Each large section of Polynesia has its own characteristic forms of song as well as of the dance. In Hawaii the "hula-hula" seems to have a great effect upon the melodies; the "haka" of the Maori sets a measure that is carried out in the songs of that people. In Samoa the natives sing as they swing at the oars of their whale-boats during their journeys around the shores of the islands, and a slower rhythm is thus imparted to their music. In all groups of the islands however, the major and the minor chant can be found, although differences in form and effect have been developed in each case.



The singers of Papara at the time of the annual feast, ready to begin their chant as they sit in the great square surrounded by friends and rivals

WHERE THE BEAVER IS PROTECTED

By Barnum Brown

The following personal observations on the American beaver in Alberta in 1911 present an optimistic outlook as to the increase of this important fur-bearing species under protection. Mr. Brown had unusual opportunities to gather accurate knowledge of the condition of the beaver during two consecutive summers, when he slowly drifted with a houseboat down the Red Deer River hunting for Cretaceous fossils.— Editor.

THE American beaver formerly had a wider distribution than any other mammal except the puma. Its range extended from Alaska to California and Arizona, across Canada, from Hudson's Bay along the Atlantic Coast as far south as Georgia and northern Florida, thence along the Gulf of Mexico as far as the Rio Grande, and some distance into Mexico. Inland it inhabited many rivers and small lakes over most of the states. At present comparatively few colonies are left within the boundaries of the United States, although most states in which they are found have laws protecting them.

Small poplar grove cut down by beavers. Most of the trunks and branches have been dragged to the river one hundred yards distant

From the earliest explorations the history of Canada has been interwoven with the beaver. The unit of barter between the Hudson's Bay Company and the Indians was formerly a beaver skin and to-day the crest of the Canadian Dominion is a beaver. In the northwestern part of Canada beavers are still quite numerous, especially in the "muskeg" regions. They are protected in New Brunswick until July 1, 1912, and in Alberta until December 31, 1912. In the unorganized territories there is an open season from October 1 to May 15. Laws to protect the beaver during a period of several years or indefinitely are most urgently needed and it is unfortunate that there should be any open season at present, for streams are now being repopulated where since settlement, beavers had almost completely disappeared.

In a journey of two hundred and fifty miles down the Red Deer River, Alberta, in 1911, I counted thirty-seven occupied beaver houses, five of which had been built since 1910 when a half of this distance was traversed. One particularly large colony observed the year before and known to contain eight individuals had been destroyed, presumably trapped as the burrow had been opened.

A beaver in the New York Zoölogical Park [Photograph secured through the courtesy of the New York Zoölogical Society]

A large dam and two colonies were seen in one of the small tributaries, but dams are unnecessary because the river is sufficiently deep not to freeze solid and the lodges or houses are built near deep holes. The beaver's main sleeping-burrow is underground but above water, while the entrance to the burrow is below water, and on this river at least is invariably covered with willows interlocked in such inextricable manner as to resist the force of ice jams during the spring thaw.

On the Red Deer River, beavers apparently feed only on the bark and twigs of young poplar trees. Birch trees growing in poplar groves had not been touched. These skillful little "woodmen" gnaw down whole groves of poplars, and I rarely saw any tree that had lodged in falling even where they had cut trees on both sides of a deep ravine. After the tree falls they cut it into sections from two to four feet long. Some trees were eight inches in diameter and the sections weighed no less than a hundred pounds each. Where a considerable number of trees had been cut some distance from the river, there was always a regular runway, well beaten and cleared of all stones and brush. Reputable witnesses told me that they had seen beavers drive their front teeth into logs to drag them backward to the water. Although I did not see this operation, I did see several logs with scars of front teeth on them in such position that it seems most probable that this is the beaver's method of taking logs down the runways. As soon as the log reaches the water, it is pushed in front of the swimming beaver till it reaches the house. After the bark has been gnawed off, the log is cast adrift. I never saw logs on shore that had been gnawed.

We rarely saw beavers during the day as they are nocturnal in habit, but on moonlight nights we often watched them from some clump of willows. No matter how skillfully we concealed ourselves however, their keen scent detected us within a short time. There would ensue a great splashing near shore, accompanied by many a resounding "whak," as the beavers in diving struck the surface of the water with their broad tails.

Beaver lodge on an island in the Red Deer River three miles above Tolman Ferry. This lodge sheltered eight beavers in 1910. In 1911 it was deserted, the burrow having been opened by trappers

Some people who live near the rivers say that because the beavers cut down so many trees they should not be protected. From my own observation, they destroy only young poplars which at best make very poor fence posts. If rigidly protected for another twenty years they will increase to such numbers that many may be killed each year thereafter, under proper restriction, without seriously decreasing the supply. Thus a source of considerable wealth may be conserved and one of the most valuable fur-bearing species be perpetuated.

AN EXPLANATION

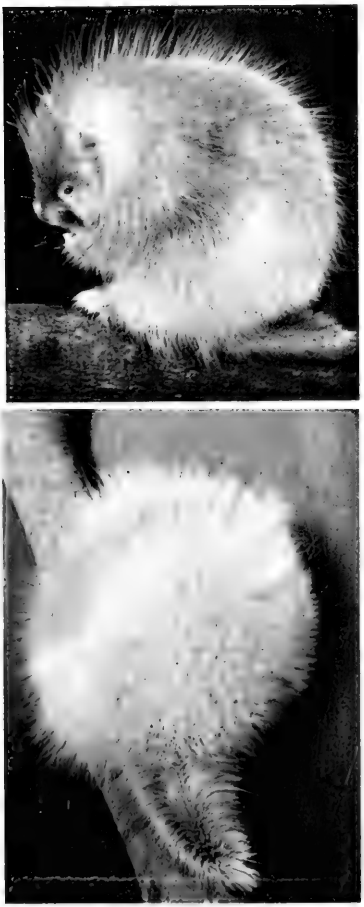
An article appeared in the December, 1911, issue of the Journal entitled "Fossil Hunting by Boat in Canada." It was the intention of the writer to describe the unique method of securing fossils and to give some of the observations that seemed most interesting.

It was not claimed nor intended to be understood that this was the first time that fossils had been secured from the Red Deer River. Their existence has long been known and fossils had previously been collected from the river by members of the Canadian Geological Survey.

Barnum Brown

THE PORCUPINE IN MAINE

A RECENT addition to the variation series[1] for the Darwin hall is a fine albino Canada porcupine, obtained from "Flint, the Porcupine Man," who turns the porcupines of Maine, usually considered a nuisance, to good account by harboring them in his woodlands and supplying them to zoölogical gardens. Some years ago the state of Maine put a bounty on porcupines, the principal result of which was to show that the state's supply of porcupines was greater than its supply of dollars. A letter received from Professor W. Lyman Underwood of the Massachusetts Institute of Technology states authoritatively the situation in Maine, and all who have studied the question of the country's wild animal life in regard to preservation, where not directly in opposition to the interests of man, will appreciate the following quotation:



For several years prior to 1903 some of the lumbermen of Maine tried to get the legislature to do something to exterminate the porcupines, which they claimed were killing a great many hemlock and poplar trees. To this end in the year 1903 the town treasurers of the state were authorized by the legislature to pay a bounty of twenty-five cents for each animal that had been killed, the front feet and the nose to be handed in as evidence. The state appropriated four thousand dollars to pay these bounties.

As you know, the legislature of Maine meets only once in two years. In the two years in which this law was in effect over 146,000 porcupines were killed and paid for at an expense of something over $36,000. In the little town of Princeton, Maine, whose population then was 1100, the treasurer paid the bounty on 2600 porcupines in the first eight months. At the next meeting of the legislature the law was very properly repealed.

In my opinion more timber was lost in the two years in which the bounty was in effect than could have been charged to the porcupines for half a century. Porcupine hunters were responsible for this loss of timber. Men and boys roamed the forests after porcupines. Many fires were started by irresponsible people; trees were cut down to dislodge the animals where the hunters did not carry any guns. I have heard timber owners themselves speak of the damage done by the hunters.

From my own personal observation I have never seen any very extensive damage to trees done by porcupines. Now and then I find a poplar tree whose top has been pretty well eaten up, and sometimes small hemlocks where the bark has been taken off by these animals. Of course they do get into a good many camps and do some damage in that way, but personally I would much rather see the creatures around in the woods than have them exterminated.

[1] Among the exhibits in course of preparation for the Darwin hall, are series illustrating variation under domestication and variation in nature, the last to include such accidental or abnormal variations as albinos and melanos.

MUSEUM NOTES

Since the last issue of the Journal the following persons have been elected to membership in the Museum:

Patron, Mr. John A. Grossbeck;

Life Members, Mrs. Christopher M. Bell, Mrs. John G. McCullough, Mrs. James McLean, Mrs. William F. Milton, Mrs. William Walter Phelps, Mrs. Byam K. Stevens, Miss Rosina S. Hoyt, Miss Ida H. Ogilvie, Hon. John B. Jackson, Dr. Austin Flint, Jr., and Messrs. Richard Canfield, Edward Pearce Casey, Percival Farquhar, Max C. Fleischmann, Dallett Fuguet, George L. Harrison, Jr., Walter Schuyler Kemeys, Charles W. Leng, John D. Ryan and L. Stuart Wing;

Sustaining Members, Messrs. Louis Brey amd J. K. Robinson;

Annual Members, Mrs. John S. Barnes, Mrs. F. Forsch, Mrs. Thomas Hastings, Mrs. George Grant Mason, Mrs. Wilton Merle-Smith, Mrs. Theodore F. Randolph, Mrs. Ogden Mills Reid, Mrs. Samuel Sloan, Mrs. Andrew H. Smith, Mrs. Frederick A. Snow, Mrs. Edwards Spencer, Mrs. E. C. Sturges, Mrs. George H. Taylor, Miss R. A. Polhemus, Miss Henrietta Prentiss, Miss Cornelia Prime, Miss Josephine C. Smith, Rev. W. H. Owen, Jr., and Messrs. Ashbel H. Barney, Chester A. Braman, Reynold Cohen, C. L. Collins, Richard C. Colt, Frederick H. Cone, Russel Dart, L. C. Deming, Robert A. Fliess, George J. Foran, A. A. Fowler, Arthur H. Hahlo, Frank B. Highet, Caspar W. Hodgson, George F. Kleinberger, Wolcott G. Lane, John E. Madden, Chase Mellen, David M. Minzesheimer, A. Henry Mosle, James M. Motley, W. P. Norton, William A. O'Connor, Ario Pardee, Eugene C. Pomeroy, Ruel W. Poor, William B. Potts, Richard C. Rathborne, G. Theodore Roberts, Charles G. Rockwood, William H. Rockwood, Herbert A. Scheftel, J. C. Sloane, William H. Souls, Gino C. Speranza, Howard W. Starr, S. Frederic Taylor, J. H. Townsend and Frederick K. Vreeland.

Ground was broken March 20 for the construction of the new southeast wing facing Central Park, which will add four new exhibition floors to the Museum, the first to be devoted to the geography and life of the sea. Connected with the new wing will be built also a structure to serve as a whale hall, with a balcony and an arched roof through which all the light will enter and of such proportions that the length (174 feet) will be twenty feet greater than that of the wing itself and the width (120 feet) twice as great. The new wing and the whale hall are a part of the comprehensive plan which has resulted from years of careful study given to the subject by the president and trustees who constitute the committee on buildings and plans.

On the evening of April 5, the American Geographical Society and the American Museum of Natural History celebrated in the auditorium of the Museum the third anniversary of the reaching of the north pole by Rear Admiral Robert E. Peary, as well as the attainment of the south pole by Captain Roald Amundsen and the recent inauguration of the Crocker Land expedition. At the same time the Peary Arctic Club, which has for so many years given its loyalty and support to the discoverer of the north pole, publicly pronounced its appreciation of his work by presenting him with its medal of honor. This medal, a five-pointed star three and one-fourth inches in diameter, is of unusual interest because made of sections of the great Ahnighito meteorite brought by Admiral Peary from Cape York in 1897. The sections have been treated with acid to bring out the Widmanstätten lines which prove meteoric origin.

The afternoon of April 10 was set apart by the Museum as a time to give honor to John Burroughs, naturalist and author. Invitations were issued for an informal reception, at which friends gave personal greeting to Mr. Burroughs on his seventy-fifth birthday and congratulations for his share in awakening America to an appreciation of her wild animal life.

The subscriptions to the Crocker Land expedition have reached an amount that has justified the chartering of the five-hundred-ton steamship Diana of previous Arctic fame to carry the exploring party to Flagler Bay. Additional subscriptions are now needed that the expedition may be equipped for the most efficient work.

Mr. Roy C. Andrews writes from Urusan, Korea, of his unusual success in the expedition for whales. His latest letter contains an enthusiastic account of all-night work in preparation of a skeleton of a hump-back $48\frac{1}{2}$ feet long. This specimen was chosen from three which had come in during the twenty-four hours, whereas only that number have been taken in all the fifteen other whaling stations during the entire year. Blue whales almost unknown in the region have been secured, as also a killer-whale of unusual size ($27\frac{1}{2}$ ft. long). The growing scarcity of humpbacks indicates that the effects of shore whaling are making themselves felt.

An unusually instructive new group has been installed in the hall of insect biology. It demonstrates the life history and habits of the cicada or seventeen-year locust, which is of especial interest because last year was a "locust year" in the vicinity of New York City. The long period of seventeen years is required for the underground development of a cicada brood, but there are many broods or sub-races and the history and distribution of each are on record, so that not only may the appearance of the insects above ground be at more frequent intervals than seventeen years but also each so-called "locust year" is accurately foretold. The cicada group will be described and illustrated in a later issue of the Journal.

In the auditorium of the Museum on the evening of March 28, Captain Frank E. Kleinschmidt, who has recently returned from a five months' cruise along the coasts of Siberia and Alaska, showed a series of moving pictures which gave a realistic idea of polar bears, moose, mountain sheep, walrus, and seals.

The ten-ton block of Grenville (pre-Cambrian) marble containing a glacial pot hole, which was secured in the town of Russell, St. Lawrence County, New York, has been placed in its permanent position at the east side of the archway in front of the Museum. The block was cut from the surrounding marble by the Gouverneur Marble Company and in January when the roads were frozen, was taken to the nearest railway station, loaded onto a flat car and brought to New York where a heavy six-horse truck transferred it to its new abiding place at the entrance to the Museum. The pot hole is two feet in diameter and four feet deep, carved by the swirling waters of some sub-glacial stream during the Great Ice Age, boulders, pebbles and gravel having been the grinding tools.

A large slab showing glacial grooves has been mounted opposite the glacial pot hole under the archway in front of the Museum. The grooves were made during the Great Ice Age by the action of gravel and pebbles under the glacier that covered northeastern North America. The rock is of Devonian Age, came from Kelleys Island and was a gift to the Museum in 1909 by Dr. Charles E. Slocum of Toledo, Ohio.

The Colombian expedition has sent to the Museum a collection of four hundred mammals and two thousand birds. These were collected chiefly on the Quindio trail of the Central Andes, and include specimens from the base tropical zone up to the limit of snow. The specimens from the paramo, that mountain zone lying between the upper limit of trees and the lower limit of snow (12,500 to 15,500 feet), contain many species not before represented in the Museum. The collection as a whole adds greatly to the value of preceding Colombian collections in the light thrown on distribution as affected by altitude and climatic conditions. The combined collections now give sufficient data on which to base a preliminary life-zone map of western Colombia. The expedition on February 14 abandoned Cali, which has been the base for the past year, and started for Popayan en route to the headwaters of the Magdalena Valley, which will serve as a base for future operations.

A cast of the Gangetic dolphin has been added to the exhibition of marine mammals on the third floor. This dolphin of India has never been found far out at sea, but is restricted to rivers, making seasonal migrations from the deep waters where the rivers empty into the sea to the shallows far up among the hills. The cast is a replica of an original mount in the Natural History Museum at Calcutta.

The department of invertebrate zoölogy is engaged in a survey of the insect fauna of Florida with especial reference to its origin and present distribution. A number of entomologists are generously assisting both by field work and identification. In this connection Mr. John A. Grossbeck of the Museum and Mr. William T. Davis of Staten Island will spend April and early May chiefly in the southwestern portion of the state.

Mr. Max Schrabisch of Paterson, New Jersey, has filed a report of his recent work for the Museum in explorations among New Jersey rock-shelters. During the past season he found six shelters showing definite traces of having been occupied by man. Altogether this enthusiastic archæologist has located, excavated and mapped twenty-three such shelters.

The department of mineralogy has received a large californite of gem quality through an exchange with Mr. F. A. Canfield of Dover, New Jersey.

LECTURE ANNOUNCEMENTS

PUPILS' COURSE

These lectures are open to school children when accompanied by their teachers and to children of members of the Museum on presentation of membership tickets.

Mondays, Wednesdays, and Fridays at four o'clock.

April 12 and May 3 — Mr. A. E. Butler, "One of the Great Industries of the United States."
April 15 and May 6 — Dr. L. Hussakof, "Scenes from Pole to Pole."
April 17 and May 8 — Mr. F. H. Smyth, "The New York Fire Department."
April 19 and May 10 — Mr. C. E. Akeley, "African Jungle Stories."
April 22 — Mr. R. W. Miner, "History of New York City."
April 24 — Mr. C. E. Akeley, "A Monkey on Safari." [A Natural History Lecture]
April 26 — Mrs. A. L. Roesler, "Early Explorers in America and the Indians."
April 29 — Dr. L. Hussakof, "Views in Europe."
May 1 — Miss S. Wilds, "Fairy Tales of Indians and Eskimo."

PEOPLE'S COURSE

Given in coöperation with the City Department of Education

Tuesday evenings, at 8:15 o'clock. Doors open at 7:30.

April 2 — Dr. John C. Bowker, "Russia."
April 9 — Dr. John C. Bowker, "Passion Play of 1910 at Ober-Ammergau."
April 16 — Dr. John C. Bowker, "Ireland."
April 23 — Dr. John C. Bowker, "Hindustan: a Story of Old India."
April 30 — Dr. Leo S. Rowe, "The Causes and Consequences of the Recent Revolution in Mexico."

Saturday evenings at 8:15 o'clock. Doors open at 7:30.

April 6 — Subject and lecturer to be announced.
April 13 — Mr. Alexander T. Van Laer, "Paintings in the Metropolitan Museum of Art."
April 20 — Mr. Alfred W. Martin, "The Afternoon and Evening of the Renaissance."
April 27 — Mr. Don C. Seitz, "Impressions of Japan."

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OF
NATURAL HISTORY

FOR THE PEOPLE
FOR EDVCATION
FOR SCIENCE

THE AMERICAN MUSEUM JOURNAL

American Museum of Natural History

Seventy-seventh Street and Central Park West, New York City

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WORKROOMS AND STORAGE COLLECTIONS may be visited by persons presenting membership tickets. The storage collections are open to all persons desiring to examine specimens for special study. Applications should be made at the information desk.

THE MITLA RESTAURANT in the east basement is reached by the elevator and is open from 12 to 5 on all days except Sundays. Afternoon Tea is served from 2 to 5. The Mitla room is of unusual interest as an exhibition hall being an exact reproduction of temple ruins at Mitla, Mexico.

The American Museum Journal

CONTENTS FOR MAY, 1912

MARY CYNTHIA DICKERSON, *Editor*

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GEORGE BORUP, EXPLORER

The Arctic explorer to-day has not the incentive of illusions as in previous centuries; truth has been separated from legend as to what may be expected in the North; and the work of the explorer stands forth in the light of scientific research merely — as a difficult task for the sake of knowledge

The American Museum Journal

VOL. XII MAY, 1912 No. 5

GEORGE BORUP—IN MEMORIAM

WITH a profound sense of its loss, the American Museum of Natural History records the death of George Borup, assistant curator of geology and one of the leaders of the Crocker Land expedition [1] scheduled to sail from Sydney, Nova Scotia, July 20, 1912. The loss is a lamentable one and on its professional side is forcibly accentuated in our minds by that very high esteem for the young explorer, which has been variously expressed in the letters and official documents of the expedition, as illustrated in the following:

1, SAVILE ROW,
BURLINGTON GARDENS, LONDON, W.,
March 29, 1912.

MY DEAR BORUP,

The programme of the Crocker Land expedition, along with a communication from Colonel Feilden has been placed before the Council of the Society for their information. I am directed to inform you that they place the highest value on the object which the proposed expedition has in view and thoroughly appreciate the care with which the programme has been drawn up, so as to lead to the most satisfactory scientific results and to the extension of our knowledge of any lands that may exist to the north of the American Arctic Archipelago as it is known at present.

The members of the Council are greatly gratified to note the very thorough training which you yourself have undergone in order to qualify you to carry out the work on the best possible lines. They ask me to assure you that they will watch the progress of the expedition with great interest and with the assurance that you will be able to bring back a rich harvest in all departments of geographical science, all the more so as we have the pleasure of reckoning you among the Fellows of our Society.

Yours very truly,

(Signed) J. S. KELTIE
Secretary of the Royal Geographical Society

The loss to the institution and to the scientific world is heightened also by the memory of the evening of the polar celebration at the Museum (April 5), when in listening to the address by Peary we heard Borup's equipment for polar exploration given this greatest living explorer's unparalleled tribute of praise:

And I doubly congratulate the Museum on putting the expedition in charge of my two boys, Borup and MacMillan, than whom no two men could be better fitted for the work by physique, temperament, experience and inclination.

When I recall their sledge journey from Cape Sheridan to Cape Morris K. Jesup and their return from there, covering two hundred and seventy-five miles in eight marches; when I recall their work establishing depots westward along the north coast of Grant Land, and

[1] For complete description of the Crocker Land expedition see the JOURNAL for March, 1912; also the article by Rear Admiral Robert E. Peary in the present number.

when I recall their work with me on the journey to the Pole, I speak with definite knowledge when I say to the Museum and its friends that it has placed the execution of the work in good hands and that the work will be done and well done.

In the following brief memorial sketches the American Museum expresses its sorrow through the words of its president, Henry Fairfield Osborn and its curator of geology, Edmund Otis Hovey; and Yale University through those of its Silliman professor of geology, Herbert E. Gregory.

THE MEMORY OF GEORGE BORUP AN INSPIRING CHAPTER IN THE HISTORY OF THE AMERICAN MUSEUM

The staff of the Museum has never sustained so sudden and so sorrowful a blow as that which came with the death of young George Borup. Only three weeks before at the great meeting held in the Museum lecture hall, a distinguished company had assembled to celebrate the achievement of the two Poles and to bid Godspeed to the new expedition to the North. All was propitious, yet at the time it was certainly in the minds and hearts of all that some dread disaster of the North might prevent the return of one or both of these young explorers. Such is often the price which man must pay for the new knowledge that is given to the world and which both these young men were ready to pay. But no one dreamt of disaster near at home.

Now all the plans for geographic work and for this expedition, which are the result of months of preparation, must again be considered under these suddenly changed conditions.

The only consolation which can be extended to those of his friends who are suffering most is that it is given to few men to achieve so much, to give so rich a promise, and to be loved and mourned by so many as young George Borup. We shall always cherish his memory and life in the Museum as one of the brief but inspiring chapters of our history.

HENRY FAIRFIELD OSBORN
President of the American Museum of Natural History

GEORGE BORUP — A BRIEF BIOGRAPHICAL SKETCH

George Borup, assistant curator in the department of geology and invertebrate palæontology, met death late in the afternoon of April 28, 1912, near Crescent Beach, Connecticut, from accidental drowning through the capsizing of a canoe. He was with his friend, Samuel W. Case of Norwich, Connecticut, who also was lost.

George Borup was the son of Lieutenant Colonel H. D. Borup, U. S. A., ret'red, and was brought up by his father to have military ideas of honor, uprightness and chivalry. Educated at Groton School and Yale University, he was graduated with the degree of bachelor of arts from the latter institution in 1907. He then went into the mechanical department of the Pennsylvania Railroad at Altoona; but the yearning for travel and exploration, particularly in the Arctics, was strong within him and he was not content till he persuaded Rear Admiral (then Commander) Peary to give him a place as assistant on the north polar expedition of 1908–1909. Loyal to the last degree in every spot where he was placed, young Borup was finally intrusted with important commissions on the accomplishment of which Peary commends him highly. Buoyant in his enthusiasm and boundless in energy, he was the life of the ship "Roosevelt" during the long night at Cape Sheridan and on the trying sledge journeys. He kept a diary which developed into the book, *A Tenderfoot with Peary*, which gave the world in vivid language the human side of an Arctic expedition as it never had been given before.

Borup returned from the North imbued with an idea of the value of scientific exploration and determined to devote his life to it. He came to the writer of this sketch in the fall of 1909 and said, "This Museum seems to me the best place in the world for a fellow; do you think, Sir, that if I were to study and work like the dickens three or four years I could get a job here?" Circumstances however were not favorable just then and he went back to work in the shops at Altoona. Nevertheless nothing could daunt the young man or turn him from his cherished purpose. Seeing his determination, the Museum formulated a general line of work and study and he went at it: first on the United States Geological Survey where he spent the field season of 1910 on topography, then at Yale, where the professors in the department of geology took the greatest interest in him and designated the branches of study that he should pursue. Diligent application proved his worth and brought out the fine quality of his mind.

The vacation season of 1911 was spent partly in the college geological camp in the mountains of Virginia and partly in work as an assistant in the department of geology and invertebrate palæontology in the Museum. In the fall, Professor Gregory of Yale was so favorably impressed with the progress being made by the young enthusiast, that he warmly indorsed him for the scientific leadership of an expedition to the far north to verify the existence of Peary's Crocker Land and to do scientific work along many lines — a great enterprise in which he was to share credit equally with Donald B. MacMillan, another of Rear Admiral Peary's trusted assistants in 1908–1909.

Now on the eve of departure, with success assured as far as adequate equipment in every respect could assure it, with a brilliant career opening

promisingly before him on his return from the North, trained in mind and body to seize and make the best use of every opportunity, George Borup is snatched away at the early age of twenty-seven. Great hopes are buried with him. Clean and courageous, modest, earnest and lovable, captivating in personality, loyal to his ideals and his friends, his brief career has been a blessing and his untimely death leaves a wound that will long remain fresh in the hearts of his friends. The loss to science furthermore, is as great as that to his friends.

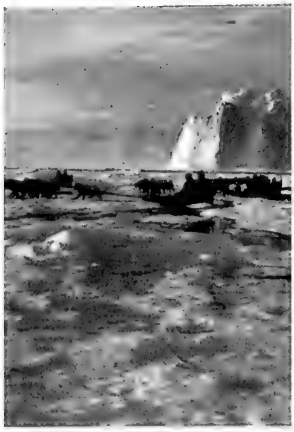
EDMUND OTIS HOVEY
Curator of Geology, American Museum of Natural History

TO DO A MAN'S WORK, TO PROVE HIMSELF WORTHY OF HIS OPPORTUNITIES WAS THE RULING MOTIVE OF HIS LIFE

Twenty-seven years is a short span of life; a period required for the unfolding of latent power and necessarily devoted to preparation for work of maturer days. Yet during this period, George Borup had done a man's work while retaining a joyous boy's spirit. His accomplishments in Arctic work were those of the seasoned explorer; his enthusiastic devotion to Peary, his unrestrained praise and affection for Marvin and for his other companions in the struggle with frigid nature, showed the simple-minded, generous boy.

The future held important and serious work for Borup — work which in a very direct way was destined to widen the bounds of human knowledge, and for which he was amply prepared. During the past two years, in which the tasks before him were constantly in mind, no detail of his mental or physical equipment was too small to engage his earnest attention. Such a supplement of adequate training, with character and personality and an eagerness to do more than one's share of drudgery and routine work, makes an ideal equipment for a scientific explorer, and the grouping of these qualities in Borup justified the confidence placed in him by his critical scientific instructors, as well as by his closer friends and college companions. There was not a selfish or unkind streak in his whole magnificent body, and it was most natural to view him not only with respect and admiration, but also with genuine affection. To make a name for himself seemed no part of his interests; to do a man's work, to prove himself worthy of his opportunities, was the ruling motive of his life. Borup maintained the most cherished Yale traditions, and I find myself comparing him with Nathan Hale — a glad-hearted boy overflowing with love for life, yet not in the least afraid to die.

HERBERT E. GREGORY
Silliman Professor of Geology, Yale University



Donald B. MacMillan, member of Peary's last polar expedition and one of the proposed leaders in the exploration of Crocker Land

THE CROCKER LAND EXPEDITION

By Robert E. Peary

The following article written for the JOURNAL by Rear Admiral Peary of the United States Navy, the man who through many years of difficult experience knows practical conditions in the North, gives us an authoritative opinion on the importance of the expedition, the possibilities of alluring or startling results and the fitness of the chosen leaders. — Editor.

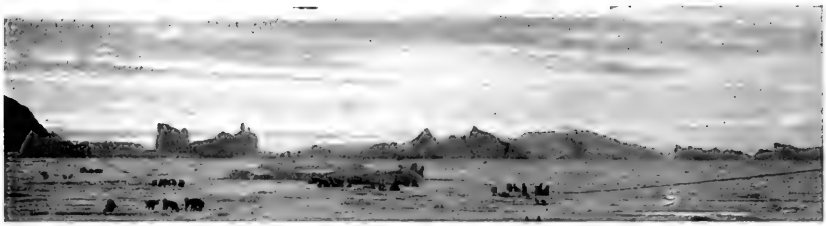
THE exploration of Crocker Land easily takes first rank among problems demanding exploration, now that the Poles have been reached and that the insularity of Greenland has been determined, the latter at one time considered the second large work of importance in the Arctic regions. And further than this, should this land, the distant mountain peaks of which I was fortunate enough to see from the summit of Cape Thomas Hubbard in July, 1906, prove to be a land of large extent, the possibilities will be most alluring, for such land will become the gateway to other lands or seas represented by the large blank space on the maps between the North Pole and Bering Strait.

As to the likelihood of startling results from this exploration, in the way of a new people, or new animals or climate, long experience in the North has

led me to be the reverse of enthusiastic. Such possibilities have been suggested by some, of different human inhabitants, or of a new fauna or flora; but the probabilities amount essentially to a certainty that the fauna and flora of Crocker Land will be identical with those of northern Grant Land, although of course there is likely to be some variation. There is no question as to the possibility of a distinctly different geological formation, and there is always the chance of mineral deposits, among which graphite, mica and cryolite are no doubt most to be expected. Thus perhaps, the work of the Crocker Land expedition will not only fill with definitely outlined land and sea a large area of what is now blank space on the map, but in case this land prove extensive may fill it also with interesting details.

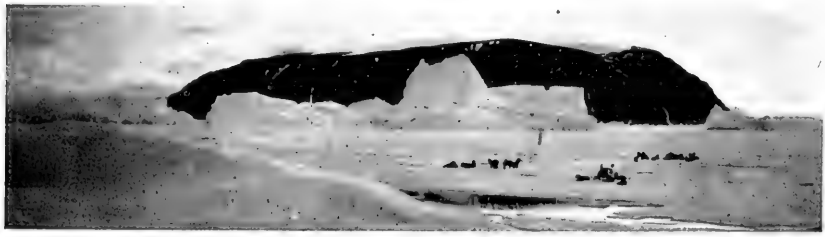
It may surprise as well as interest many to know that the second item in the program of this expedition, namely, the crossing of Greenland from the west coast to the east coast somewhere in the vicinity of the seventy-eighth or seventy-ninth parallel, will be a trip which in length, the elevation attained and the conditions under which it must be accomplished, will be almost a repetition of the journey of Amundsen from the Bay of Whales to the South Pole, and that of Scott from MacMurdo Sound to the Pole. This traverse of the great inland ice cap of Greenland if accomplished, will be the most important of any of the interior journeys yet undertaken in the Arctics.

Cape Thomas Hubbard from which the Crocker Land expedition must start northward over the sea ice in search of the unknown country



ESKIMO MOTHER AND CHILD

There is little likelihood that human inhabitants on Crocker Land — if there should prove to be such — will be different from those of Grant Land and neighboring regions to the south. The fauna and flora also of the new land will no doubt prove identical with that of Grant Land



A third work, which if the expedition has time will be of the greatest interest and importance, both to geographers and oceanographers, will be the running of deep-sea soundings northward beyond the edge of the continental shelf from various points on the coasts of Greenland and Grant Land, extending from Cape Morris K. Jesup on the east to Cape Thomas Hubbard on the west (some seventy degrees of longitude). These soundings will determine the limits of the continental shelf and the proximity of oceanic depths to the land. I should suggest a series of such soundings running north from Cape Thomas Hubbard, Cape Colgate, Cape Richards, Cape Joseph Henry, Cape Bryant, Cape Washington and Cape Bridgman, supplementing those made by the last expedition of the Peary Arctic Club from Cape Columbia and Cape Morris K. Jesup.

The American Museum is to be congratulated upon its initiative in making it possible for this expedition to go into the field, and it is to be

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Scanning the horizon in the vast Arctic wilderness

doubly congratulated that it is intrusting the expedition to my two tried men, George Borup and Donald B. MacMillan, both of whom are ideally fitted for the thorough accomplishment of the work.

The Crocker Land expedition calls forth the enthusiasm of the Arctic explorer. With its objects the accomplishment of the still remaining large items of work in the Arctic regions; with its personnel one that is in possession of the inestimable advantage of thorough experience and training in details and methods, together with knowledge of the region in which the work is to be prosecuted; with its backing that of one of the most influential of American institutions; with a sufficient proportion of the necessary funds already in hand, to insure securing the entire amount — the Crocker Land expedition under the auspices of the American Museum of Natural History and the American Geographical Society, seems to be one of the most enviable of recent exploring ventures.

Last view of the sun in the country where for four months of the twelve exploration work must proceed in darkness

GEOGRAPHICAL EXPLORATION AND THE MUSEUM

QUOTATIONS FROM AN ADDRESS BY HENRY FAIRFIELD OSBORN WHO AS PRESIDENT OF THE AMERICAN MUSEUM OF NATURAL HISTORY AND MEMBER OF THE HONORARY COMMITTEE OF THE CROCKER LAND EXPEDITION, PRESIDED AT THE POLAR CELEBRATION OF APRIL 5, THE THIRD ANNIVERSARY OF THE DISCOVERY OF THE NORTH POLE. THE ADDRESS WAS DELIVERED BEFORE MEMBERS OF THE NATIONAL, PHILADELPHIA AND AMERICAN GEOGRAPHICAL SOCIETIES, OF THE AMERICAN MUSEUM OF NATURAL HISTORY, THE PEARY ARCTIC CLUB, AND REPRESENTATIVES OF THE NORWEGIAN AND DANISH GOVERNMENTS

THE Crocker Land expedition will be the seventh expedition leaving the harbor of New York for north polar seas. The second Grinnell expedition, in search of Sir John Franklin, which was commanded by Elisha Kent Kane, sailed from New York, May 30, 1853. Charles Francis Hall left New York in the "Polaris" July 3, 1871, in command of an expedition to the North Pole. He died in the Arctics in November, 1871. George Washington de Long was born in New York City and was in command of the "Jeannette" expedition in 1879 which was financed by James Gordon Bennett. Lieutenant de Long died in Siberia in October, 1881. His body and those of his companions were discovered by Chief Engineer George W. Melville. The Greely relief expedition in 1884 sailed

from New York under the command of Captain Winfield Scott Schley. The Peary expedition of 1905 and the Peary expedition of 1908 both sailed from New York.

Of these seven expeditions the Museum is identified more or less directly with three. An honorable part of the history of the institution however, is formed by the geographical work it has accomplished through expeditions other than polar. In the years 1865 to 1868 Professor Albert S. Bickmore visited the South Sea Islands and China, and was probably the first American to cross Siberia. In 1900 to 1902 Messrs. Bogoras and Jochelson on the Jesup North Pacific expedition, in connection with their investigations of the tribes in eastern Siberia explored the regions visited. In 1898 to 1899 Mr. Andrew J. Stone secured important information about the general character of the country east of the mouth of the Mackenzie and corrected gross errors in the current maps of the region. Captain George Comer spent many winters in the Hudson Bay region and has recently published in the *Bulletin* of the American Geographical Society a corrected map of Southampton Island.

There have also been many American Museum expeditions of a semi-geographical character. Dr. E. O. Hovey visited the West Indies and the Chihuahua district of Mexico to study volcanoes. Professor Henry E. Crampton has conducted three expeditions to Tahiti and the South Sea Islands, and a recent expedition to British Guiana and Mount Roraima. Mr. Frank M. Chapman has covered more than 65,000 miles in collecting materials for the Museum bird groups, and more recently has visited the United States of Colombia. Many of the expeditions of the department of vertebrate palæontology have yielded more or less important geographical facts.

In addition the Museum's Arctic expedition in the field the past two years under the leadership of Messrs. Stefánsson and Anderson has traversed the unexplored area between Cape Parry and the Coppermine River; and during the same years, the Congo expedition in charge of Messrs. Lang and Chapin has been working through little-known jungles of Africa.

Every time a man extends our knowledge of the unknown, his example raises the whole human race a little higher than it was before and places all the present generation and all future generations in his debt. The members of the American Museum and of the American Geographical Society give their warm support to the young men who are planning to start out on the Crocker Land expedition. We believe in the great objects of their journey to the north polar sea; we have the utmost faith in them, in their courage, their high purpose and their intelligence; and we shall do our best to supply them with the sinews of exploration — namely, funds sufficient to care for them, their Eskimo and their dogs, as well as to enable them to make scientific observations, records and collections.

Through courtesy of Popular Mechanics Magazine

There is shifting ice over deep sea at the North Pole making all exploration a hazardous venture

ARCTIC AND ANTARCTIC EXPLORATION COMPARED

QUOTATIONS FROM AN ADDRESS BY REAR ADMIRAL ROBERT E. PEARY, U. S. N., ON THE OCCASION OF THE POLAR CELEBRATION AT THE AMERICAN MUSEUM OF NATURAL HISTORY ON APRIL 5

THE contrast between fundamental physical conditions at the North Pole and the South Pole is most striking. The North Pole is located in a deep polar sea basin. The South Pole is located on a great elevated snow plateau of unusual altitude. From this striking contrast in physical conditions, arises and results the great advantage which south polar exploration has over north polar — namely, that it can be carried on over a permanent fixed surface remaining the same from year to year, instead of over the treacherous and unstable surface of an ice-covered ocean.

North polar exploration antedates by many years the first south polar attempts. For nearly four centuries the quest of the North Pole fired the imagination and spurred the efforts of adventurous and ambitious men of many nations. Great Britain, Holland, Russia, Germany, Norway, Sweden, Spain, Austria, Italy and America sent out expeditions which took part in the stern race in which the invariable reward was failure and the frequent prize, death. Among the names that will always be famous in

Through courtesy of Popular Mechanics Magazine

At the South Pole there is land which lessens danger and gives permanent landmarks

this connection are those of Barentz, Bering, Wrangell, Hudson, Baffin, Parry, Franklin, Nordenskjöld, Koldewey, Weyprecht, Kane, Hall, Markham, Lockwood, Melville, Nansen and Abruzzi.

South polar exploration dates back but one hundred and forty years. As a matter of fact serious attempts to penetrate the Antarctic continent date back only to the beginning of the present century, twelve years ago.

Though the Antarctic circle was entered for the first time by Captain James Cook in 1773, no landing appears to have been made on the Antarctic continent until 1895; no expedition wintered inside the Antarctic circle until 1897, and no real penetration of the continent was effected until

The musk ox is an invaluable source of food supply in north polar exploration

An expedition which penetrates the region of sea ice north of Grant Land must make deep-sea soundings to determine the limits of the continental shelf

Young Eskimo dogs. For exploration in north or south polar regions the dog is more valuable than other animals because of its adaptation to any sort of food

In north polar exploration the route over the sea ice may often be blocked by open water

1902, when Scott reached 82 degrees 17 minutes south latitude, a distance of two hundred and seventy-seven miles from his winter quarters.

Up to the present time, with the exception of the Ross Sea route, developed by the British directly south from New Zealand, no work has been done in the Antarctic by a powerful steamer fitted for ice work. There are very attractive possibilities for a ship of the Roosevelt class in Weddell Sea, in the bight between Kaiser Wilhelm II Land and Kemp Land, and between King Edward VII Land and Alexander I Land.

With the attainment of the South Pole effected, there remains now another traverse from the opposite side of Antarctica to the Pole, which

Icebergs menace ships in north or south polar seas. There is still opportunity for large results in exploration in the seas surrounding the south polar continent for an ice-fighting ship like the Roosevelt

Penguins literally swarm in Antarctic regions, occupying every available space near the sea

with the journeys of Amundsen and Scott will give us continuous traverse section of the Antarctic continent, and then the filling in of the remaining unknown interior and circumference of that great region. The German expedition under Lieutenant Filchner and the Australian expedition under Dr. Mawson may be counted upon to make extensive inroads upon this terra incognita. But there will still be ample work left for an Antarctic expedition from the United States, which I earnestly hope may materialize, as a matter of national duty, privilege, prestige and morale.

Turning to the north polar regions with the attainment of the Pole effected, there remain two very interesting problems — namely, the exploration of Crocker Land and penetration of that remaining large unknown area lying between the North Pole and Bering Strait, and second, the crossing of Greenland at its widest part near the seventy-eighth parallel from Whale Sound to Cape Bismark.

As I think of the possibilities of the first, I can hardly restrain my enthusiasm and I long for just enough of that fabled fountain of youth to wash away some twenty years. I can hear the eager yelping of the dogs, the shouting of the drivers and the forward rushing of the sledges, as after days of weary travel across the ragged sea ice, every man and dog spurts for the shore of that untrodden land lying a few yards ahead in the brilliant Arctic sunlight.

THE EXHIBITION OF FISHES

By Bashford Dean

FISHES, as every museum has found to its cost, are among the least satisfactory objects to exhibit to the average visitor. They are soft-bodied, mucous-covered creatures, which appear at their best only under water; they shrink in the air, lose their colors, wrinkle, and often appear little like living animals. In most museums they are exhibited preserved in fluid, sometimes delicately painted before they are placed in jars. They are apt however to be shrunken, opaque, faded and generally unattractive, so that a visitor may pass them by and have but an imperfect idea of the *real* fishes, their graceful or curious forms and their beautiful colors. Many a person, for this reason only, has failed to find how interesting the fishes are, and how important in the economy of nature.

How to exhibit fishes satisfactorily is a great puzzle. If they are not to be installed in jars, and this method of display is becoming less and less common in museums, mounted specimens, as usually shown, are nearly as unsatisfactory. Their scales curl up in course of time, the fins warp, and altogether the result is unnatural, sometimes grotesque.

In a few museums, notably in Brooklyn and Chicago, efforts have been made to exhibit fishes as though living in aquaria. In these instances effective backgrounds are introduced and stuffed fishes are painted and posed in lifelike fashion. This development is certainly, from the popular point of view, an advance over earlier systems. Casts have also been used to advantage when these were taken from fishes before they had shrunken in contact with air. This method was developed a generation ago by the United States National Museum, and numerous copies of casts were distributed to galleries here and abroad. In general however, casts of this kind lacked much of the feeling of the actual specimens: fins and similar delicate structures were not well represented in plaster, and various technical difficulties, including the matter of coloring, prevented the usual cast from being a successful portrayal of the living fish.

In the exhibition of fishes in the American Museum of Natural History there have, until recently, been used only (1) plaster casts of the National Museum type, and (2) mounted skins, some of which, prepared by careful taxidermists and colored from fresh material, were the points of departure in our present work. Where skins or casts were not available, the required types were represented by models, and in these, better poses could sometimes be given. Of necessity however, model-making was a laborious process, for the greatest care had to be used in obtaining accuracy in proportions and contours; indeed no one but a sculptor will realize how many subtle curves and troublesome details occur on the surface of a fish. In order to indicate the fins adequately, many plans were devised: one of these

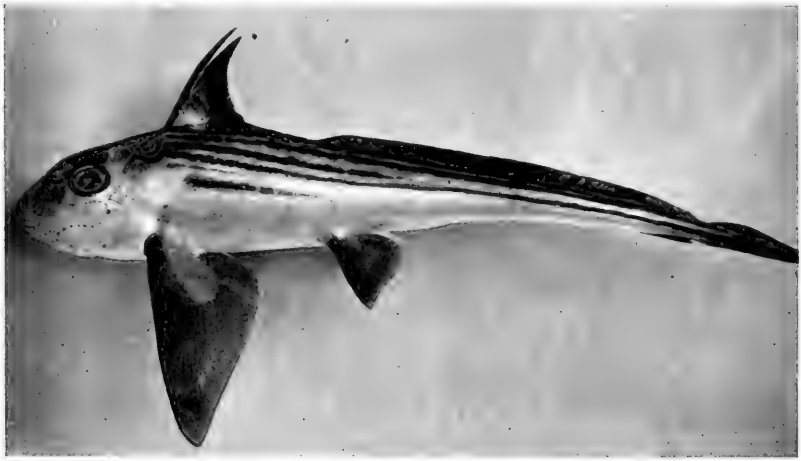
THE SPOONBILL STURGEON GROUP IN THE GALLERY OF FISHES (CLEVELAND H. DODGE FUND)

The group represents a school of spoonbill sturgeon or paddlefish swinging around into the seine of the fisherman [the group is a large exhibit, the glass front of the case measuring 9 feet 4 by 3 feet 1]. Field work on the lower Mississippi in 1910 and supervision of the group by Dr. Louis Hussakof, associate curator of fishes. Casts and color work by Mr. Dwight Franklin; background by Mr. Albert Operti

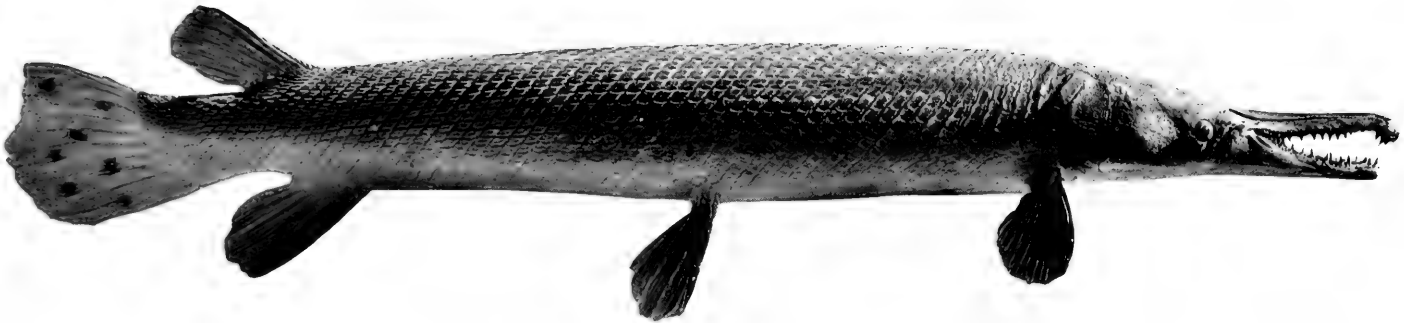
consisted in casting the fins in wax and mounting the casts on a backing of thin metal. Another method (Mr. Horter's), which yielded delicate and permanent results, was to make the impressions of the fins in softened gutta percha which could then be vulcanized. In several of the models prepared, a combination has been arranged so that the body of a fish has been cast from the fresh specimen and upon this (a wax cast rather than a plaster one) actual fins have been mounted. The result has then been placed in the hands of colorists who have followed as far as possible living models, the New York Aquarium having furnished excellent facilities for this work.

Slime-eel, or hagfish, *Homea stouti*. Model showing this fish wound around a long trawl line and enveloped in a profuse secretion of slime. Hagfishes have the simplest type of a skeleton, and in numerous regards typify the "fish" from which all other fishes descended

A number of the specimens lately completed in the museum would

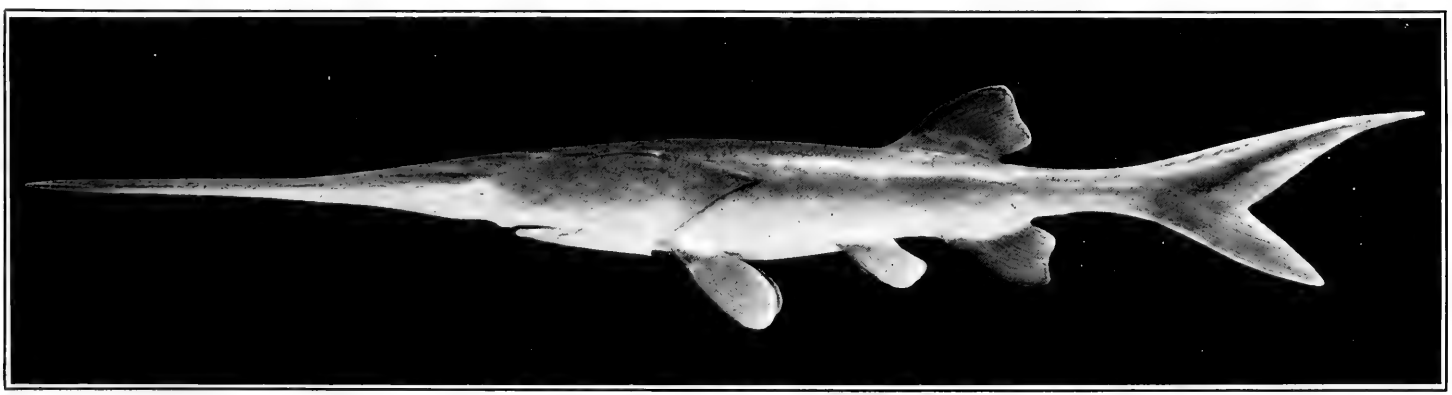


Model of a Japanese "ghost-fish," or chimæroid. This fish is now known to be a highly modified shark, not the oldest and most primitive form of existing fish, as sometimes maintained



MOUNTED SKIN OF THE ALLIGATOR GAR, *Lepisosteus osseus*

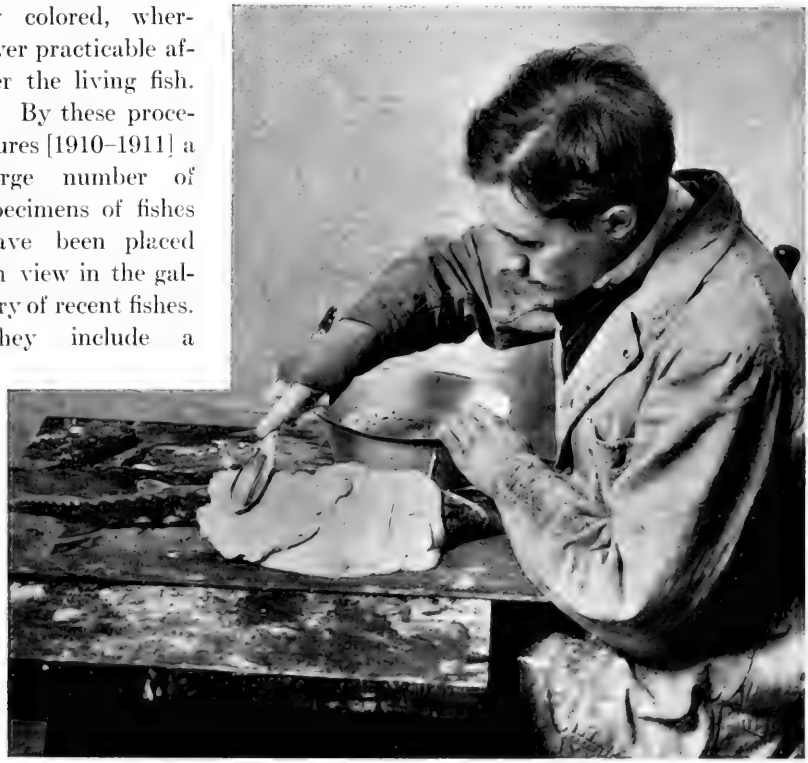
Specimen more than nine feet long taken in Moon Lake, Mississippi (Dodge expedition). The gar is a survivor of a numerous tribe of fishes, "ganoids," which flourished during the Age of Reptiles



MODEL OF THE CHINESE PADDLEFISH, *Psephurus gladius*, A LONG-NOSED STURGEON WHICH HAS LOST ITS SCALES

give an adequate representation of the animal in lifelike pose and colors, were it not for a single and fatal objection: the "fish" is after all only a model, and we have sometimes a suspicion that it belongs in a museum not of natural history, but of art. The best result is clearly forthcoming when some method is discovered which will make it practicable to retain the actual skin of the fish yet give it lifelike contour, texture and colors. Efforts in this direction have not been lacking in the department of preparation; and especially successful are the results obtained by Messrs. Franklin and West, who have shown a friendly rivalry in their work. It was found first of all that only those fishes could be well mounted which were freshly killed, for the slightest drying or decomposition alters at once the colors and texture of the skin. The best specimens have been prepared in the following way: a mold of the fish is first cast in plaster; the skin is then removed and placed in the freshly made mold. A preparation is next introduced which presses the skin against the mold, or matrix, filling out the skin completely. By this means the skin when dried retains exact contours. The preparation is finally colored, wherever practicable after the living fish.

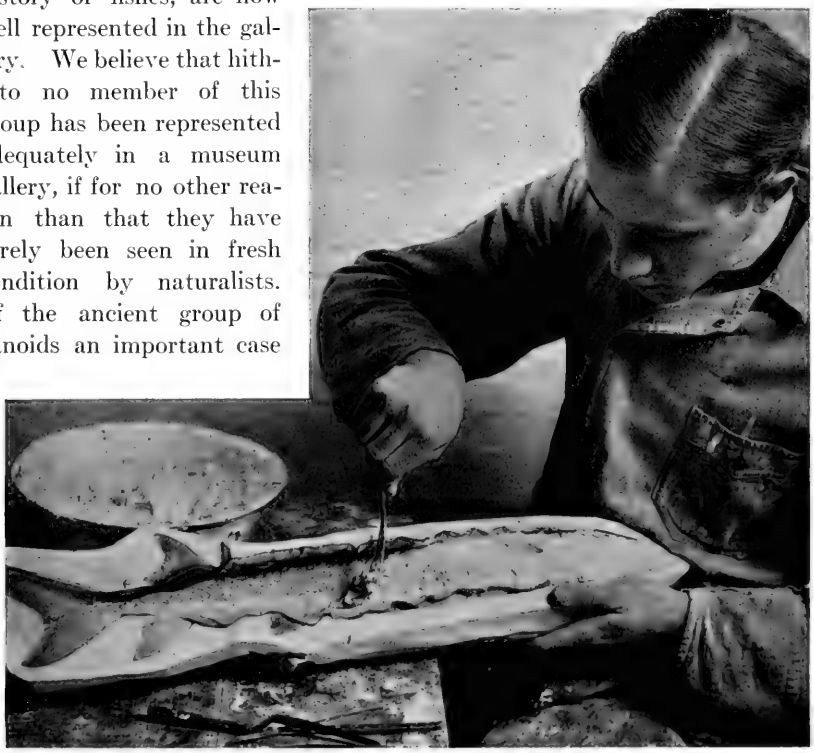
By these procedures [1910–1911] a large number of specimens of fishes have been placed on view in the gallery of recent fishes. They include a



The first stage in preparing a fish mount. Mr. Dwight Franklin has partly embedded one side of a sturgeon in clay, and is covering the exposed side with plaster

series of more than a dozen kinds of hagfishes and lampreys, a race of fishes standing near the base of the genealogical tree of the back-boned animals. In one instance there is represented a hagfish attached to a trawl line, coiled tightly about it, and secreting a great mass of slime characteristic of these primitive "eels." A number of shark models have been prepared, including characteristic examples, like the frilled shark of Japan (which, by the way, is the only living type of a family of vertebrates dating from the Coal Age); or the curious long-nosed shark, *Scapanorhynchus*, long known from the chalk epoch and lately found living in the deep waters off Japan. Among lungfishes we have now examples of all surviving forms, including a good model of the South American *Lepidosiren*, which breathes both by lungs and by gills. The particular specimen modeled was collected during the breeding season, when it develops a great number of hairlike processes from its hinder fins. These are blood-red in color and serve, it appears, to aërate the mass of eggs around which the fish coils.

The rare and curious "ghost fishes" or chimæroids, important in the history of fishes, are now well represented in the gallery. We believe that hitherto no member of this group has been represented adequately in a museum gallery, if for no other reason than that they have rarely been seen in fresh condition by naturalists. Of the ancient group of ganoids an important case



The skin of the fish is placed in the plaster jacket and pressed into place by a filling of composition

has now been prepared. Especially noteworthy is the Chinese spoonbill sturgeon, *Psephurus gladius*, now for the first time modeled. Of the American spoonbill, *Polyodon spathula*, which is rapidly being exterminated by the caviare fishermen, a habitat group has recently been placed on view. It represents a school of these large fishes swinging around into the seine of the fisherman; another ganoid, the garpike, appears at the left poised high in characteristic position, while below are catfish, carps, perches, herrings and drumfish—giving a comprehensive picture of the fish life of the lower Mississippi. This group is one of the results of the Dodge expedition of two years ago.

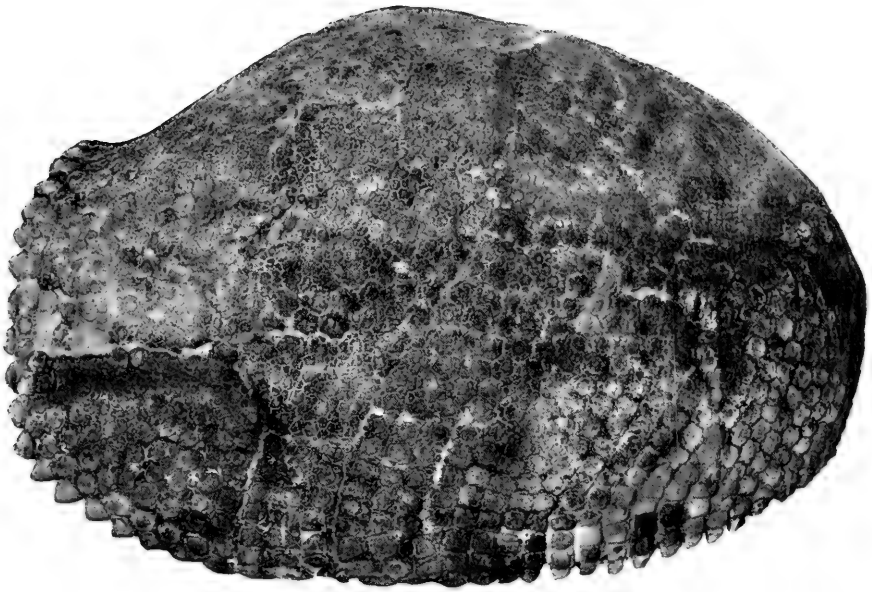
A DISCOVERY IN THE FOSSIL FIELDS OF MEXICO

By Barnum Brown

THE state of Jalisco, Mexico, is traversed north and south by low ranges of mountains interrupted at intervals by short rivers that flow into the Pacific. One of these, the Ameca, rises about fifteen kilometers west of Guadalajara in a valley at first open but shut in farther on by low mountains. During Pleistocene times the outlet of this valley was blocked long enough to allow a shallow lake to be formed in which sediments collected and the remains of many animals then inhabiting the country were preserved. These lake and river sediments now appear as terraces of clay, gravel and volcanic débris along the foothills.

Searching the terraces for fossils in the winter of 1910, I found remains of several different species of mammals, turtles and fishes, the most interesting of all discoveries being a complete carapace of a large glyptodont, an animal related to the armadillos. Different genera of glyptodonts existed during Miocene, Pliocene and Pleistocene times, ranging in distribution from Patagonia to northern Texas, Florida and California, and were especially numerous on the pampas of Argentina during the Pleistocene. It is a curious coincidence that the range of distribution of this order of animals covers the territory influenced by the Spanish tongue in the Americas.

The new specimen was found on the San Miguel ranch twelve miles west of Ameca. As the Madero revolution was in progress at the time of the discovery, I did not as usual camp near the spot where the work was to be done, considering it safer to sleep in the town with its little colony



Complete carapace of the new glyptodont *Brachyostracon*, four feet eight inches long, three feet one inch high

of half a dozen American families. Thus there was a ride to and from the specimen, which consumed several hours each day, but the changing rural scenes more than compensated for the loss of time. Every mile was through scenes primitive as in Bible times. It is difficult to realize that within four days' travel from New York, people are using the methods of soil culture employed two thousand years ago. In the valley, white-clad men cultivated the fields with wood pointed plows drawn by oxen, or planted sugar cane, while on the hills and high above on the mountain sides others worked in the fields of century plants from which *tequile*, the native alcoholic drink, is brewed.

The peon field hand is a picturesque figure in his white cotton shirt and trousers, with a straw sombrero and fibre sandals. A bright red blanket over his shoulder serves as a coat when the air is chill, and at night is his bed. In the early hours of the day groups of blanketed figures shuffle along the road to and from town, some carrying immense loads on their heads or backs. But the burro is the common carrier of the mountainous districts. What the camel is to desert Africa, the burro is to Mexico. Caravans file over the mountain trails loaded with bales, boxes and lumber. At first sight it is rather disconcerting to see a stack of hay or a shock of corn moving along the road apparently of its own volition. Closer scrutiny however reveals four tiny feet underneath, sufficient evidence that a burro is the motive power.

Straggling groups of adobe huts and thatched shelters of the peons are

Partly dug-out glyptodont carapace in a region of terraced Pleistocene gravel beds

Eight peons carrying the fossil down to the road

scattered along the streams and at springs. On wash days the women congregate along the streams, washing the clothes on flat stones — often the same stones on which they grind their daily corn.

Having had fossils injured by curious natives in northern Mexico, I feared that harm might come to this valuable specimen if found by them, so exercised considerable care to ride to it unobserved until it should be completely prepared for transportation. When ready for shipment it weighed over four hundred pounds. The work of carrying the fossil to Ameca proved a considerable problem. An ox-cart, because of its uncertainty was not to be considered, therefore the mail-carrier of the town was persuaded to transport the fossil in his wagon — that is, from the point where the road began. From the bad lands down to this road eight peons carried the specimen suspended from a pole, making a picturesque group, as are all seen along Mexican roads. Before this discovery there were in existence two glyptodont carapaces from the valley of Mexico, both preserved in Mexico City. They with this third specimen from Ameca show characters in the teeth, pelvis and carapace that distinguish the Mexican glyptodonts from known South American genera. On account of the peculiar shape of the carapace, which is short and high, this genus has been named *Brachyostracon*.

In the valleys white-clad men cultivate the fields with wood pointed plows drawn by oxen

What the camel is to desert Africa, the burro is to Mexico

EARLY MAN IN AMERICA

THIRTY YEARS OF EXPERIENCE IN SEARCHING FOR EVIDENCES OF THE ANTIQUITY OF MAN IN THE DELAWARE VALLEY [1]

By Ernest Volk

FOR the last half-century the question of man's antiquity in America has kept the scientific world busy. In the first place the pioneers of prehistoric archæology made very important finds in England and France in the shape of artificially fractured flints. These were found in glacial gravel and upon claiming them as the handiwork of man, the discoverers were vigorously assailed as to their veracity. Gradually however, evidence of such overpowering weight accumulated that it finally triumphed over criticism.

Exactly the same unpleasant experience was in store for archæologists in America, but fortunately in this as elsewhere in life, patience and perseverance are valuable capital. It is this capital that has drawn a large interest in the search for traces of early man in the Delaware Valley, where indeed unlimited patience was needed, day in and day out during weeks and months barren of result. Thousands of feet of earth, sand and gravel were removed with the trowel and carefully searched for specimens. Each day's work was begun with a new hope, which lived only to be buried at evening and resurrected again each following morning. Thus the archæologist becomes a veritable "Micawber," always hoping "for something to turn up."

Thirty years of a man's life seem a long time to look for a certain thing, but when a subject becomes so well established that it fills his mind, years fly like days. The last twenty-two of my thirty years' search were under the direction of Professor F. W. Putnam of Harvard University, who with untiring interest and love for the work has always succeeded in soliciting new funds for the explorations which have finally brought results.

The glacial deposits are a very prominent feature at Trenton, the city actually being built upon the glacial drift which forms a bank of from forty to sixty feet high near the Delaware, extending southeast and then south for miles until finally lost. Of these deposits the Trenton gravel has a thickness of thirty to forty feet near the river and gradually thins out as it extends eastward. It is composed of coarse and fine sand and gravel with large boulders both water-worn and angular, varying from six to forty

[1] Editor's note.— THE ARCHÆOLOGY OF THE DELAWARE VALLEY. By Ernest Volk. 8vo., pp. 258, plate 127. Published by the Peabody Museum, Harvard University, 1911.

Mr. Ernest Volk, field archæologist, has published in this volume with fascinating detail and clearness many notes from his field journal. These together with his conclusions are of exceedingly great interest not only to the technically trained archæologist but also to the average reader interested in the history of the human race in America.

and more inches in diameter. The whole is stratified and shows in addition to the large boulders, a peculiar feature much like a pit but which, from my point of view, cannot be mistaken for an ordinary pit, being rather an ice pit, a place once occupied by a large cake of ice. This ice stranded there and melting gradually, the while the stratum overlying it was being laid down, finally disappeared altogether, and its place was taken up by material from said stratum above. All ice pits found have been near the top in the last layer of sand. The deposit of the Trenton gravel is topped by a *yellow loam*, varying in thickness from two to five feet and is a combination of loam, fine sand, clay and iron. On top of this yellow loam is the so-called *black soil*, the surface at the present day. This is chiefly the accumulation of decayed vegetation and varies in thickness from six to thirty-six and more inches according to the adaptability of the location to plant growth.

The long search on this glacial terrace has brought traces of the presence of early man, of which the black or top soil shows the following evidence: numerous force-broken quartzite pebbles, chips and flakes of various minerals such as argillite, chert, hornstone, jasper, quartz and quartzite, detached in the manufacture of implements; also the implements themselves, whole and broken, and occasionally fragments of animal bone and small fragments of pottery. This black soil has been disturbed by human agency and penetrated downward into the underlying yellow loam in pits, postholes, ashbeds, hearths and graves.

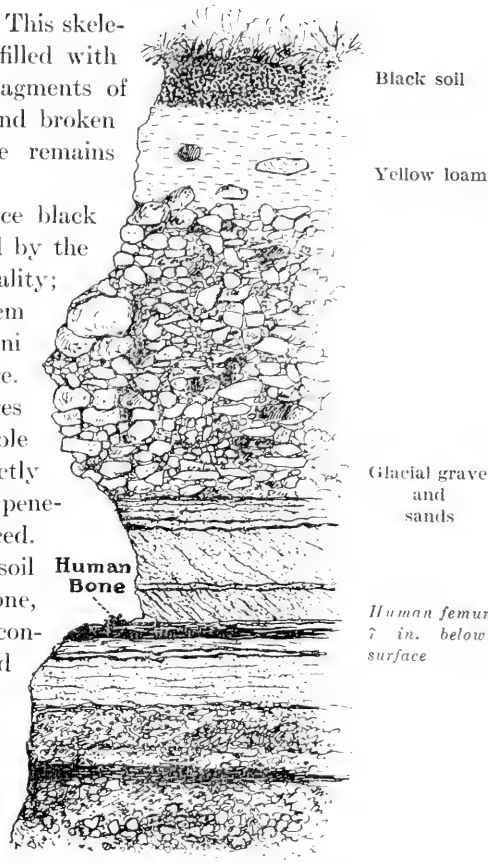
The pits are of various depths from one to five feet and of a diameter from six to sixty inches and contain charcoal, broken pottery, fragments of animal bone, whole and broken implements, plant and fruit remains, nutshells and whole and broken pebbles, of which many are burnt and fire-fractured. The hearths contain single and double layers of pebbles, whole, burnt and fire-broken. The ashbeds are generally the depth of the shallow pits and contain a large amount of ashes with fragments of animal bone among which are recognized the bones of Virginia deer, of bear, wolf or fox, beaver and opossum, wild turkey, wild goose or duck, of the sturgeon, shad, catfish and turtle. These ashpits are clearly the evidences of large feasts.

The graves were of three kinds according to depth. The shallow graves were those where the body had evidently been laid upon the surface and the ground or earth heaped over it forming a low mound which has generally been disturbed by the farmer's plow. The medium graves had a depth of from eight to twenty inches below the surface and the deep graves from two to three feet. The skeletons found show that bodies were buried in various positions, on the side with knees drawn up toward the body prevailing. In some instances the body was straightened out on the back with arms at the side. In one exceptional case the body had been placed in a sitting

position with knees somewhat drawn up. This skeleton was covered by two feet of ashes, filled with broken pots and bone implements, with fragments of animal bone, with mussel shells, charcoal and broken stone implements, all very evidently the remains of a feast.

Such traces of occupancy in the surface black soil are to be referred to the Indians found by the Europeans when first arriving in this locality; the tribe was called the Delawares by them but the Indians called themselves the "Leni Lenapés," "original people" in their language. All excavations made by these Delawares below the top black soil are plainly traceable in the underlying yellow loam, just as distinctly as black ink shows on white paper; even the penetration of surface vegetation can easily be traced.

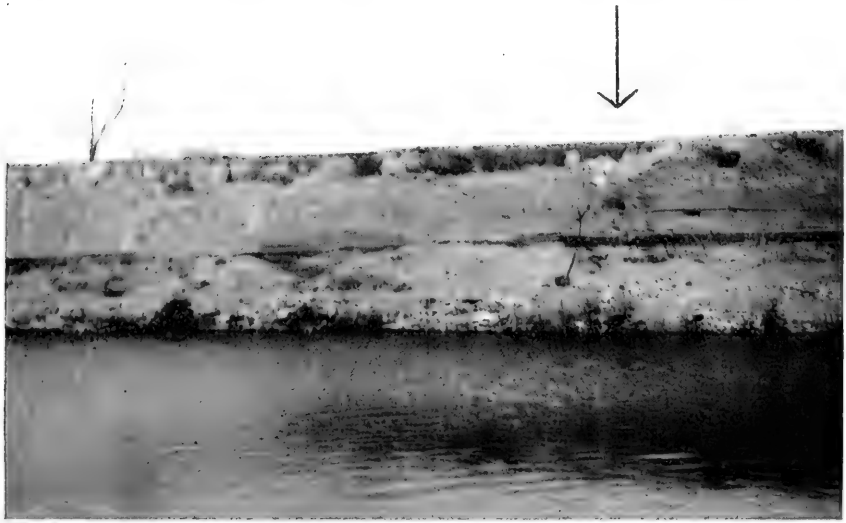
The yellow deposit underlying the black soil also shows traces of man's occupancy in stone, animal bone and human bone, but no connection is found between these specimens and those heretofore described. There is a total absence of pottery. Nor is there any trace whatsoever of an intrusion from the black soil. The pits found show clearly that they were excavated from a lower level in the yellow soil than those which carry intrusions of the black soil, as the red clay bands deposited by water covered the mouths or openings of these pits. The pits contained broken quartzite pebbles, small particles of charcoal and one, the bones of the American bison with charcoal particles and fire-broken stone.



Cross section of layers of soil in the Delaware Valley, and human remains in the glacial deposit where have been found the bones of musk ox and other Arctic animals

Such traces of man's presence in the yellow soil were found during a number of years for a distance of several miles, and include chips and flakes of argillite and implements of the same material in shape of slender spear heads and arrow points. Besides the scattered specimens and the specimens in pits there were specimens found close together in patches of three feet diameter and more, representing places where the chipping of the argillite was done. But not until April, 1899, did we find the bones of man belonging exclusively to this deposit, and as many a time is the case, these were accidentally found in a trench excavated for the purpose of ascertaining the thickness of the Trenton gravel at its eastern end. There were two heaps of human bones some feet apart, six feet below the present surface, one in

Ice pits in cut south of Trenton, with large water-worn boulders in position



Railroad cut where human femur was found in glacial drift, 7 feet 7 inches below the surface. This bone is on exhibition in the American Museum, New Jersey section of the archæological hall (second floor)

a stratum of clay and the other in a stratum of manganese that had saturated the bones and made them very heavy; all were in a bad state of preservation.

The traces of man in the gravel, far below the above-named two stations of occupation, were found in the shape of artificially fractured stone chiefly

of argillite and quartz, at various depths in undisturbed gravel, also the bones of Arctic animals such as musk ox and of elk, probably species now extinct, but which were contemporaneous with the man whose remains are found in the same deposit. And finally, in November, 1899, after so many years of search the work was crowned by the finding of human bones in the same glacial deposit where the bones of Arctic animals were found. The find consisted of a fragment of the left femur of a human skeleton. The cellular structure had been gouged out, one end cut off and two holes were drilled into the sides of the bone, which indicates that the same may have been the handle of a tool or weapon at some time in the remote past and removes any possibility for doubt: not only was it a human bone, but it was also a sample of man's handiwork. All animal matter had gone out of the bone and the whole was water-worn and rounded off at the ends, and of the consistency of chalk. Some fragments of the parietal bone of a human cranium were also found in the same deposit and were of the same consistency as the femur.

The fact that these finds were made in undisturbed gravel deposited by the glacial floods shows that the home of these people had been somewhere farther up the valley, and that the objects shared the journey of the gravel down to the place where they were now found, that they were a part of this gravel and as old as the deposits they were found in, whatever the age of the gravel may be.

We have here now the traces of three distinct habitations of man in the Delaware Valley: the Indian on the present surface, the black soil; some prehistoric man when the yellow soil was the surface prior to the accumulation of the black soil, and as this man used only argillite in the manufacture of his implements, he may be termed the "argillite man"; and finally a still older race before the yellow loam was deposited, the so-called "glacial man" or "gravel man."

However important these facts may be, they are at their best only meagre information and it is hoped that much more can be learned through future explorations. Continued search must reveal still other facts on which to build the history of man on the American continent.

Most of the specimens mentioned which go to prove the three periods of occupation in the Delaware Valley are on exhibition in the American Museum of Natural History, and the explorations were made possible by or through the generosity and interest of Dr. Frederick E. Hyde of New York City and of the Duke of Loubat.

THE NEW FOUR-TOED HORSE SKELETON

By W. D. Matthew

THIS skeleton, presented by Mr. Frank K. Sturgis, represents the earliest known stage in the ancestry of the horse. It was found in 1910 in the Wasatch formation of the Big Horn Basin of Wyoming.

Three skeletons of the little four-toed horse of the Eocene period are now on exhibition. The first, from the Wind River formation, was one of the gems of the Cope collection, purchased by the Museum in 1894. The second, found by the Museum expedition of 1905 in the Bridger Basin, represents a later stage of evolution, the middle Eocene. This third skeleton, found at a lower geological horizon, is an earlier stage than the Cope skeleton and although of somewhat larger size is more primitive in retaining on the hind foot tiny splint-like vestiges of the first and fifth digits, reminiscences of an earlier five-toed condition which have been completely lost by its successors. Although these vestigial splints are not preserved in this skeleton, their existence is indicated by articulating facets on the adjoining digits and in another partial skeleton of the same species found in 1911, one of the little splints is preserved entire.

Numerous specimens of jaws and teeth of these little four-toed horses have been secured by the persevering work of the American Museum field parties, but skeletons and skulls are exceedingly rare and this one, although by no means complete, is somewhat more so than any hitherto found. It has been restored and mounted in a grazing attitude by Albert Thomson.

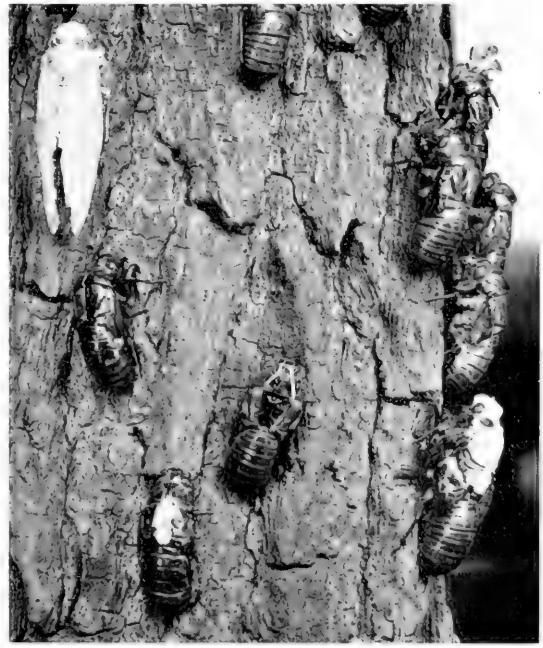
THE SEVENTEEN-YEAR LOCUST GROUP

By John A. Grossbeck

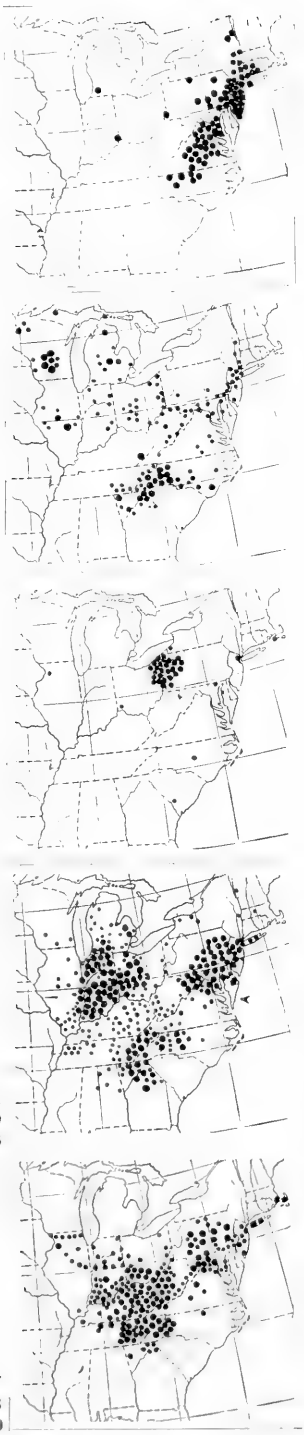
RECENTLY there has been installed in the insect hall a new group illustrative of the biology of the seventeen-year locust or periodical cicada (*Cicada septendecim* L.), the studies having been made in the early summer of 1911 when the insects appeared in such swarms in the vicinity of New York City.

The long life of the cicada, both as a larva and subsequently as a pupa, is passed in the earth at some distance beneath the surface where it feeds in both these stages on fluid food. In a "locust year," by which is meant the year in which the insects appear above ground, the active pupa, which stage is assumed six or seven years prior to appearance above ground, makes its way toward the surface and there awaits the advent of summer before breaking through the upper crust into sunshine and the outer air. When the latter part of May or the first part of June arrives, the uncouth creature emerges. At the same time incredible numbers of other pupæ have also emerged and attaching themselves to some surface, preferably to the trunk of a tree or to the undersides of leaves of shrubs, they shed the pupal skin and appear as winged cicadas.

Egg-laying begins in a few days after the emergence of the adults, and it is this process which results in the only injury caused by them. They select the slender terminal twigs of a great variety of orchard, shade and forest trees, for the purpose of depositing the eggs. Deep punctures are made in the twig, one immediately above the other, and in each puncture from twelve to twenty eggs are laid. These hatch toward the latter part of summer and the little grub-like



From the seventeen-year locust or cicada group. The cicada pupa emerges from the ground and ascends some tree trunk where it bursts the outer horny skin and crawls out an adult



animals immediately drop to the ground and burrow into the soil to dwell in darkness until that subtle influence called instinct calls them into the outer world.

But ere these little fellows have broken through the eggshell the weight of the branch beyond the point at which the eggs were laid, aided by the wind, may have caused the twig to break, and the leaves beyond the break may then turn brown. The injury to a large tree, aside from the unsightly appearance of the dead leaves, is slight and the tree soon recovers completely; but small trees, especially seedlings are often killed. All in all, little apprehension need be entertained by the farmer or fruit-grower as a locust year approaches, for at most he must needs only forbear to plant young trees that year; and to the lover of the curious in nature a locust year is one looked forward to with great interest.

In the group now installed on the third floor the insects are shown emerging from the ground through neat circular openings on a level with the surface where the soil is compact and bare of vegetation, and through the tops of mud towers or "cones" which the young cicadas have constructed where the soil is moist, particularly where there is a layer of leaves or grass. On the trunk of a sweet gum tree and on some of the leaves of the scrub white oak nearby are numerous shed pupal skins, and adults delicate and white are seen breaking through the skins, or expanding their wings after having just emerged. Fully colored adults, blackish conspicuously marked with red, are shown resting on the twigs, some in the act of egg-laying. Certain of the insects in the group are represented as affected by the fungous disease known as *Massopora cicadina*. Also egg punctures are shown on some of the twigs, and the result of these in the broken twigs with dead leaves is conspicuous among the fresh summer foliage.

An English sparrow, that inveterate destroyer of the cicadas among the many birds

that prey upon them, has just captured one of the insects, and hosts of cicada wings (which are not eaten by the birds) are strewn on the ground. A nest of the ant *Formica fusca subsericea* is shown also with the ants feeding on the dead bodies of the cicadas. The cicadas are too large to be carried into underground galleries, so are merely dragged to the entrance of the nest and eaten there.

A small variety of the cicada which has been named *Cicada cassinii* and occurs locally in nature with the large form is shown in one corner of the group.

Twig punctured for egg-laying. Photographed from cicada group

MUSEUM NOTES

Since the last issue of the Journal the following persons have been elected to membership in the Museum:

Patrons, Mrs. Archer M. Huntington, Dr. Charles E. Slocum and Mr. Frank K. Sturgis;

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At the regular meeting of the board of trustees on May 6, 1912 the following patrons of the Museum were elected associate benefactors in recognition of their generous contributions and continued activity in the growth of the institution: George S. Bowdoin, Cleveland H. Dodge, Archer M. Huntington, Arthur Curtiss James, Charles Lanier, Joseph F. Loubat, J. Pierpont Morgan, Jr., Henry Fairfield Osborn, Percy R. Pyne, William Rockefeller, Jacob H. Schiff and Felix M. Warburg.

The Museum was visited on April 9 by a committee from the Deutsches Museum of Munich, consisting of Director Oskar von Miller and ten of his associates. The committee was received by the president and director of the American Museum and by Mr. Felix M. Warburg of the board of trustees, the last-named always a great admirer of the work of administration and exhibition as carried out in the Deutsches Museum. It is inspiriting to the Museum that it was this American institution and its published plans for future extension that were said to have been the determining factors in deciding the Munich committee to visit the United States; and also to hear now that this committee maintains after visiting the large cities from the Coast to the Middle West that "of the works of man, they saw nothing equal to the American Museum in New York City" — all of which augments the institution's zeal to be worthy such distinction.

The forty-third annual report of the president of the American Museum of Natural History, issued in February as a preliminary report to the trustees and members of the institution and to the municipal authorities of the city of New York, was published in permanent form during the past month. The volume is particularly instructive as to the Museum's administration and support as well as in regard to its work in exploration, research, exhibition and education.

THROUGH the African field work of Mr. Carl E. Akeley the Museum is enriched by a series of ten skulls of the African elephant ranging in size from the yearling to the old tusker of perhaps thirty-five years, the skull measurements showing increase in width from twelve inches to thirty-five and in length from sixteen inches to forty-five. Examples of this species of elephant are more rare in museums in America than of even the mastodon, and thus unusual value is attached to this new and very extensive series.

THE MUSEUM has received from Mr. Alfred J. Klein skins and skeletons ready for mounting of a pair of the very remarkable giant forest pigs, *Hylochœrus meinertzhageni*. This species was discovered in 1898 in the wilds of British East Africa and is somewhat intermediate between the well-known wart hog and the river hog, being like the former in that the face of the male is characterized by a huge excrescence.

MR. CLARENCE H. EAGLE of New York City has presented to the Museum his private collection of about eight hundred bird skins representing North American species. These will be known as the C. H. Eagle collection and like other collections in the Museum will be accessible to students.

THE department of geology has recently come into possession of some interesting meteorites which are now on exhibition in the foyer. The largest of these is an entire mass of the so-called Amalia siderite or iron meteorite, which is held to be a portion of the great Mukerop find, receiving its name from the farm near Gibeon, German Southwest Africa, on which it was discovered. This mass weighs 675 pounds and forms an interesting companion-piece to the model of the Gibeon mass from the same region. A polished and etched section of Amalia is displayed in connection with the large mass and shows some most interesting characteristics, chief among which may be mentioned the curving of the Widmannstätten lines in certain portions of the mass, and a line of discordance running across the plate in such manner as to suggest that the original mass had been broken and welded together again before it struck the earth or that it consisted of two parts that were welded together. The other accessions are: a 370-gram, polished slice of the Lampa aërolite or stone meteorite, from the desert of Atacama, South America; a 457-gram, polished section of the Cullison aërolite, from Pratt County, Kansas; and a 567-gram, polished and etched slice of the Shrewsbury siderite, from York County, Pennsylvania. All of these are newly-described finds and are valuable additions to our collection.

FOUR new radiolarian models prepared by Mr. H. Müller have recently been placed on exhibition by the department of invertebrate zoölogy. The glasslike skeletons of these minute sea animals are represented enlarged 1500 to 2000 diameters and show clearly their delicate and intricate struc-

ture. While the radiolarians are so small as to be scarcely visible to the unaided eye, yet they are so abundant in the warmer oceanic waters that the skeletons of their past generations cover the ocean floor to a considerable depth and may form a layer compacted into flinty "Barbados earth" which is used commercially for polishing and finishing.

An addition to the series of fishes on exhibition in the Museum is a case containing models of certain species that live in depths of the sea one or two miles below the surface where no light penetrates. Many of them are provided with special phosphorescent organs arranged along the sides or in some cases at the ends of fleshy filaments, like minute lanterns on long poles to light the sea bottom or to lure prey. The models represent some of the remarkable forms which have been obtained in the course of the work of the "Albatross" and other vessels equipped for deep-sea dredging. They were purchased from the modeler who made the original series for the British Museum and have been altered according to the researches of Dr. Bashford Dean and in part recolored by the Museum artists.

The department of anthropology has issued to artists and teachers of art classes in New York City and vicinity a card calling attention to the remarkable collection of prehistoric Peruvian cloths recently put on exhibition in the South American gallery. Not only are these mummy cloths of unusual beauty but they also present an opportunity to study the evolution of primitive designs and color schemes.

During the coming summer Dr. Frank E. Lutz will continue the study of the invertebrates of the vicinity of New York City paying especial attention to the Ramapo Mountains and Pine Barren regions of New Jersey.

Dr. Herbert J. Spinden, assistant curator of anthropology, is on a Museum expedition in the Southwest. In January he visited the ruins of Copán in Guatemala returning to the Southwest to study the little-known remnants of Pueblo tribes formerly living on the lower Rio Grande in the vicinity of El Paso. He is now among the Rio Grande Pueblos proper near Santa Fé taking up again the work of former years on decorative art and material culture.

The department of anthropology reports progress in local archæological discoveries. Mr. William Floyd of Long Island, while looking for archæological remains on his estate uncovered an Indian burial, the skeletons from which he has presented to the Museum. The grave contained three skeletons, one apparently that of a girl, the others of two middle-aged men. As is the case with most burials in this vicinity, no objects of any kind were found in the graves. Mr. Max Schrabisch of Paterson, New Jersey, has again begun his search for rock-shelters and reports the finding of a very important one near Stony Point, New York. The excavations of this shelter so far have been rewarded with rich finds of pitted hammerstones, knives, scrapers and pottery.

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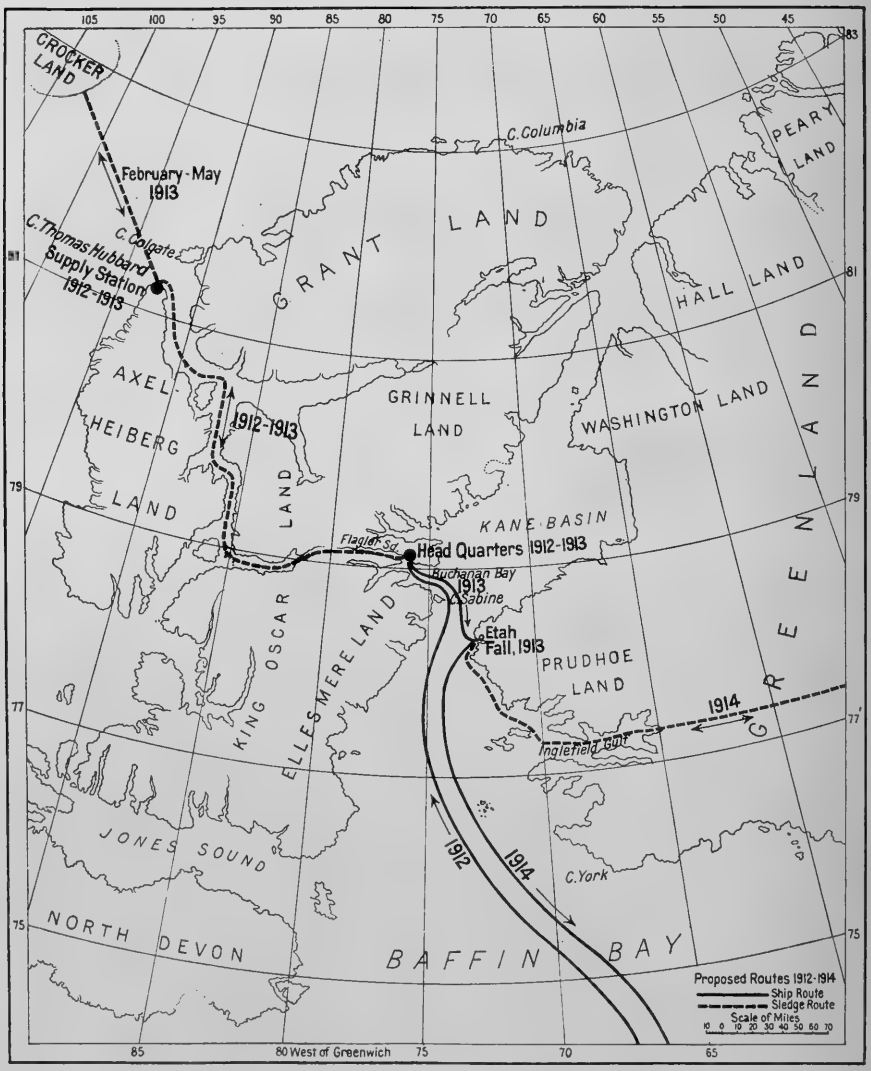
CROCKER LAND
February - May 1913
C. Thomas Hubbard Supply Station 1912-1913
C. Colgate
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1912-1913
GRINNELL LAND
WASHINGTON LAND
GREENLAND
KANE BASIN
Flagler Sd.
Head Quarters 1912-1913
Buchanan Bay
1913
Sabine
Etah
Fall, 1913
OSCAR LAND
ELLESMERE LAND
PRUDHOE LAND
1914
Inglefield Gulf
JONES SOUND
1912
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NORTH DEVON
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Proposed Routes 1912-1914
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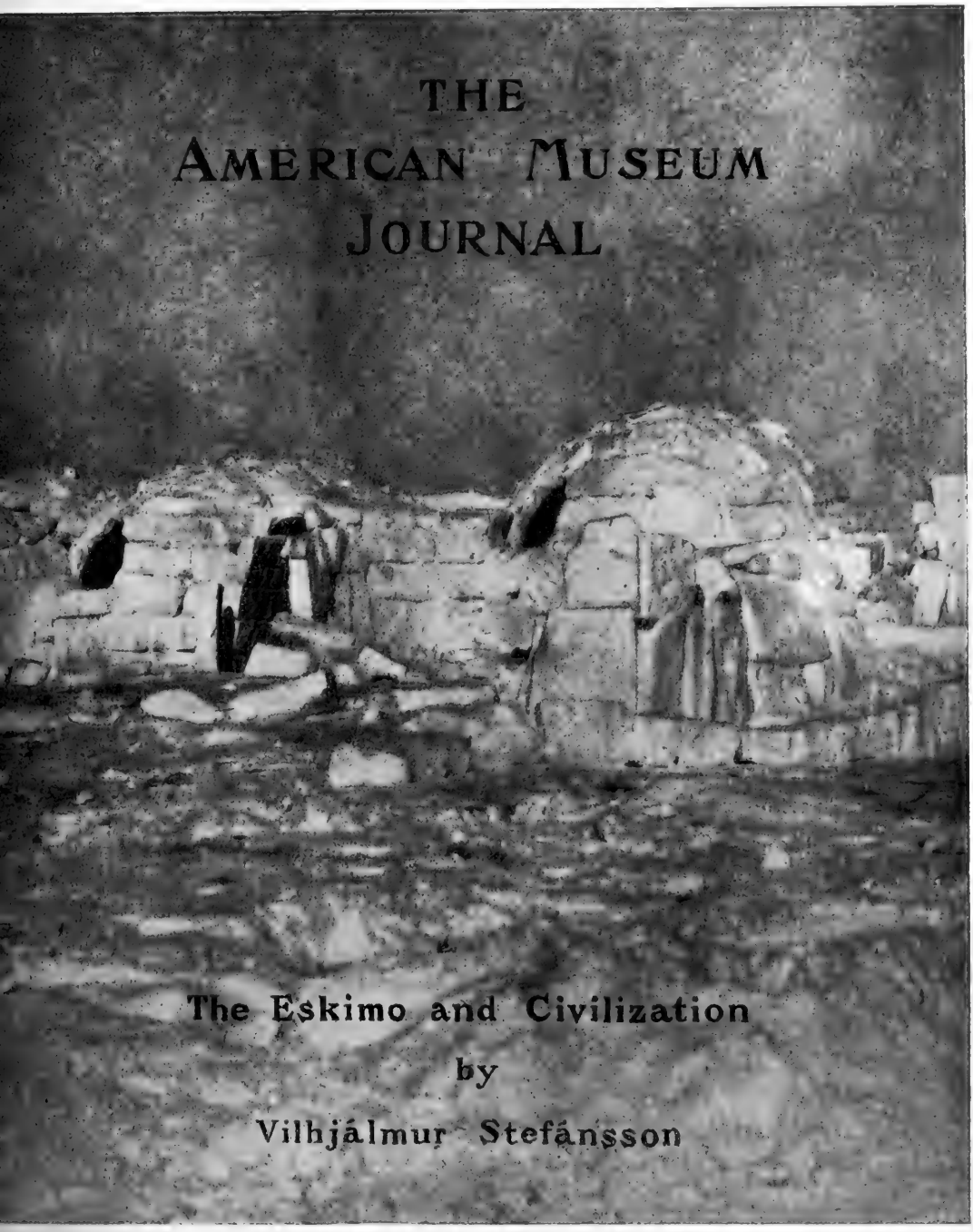
Scale of Miles
80 West of Greenwich

THE AMERICAN MUSEUM JOURNAL



The Eskimo and Civilization

by

Vilhjálmur Stefánsson

Volume XII October, 1912 Number 6

American Museum of Natural History

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The American Museum Journal

CONTENTS FOR OCTOBER, 1912

Mary Cynthia Dickerson, *Editor*

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VILHJÁLMUR STEFÁNSSON, ETHNOLOGIST AND EXPLORER

The American Museum Journal

VOL. XII OCTOBER, 1912 No. 6

THE ESKIMO AND CIVILIZATION

DISEASE AND DEATH FOR THE NEW ESKIMO TRIBES WITH PAUPERIZATION OF THOSE THAT CHANCE TO SURVIVE CAN BE PREVENTED ONLY BY A QUARANTINE WHICH WILL ALLOW THE CONDITIONS OF CIVILIZATION BUT SLOW ENTRANCE TO THEIR TERRITORY

By Vilhjálmur Stefánsson

INTRODUCTORY NOTE: The history to date of the Stefánsson-Anderson expedition financed by the American Museum of Natural History and just returned from four years' work in Arctic North America, has been fully reported in previous numbers of the JOURNAL, with especially long and accurate articles in the issues for November, 1910, and January, 1912. The reports contain an account of the discovery of Eskimo tribes in the Victoria Land region [marked "Uninhabited" on modern maps], Stefánsson's own descriptions of incidents connected with a many months' intimate acquaintance with Eskimo who had never before known a white man, his descriptions of those tribes of Victoria Island which show traces of admixture of European blood, and finally the explorer's opinion tentatively stated as to some of the theories which possibly explain the admixture. The character of these discoveries makes the Stefánsson-Anderson expedition one of the most important in recent years, in fact the discoveries are of such importance and extent that for the first time in history there promises to be data on which to build a comparative study of Eskimo tribes throughout the breadth of the American continent.

The series of preliminary reports in the JOURNAL on the ethnological work of the expedition is completed in this number with an article by the explorer himself on the disastrous effect that civilization is likely to have on the newly located people. The opinion of Mr. Stefánsson is of value as that of an ethnologist who has planned to do serious research on the civilized and uncivilized Eskimo of America, despite the hardships and perils of the task, and who has just finished four years of the field work of that research on the Eskimo of Alaska, the Mackenzie River and the Coppermine. It is with interest that the world listens to any suggestion he may have concerning the welfare of the people which he has discovered.—THE EDITOR.

IT is now forever too late to make even a reasonable guess as to what may have been the Eskimo population of Arctic Alaska at the time of the Russian discoveries, but it seems certain that the present inhabitants cannot be even ten per cent of the original number. Since 1884 the villages of Cape Smythe and Point Barrow have maintained approximately a constant population. For this reason the figures of the United States census give a deceptive appearance of permanence to the population of that district. The fact is that while in 1884 most of the individuals in those villages were born in or near them and descended from people of that locality, to-day there are living at Cape Smythe, in a population of about four hundred Eskimo, only three individuals who are considered by the Eskimo as belonging to the Cape Smythe tribe. Two others are known to

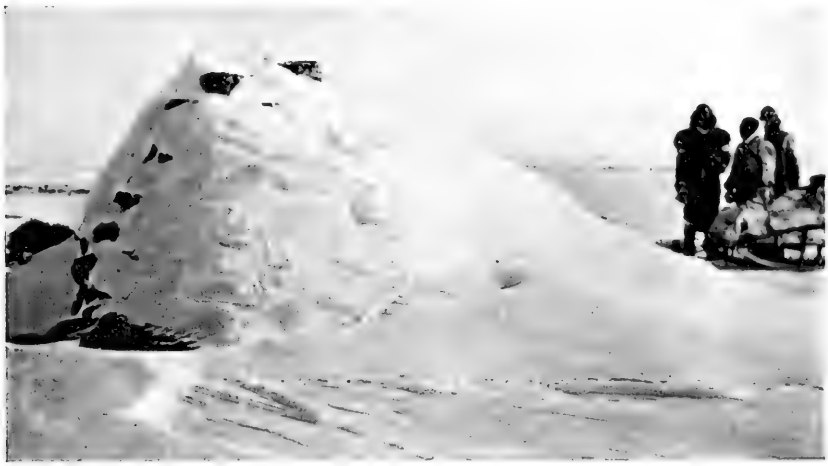
Spring village in Dolphin and Union Strait, May, 1911. The snow roofs of the houses have been caved in by the sun and replaced by caribou skins

Nine bowmen in pursuit of a single ptarmigan, Dolphin and Union Strait, May, 1911 The Coronation Gulf Eskimo did not know firearms but manufactured bows of driftwood strengthened with sinew, the arrows tipped with copper although sometimes with iron or stone

The start of the expedition from Coronation Gulf near the mouth of the Coppermine River for the crossing of Victoria Island. [Mr. Stefánsson is at the left in the photograph

be still living, one near the mouth of the Mackenzie River and the other some thirty or forty miles southwest of Cape Smythe. There are also about twenty individuals who are descended from the Cape Smythe tribe through one parent. The fact which explains the constancy of the census figures is that the extermination of the caribou in the interior of Alaska has depopulated the highlands and driven the survivors of those districts to the coasts. It seems probable too that the mixture of Indian blood has given the Eskimo of the interior a greater power of resisting effects of civilization. At any rate the fact is that most members of the present coast population of Alaska are the descendants of the inland Eskimo and the more pure coast population has been practically exterminated.

For the Mackenzie delta, reasonably accurate estimates can be made. A careful reading of Sir John Richardson's account of his Arctic search



Ancient stone house, Simpson Bay, like several others in southwestern Victoria Island. The present Eskimo of Victoria Island did not build these houses and do not know that their ancestors did; they believe them the work of spirits before human beings lived on the island

expedition of 1848 shows that there must have been a population of over two thousand upon the three-hundred-mile stretch between Cape Bathurst and the Mackenzie River. The mounted police census shows that there are now forty surviving. Both Alaska and the Mackenzie delta during this period of progress have been in continuous contact with white men. It is interesting therefore to compare their condition with that of the Eskimo of Prince Albert Sound who were visited by Captain Collinson and Captain M'Clure in 1852 and 1853. They do not give us a census of this tribe, but it seems certain from their account that there cannot have been over two hundred. In the spring of 1911 I found the population of this tribe to be about two hundred and twenty. In other words, during the period in which

Stefánsson visiting a temporarily deserted village on the ice in Coronation Gulf. The caches of property show that the Eskimo intend to return before the ice melts in the summer. The Coronation Gulf Eskimo settle on the ice of the bay in winter to hunt seal and return to the interior of the island in summer where they live on caribou

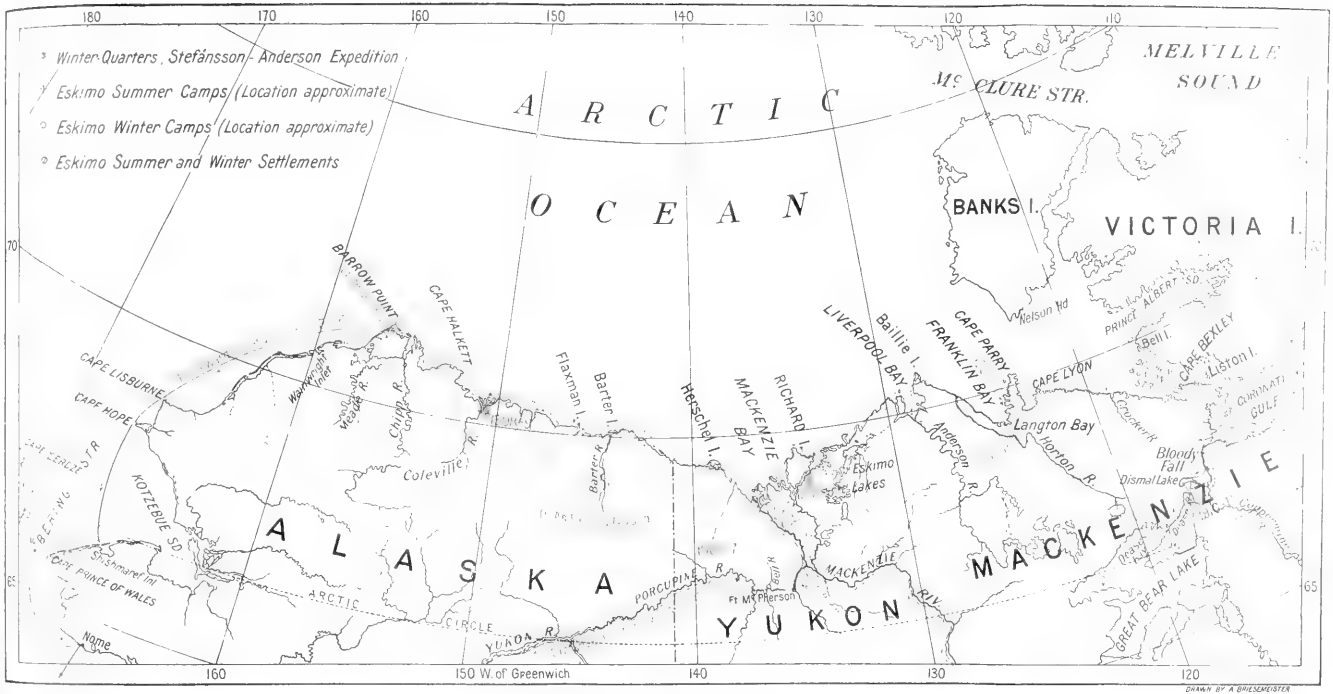
Stefánsson's party preparing to camp in one of the houses of a permanently deserted winter village in Coronation Gulf, April, 1911. The minimum winter temperature of the Coronation Gulf region is 55° F. below zero. The holes in the walls of the houses are not windows but are made for convenience in passing household goods out at time of leaving. The Victoria Island Eskimo are migratory and build no permanent houses of any kind, which fact in large part accounts for their relative freedom from contagious and other diseases

DRAWN BY A. BRIESEMEISTER

1908–9

In the e to the Coppermine region and in April, Ocean. The Coronation Gulf, passed through Dolphin wright Inlet. Land, Prince Albert Sound, took there and sled, and s the still frozen sea to the mainland and **1910** ent in archæological work

In late A es, was spent on Horton River inland from known to be h 22, 1912, for the thousand-mile sled trip Bexley encou he following two months in the excavation white man. . revenue cutter "Bear" bound for Nome, from Liston the Copperm



DRAWN BY A. BRIESEMEISTER

ITINERARY OF THE STEFÁNSSON-ANDERSON EXPEDITION

Map prepared under the supervision of Vilhjálmur Stefánsson

1908–9

In the early summer of 1908 the expedition descended the Mackenzie River by boat to the Arctic Ocean. The winter was spent on the north coast of Alaska, with sled journeys as far west as the Wainwright Inlet. In the spring and summer of 1909 the expedition moved eastward along the coast by boat and sled, and spent the winter following near Cape Parry

1910

In late April, 1910, Mr. Stefánsson left Langton Bay and Cape Lyon, the latter the most easterly point known to be visited by the Western Eskimo, and traversed the coast of Dolphin and Union Strait to Cape Bexley encountering no Eskimo until the end of the journey when he found a tribe that had never seen a white man. In May, 1910, Mr. Stefánsson crossed over to Victoria Land and then proceeded southward from Liston Island, entering the mouth of the Coppermine River in early June. He spent the summer on the Coppermine and Dease rivers and Dismal Lake. In early November he went to Langton Bay to communicate with Dr. Anderson, crossing one of the largest unexplored regions in Canada

1911

In April, 1911, Mr. Stefánsson and Dr. Anderson returned to the Coppermine region and in April, May and June Mr Stefánsson and the Eskimo Natkusiak crossed Coronation Gulf, passed through Dolphin and Union Strait, crossed the Wollaston peninsula of Victoria Land, Prince Albert Sound, took there about 400 pounds of scientific collections and hauled these across the still frozen sea to the mainland and thence along the coast to Langton Bay, where the summer was spent in archæological work

1912

The winter of 1911–12, devoted chiefly to linguistic researches, was spent on Horton River inland from Langton Bay. Mr Stefánsson started from Langton Bay, March 22, 1912, for the thousand-mile sled trip to Point Barrow, Alaska. He reached that place June 13, spent the following two months in the excavation of ancient village sites, and left there August 13 on board the U. S. revenue cutter "Bear" bound for Nome, Alaska

the Mackenzie Eskimo have decreased from two thousand to forty, these Eskimo of northern Victoria Land have been holding their own. On the well-known American principle that "the only good Indian is a dead Indian," civilization in the Mackenzie delta is justified by its fruits.

In the Mackenzie district at least, the main cause of the decrease of population has been measles. There are on record, cases where out of a family of thirteen, eleven have died within a single week. Consumption was probably always present among the Mackenzie Eskimo, although its virulence has almost certainly been increased by the unnatural conditions under which the Eskimo have now been taught and forced to live. Syphilis and other contagious diseases peculiar to Europeans have also had their effect. Among the Coronation Gulf Eskimo I saw no signs of any of these. It is certain that not only are these diseases now absent, but that also they will soon be introduced and that the effect on the population of Coronation Gulf will be the same as it has been on the Mackenzie population. In other words, if civilization is allowed to take its ordinary course, the two thousand Eskimo of the Coronation Gulf district of to-day will fifty years from now be represented by not more than two hundred. A people such as the Eskimo, have, through the evolution of a thousand years, become delicately adjusted to the conditions of their environment. The coming in of civilization, whether it be brought by whalers or by missionaries, will break that equilibrium and the result will be essentially the same. Missionaries may not bring in syphilis but they are quite as likely as whalers to bring in measles, for wherever the missionary goes, supply ships must follow, and it can be a question of only a few years until some white man's epidemic such as the measles or smallpox will reach these hitherto isolated people. No change of habits that the white men are likely to bring in will materially benefit the Eskimo, while three sets of new conditions in particular will work for his destruction — white men's houses, white men's foods and white men's clothes.

At present the Eskimo live in snow houses in winter and in tents in summer. Both of these kinds of dwellings are hygienic and are made more especially so by the fact that they are never long located in one place. Before a dwelling can become filthy, it is in the natural course of events abandoned and a new one constructed. White men, however, when they come to live among these people, will have their permanent houses. These will be emulated by the Eskimo. They will build their poor hovels in as near an imitation as they can of the white men's pretentious dwellings, and they will live in these the year through exactly as they now do at Point Barrow. The germs of tuberculosis and other diseases will lodge in these dwellings. When one set of inhabitants have sickened and died, the vacated house will be occupied by others and there will be a continuous procession from the tent to the frame house and from the frame house to the grave.

Prince Albert Sound Eskimo of the blond type in heavy winter dress

Next to the white man's house, the white man's diet is most deadly to the Eskimo. They are accustomed to living on bulky meats and when they commence to eat flour and other condensed foods used by white men, a derangement of the digestive functions is inevitable. Certain diseases will naturally arise directly from this cause and the general resistance of the body to all diseases will be decreased.

The bringing in of firearms will in the course of a few years undoubtedly exterminate the caribou here as it has done in Alaska. The people will thereby be deprived not only of the source of food but also of materials for clothing. White men's cotton and woolen clothes will take the place of the far more satisfactory deerskins and this will be one more contributing factor in the decline of the population.

The evil moral effects of civilization too are marked. I found the population of Coronation Gulf independent, self-respecting and prosperous. They did not beg; they did not pry into our affairs; they were hospitable, courteous and truthful. In Prince Albert Sound I made a present of one needle each to the forty-three married women of the tribe. Of course I kept no books, but I feel certain that

Victoria Island Eskimo, to show style of clothing

Prince Albert Sound Eskimo at Stefánsson's tent to talk and trade, May 14, 1911. Isolated from civilization, these people have been living in what is practically the Stone Age. Mr. Stefánsson remained twelve months visiting different groups of the "new people." He identified himself with their interests to such an extent that they came to look upon him as a member of their own tribe. This gave opportunity for an accurate study of their manners and customs

every one of those women brought me something with which to pay for the needle, most of them saying that they did not want me to think that they

ESKIMO OF THE BLOND TYPE

Prince Albert Sound, May, 1911. These Eskimo differ in general features from Eskimo of Alaska and Mackenzie River. Some have blue eyes and fifty per cent have light eyebrows; a few have reddish beards. The expedition obtained physical measurements of 206 Coronation Gulf Eskimo. The characteristics of these people seem to suggest a mixture of European and Eskimo blood

were people who accepted gifts. In Nome, Alaska, a prominent lawyer told me a story which puts the contrast definitely. He had a suit of clothes that he had made up his mind to throw away, although they

Stefánsson's party hauling a seal to shore. The party averaged seven Eskimo, four of these seven remaining with the expedition the entire four years. Among these four were Ilavinirk, his wife, Mamayauk, and their daughter, Nogosak. [Mamayauk is shown in the photograph at the extreme right]

were still in good condition. One day an Eskimo passed his door and it struck the lawyer that the suit of clothes would just about fit that particular man, so he called him in, dressed him from head to foot in clothes better than most Eskimo can afford — gave him shoes, a hat and everything else necessary to make him presentable. The Eskimo took all this as a matter of course, expressing neither gratitude nor pleasure, and when he saw that he was going to get nothing more, he pulled out an ivory toothpick and tried to sell it to the lawyer for ten cents. The story is typical of the entire Alaska and Mackenzie district; the indiscriminate charities of whalers and missionaries alike have thoroughly pauperized the Eskimo. It seems strange that while we fully realize the danger of pauperizing the slums of New York, there seems to occur to no one the possibility that the heathen as well as the hoodlum may be injured by too much kindness. You may be able to sterilize out of the old clothes boxes the germs of tuberculosis, typhoid and measles, but you

Young Nogosak, daughter of Mamayauk, with her older adopted brother. The latter was a valuable member of the expedition for three years

cannot sterilize out of them the germs of thriftlessness and laziness, the germs of pauperism, that take root wherever men learn that a whine will go farther than a month's honest work toward dressing themselves and their families.

Captain Amundsen closes his chapter on the Eskimo of King William Island with a significant sentence: "My best wish for my friends the Netchilik Eskimo is that civilization may never get to them." It is the wish of a true friend, but a vain wish unfortunately. We cannot stop the onslaughts of civilization upon the Eskimo any more than the Red Cross can stop war, but like the Red Cross we can work for the amelioration of a brutal system.

Mamayauk, member of the expedition for four years. A civilized Eskimo of the Mackenzie River region

The mission boards, by taking thought, can add a cubit to the average intellectual stature of the men who are doing their field work among the heathen; by taking thought they can devise systems which will yield them better spiritual harvests than they are now gathering, and manifold the present almost negligible contribution they are making toward the bodily welfare of the Eskimo. They should place the commandments of sanitation on a par with those of Sinai. The governments of Alaska and of Canada should follow the Danish government of Greenland in trying to protect the Eskimo against epidemics, pauperization and commercial exploitation. Lastly, those of us who are in the habit of contributing our spare pennies toward the carrying of light to the dark places of the earth should inquire as to the local suitability of our illuminating systems in the places where they are to be used. After all, the Eskimo have the sun, moon, stars, and aurora.

Arranging the packloads for men and dogs. A morning scene on the Barren Ground, inland from Cape Parry, August, 1911

Summer travel on the Barren Ground. The search for caribou to provide food for the coming winter

STEFÁNSSON'S DISCOVERIES — A TENTATIVE SUMMARY OF RESULTS

By Clark Wissler

THE anthropological results of the Stefánsson-Anderson expedition may be tentatively summarized, although an authoritative statement cannot be made until the collections have arrived and have been given careful consideration and comparison with those from other regions. The region between Cape Bathurst and King William Island was formerly so little known that one could do no more than conjecture as to what groups of Eskimo lived therein.

Mr. Stefánsson succeeded in visiting thirteen groups in that territory and determining approximately their respective habitats. This alone marks an important advance in our knowledge of the Eskimo. Moreover some data as to the culture, language, and somatology of each group were recorded. This, in comparison with data on the Central and Alaskan Eskimo should give us a fair idea of the whole gamut of Eskimo culture from Greenland to the Aleutian Islands. When it is recalled that anthropologists have found some important differences between the culture of the Alaskan Eskimo and of those around Hudson Bay, it must follow that a boundary line or a transitional belt exists somewhere in the region visited by Stefánsson and Anderson. The data will give at least a tentative solution of this problem.

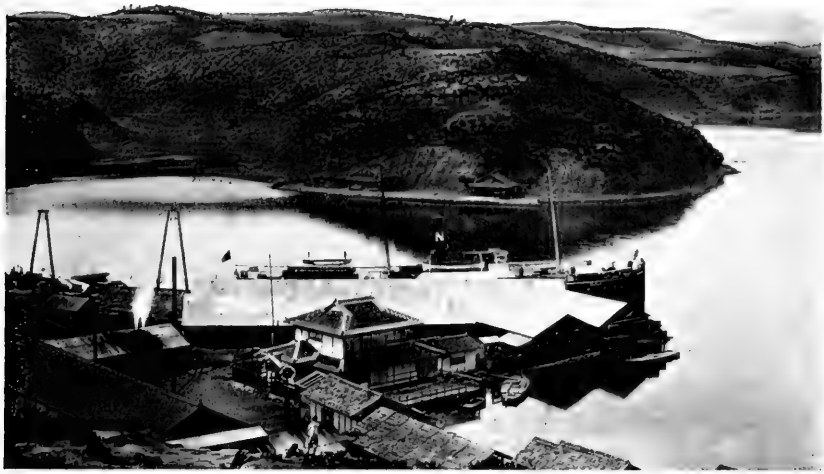
As to the past history of the Eskimo, we must appeal to what is in the ground. The expedition noted many ruins of former villages and recorded the character of houses and culture for further study. A point of especial interest is, that from Cape Parry we have a collection of pottery dug up out of the cutbank. Mr. Stefánsson says this pottery is of the Point Barrow type. This one fact is of considerable importance since it greatly extends the pottery area among the Eskimo. Other archæological material was secured from the vicinity of Point Barrow and a comparative study of these two collections, one east of the Mackenzie and one west, will prove of great importance.

It appears now that these collections supplemented by other historical data will enable Mr. Stefánsson to demonstrate that the introduction of fish nets, labrets and tobacco pipes was comparatively recent and from the west, whereas pottery was known a long time before, in fact at Point Barrow he reports it as occurring in the oldest known remains of the Eskimo.

Lastly, we may mention the peculiar suggestions of European blood among these Eskimo. This is an interesting somatological discovery. We say traces of European blood because that seems the most reasonable explanation of the observed facts. If a tendency toward blond hair only occurred, the possibility of variation within the group might be granted but

since some blondish hair was also curly and associated with eyes of a bluish cast, we have at least three characters peculiar in association to European peoples. That the presence of all in association among a group of Eskimo could be attributed to accidental variation is almost inconceivable. Consequently Mr. Stefánsson has brought forward as the most reasonable explanation, the theory that the observed admixture is the result of intermarriage with the early Scandinavian colonists in Greenland. No more definite conclusion can now be formed. While most of the mixed groups had never been visited, explorers had from time to time heard native accounts of them, and as Mr. Stefánsson says, on Franklin's expedition, one lone Eskimo was encountered in the same locality, an old man with European features and an exceptionally long white beard. If the characters are due to mixture, the infusion must have occurred several hundred years ago and although we may never know precisely how the foreign blood was introduced, a complete record of facts will nevertheless be of interest. We hope that Mr. Stefánsson may continue his investigation to determine the relative distribution of European characters among these Eskimo groups.

Summer hunting lodge of spruce boughs, Horton River, about ten miles from the Arctic coast, September, 1911



The whaling station at Ulsan, Korea. A transport is ready to carry whale flesh and blubber to the Japanese markets

AN EXPEDITION IN KOREA

THE CALIFORNIA GRAY WHALE, SUPPOSED BY MANY NATURALISTS, TO BE EXTINCT, REDISCOVERED IN KOREAN WATERS

By Roy C. Andrews

With Photographs by the Author

THE American Museum sent an expedition to Korea in 1911 primarily to complete the study and collection of the Japanese whales upon which work had been begun in 1910; secondarily to make a zoölogical and geographical exploration of the country lying between the Tumen and Yalu rivers along the northeastern Korean boundary.[1] On the previous expedition skeletons of all the large species except the humpback and California gray whales had been secured. It was especially desirable to acquire specimens of the latter because the "devilfish," as it is often called, was believed by many naturalists to be extinct and no complete specimen existed in any of the museums of Europe or America. Moreover, the California gray whale is of especial importance to systematists since it apparently represents an intermediate stage between the two great families of whalebone whales, the Balænopteridæ and the Balænidæ.

For many years this species was the object of a desultory pursuit by whalemen along the southern California coast where it appeared on its annual migrations, but its numbers decreased until it was no longer

[1] The account of the exploration of northern Korea is held in reserve for a later issue of the JOURNAL.— Editor.

Hauling a California gray whale to the wharf. The shape of the "flukes" or tail is peculiar and the body has characteristic gray markings

Cutting up a California gray whale. The white markings on the head and flipper were produced by parasites, chiefly small crustaceans called "whale lice." The shape of the flipper is distinctive

Bringing in a finback whale at Ulsan, Korea. A "whale spade" is being used to cut the harpoon rope

commercially profitable and the hunt was abandoned. This was in the early seventy's; since then the gray whale has been lost to science.

While in Japan in 1910, I heard reports from the Oriental Whaling Company that a whale called the devilfish, constituted the basis of their fishery on the Korean shores during the months of December and January. I was tremendously interested in this for it seemed that possibly here was to be an opportunity of rediscovering the gray whale. At that time it was impossible to visit the Korean stations because it was already the middle of February when I arrived in Japan from a long cruise south of the equator, but after the success of 1910 it seemed to be of paramount importance to investigate the gray whale fishery.

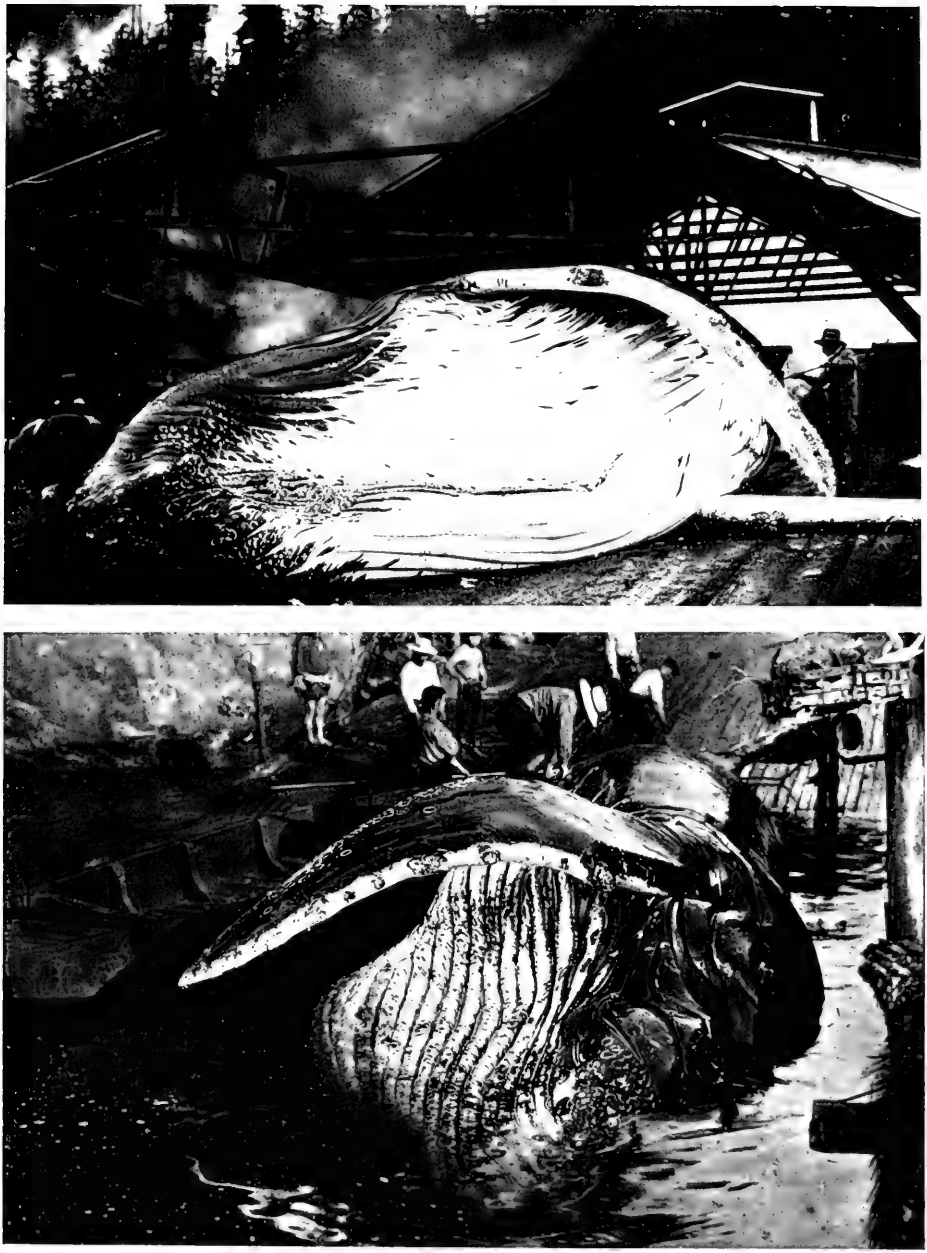
The Oriental Whaling Company at once invited the Museum to continue the work of the preceding season and agreed to render all assistance in its power for accomplishing the desired work. The company had already presented to the Museum skeletons of six large whales and ten porpoises which had been taken during the year 1910. The courtesies of its stations and ships had been freely extended and every help rendered in securing for us specimens of the whales desired. It was therefore exceedingly liberal in the president and directors of the company to continue to give their support and was indicative of the true scientific spirit with which the Japanese nation is inspired.

When I arrived in the Orient at the beginning of 1912, everything had been prepared for my reception. I left Japan immediately upon one of the company's transports for the Korean station, situated in a beautiful bay at Ulsan, on the east coast forty miles north of Fusan. The next day I had my first view of the California gray whale, for a splendid specimen was brought in by the steamship "Olga Maru." I shall never forget the excitement with which I examined the extraordinary animal and studied the skeleton as it was stripped of flesh. The resemblance to a right whale, the typical representative of the Balænidæ, is striking, and yet an examination of the bones shows many characters allying it to the fin whales of the Balænopteridæ. It was especially interesting to examine the specimen with reference to the accounts of the species which have already been published, for all are meagre and full of inaccuracies. Probably no whale has more individual peculiarities than has this species: the shape of the head, of flippers and flukes, and in fact of the entire body is quite unlike that of any other large cetacean.

Its habits too are distinctly individual. About the middle of December the animals begin to appear on the coast of central Korea, following the shore line closely on their migration to the islands of the south. First come a few straggling males, then the main body of females, and later males alone bringing up the rear. Almost all of the females are carrying young, soon to be born, and they head for the quiet waters among the many islands of south Korea where the birth takes place. In April the young are large enough to travel northward and accompany their parents on the long trip to the Okhotsk Sea and the icebound shores of the Arctic.

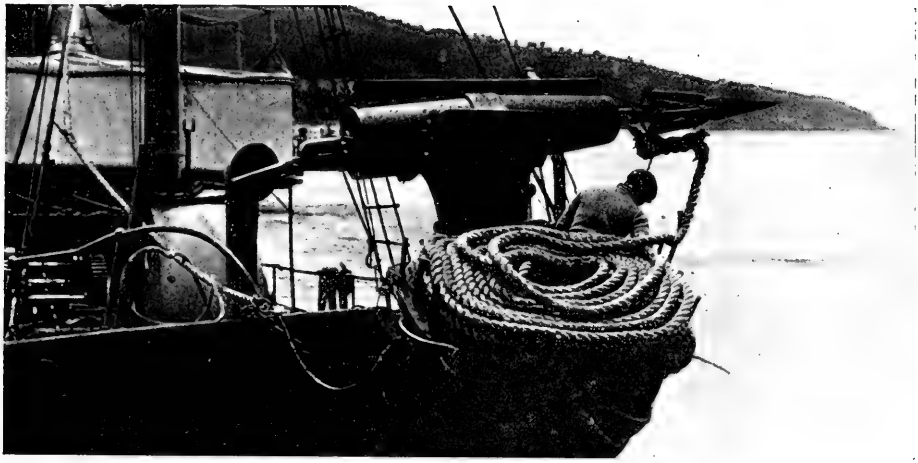
While the ship is following a devilfish the animal will sometimes come to the surface very slowly and quietly, put just the nostrils above the water and blow so softly that no column of vapor is formed. It will then sink noiselessly without having shown more than eighteen or twenty inches of its body above the surface. It will also swim along the shore, often actually rolling in the surf, so close that the ship cannot

Throat of a gray whale showing the two characteristic furrows. Right whales have no throat grooves and fin whales have many; the gray whale is apparently an intermediate stage between the two families



A very white humpback whale in a position to show throat, breast and flippers. The circular markings on the throat are probably caused by barnacles, masses of which are seen adhering to the folds and on the edges of the fins

Humpback whale [right fin and breast in view, lower photograph] secured for the Museum on the Korean expedition. It measured 48 ft., 8 in. in length. The fins in this species are nearly one quarter of the length of the entire body



THE HARPOON GUN

The harpoon weighs 110 pounds. Powder in the hollow point is ignited by a time fuse. Forty fathoms of rope give slack to be carried with the harpoon in its flight. If the iron is well placed the whale is killed almost instantly

A KILLER WHALE SECURED FOR THE MUSEUM

Killer whales wage a continual warfare upon the gray whales. They were seen to force open the mouths of the living gray whales and eat the tongue, sometimes killing and completely devouring their prey

follow; it will even slide in behind rocks and try to hide, until the men on the vessel have become tired of waiting and leave. Gray whales live in perpetual terror of the killer whale which seems to single out this species especially for attacks. When a herd of killer whales surround a devilfish, the latter will often turn upon its back, the fins extended, and lie quietly at the surface seemingly paralyzed by fear. The killers force open the mouth and at times eat almost the entire tongue before the gray whale escapes; or the animal may even be killed, and completely devoured.

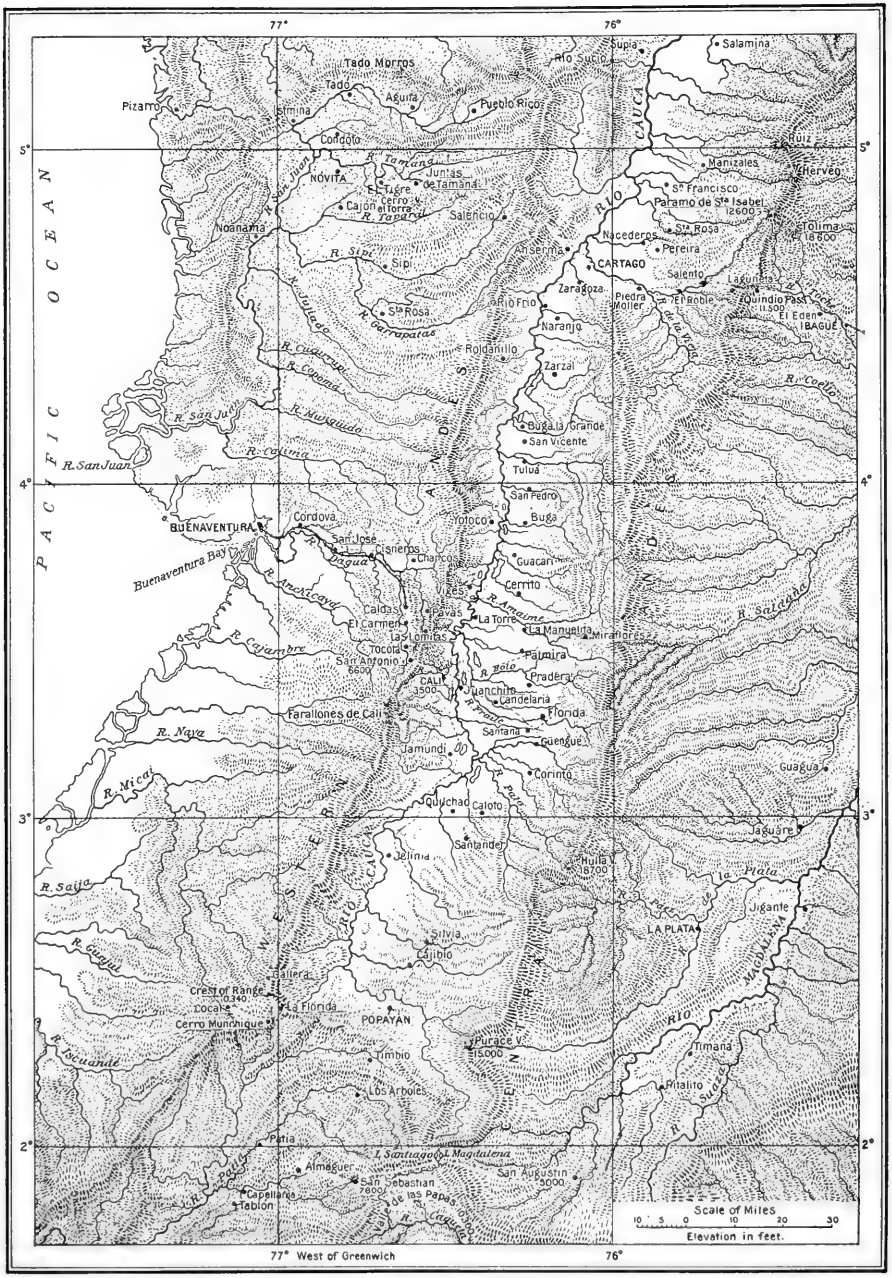
I had always been skeptical as to just how much truth lies in the story that the killers really try to eat the tongues of living whales; it has been recorded in almost every account relating to the Orcas, but I had always considered it extremely improbable. After witnessing it in the case of the California gray whales however, my doubts entirely disappeared.

One fine skeleton was taken for the Museum and a second, by arrangement, for the National Museum at Washington. Many photographs also were secured (the only ones in existence of this species), together with much alcoholic material, and three rolls of motion-picture films, besides notes and measurements of the thirty individuals which were taken during my stay at Ulsan.

We wished to get also the skeleton of a humpback whale. Although humpbacks are common in many parts of the world, they have been so persistently hunted in Japan, that they are now extremely rare. The humpback furnishes the most highly esteemed food of all the whales and in the Japanese markets the flesh of a single individual brings as much as 5000 yen ($2500).

February came and I had almost despaired of getting a humpback in Korea, for only one had been taken during the entire season. On the thirteenth of the month however, three specimens were brought in and the skeleton of the largest was preserved, a male forty-eight and a half feet long; the Museum is fortunate in securing such a splendid representative of this aberrant species. As soon as the bones had been cleaned and crated, I chartered a schooner and sent the whale skeletons to Shimonoseki for trans-shipment to New York.

This material makes the Museum's collection of large cetaceans the most complete in the world. It lacks only the great "bowhead" of the Arctic and it is to be hoped that funds to secure a skeleton of this extraordinary mammal will soon be forthcoming.



MAP OF WESTERN COLOMBIA

Drawn under the direction of Frank M. Chapman, mainly from R. Blake White's map (1883) and from data gained by the Colombian expedition

The dotted red lines show the route of the Colombian expedition. Names underscored with red indicate localities where collections, aggregating more than 7000 specimens, have been made for the Museum

FIELD WORK IN COLOMBIA

NEW BIRD COLLECTIONS BEAR DIRECTLY ON THE PROBLEM OF THE ORIGIN AND DISTRIBUTION OF BIRD LIFE IN TROPICAL AMERICA — MATERIAL OBTAINED FOR A HABITAT GROUP OF THE FAMOUS "COCK-OF-THE-ROCK" [1]

By Frank M. Chapman

THE last report [2] published of the work of the Colombian expedition left Messrs. Allen and Miller, with their native assistants, in the Quindio region of the Central Andes, where collections of birds and mammals had been made up to the lower limit of perpetual snow, at an altitude of about 15,000 feet. In November, 1911, they returned to the Cauca Valley to explore the primitive forests which exist in the vicinity of Rio Frio, and the collections made here supply important data on the origin of the life of the valley.

Early in December a start was made from Cartago, in the Cauca Valley, toward Nóvita on the Rio San Juan, west of the coastal Andes. Supplies and outfit were transported on oxen for the first two days but for the remaining six, Indian carriers were employed, the trail being impassable for either mules or oxen. Rain fell almost constantly during this journey and while the party was in the San Juan region, nevertheless many specimens new to the Museum and others new to science were secured, the fauna of the west side of the Coast Range being totally different from that found on its eastern side.

The return to headquarters at Cali was made by way of Buenaventura and at this time the expedition was greatly assisted by Mr. D. C. Stapleton, a fellow of the Museum, whom the expedition fortunately encountered and who transported the men and their outfit to Buenaventura on his launch.

Exposure to the unhealthful conditions which prevail in the coast region resulted in both Messrs. Allen and Miller falling victims to severe attacks of fever, and the month of January was passed in Cali where medical attendance could be secured. In March they were sufficiently recovered to resume exploration along lines previously planned, and they left Cali for Popayán en route for the headwaters of the Magdalena. As is shown in the accompanying map, this zoölogically little-known part of South America was reached by way of Almaguer over a foot-trail through a region difficult of passage but of great interest.

After no little hardship San Agustin was reached early in April and here Mr. Allen, whose fever had returned with increased severity, was obliged to leave for Bogotá for treatment and was subsequently sent back to America, while Mr. Miller, who had planned to return home for a well-earned vacation, decided to remain alone and explore the most promising field the expedition had thus far entered.

[1] The cock-of-the-rock of the genus *Rupicola* is about the size of a partridge. Well-known to former explorers, the species has been locally destroyed because of the high decorative value of its flame-colored plumage. Mr. Leo E. Miller has found the bird in the wilds of the Naranjos River.

[2] Am. Mus. Journal, Dec., 1911, pp. 295–298.

LEO E. MILLER, COLLECTOR, IN COLOMBIA

He has succeeded in getting material for a Museum habitat group of the famous "cock-of-the-rock"

He first turned his attention to the upper branches of the Rio Magdalena and among other valuable specimens, secured one of the chief desiderata of the expedition, the heretofore almost unknown nest of the cock-of-the-rock, with studies on which to base a group of this remarkable bird. Concerning his discovery Mr. Miller wrote from San Agustin under date of May 6:

Since I have been alone, the work has been pushed along as usual, and we have not been altogether unsuccessful. The best work was probably done in the wilds on the Rio Naranjos. Here I found the cock-of-the-rock in considerable numbers and had great hopes of finding a nest. Search as I would, in the most likely places, nothing resulted but an old root-lined mud nest, resembling a phœbe's, but much larger. This of course did not amount to anything as there was no way of identifying it for certain. The Naranjos and its affluents are flanked by great, sheer cliffs, and as the birds that were examined were breeding (all males) I knew there must be nests somewhere. I recalled how eager you were to get this nest, and that acted as a stimulus for further search. To make a long story short, I took seven fine nests in all: the old one, one with two eggs, two with one egg each, one with two very small young in very long down, one with one young with pin feathers and some down, and one with two young almost feathered; also, a series of males and females, in various plumages. The nests were all plastered against cliffs or rocks, but not high above the water; four, seven to fifteen feet, in the worst spots imaginable. To reach them it was necessary to build rafts, fell trees, and clamber down the stone walls secured with ropes. The females of nearly all the nests were collected. I have made as complete notes as possible. The nests are made with a solid mud foundation and are lined with fine rootlets. The eggs are nearly as large as a crow's, and marked very heavily with much the same coloring as those of the black vulture.

With characteristic modesty Mr. Miller does not add what we have subsequently learned, that the raft he mentions overturned throwing him into a current so rapid that he narrowly escaped drowning.

Early in June Mr. Miller left San Agustin and crossed the eastern Andes

from Alta Mira in the Magdalena Valley, to Florencia in Caquetá, on the headwaters of Amazonian drainage. The inaccessibility of this region has made it one of the least-known parts of South America, but it can now be reached over a recently constructed government road. Thirty days were passed in the vast forests about Florencia, which is at an altitude of only six hundred feet. It was the height of the rainy season but in spite of the heat and excessive humidity, Mr. Miller collected and preserved some eight hundred birds and mammals, practically none of which are represented in our previous Colombian collections. Forty-five days were required for the journey to New York where Mr. Miller arrived September 9, after eighteen months of continuous field work.

It is still too early to speak at length of the major results obtained by our work in Colombia, but it is obvious as study of the collections progresses, that we are in possession of data of high importance in its bearing not only on the origin of life in Colombia, but also on the origin of life in tropical America. Incidentally the expedition has secured a surprisingly large number of new and rare species. We have found, for example, that a certain duck (*Aythya nationi*) previously known from only two specimens, is a common bird in the Cauca Valley, and our series of fifteen beautifully prepared skins enables us to show the close relationships of this bird with *Aythya brunnea* of South Africa.

At least one-fourth of the birds collected were not before contained in our Museum and many of these are new to American museums, while of those new to science a beautiful little parrot from near the crest of the Central Andes proves to be a link connecting other forms of its group. It has been named *Pionopsitta fuertesi*, in honor of Louis Agassiz Fuertes, foremost painter of birds, and a member of the reconnaissance party which planned the Colombian expedition route.

There are also two new ant-thrushes which have been named respectively *Grallaria alleni* and *Grallaria milleri*, in honor of the men who have rendered the Museum such excellent service at no small personal risk; new creepers, flycatchers, wrens, thrushes, finches, warblers, grosbeaks and tanagers, whose discovery shows how rich is the field awaiting the zoölogical explorer in South America.

We should not fail to explain that the success we have met with in Colombia has been due not to the energy of our own representatives alone, but in no small measure to the courtesy and coöperation of the Colombians who, whether as officials or individuals, have invariably honored our calls for information and assistance, and have frequently extended hospitalities which greatly increased the efficiency of the expedition.

Our plans for the future include a biological survey of the Bogotá region, to be followed by explorations in that little-known territory to the east in which upper branches of both the Orinoco and the Amazon have their origin.

CAVE MATERIAL FROM A MEXICAN MINE

By Edmund Otis Hovey

THE department of geology has received from Mr. Grant B. Schley, president of the El Potosi Mining Company, a series of remarkable specimens of calcite and aragonite (carbonates of lime) and selenite (sulphate of lime) from a cave in the company's mine near the city of Chihuahua, Mexico. This cave consists of a series of chambers in massive limestone and was broken into in the course of ordinary mining operations. The rooms are on several levels and are of different heights, although there are none with ceilings very lofty.

The calcite and aragonite show some most delicate tints — water white and snow white, rose, salmon color, light lemon and sulphur yellow.

One of the chambers of the cave discovered in a mine near Chihuahua. Delicate and fantastic crystals from this cave are on exhibition in the hall of historic geology

The selenite or gypsum occurs in transparent, colorless crystals and crystallized aggregates, and as thick mats of long slender crystals resting like glistening snow upon curiously distorted helictites of the carbonate of lime. Radiating arrow heads of calcite are grouped together in some of the specimens and blunt crystals in others, but the most showy group of all consists of slightly salmon-colored, double-pointed two-inch crystals of dogtooth spar forming a flat mass more than thirty inches across.

Unfortunately for science and the public, the cave contains a large amount of valuable silver lead ore in its walls and floor and is now in process of demolition for the winning of the precious minerals.

NEW DINOSAURS FOR THE AMERICAN MUSEUM

By W. D. Matthew

FOR the past three summers the Museum has had an expedition in Alberta, Canada, searching for dinosaurs in the Cretaceous formations of the Red Deer River. This expedition in charge of Mr. Barnum Brown, associate curator of fossil reptiles, has secured a fine series of specimens including a number of more or less complete skeletons of dinosaurs, some of them new, others related to the Cretaceous dinosaurs of Wyoming and Montana. The collection is already large and will be doubled by the results of this season's work; its preparation and study will not be completed for some time to come. The specimens of the following list have been placed on exhibition on the fourth floor in the case opposite the elevator.

1. *Albertosaurus* skull, hind limb and part of tail. This was a great carnivorous dinosaur related to the *Tyrannosaurus* and more distantly to the *Allosaurus* and intermediate between the two in size.
2. Small ceratopsian (new). This is related to the huge horned dinosaurs, but is quite a small animal. A fragmentary skeleton was secured of which the fore limb and tail have been placed on exhibition, the rest being very much broken up.
3. Crested dinosaur *Sauralophus* (new). A complete articulated skeleton, of which the skull and jaws are placed on exhibition. It is related to the duck-bill dinosaurs but had a crest along the back and a great bony spine at the back of the skull.
4. Skulls and end of tail of armored dinosaurs. These are perhaps the most remarkable of Mr. Brown's discoveries. The whole body was covered with heavy armor-plates, consolidated on the skull and the tip of the tail into a solid bony mass. This group of dinosaurs has become known to science only within the last few years, chiefly through Mr. Brown's explorations and studies. The specimens secured will probably enable us to restore the entire skeleton of the largest of the group, *Ankylosaurus*.

The novel methods adopted by Mr. Brown to explore this formation were outlined by him in the JOURNAL for December, 1911. The friendly attitude of the Canadian Geological Survey, to whose field parties we owe our first knowledge of the fossil riches of this territory, has been of material assistance.

A PEOPLE'S MUSEUM OF EUROPE

By Walter Granger

OF the natural history museums of Europe there is one which should be of especial interest to members and friends of the American Museum, because in the relations existing between the museum and the public it seems more nearly to approach our own than any other institution of its kind. This is the Museum of the Senckenberg Natural History Society of Frankfurt-am-Main, Germany. In some respects it is unique among natural history museums. The American Museum, like the British Museum and our National Museum, has a two-fold object, scientific research and public instruction. University museums here and

abroad are chiefly for research and the special instruction of students, but the Senckenberg Museum has for its chief object the instruction of the public in natural history, first by popular lectures given in properly arranged courses by members of the staff, second by carefully selected, well arranged and well labeled specimens in the exhibition halls.

The Senckenberg Society is an old one, but their museum, in its present quarters, dates only from 1907. This new building embodies new ideas in the arrangement of exhibition halls, in lighting, in the construction of cases and in the equipment of its lecture halls and laboratories. In the exhibits unnecessary duplication is avoided and a strong effort is made to illustrate all of the more important and interesting groups of animal life by at least one choice example. For instance in the great central court is an original skeleton of the herbivorous dinosaur *Diplodocus* obtained from the American Museum through the late President Jesup, a skull of the horned dinosaur *Triceratops* purchased from an American collector and the skeleton of the Whitfield mastodon obtained from this Museum. The Senckenberg Museum is also ambitious in the matter of habitat groups and already two very large and elaborate ones have been installed. One represents two phases of African mammalian life, the two groups of animals each dominated by an adult giraffe, being arranged on opposite sides of the case yet the whole being so blended as to present a single picture. The second group is of the Arctic regions and the animals include the walrus, polar bear Arctic fox and hare.

Frankfurt is famous for the civic pride displayed by its inhabitants and the museum is fortunate in having many wealthy friends who contribute generously toward its development. Perhaps the most interesting and unusual feature of this museum however, is the hearty and earnest coöperation of the public in the actual work of the museum. Many young men and women of the city, some of them students in science and all interested in natural history, come to the museum during free hours and may be seen scattered through the laboratories engaged in the preparation of specimens, in labeling, cataloging and arranging collections, in the preparation of charts as illustrations for the lectures, and in various kinds of work connected with a museum, under the supervision of the regular staff of course, and all without pay. In this manner the workers acquire much knowledge which could be gained in no other way and the museum obtains services for which it would otherwise be obliged to hire assistants. Both the directors of the museum and the public take particular pride in this coöperation.

It was gratifying to learn that the methods of exhibition and instruction in general in our Museum, through the agency of the JOURNAL and the *Guide Leaflets*, are closely studied by the directors of the Frankfurt Museum, and it may be said in return that their splendid institution has many suggestions to offer to the American Museum and others.

MUSEUM NOTES

Since the last issue of the Journal the following persons have been elected to membership in the Museum:

Life Members, Messrs. Clarence H. Eagle, C. H. Ruddock and John G. Worth;

Annual Members, Baroness Raoul de Graffenried, Mrs. Gorham Bacon, Mrs. William E. Bond, Mrs. George W. Burleigh, Mrs. William Allen Butler, Mrs. George E. Chisolm, Mrs. Sidney J. Jennings, Mrs. Minnie A. McBarron, Mrs. Abram N. Stein, Mrs. James R. Whiting, Mrs. C. R. Woodin, Miss Anna Bogert, Miss Theodate Pope, Miss Mary F. Reuter, Rev. Francis Rolt-Wheeler, Dr. E. B. Bronson, Dr. Ethan Flagg Butler, Dr. George W. Crile, Dr. Frank Overton and Messrs. S. Reed Anthony, Clinton T. Bissell, George Whitefield Blood, Stanley D. Brown, Belmore Browne, Frederick H. Clarke, Edwin Corning, Eugene Delano, Jr., Guy du Val, William Crowninshield Endicott, William Floyd, John H. Inman, William Forrest Keyes, Albert M. Lilienthal, Edward Lindsey, W. S. McCrea, M. Mack, W. N. McMillan, W. Forbes Morgan, Jr., John M. Phillips, Albert Houghton Pratt, H. S. Putnam, George W. Rogers, Morgan R. Ross, Benjamin F. Seaver, Louis Agassiz Shaw, Theodore A. Simon, Charles Wilson Taintor, Harry W. Thedford, J. V. Van Santvoord, Frederick B. Van Vorst and Amasa Walker.

President Henry Fairfield Osborn has just returned to the Museum from a tour through northern Italy, France and northwestern Spain. He visited several museums, including the Natural History Museum of Toulouse and the Musée Océanographique of Monaco, the latter forming the model for the new oceanographic hall of the American Museum.

The chief feature of his journey was the inspection of Upper Palæolithic caverns, those of the Pyrenees with Professor Emile Cartailhac, of the Dordogne with L'Abbé Henri Breuil, and of northwestern Spain with Professor Hugo Obermaier. In the French caverns he was accompanied by Professor George G. MacCurdy of Yale University, who is representing the American Museum in the Palæolithic of Europe. At the invitation of Comte Begouen of Toulouse, President Osborn and Professor MacCurdy joined the first party to enter the newly discovered cavern known as Tuc d'Audoubert, which contains more than fifty drawings of the mammals of Upper Palæolithic times. In this tour all the principal caverns and stations of the Upper Palæolithic were visited, and through the courtesy of the leading French anthropologists who conducted these journeys important arrangements were made for the development of the American Museum collections. An archaic stone carving of the horse of Aurignacian age was secured for the Museum as well as a great collection of Palæolithic flints.

The Congo expedition under the leadership of Messrs. Lang and Chapin is again at a place where it can receive and send out letters, and the uneasiness felt by its friends and supporters in New York is relieved. The expedition reports from Faradje under date of July 27 that its field work is successfully completed and later under date of August 21 that the packing of equipment and collections is well under way for the start with caravan for Avakubi and thence out of Africa by the western coast.

Director Frederic A. Lucas was appointed by the Executive Committee as a delegate of the American Museum to the meeting of the Museums Association of Great Britain which was held in Dublin, July 8 to 12. Dr. Lucas also represented the Museum at the laying of the corner stone of the new National Museum in Cardiff, Wales. He left New York on June 15 and spent more than two months studying the museums of London, Liverpool, Edinburgh and other cities of the British Isles.

Dr. Edmund Otis Hovey, curator of geology and invertebrate palæontology, served the Museum as acting director during the absence of Director Lucas.

Dr. George Grant MacCurdy of Yale University was appointed the representative of the American Museum of Natural History at the eighth session of the Congrès Préhistorique de France at Angoulême, August 18 to 24. He was also appointed as the Museum's delegate at the fourteenth session of the Congrès International d'Anthropologie et d'Archéologie Préhistoriques, held at Geneva the first week in September.

The library has received as a gift from Mr. J. Pierpont Morgan an interesting manuscript by Richard Bliss, Jr. entitled *Descriptions of New Species of Mauritian Fishes:* this dates from 1875 and serves in part as letter-press for the volumes of unpublished drawings which the Museum acquired in 1905.

Professor Henry Fairfield Osborn presented a dedicatory address, "The State Museum and State Progress," at the opening of the New York State Education building, October 15.

Mr. Anson W. Hard has again presented several very rare and valuable works in natural history to the library. Among them are the following: *Monograph of the Coraciidæ or Family of Rollers* by H. E. Dresser (1893); *Sammlung exotischer Schmetterlinge* by J. Hübner (3 volumes and 5 supplements, with manuscript index by Staudinger, 1806–1837); *Études d'Entomologie* by Charles Oberthür (21 parts, 1876–1902), also *Études de Lépidoptèrologie Comparée* by Charles Oberthür (1904–1911); *Entomologie*

ou Histoire Naturelle des Insectes by M. Olivier (8 volumes, 1789–1808); a set of *Palaeontographia Italia* (16 volumes); *The Birds of Tunisia* by J. I. S. Whitaker (2 volumes).

Dr. R. M. Anderson of the Stefánsson–Anderson Arctic expedition is at present on board a whaler bound for San Francisco. He will reach New York in November bringing to the Museum important zoölogical collections.

Director Frederic A. Lucas as delegate represented the Museum at the dedication of the New York State Education building, October 17.

Members of the Eighth International Congress of Applied Chemistry were the guests of the Museum on September 7.

The gift of back numbers of the Journal to the files of the library will be appreciated by the Museum.

During the summer Dr. Clark Wissler has been carrying on archæological work among the Blackfoot and Dakota Indians of the Missouri River.

Through the generosity of Mr. Charles L. Bernheimer, a life member of the Museum, Mr. Andrews was able to purchase in Japan a mounted skin, a skeleton and two skulls of the oriental finless porpoise *Neomeris phocænoides* (Cuvier). This cetacean is represented in but few collections of the world although not infrequently seen in Japanese waters.

The preliminary report by Frank M. Chapman on the bird collections received from the Colombian expedition has just been published in the *Bulletin* of the American Museum of Natural History. It describes thirty-nine species new to science, and is accompanied by a map giving much new information on the region.

Dr. Chester A. Reeds, for four years instructor in geology at Bryn Mawr College, has been appointed assistant curator in the department of geology and invertebrate palæontology. He began his active duties on the first of August.

Miss Mary C. Dickerson, assistant curator of herpetology, spent August in the field in southern Arizona where she secured a representative collection of the reptiles of the region and data on the relation of the reptile fauna to desert conditions for use in future group work.

The localities in Victoria Land and the Coppermine region occupied by the Eskimo tribes discovered by the Stefánsson-Anderson expedition have been indicated on the globe in the North Pacific hall. Also in the exhibition

case at the right of the globe are displayed the clothing, weapons and other objects representative of the culture of these tribes [See back of cover]. These objects would tell in themselves, if there were no other evidence, that they come from a primitive, isolated people. They are unusually strong, having been made for use, not soon to be traded for knives or firearms, nor to be used mainly by the children of the tribe, as is the case when civilization is in process.

MESSRS. SPINDEN, LOWIE AND SKINNER of the department of anthropology have returned to the Museum from field research on the American Indian in North Dakota, Montana and Wisconsin respectively.

MR. C. W. LENG of the department of invertebrate zoölogy spent several weeks of the summer in Labrador and Newfoundland collecting insects for the Museum.

THE third annual exhibition of the Aquarium Society was held in the west assembly hall of the Museum October 6 to 13.

MR. ROBERT C. MURPHY is in charge of an expedition to the South Georgia Islands, under the joint auspices of the Museum of the Brooklyn Institute of Arts and Sciences and the American Museum of Natural History.

MR. WILLIAM B. RICHARDSON returned to Colombia in July, to explore the exceedingly unhealthful Patia region, which appears not to have been visited before by a naturalist.

THE MUSEUM is represented in the Chocó region of western Colombia by Mrs. Elizabeth Kerr, an American, who has recently sent a small collection of birds and mammals containing two new species of marmoset and several new birds.

UNDER the leadership of Dr. W. S. Rainsford, a third African expedition has been organized for the collection of the black rhinoceros and other large mammals.

THE Museum's public health models and diagrams illustrating the problems of water supply and waste disposal and structure of the bacteria of disease were shown at the exhibition of the International Congress of Hygiene and Demography during September and were awarded the highest honor in each of the sections in which they were exhibited. The department of public health is at present engaged in the preparation of an exhibit dealing with insect-borne disease, one of the principal features of which will be a large and elaborate model of the common house-fly.

DIRECTOR

Frederic A. Lucas, Sc.D.

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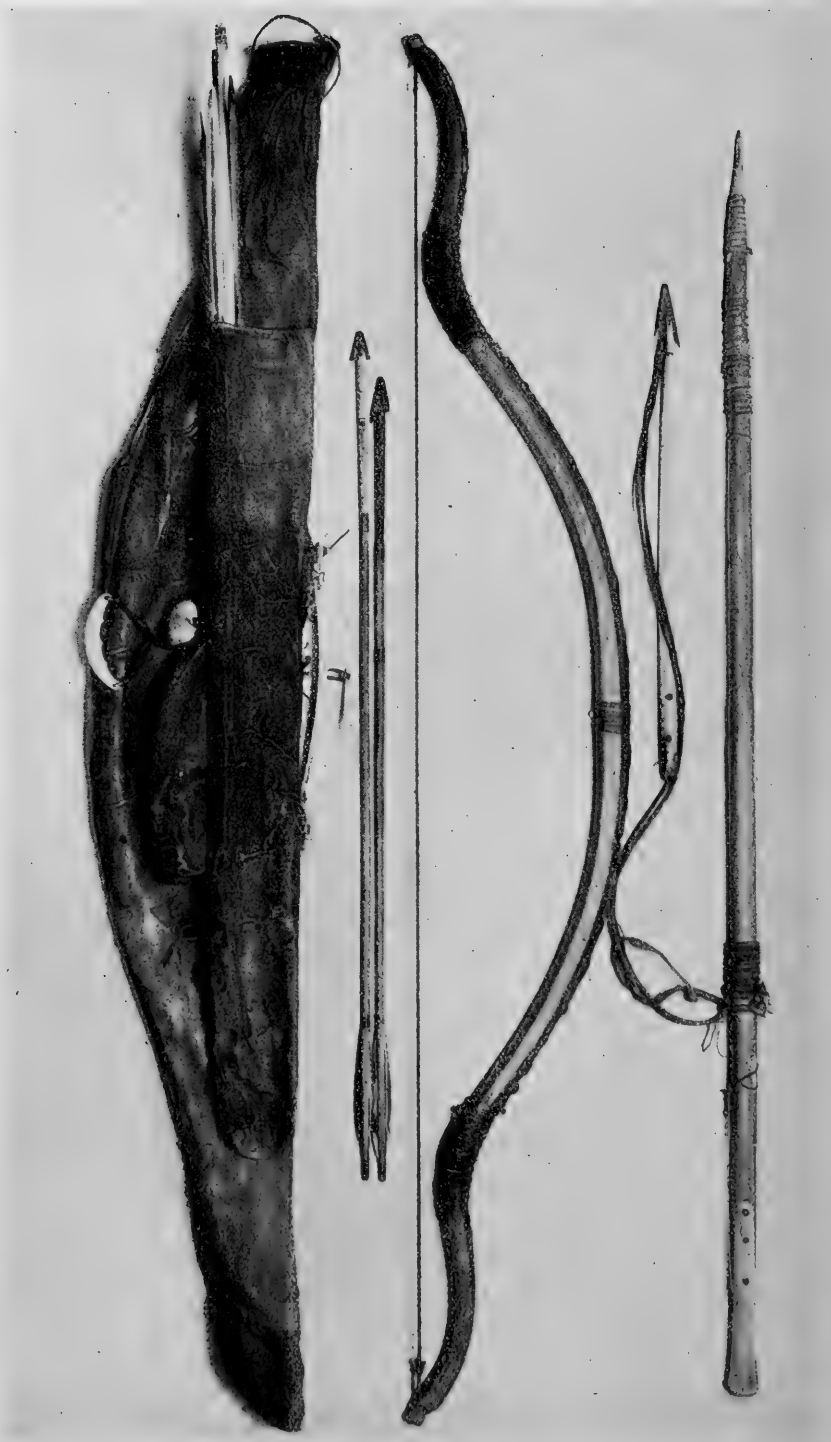

THE HUNTING WEAPONS OF THE "NEW ESKIMO"

From the large and representative collection obtained by the Stefánsson-Anderson expedition among the Coronation Gulf Eskimo — those Eskimo who show mixtures of blond hair, blue eyes, and other European features

THE AMERICAN MUSEUM JOURNAL

e XII November, 1912 Number 7

American Museum of Natural History

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Annual Members	$ 10	Fellows	$ 500
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THE MUSEUM LIBRARY contains more than 60,000 volumes with a good working collection of publications issued by scientific institutions and societies in this country and abroad. The library is open to the public for reference daily — Sundays and holidays excepted — from 9 A. M. to 5 P. M.

THE MUSEUM PUBLICATIONS are issued in six series: *American Museum Journal, Annual Report, Anthropological Papers, Bulletin, Guide Leaflets* and *Memoirs*. Information concerning their sale may be obtained at the Museum library.

GUIDES FOR STUDY OF EXHIBITS are provided on request by the department of public education. Teachers wishing to bring classes should write or telephone the department for an appointment, specifying the collection to be studied Lectures to classes may also be arranged for. In all cases the best results are obtained with small groups of children.

WORKROOMS AND STORAGE COLLECTIONS may be visited by persons presenting membership tickets. The storage collections are open to all persons desiring to examine specimens for special study. Applications should be made at the information desk.

THE MITLA RESTAURANT in the east basement is reached by the elevator and is open from 12 to 5 on all days except Sundays. Afternoon Tea is served from 2 to 5. The Mitla room is of unusual interest as an exhibition hall being an exact reproduction of temple ruins at Mitla, Mexico.

The American Museum Journal

CONTENTS FOR NOVEMBER, 1912

MARY CYNTHIA DICKERSON, *Editor*

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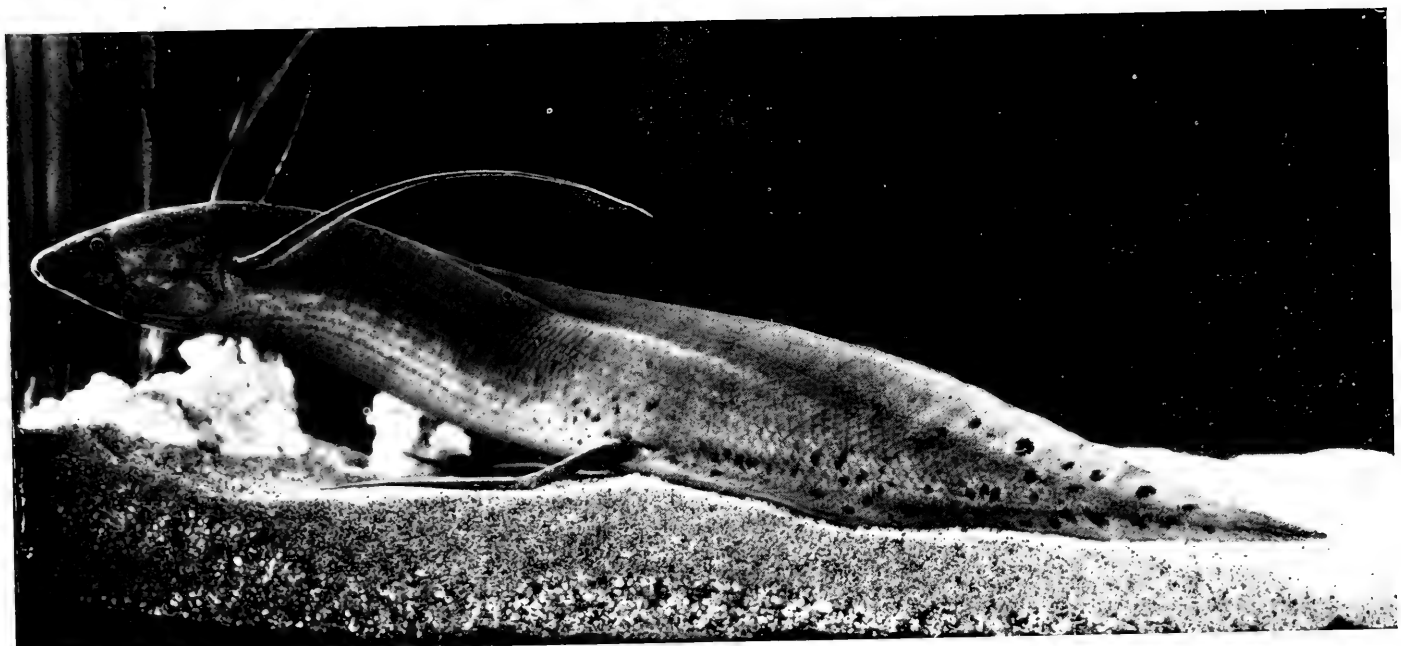

A LIVING LUNGFISH — THE SECOND SPECIMEN EVER BROUGHT TO THE UNITED STATES

It came from Africa in a dry clod of earth from the bottom of a dried-up stream and is here shown fully recovered from its months of out-of-water existence. It is pale colored, sleek, its back fin with waxy bloom, its lateral fins delicate and straight (Compare with cut on page 251). The lungfish pictures the kind of fish which gave rise to land-living animals. It uses its fins in a fashion to suggest the legs of a salamander and has many striking structural similarities to a salamander

— "A Fish Out of Water," page 251

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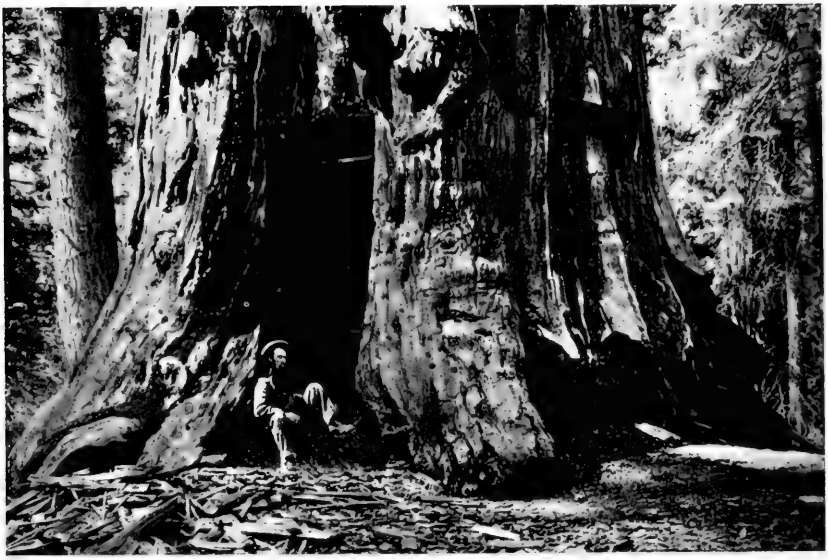


"Lady Lena" bigtree with room cut out and door fitted in the trunk. Diameter 21 feet. Sequoia National Forest, Tulare County, California

PRESENT CONDITION OF THE CALIFORNIA BIGTREES[1]

By George B. Sudworth

[CHIEF OF DENDROLOGY, UNITED STATES FOREST SERVICE]

EVERYONE who has visited California's famous sequoias admits that their real grandeur and the reverence they inspire cannot be appreciated without standing in their presence. Comparisons with other trees fail utterly to give a correct impression of their gigantic size.

[1] The Museum's specimen of bigtree collected by special expedition to California some twenty years ago, has been recently moved from the Darwin hall to the west end of the forestry hall. Here it has been newly faced off and put again on exhibition with labels pointing out the centuries of growth from 550 A. D. to 1891 A. D. and relating the history of this growth to that of the development of the world's science and art.

Interest in the bigtree is peculiarly great at this time when wood and forest production are recognized paramount in importance to the American nation. Is there a future as well as a past for this tree from prehistoric times, which has the ability to attain a height of 300 feet and an age greater than that of any other living thing, and which has remarkable value whether destined for the timber market or permanently for the mountain side? Can young sequoia forests be made to rise on land bared of their giant forefathers by fire or lumbermen? The question has been a disputed one. Dr. Sudworth's article represents personal investigation in the various California groves. The photographs are by the author.— M. C. D.

228 OLD BURNED TRUNK OF CENTENNIAL EXPOSITION BIGTREE

This tree was cut in 1876 to gain a section for the centennial exposition. Interior view in Sequoia National Forest [photographed in 1900]

With the possible exception of a sister species, the Coast redwood, and some of the Australian eucalypts, the bigtree is unique among the world's living arborescent plant forms. While it lives in a land where pines and firs grow to enormous size and to great age, even the largest of the latter is small in comparison with the sequoia towering one hundred to one hundred and fifty feet higher, its trunk broader by twenty or more feet, and from two thousand to nearly three thousand years older.

The North Calaveras bigtree grove was the first one discovered (1841), and the renown of this tree in America and abroad probably came chiefly from accounts of the trees as seen there, although later from the Mariposa grove. Forty or more years ago botanists and a few explorers knew in a general way that the sequoia ranged from the North Calaveras grove southward in the Sierras to the Tule River country, but until quite recently we have had no published account of the exact location and extent of all of the existing "groves" and "forests." Singularly enough however, the locations of these trees, so long unknown to published literature, were familiar to the early back country settlers and lumbermen, and particularly

Log cuttings and broken, waste trunks on cut-over bigtree land near sawmill, Sequoia National Forest

to cattle and sheep men whose herds browsed beneath the giants even fifty or sixty years ago.

Passing over the question of whether or not the bigtree should be called *Sequoia gigantea, Sequoia wellingtoniana* or *Sequoia washingtoniana,* far

Bigtree 20 feet in diameter damaged by fire, Redwood Mountain Forest, Tulare County, California. Nearly every large sequoia in California is scarred by fire

more interesting matters are what exactly is the range of this ancient tree, and how is it holding its own in the struggle for existence with other trees of its range. Thirty-one large and small groups are now known. They are more or less widely separated from one another, extending on the north from a point in the Sierras near the southern boundary of Placer County

for one hundred and fifty miles as the crow flies, southward to the head of the south fork of Deer Creek (a tributary of White River) in Tulare County. The different groups contain from half a dozen to several thousand trees and cover from less than an acre of ground to ten square miles, aggregating

Looking along the trunk of a bigtree crushed in falling. Lumber operations, Fresno County. Recent cuttings of bigtrees are in the King's River and Kaweah River forests.

altogether about fifty square miles. They are mountain trees, growing naturally only at elevations from 5000 to 8500 feet.

Ownership of lands carrying bigtrees is variously divided between private individuals and the federal government, and with few exceptions all of the trees are within the national forests of California, where irrespective of ownership, the government guards them as much as possible against fire.

VIEW IN MARIPOSA GROVE

"General Grant," "General Sherman" and "Four Guards," Yosemite National Park, Mariposa County, California

BIGTREES IN CALAVERAS GROVE

"Mother of the Forest" in the background, a bigtree killed in 1854 by having the bark stripped from the trunk. It measures 84 feet in circumference at the base without this bark and stands more than 300 feet high. Stanislaus National Forest, Calaveras County, California

Seedling bigtrees two years old and two or three inches high. They are growing in moist soil where the surface has been cleared by fire. Sequoia National Forest

The bigtree lives more or less closely associated with the stately sugar pine and western yellow pine, the white fir and incense cedar, and at lower levels the California black oak, sugar pine and white fir are its more frequent neighbors. Pure stands of bigtrees occur in but few instances, the most notable of such stands being the Redwood Mountain and Giant forests, in which the solemn grandeur of this tree is most impressive.

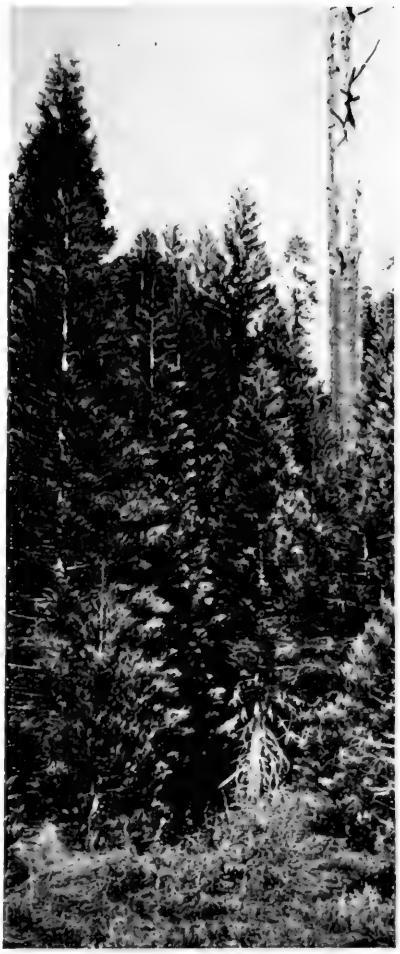
None of the government's bigtrees are being cut, but privately owned holdings have been lumbered as far back as forty or fifty years ago, and the work is still going on. The lumbering of this timber has from the first been confined mainly to the southern groups. Recent cuttings are in the King's River (Converse Basin) and Kaweah River forests, while old work took place notably in the Redwood Mountain, Merced, and Tule River regions. The

Seedling bigtrees eleven or twelve years old and three and one-half feet high. There is abundant reproduction where old trees have been felled by fire and the surface soil bared. Sequoia National Forest

earlier cutting took only part of this timber, but the later operations have removed practically every tree.

Innumerable fires have scarred nearly every large bigtree. Some have great holes eaten into their sides large enough to admit a horse and rider, but still live, while only blackened pits mark the places where others once stood. Doubtless very many more would have been destroyed, had not nature provided these trees with an enormously thick bark which has enabled large numbers to survive the fierce flames to which they have long been subjected.

A quite prevalent popular belief is that the bigtree is not reproducing itself, and that should the huge trees now standing be destroyed, the species might become extinct. This impression probably came from observations made in the northern groves where seedlings are very rare, the natural conclusion being that the species is in general reproducing itself only very occasionally or not at all. This supposed fact has been used as one of the arguments for the federal purchase of the North Calaveras grove, which is still in private hands. I believe that for other good reasons this splendid body of bigtrees should be owned and protected by the government, but not because the species is in danger of disappearing for lack of reproductive capacity.



Dense stand of young bigtrees four to thirty feet high. Sequoia National Forest. Under favorable soil and light conditions young bigtrees are holding their own in competition with other species

A study of the silvical requirements of the bigtree shows that it is intolerant of shade, and that moreover unless the seeds fall on mineral soil — freed by fire or logging operations of its usual thick layer of half-rotted vegetable matter — the resulting seedlings perish long before the slender roots can force their way through the dry "duff" and into the soil below. Unlike the southern groves, the northern bigtree forests have had no lumbering operations in them to open up the dense shade and to tear the

ground. As a result, there is practically no reproduction in the northern groves. By the most diligent search the writer found only one or two five-year-old bigtree seedlings in the South Calaveras grove, where storm had made an opening in the forest and a ground fire had exposed a little mineral soil. Apparently good use had been made of the first opportunity for reproduction, for the young bigtrees were vigorous in the full enjoyment of the sun.

Wherever in the southern groves lumbering and fire have opened up the forest and exposed the mineral earth, an abundance of young bigtrees is always found near seed trees, unless, of course, fire has destroyed them. The dependence of this tree for its reproduction on direct sunlight and open soil is particularly evident in the Tule River cañons where very open stands of large bigtrees have invariably seeded up the washed gravelly soil.

It is evident that under favorable soil and light conditions the bigtree is not lacking in reproductive energy, and that under these conditions it is holding its own in competition with other trees. Although it is but meagrely represented in the few scattered groups now preserved, the species seems still to possess that strong inherent reproductive power that permits survival of the fit.

Typical appearance of land near a sawmill where the bigtree forest has been cut. None of the government's bigtrees are being cut at present

ZOÖLOGY OF THE STEFÁNSSON-ANDERSON EXPEDITION — A PRELIMINARY ESTIMATE

By J. A. Allen

THE work of the Stefánsson-Anderson expedition in Arctic America is of great importance to zoölogy, much of the immense region traversed having never previously been visited by a collector and observer trained for natural history exploration. Dr. R. M. Anderson has been especially in charge of this work, and considering the difficulties of transportation and travel encountered, has made collections of great value, which with his field observations, covering a period of four and one-half years, must add greatly to our knowledge of the bird and mammal life of this hitherto very imperfectly known part of North America. The field covered includes the coast region of Alaska east of Colville River, and the Barren Grounds of the Yukon and Mackenzie districts east to Coronation Gulf. The collections, now en route to the Museum, include good series of all the Arctic breeding birds with their nests and eggs, and also of the mammals of the region, both small and large. The former comprise shrews, field mice, lemmings, spermophiles, porcupines and hares, while the fur-bearing and game animals include the ermine, martin, wolverine, white, blue, red, cross and silver foxes, wolves, seals, polar and barren ground bears, sheep and caribou. The last-mentioned is represented by a very large series of specimens from the Barren Grounds of Alaska and the Horton and Coppermine River regions, and will supply an important link in the chain of evidence bearing upon the morphology and geographical relations of the Arctic forms of this exceedingly interesting and plastic group of the deer tribe. The series of seventeen mountable skins of the barren ground bear, with their skulls and leg bones and two additional skulls, representing both sexes and all ages, is a most noteworthy acquisition. Although a bear allied to the grizzly and supposed to be possibly referable to it, has been known from this region for a century, and was formally named and introduced into science more than fifty years ago as a distinct species, it is still represented in museums by only a few skulls, its external characters having remained practically unknown, and nothing has been recorded of its life history.

While the collections of birds and mammals made by Dr. Anderson are very comprehensive in respect to both species and specimens and include much material of great scientific value, his field notes must prove an even greater contribution to our knowledge of the fauna of Arctic America.

R. M. ANDERSON IN UNEXPLORED ARCTIC AMERICA

[Editorial comment on the zoölogical work of the Stefánsson-Anderson Arctic expedition and quotations from Dr. Anderson's letters]

THE zoölogical work of the Stefánsson-Anderson expedition brings to the American Museum the most complete and valuable zoölogical collection ever gathered together in the Arctic. It does this in spite of the fact that the expedition as a zoölogical enterprise has been working under a twofold handicap: First that its primary aim was not zoölogical and second that its method of exploration was the one chosen.

The main aim of the expedition was ethnological; that was understood in the original contract, paragraph 3 of that formal agreement reading as follows: "That the primary aim of the expedition is, as stated in paragraph 1, the scientific study of the Eskimo, and that the movements of the party are to be regulated accordingly." This put Dr. Anderson, the zoölogist of the expedition and second in command under Mr. Stefánsson, in a position in which he must sometimes yield his plans to the plans of the expedition as a whole.

That the method of exploration was satisfactory for the study of the Eskimo and less favorable for systematic zoölogical survey can also well be understood. The expedition carried few supplies and depended on getting a living from the country. This often necessitated much time spent in hard labor for a living and in moving at inopportune times to reach sources of food supply, all of which must have considerably interfered with intensive study of any given locality with the attendant collecting and preparation of material.

Add to these two handicaps the natural one of the country with its almost insurmountable obstacles to transportation of heavy equipment and collections, and some small part of Dr. Anderson's work will be realized. Four years of a man's life away from civilization, confronting each day problems of existence and travel in addition to the problems of a zoölogical survey, is much to give for the cause of science. We appreciate Dr. Anderson's words when in one of his letters he compares the attitude of the Eskimo of the expedition with that of the leaders, "If we get in touch with ships, a certain amount of provisions must be obtained to satisfy native employees, who seem to consider the 'luxuries' of civilization (flour, molasses, etc.) more necessary than do either Stefánsson or myself. A native lives only in the present and considers that he is justified in demanding whatever creature comforts are obtainable, while we are willing to make sacrifices in order to accomplish an end some distance in futurity."

Dr. Anderson arrived at San Francisco November first on the whaling vessel "Belvedere," immediately telegraphing the Museum and Mr. Stefánsson of his safe arrival. He has repacked ready for shipment across the

country the sixty cases of specimens brought out of the Arctic by the expedition and will himself reach New York it is hoped before the end of November. The following are a few excerps from his letters of the past four years:

HUNTING MOUNTAIN SHEEP AND CARIBOU IN THE ENDICOTT MOUNTAINS

....I shall go up into the mountains near here with one of our natives, either up the Hula-hula or Kugruak, and try to get some mountain sheep before the snow is too deep [Autumn, 1908]. This part of the Endicott range is said to be the best mountain sheep country left in Alaska, and the natives kill a good many at all seasons of the year. The caribou are killed in considerable numbers all along this coast and are said to be working westward in greater numbers every year to the Colville River region and up toward Point Barrow.

Auktalik told me that his brother Umigluk with two companions had several years before crossed the divide from the head of the Hula-hula River and hunted on a river flowing south (I believe the middle or east branch of the Chandler), a northern tributary of the Yukon, and had found plenty tuktu (caribou).

There is an immense territory south of the Endicott Mountains and north of the Yukon which the white prospectors have not yet reached except in a few places. The Rampart House and Fort Yukon Indians do not range so far north except in summer, and the Eskimo seldom cross the mountains. To the knowledge of the natives, no white man had ever crossed the mountains in this region.

We decided that it would take too long to return to Flaxman Island for flour, etc. before crossing the mountains and having as much frozen mutton as we could carry on our sleds, after leaving a few carcasses cached to fall back upon near the head of the Hula-hula, we crossed the divide on December 4 [1908]. The week before we had hauled a load of meat within a quarter of a mile of the summit and camped one night (December 3) above the willow line. We now took the sleds over singly by putting ten dogs in harness, with six men boosting and pulling. Descending a rocky creek gorge, we reached large willows before night. The second day devoted to hunting brought in one sheep out of a flock of eleven seen. The third day's travel brought us to green spruce trees. Ptarmigan were scarce and hard to find as the river valley was wild. We were on pretty short rations before we struck the caribou herds in the high foothills on December 18. The snow was very deep and soft on the south side of the divide, our sleds were soon stalled and we were delayed three days cutting trees, hewing out boards and making toboggans. A trail had to be snow-shoed ahead and travel was slow, all hands "slugging" in harness with the dogs. Two porcupines and a great gray owl proved welcome additions to our larder. Canada jays were observed a few miles north of the limit of spruce trees and ravens were often in sight. During the latter part of December we saw many caribou, at one time over a thousand within rifle range — a magnificent spectacle. We lived in tents until December 27, when we built a hut of poles covered with blocks of moss, living in it until late in January [1909], occasionally seeing caribou which were always moving eastward.

EASTWARD ALONG THE ARCTIC COAST

I started west from Flaxman Island [April, 1909], after finishing the preparation of my specimens, and sledded as far west as Smith Bay. Here I found a note from Mr. Stefánsson who had preceded me, stating that advices were received at Point Barrow to the effect that no whalers were coming into the Arctic Ocean this summer, and that thus we were left to our own resources to get our belongings east.

We at once started hauling goods and supplies east from our cache at Smith Bay and by strenuous effort with two sleds succeeded in getting five sled-loads of gear and a 33½-foot skin umiak within a few miles of the Colville delta before water overflowing the sea ice put an end to sled travel on June 14 [1909]. We launched our boat on June 23 and have spent the time since then moving eastward, paddling, sailing or tracking. I have spent all available time in collecting and have taken a fair series of eggs and nests, including whistling swan, black brant, Hutchins's goose, black-bellied and American golden plovers, turnstone, red-backed, pectoral and semipalmated sandpipers, northern and red phalarope, snowflake, Lapland longspur, parasitic jaeger, red-throated loon, willow ptarmigan, etc., all from the vicinity of Colville delta.

DIFFICULT TRAVEL WITH BULKY SLED-LOADS OF SUPPLIES, EQUIPMENT AND COLLECTIONS

We left Tuktuyaktok October 17 [1909], and have been compelled to follow the coastline very closely all the way. open water and dangerous thin ice off shore preventing us from crossing bays and inlets, and deep, soft snow making inland travel impracticable. Our Eskimo sleds were heavily loaded with equipment and collections, necessary supplies and heavy frozen fish for dog food.

We camped November 2, about two miles north of Kublurak (the outlet of Eskimo lakes into southwest corner of Liverpool Bay), and the next day crossed a deep estuary, seven or eight miles wide at the mouth of a large river known as the Kugalluk (the western mouth of the Anderson River). We crossed in a blinding snowstorm and were stopped near the eastern side by a strip of very thin ice, from one hundred to two hundred yards wide. We followed the edge of this lead south for about half a mile and barely succeeded in crossing a lead about seventy-five yards wide, rushing the sleds across singly although the ice bent in deep undulations.

SOME HABITS OF POLAR BEARS

We (Billy, Pikalo and myself) left Horton River on the morning of November 23, [1909] to get a large number of needed articles still cached in an old house near the wreck of the steam whaler "Alexander" at Cape Parry. The thermometer stood at thirty-one degrees below zero and a gale was blowing from west-northwest, with snow drifting everywhere, but as the wind was a little abaft, we made good time. We expected to reach Langton Bay in one "sleep" so took only six small fish with us — one apiece for supper and the same for breakfast. However next day the wind increased, blowing all the ice away from the beach, necessitating much hard pulling over bare ground and sand-covered snow. November 25 we were unable to travel at all, and we reached the Langton Bay cache in the evening of the twenty-sixth after a fast of sixty hours.

We reached the cache near the wreck of the "Alexander" on December 3. Polar bears had broken into the house and devoured four boxes (about 500 pounds) of whale blubber (all our dog food), two slabs of bacon, overturned and spilled a ten-gallon can of alcohol (all we had left), and knocked things about generally. Bears had also cleaned out a cache of Ugyuk (bearded seal) meat and blubber which Stefánsson had made some distance down the fiord.

WILD GEESE AND WHISTLING SWANS IN THE COPPERMINE REGION

The first goose of the season (*Anser albifrons gambeli*) appeared at Kittigaryuit May 5 [1910], but no great numbers were seen until May 27. The American white-fronted, Hutchins's and lesser snow geese were most abundant at first, while later the black brant came in great flocks. Whistling swans were also fairly common.

THE NESTING OF BLACK BRANTS

Just before leaving my spring quarters, I accompanied a native named Kalakotak on a sled trip up the coast after goose eggs. We started on the thirteenth of June [1910], and had very hard traveling through deep water and slushy snow on the ice of the estuary. About a hundred pair of black brant were nesting on little islands in a series of shallow lakes or ponds about three-fourths of a mile from the coast. Two or three nests contained four eggs each, but the great majority contained two. Three or four nests of glaucous gulls were also found.

SUMMER IN THE MACKENZIE DELTA

Snow buntings were observed carrying feathers, and Lapland longspurs' nests were found with incomplete sets of eggs. We returned on the sixteenth [June, 1910] finding traveling much better as most of the snow had disappeared, and water had run down through cracks, leaving a smooth surface of solid ice five or six feet thick but rapidly disintegrating into sharp prismatic needles. Travel was rapid but exceedingly hard on the dogs' feet, which had to be protected by boots, or often rewrapped in calico. Sailing from Kittigaryuit on June 19, three days brought us from the ice fields into the almost tropical heat of the Mackenzie delta proper. Mosquitoes were abundant and on the twenty-second I found a robin's nest with four young birds. The season seemed to be fully a month further advanced than it was twenty-five or thirty miles north. Yellow warblers (*Dendroica æstiva*) were seen on

Richard Island and other smaller islands nearby. They were common throughout the delta. Fresh moose tracks were seen and rabbits appeared to be numerous. East of the Mackenzie, rabbits seem to have been practically extinct the past winter. On Horton River where a few years ago they were abundant, only one or two were seen.

EVENTS INCIDENTAL TO A ZOÖLOGICAL SURVEY

We had only four dogs and only two of them were able to pull very much, but we decided to take a light sled, "pack" our guns across the barren ground, and use the sled on the mountains. The sled pulled very heavy [September 21, 1910] over sparsely grassed hilltops near the coast, which were generally fine sand or clay with scattering sharp stones and rocks. We succeeded in crossing the divide the same day however and camped on the southern slope although with no fuel but green willows. Next day, September 22, we moved south about six miles before we sighted a band of ten caribou. We made camp at once and succeeded in killing eight. It was dark before I finished skinning two for "specimens" and failing to find camp I was obliged to walk the rest of the night to keep from freezing.

TOMCOD AND OTHER FISH OF THE ARCTIC COAST

We reached the fishing camp at Okatou near Langton Bay March 11 [1910]. The day we arrived, three or four people had caught nearly a sled-load of fish (tomcod) in half a day's fishing. A very few codfish (apparently true cod, but none over fifteen inches long) were also being caught. The fishing is done in about four fathoms of water. The female fish of both species were carrying roe. The tomcod have a slightly sweetish taste when boiled. . . . .

. . . . On the return from Langton Bay, we had crossed fresh tracks of a band of caribou going north in the Parry Peninsula. This induced me to make a week's trip [November 14–21, 1910] to the fishing place on the northeast side of Langton Bay. Here we looked for the caribou without success. The tomcod were not so abundant as last spring, although we could hook forty to fifty through the ice any day. I caught one larger fish, about two pound weight, apparently a true codfish. A few sculpin were also hooked but no other species. In the summer, Ilavinirk had caught "whitefish," salmon, trout and a few small flounders in the vicinity.

BARREN GROUND BEARS — THE ONLY COLLECTION IN THE WORLD

Mr. Stefánsson reports [December, 1910] brown bears in this region, probably *Ursus richardsoni*. The numbers which he has seen and killed around Langton Bay and Horton River and on the coast east of Cape Lyon make it very probable that a good series can be obtained, though probably not in a single season. Barren ground bears from any locality are not very abundant in museums, and I am anxious to investigate and bring specimens out. . . .

. . . . Our collection of barren ground bears [January, 1911] consists of seventeen mountable skins, with skulls and legbones, and two extra skulls — both sexes, all ages and sizes — spring, summer and fall specimens.

TRANSPORTING VALUABLE COLLECTIONS OVERLAND

I started April 23 [1911], with one Eskimo named Tannaumirk, seven dogs and two toboggans, hauling two good-sized loads of ethnological specimens with caribou skins and skulls from Coppermine River and Coronation Gulf. We made good time up Coppermine River and found no signs of thaw until we were some fifteen miles southwest of Dismal Lake, May 1. The warm weather continued, the snow disappeared from the Barren Grounds with startling rapidity and we had to drag sleds over many bare ridges before reaching our house on the east branch of the Dease River. We remained here on the third, drying, packing and labeling such specimens as required it, and started down the river on the morning of May 4. There was a little water in places on the river, but the farther we went the worse matters got — no snow on barren uplands, impassable brush in the spruce trees along the river (impassable for our bulky sled loads), and river flooding rapidly. We were compelled to halt in the evening, having laboriously made about ten miles in ten hours. We could not go back and to protect our specimens were obliged to spend nearly two days in cutting down large green spruce trees to make a square cache of logs fitted together strong enough to keep out wolverines for a time at least. Nothing short of a burglar-proof safe will keep a wolverine out for a great length of time.

GIANT FOREST PIGS

Specimens brought from Africa by Mr. Alfred J. Klein and mounted by Mr. F. Blaschke

The forest pig is exceeded in size only by some long extinct species whose fossil remains are found in our western states but these were not pigs in the true sense of the word, and while the long-faced pig of Borneo is as tall as its African cousin, it is by no means so massive or so picturesquely ugly

THE GIANT FOREST PIG

By Frederic A. Lucas

AFRICA is not only preëminently the land of mammals; it is the home of many large and curious beasts. Something like 2400 years ago Hanno, the Carthaginian, sailing southward along the coast of Africa, encountered some "wild men" which he slew and flayed, and on his return, deposited their skins in the Temple of Astarte.[1]

This was the first and one of the most remarkable of animals to be brought from Africa but since that time there has been brought out many another strange beast, the most notable, the okapi, and one of the latest, the pigmy elephant, now in the New York Zoölogical Park. It is quite probable that still others remain to be discovered, although with the rapid opening up of the country and its exploration by sportsmen and ivory hunters, it would seem that the possibilities must ere long be exhausted.

For something like fifteen years it was suspected that the forests of Central Africa harbored some giant member of the hog family, but owing to the retiring habits of the animal, it was not until 1904 that a specimen fell into the hands of a naturalist and that the creature was properly introduced to the scientific world. Had the animal known that it was to be christened *Hylochœrus meinertzhageni*, it probably would have remained hidden for another fifteen years. The specimens placed on exhibition were taken by Mr. Alfred J. Klein near the Channa River, and were mounted by Mr. F. Blaschke.

The forest pig is most nearly related to the well-known wart hog, which it exceeds in size if not in ugliness. Like the wart hog, the head of the forest pig is long, the upturned tusks heavy, the snout unusually broad and there are callosities just below the eyes. The body is deep and heavy, the legs slender, so that the animal is at once quick and powerful.

Very little is really known about the forest pig, partly on account of its habits, which like those of most pigs are nocturnal, partly because its chosen home is in the tall grass of the African jungle. The hunter forces his way through the bamboos and underbrush, up to his eyes in the grass — there is a grunt, a rush, and the game is far away without having even been seen. On the slopes of Mount Kenia at an elevation of six thousand feet, where the bamboo jungle meets the forest, Mr. Carl E. Akeley found evidences of the presence of numbers of these pigs, their tracks following the elephant trails for long distances, and here and there were patches of upturned ground. Most curious of all were regular haycocks, two and three feet high, eight and ten feet in diameter, evidently piled up by this animal. What was the object however of these piles of fresh grass, Mr. Akeley does not venture to say.

[1] Kipling has used this incident as the basis of one of the adventures of the "Knights of the Joyous Venture." It has been suggested that the animals taken by Hanno were only baboons, but this suggestion came from a disappointed gorilla hunter, and we prefer to think of them as gorillas, the more, that Hanno was well acquainted with baboons.

THE SEA WORM GROUP, FROM STUDIES AT WOODS HOLE, MASSACHUSETTS

Two colored photographic transparencies [glass] six feet in length are placed one before the other for the background above the water surface. Below the surface the background is constructed of five successive sheets of painted glass. Most of the animal and plant life shown is made of celluloid or blown glass or is modeled in wax. The group is lighted by daylight which filters through the transparent background from the window against which the case stands

Collecting for the sea worm group at Devil's Foot Island, Woods Hole. A water-glass was used to locate the worm burrows and to make observations on the sea bottom. Living specimens of the worms were brought into the laboratory and studied in sea-water aquaria. From these were made the sketches and photographs for the models used in the group

A NEW EXHIBIT IN THE DARWIN HALL

THE MARINE WORMS OF THE ATLANTIC COAST SHOWN IN A HABITAT GROUP[1] MADE FROM FIELD STUDIES AT WOODS HOLE, MASSACHUSETTS

By Roy W. Miner

THE series of window groups in preparation for the Darwin hall will portray the invertebrates in their natural surroundings and emphasize certain important biological principles. The first of these principles is that of the struggle for existence — that battle for life which must be waged by all living creatures.

The second principle involves the immediate result of this struggle — namely, the establishment of a balanced association composed of the surviving animals and their environment, within which the struggle for existence continues, but on practically equal terms.

The third principle, that of adaptation, implies that the surviving creatures forming this association, in the course of generations change in form and habits to become more and more fitted to their appropriate positions in the closely interlocking community. This change is the logical result of the continued struggle for existence acting under the conditions

[1] The fieldwork, composition and effects for this group are the work of the author. The wax-modeling was done by Messrs. I. Matausch and E. Mueller, the glass work by Mr. H. Mueller, and the coloring by Messrs. S. Shimotori and I. Matausch, under the supervision of the author. Through the courtesy of the United States Fish Commission, the laboratories of its Woods Hole station were put at the disposal of the museum for the fieldwork of this group.

of the particular community, made possible through the fourth and fifth principles — namely, that no two animals are exactly alike in the same or successive generations and may differ greatly from one generation to the next, and that the differences of the surviving animals tend to be inherited by their offspring. The net result of these principles shows that the true unit in animal life is not the individual, but the individual with its animate and inanimate environment.

Thus it will be seen that a museum group representing as in life a natural association of animals will necessarily illustrate within itself all those laws which lie at the basis of the doctrine of evolution, to the presentation of which the Darwin hall is dedicated.

The most recently installed of these groups shows the animals of a portion of the sea bottom of our Atlantic coast where the conditions of life are favorable to the existence of those curious forms, the marine worms. These animals are particularly suited to illustrate the principles of evolution, because of their diversity of form and habits, and their close adaptation to their surroundings.

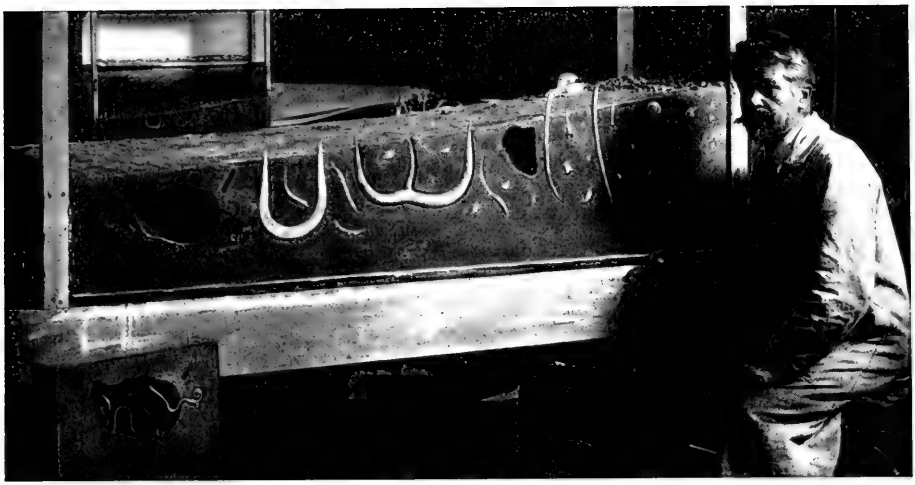
The locality chosen for the setting is the Greater Harbor of Woods Hole, Massachusetts. In the upper part of the group, a distant view of the wharves and buildings of the United States Fish Commission is shown on a colored, photographic glass transparency six feet in length. In the middle distance, on a similar transparency, is the grass-covered spur of Devil's Foot, a small island at the harbor entrance. In the cove sheltered by the island and its projecting spur, the tides have deposited their load of silt washed from neighboring points to form a muddy bottom.

Below the surface of the water, which is here represented as if in section, the border of an extensive patch of eel grass growing in the mud is shown to the left and is continued into the transparent background. Here is seen the animal life to which such conditions are favorable. Lurking at the edge of the eel-grass is a green crab, while just beyond its reach, mud minnows are nibbling at the seaweed. A whelk crawls over the sand searching for the clams and other bivalves which form its food. A scallop disturbed by their maneuvers "jumps" in its awkward flopping fashion into the eel-grass. Hermit crabs, mud snails and shrimp are busily fulfilling their duty as the street-cleaning department of the shallow waters, while mud crabs hide in every crevice.

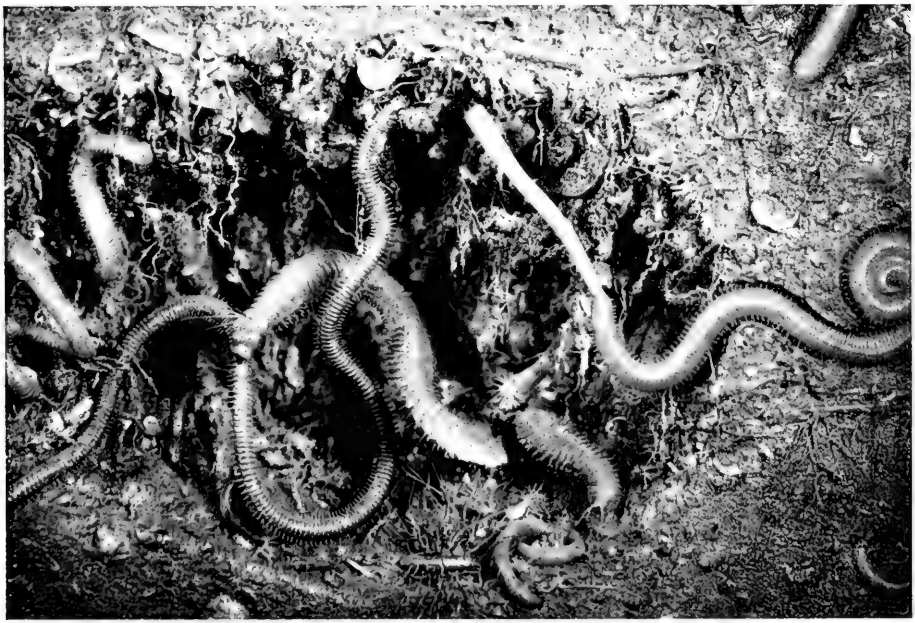
Finally below this zone of shallow-water life, there is shown still another world composed of dwellers beneath the sea bottom itself. These are the marine worms. Burrowing in the mud below the eel grass, tunneling in the sandy mud of the open spaces or in the still more sandy stretches where the bottom slopes up toward the pebble-strewn sea-margin, is this underworld of creatures, strange in form and habits, often magnificently clad in armor of iridescent coloring, adorned with breathing plumes and grotesque

A bit of the sea bottom near the shore where the tide washing away the mud, leaves only sand and pebbles. Here are the chimneys of the plumed worm protectively concealed by shell and weed fragments. Here too, delicate transparent shrimp, scavengers of the ocean margin, are busily cleaning dead shells of their decaying fragments

A scallop, disturbed by the mud minnows, has "jumped" in awkward flopping fashion into the eel grass



Mr. Ignaz Matausch, expert preparator, and the group at an early stage in the work. The miniature sketch model at the upper left hand was constructed at the seashore (Woods Hole) for study of composition. It is made to the scale of three inches to the foot. A framework for the finished group, six feet in length, was constructed in the Museum, and the sea-bottom modeled in. Temporary wax dummies were used to determine the final position of the various worm-tubes



A cavity is represented arbitrarily hollowed out among the roots of the eel grass to disclose the worms burrowing in the mud. A clam-worm [center] is attacking the iridescent opal worm. Beak-throwers are swimming corkscrew fashion [at left in cut], or throwing out a club-shaped proboscis armed with hooks [at right in cut]. A coiling fringed worm [middle below] extends its threadlike breathing organs in all directions. [Accurate representation in wax and glass. See preliminary sketch model in lower left hand corner of cut above]

with tentacles, bristles and spines. The chimneys of their houses project above the sea bottom here and there, while our license as group-makers permits us to expose and section their burrows to show the inhabitants therein.

Driven to dig and burrow and to build underground homes for themselves, the inhabitants of the mud and sand have preserved their race from extinction by thus concealing their soft bodies from their mortal enemies the heavily armored crabs and swift-moving fishes which hold supreme power in the water world above. But even in the mud the struggle for existence goes on. Many of the worms are predacious and actively prey upon their fellows. Some of the larger mollusks like the sand-collar snail, dig rapidly through the soil and seize upon the worms in their burrows. They are not even safe from the attacks of fishes, for scup and tautog eagerly root in the mud for them. Hence the worms have been driven to all sorts of protecting and concealing devices, to hinder or prevent these attacks. Many build tubes and shells for themselves, and in the course of time have adapted their form to their habitation so that they can live in no other way.

Let us examine the group more closely for examples of these various adaptations. To the left among the eel-grass roots, a cavity is represented arbitrarily hollowed out to disclose the worms burrowing there. The predacious clam worm (*Nereis virens*) actively wriggles from its burrow and with powerful jaws viciously attacks its nearest neighbor, the long and slender opal worm (*Arabella opalina*), so-called from the changing opalescent hues of its many body rings. Beak-throwers (*Rhynchobolus dibranchiatus*) swim about them with a curious corkscrew motion, and suddenly shoot forth a club-shaped proboscis armed at the end with hooklike jaws. These are all actively moving species. Their many segments are similar and furnished with similar segmental limbs throughout, and to this extent they probably represent the structure of the primitive ancestral type of this general group.

They must be contrasted however with their tube-dwelling relatives such as the plumed worm (*Diopatra cuprœa*) which builds deeply penetrating tubes, the outstanding chimneys of which are protectively concealed by the shell and weed fragments cemented about them. One of these tubes is shown in section, disclosing its occupant, whose blood-red gill plumes and segmental limbs are well developed on the forward portion of the body, where they are near the tube-opening, but are reduced to small rudiments or are altogether wanting on the hinder extremity. This is a partial adaptation to the tube-dwelling habit.

The most marked case of adaptation however is that of the parchment worm (*Chætopterus vario pedatus*) the *U*-shaped tubes of which are shown in the center of the group with their chimneys extending above the sea-

bottom. One of these in section, discloses its curious occupant, the strangest of all the worms. At first sight all resemblance to the other worms seems to have become lost, and its entire structure is closely adapted to its peculiar habitation which it never leaves. The appendages of the middle segments of its body have united to form three circular "palettes" which fit closely the interior of the tube and act like the pistons of a suction pump, drawing the sea water in through one of the chimneys of the tube to flow out at the other. This incoming stream bears the multitude of minute organisms which form the food of the worm, and are abstracted by a special apparatus as the water current passes over its body. Other greatly modified worms are shown, such as the fringed worm (*Cirratulus grandis*) with its threadlike breathing and prehensile organs, and the trumpet worm (*Pectinaria belgica*) which builds a funnel-shaped tube of sand-grains and digs rapidly in the sand with a pair of golden combs borne upon its shoulders.

All these are true worms which have become adapted in various ways to their environment. The sandworm (*Phascolosoma gouldii*) however, although externally wormlike, is internally of so different a structure that it is doubtfully classed with the worms at all. Several are shown in the group; some in a contracted condition, others expanded to disclose the slender graceful neck and head wreathed with delicate flesh-tinted tentacles.

In a second arbitrary cavity, are shown several of the so-called acorn "worms" (*Balanoglossus kowalevskii*) — peculiar creatures with red "collar" and tapering proboscis which they fill with water until rigid and utilize as a digging organ. These "worms" swallow the mud for the sake of the animal and vegetable matter contained in it, and after all nutriment is extracted, cast it forth on the sea bottom at the entrance of their burrows molded into little stringlike piles, many of which are represented in the group.

This acorn "worm" however has a far greater interest for science than in its peculiar habits and adaptations. In spite of its wormlike body, it is actually classed as an extremely primitive member of the same great group to which we ourselves belong, the chordates, since it possesses certain structures found only in that group. Its wormlike body, and probably that of the sand worm, is a secondary adaptation to its burrowing mode of life and illustrates the phenomenon of *parallelism*, the acquirement by totally unrelated organisms of similar form or structure as the effect of a similar environment.

To sum up, the marine worms or any other group of animals in the midst of their natural environment, may be considered as the members of an interlocking and balanced association which is the net result and exemplification of the laws underlying evolution. The great diversification of form among the marine worms makes this especially clear, since diversification means adaptation in the world of life.

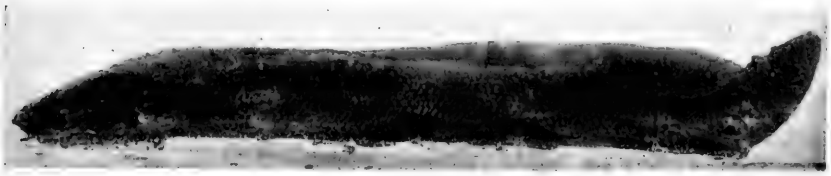
A FISH OUT OF WATER

By Bashford Dean

FAITH in our conception of what a fish ought to be is certainly shattered when we find one which can live for months, possibly for a year, out of water — which breathes by means of gills when in water, but with a lung during the summer drought, inhaling and exhaling air as though it were a land-living animal. Such a queer fish was recently sent by Dr. Joseph A. Clubb to the American Museum of Natural History in an exchange with the Public Museums of Liverpool. It came from the Gambian region of Africa, coiled up in a kind of cocoon, deeply sunken in a large clod of earth which months before had been a bit of the bottom of a dried-up stream. When received at the American Museum the cake of earth showed, as a sole sign that anything alive was within it, a little tunnel-like opening where the fish burrowed when the earth was still soft, and through which the fish later secured its supply of air for breathing.

Indeed it is this opening which gives us the clue as to how the dormant fish can best be examined. For we may begin at the edge of the tunnel and chisel the hard earth away, and on reaching the bottom we may, cutting with greater care,

A block of dry earth [greatly reduced in size] in which is encased a living lungfish. The funnel-like opening for air shows at the upper right hand. This block of earth came from Africa in a box provided with holes to admit air for the fish's breathing. Metal grating over the holes guarded the dormant fish against the attacks of shipboard rats and roaches



The fish alive [greatly reduced in size] and newly released from its cocoon in the block of earth. Its fins are crumpled; it is covered with slime and is dark, almost black in color. Compare with frontispiece

After the earth has been chiseled away down to the brown cocoon which contains the fish. At one point this cocoon shows the pit through which the fish is breathing. The pit leads into a tube of hardened slime which goes into the fish's mouth and conducts the air directly into the lung

The cocoon seen from the side when nearly separated from the mass of earth. It is of papery texture and is formed of hardened layers of slime secreted by the fish's body

expose the side of the capsule within which the fish is tightly coiled. The whole mass is then placed in tepid water to soften the wall of the capsule (which was formed by mucous secretion on the surface of the fish's body) and thus to allow the fish to escape. Within a few minutes after the present cocoon had been placed in water, the papery wall or shell showed movements, but before the fish broke its way out, a trap door was cut in the side of the capsule so that a photograph could be taken. The mass was then again placed in water and within a few minutes the fish emerged.

This lungfish is now exhibited in an aquarium on the fourth floor of the Museum in the hall of fossil fishes. It has been placed there since it is at home, scientifically speaking, among fishes which lived millions of years ago and whose race is almost extinct. It furnishes, in fact, an excellent instance of the survival of a race of animals from a very ancient period of time. It has further claim to our interest, for we can safely say that a lung-

fish pictures the kind of fish which gave rise to the earliest land-living animals, or the stock of amphibians, reptiles, birds and mammals. In fact the present little fish is known by anatomists to have many striking similarities to salamanders. Thus in a general way, its limbs represent a stage between fins and hands, and it uses them in a fashion which suggests a salamander. So also in structures of skin, muscles, skeleton and brain, the fish is to a certain degree, a connecting link between the true fishes and the four-footed animals.

As far as is known, this is the second specimen of a living lungfish to be brought to the United States, and those who are interested in natural history in general and in fishes in particular, would perhaps be glad to profit by the opportunity of seeing it alive. Its scientific name, *Protopterus annectens*, by the way, refers in the first word to its supposedly primitive fins, and in the second to its being intermediate between fishes and amphibians.

THE IMPORTANCE OF INSECTS

By Frank E. Lutz

INTRODUCTORY NOTE.— There are few halls in the Museum better arranged to instruct in the particular animal class represented and in addition to teach the principles of biology than the insect hall. It is used continually by high schools as a laboratory for their classes who, because the hall is so well arranged in correlation with the high school courses and is so clearly and fully labeled, can be sent to the Museum with lists of questions for undirected observation and study.

The hall has a separate exhibit, for example, covering the importance of insects. This contains not only such objects as silk, shellac and other useful products of insects, wax models to show the action of the bumble-bee in pollinating the flowers of the apple tree and thus insuring the harvest of fruit, etcetera, but also diagrams telling with emphasis certain well proved facts concerning insect-borne diseases, which can but make the boy or girl draw his own conclusions as to the need of action and the value of action in such matters as public hygiene.

This is but one exhibit. There are many others covering the subject matter of entomology and its practical relation to agriculture as well as special exhibits illustrating such biological theories as sexual dimorphism, fluctuating variation, geographical distribution and heredity.— EDITOR.

THOREAU was right in believing that there was more to entomology than the study of insect pests.[1] Yet if there were not, entomology would still be the queen of biological sciences. Agriculture and forestry are injured to the enormous extent of eight hundred millions of dollars annually by less than one per cent of the insects of the United States; the fourteen thousand deaths annually from malarial fevers in the United States, to say nothing of malarial illnesses not resulting in death, are due

[1] "We accuse savages of worshipping only the bad spirit or devil. Though they may distinguish both a good and a bad, they regard only the one which they fear, worship the devil only. We too are savages in this, doing precisely the same thing. This occurred to me yesterday as I sat in the woods admiring the beauty of the blue butterfly. We are not chiefly interested in birds and insects, for example, because they are ornamental to the earth and cheering to man, but we spare the lives of the former only on condition that they eat more grubs than they do cherries, and the only account of the insects which the State encourages is of the insects injurious to vegetation."— THOREAU.

solely to one species of mosquito; typhoid, tuberculosis and other diseases are peddled in all parts of the world by the common house-fly; yellow fever, bubonic plague and sleeping sickness have made large portions of the globe practically uninhabitable to the human race solely through the work of insects.

On the other hand, it is impossible to estimate the material benefits that insects confer. Were bees, butterflies and other pollinating insects suddenly wiped out of existence, the majority of the world's flowers would go with them leaving only such as the field corn and other grasses, and fruit crops would then be failures. A few insects damage fruits in the United States to the extent of twenty-seven million dollars annually, but practically all of the one hundred and thirty-five million dollars worth of fruit that we use owes its existence to insects. It would be impossible to get a single crop of clover seed without the aid of insects while insects damage but ten per cent of the total hay crop. When fig-growing was first attempted in this country, the trees never held their fruit until ripe. A minute insect which fertilizes the figs in the Mediterranean region was imported and now thousands of pounds of the finest fruit in the world are produced every year in the United States.

Often a crop is injured by an insect and relieved from that injury by another insect. For example, twenty years ago the orange and olive orchards of California were on the verge of destruction on account of scale insects, when two species of predacious beetles were imported from Australia and a little parasitic fly from Cape Colony. So thoroughly did these accomplish the task upon which human efforts had been of no avail that the destructive scales are now as scarce as they were once abundant, and oranges and olives flourish. These are only a few cases, hundreds of species of insects throughout the country are doing similar beneficial work. In addition we have many direct products of insects such as the shellac on our furniture, the silk in our decorations, the honey for our bread and even many of our medicines.

Moreover insects are important to all interested in natural history because of their large number, not only of individuals but also of species. Approximately three-fourths of the known kinds of animals are insects. There are more than fifteen thousand species of insects within fifty miles of New York City as compared with about thirteen thousand species of birds in the entire world and less than half that number of mammals.

Insects form a group surpassing all others in material for study of instinct or racial behavior, of variation in form and color; as also for research in problems in heredity since the breeding is so rapid that the chain of life can be kept unbroken for many generations.

FACTS AND THEORIES RELATING TO THE ANCESTRY OF MAN[1]

By W. D. Matthew

THE literature bearing upon the ancestry of man has been enriched by a number of valuable contributions during the past year. A memoir of Dr. Max Schlosser upon the early Tertiary fauna of the Fayum district in Egypt, contains descriptions of three new genera which the author refers to the higher Primates (Anthropoidea), one of which (*Propliopithecus*) he regards as ancestral to the higher apes and man. The oldest anthropoid Primates heretofore known are from the Miocene or later Tertiary. Dr. Schlosser's discoveries are from the Lower Oligocene or perhaps Upper Eocene. [There is a great collection of fossils from the Fayum in this Museum including several specimens supposed to be Primates but not yet carefully studied.]

The remarkable human skull of Chapelle-aux-Saints in France has been fully described and illustrated by Professor Marcellin Boule of the Paris Museum, who regards it as pertaining to the same type as the "Heidelberg man," a lower jaw found at the base of the Pleistocene formation at Mauer near Heidelberg, and representing a clearly distinct and primitive species of the genus *Homo*. A cast of the Heidelberg jaw is on exhibition in the Primate case in the fossil mammal hall, and Dr. Boule has promised President Osborn a cast of the Chapelle-aux-Saints skull.

A very important paper was read by Dr. G. Elliot Smith before the 1912 meeting of the British Association for the Advancement of Science, and has attracted considerable newspaper attention since. Dr. Smith regards the pen-tailed tree shrew (*Tupaia*) as a living representative of the more primitive mammals from which the lemurs, monkeys, apes and in turn man have successively evolved. The evidence upon which this important conclusion is based is due partly to the author's own studies, partly to researches by Leche and Carllson of Stockholm and W. K. Gregory of this Museum. The Primates have hitherto formed a group apart from other mammalian orders,

[1] Dr. Matthew's article is of significance for the members of the American Museum in that it gathers together some of the year's new sources of information on the question of the antiquity of man at a time just previous to an important series of lectures on that subject announced by the trustees. These lectures will occur in the Museum auditorium on Wednesday evenings from November 20 to December 18 inclusive. The opening lecture by President Henry Fairfield Osborn of the American Museum will be a consideration of the most ancient types of man. This will be followed in other lectures by evidences of the antiquity of man from Old World culture by Professor George Grant MacCurdy of Yale; New World physical and cultural evidences by Professor Livingston Farrand of Columbia; and the proofs as set forth in North American archæology by Professor Nels C. Nelson, formerly of the University of California and at present of the staff of the American Museum.— EDITOR.

with much uncertainty as to which if any of the lower mammals were ancestral to them. It is now reasonably clear that they must have been derived from early Eocene or Cretaceous ancestors related to the Tupaiid family of insectivora. The next step will be to confirm or modify this theoretical conclusion by the evidence of fossils showing the various stages of transition from the higher Primates of the later Tertiary through the early lemuroid Primates into insectivorous ancestors related to the tree shrew. The materials for this purpose lie at hand, we believe, in the American Museum collections.

As the result of ten years' expeditions in charge of Associate Curator Granger to the Eocene formations of the western states, a great collection of fossil mammals has been brought together, peculiarly rich in the remains of smaller species, and containing numerous specimens of lemuroid Primates and of Insectivora. Some of the latter appear to be related to the tree shrews and preliminary studies indicate various transitional characters between the two groups. So far they confirm notably the conclusions of Elliot Smith. The more thorough study of these collections should serve to clear up to a great extent the early history and derivation of the order of Mammalia to which man belongs.

To confirm thus the deductions of comparative anatomy by the facts of palæontology is a peculiarly pleasant and inspiring task. Less congenial, but no less necessary is the critical examination and disproof if erroneous of other and conflicting theories, by careful sifting of the evidence upon which they are based. To such a task has Dr. Ales Hrdlička of the United States National Museum addressed himself, in his review of the evidence which has been brought forward by the late Dr. Florentino Ameghino for the South American ancestry and evolution of man. The writer of this notice has elsewhere expressed his high appreciation of Dr. Ameghino's ability and services to science, while intimating disagreement with many of his theoretical conclusions. Dr. Hrdlička, after careful study upon the spot of all the evidence brought forward by Ameghino in support of his favorite theory, comes to the conclusion that none of it can be regarded as indicating a very high antiquity of the human race in South America nor as affording any conclusive proof of earlier stages in its evolution.

The *Origin and Antiquity of Man* by Professor George F. Wright is a very able and well-written discussion of the evidence on this subject, considered from a viewpoint almost forgotten in modern scientific progress, that of the "reconcilers" (of Genesis and geology). Dr. Wright is a high authority on glacial geology, and his criticisms of the excessive estimates made by some authors of the length of the glacial period and of the antiquity of the earliest evidences of man, deserve especial consideration. It is not intended to review Dr. Wright's volume here, merely to mention it as a book worth reading whether or not one agrees with its conclusions.

NEW ACCESSIONS OF METEORITES

By Edmund Otis Hovey

THROUGH the generosity of Mr. J. P. Morgan, Jr., the Museum secured recently the collections of minerals and meteorites left by the late Stratford C. H. Bailey of Oscawana-on-Hudson. Mr. Bailey was an indefatigable collector for many years and he assembled representatives of nearly three hundred falls and finds of meteorites. At least twenty-two of these are new to the Museum's already great collection. The gem of the collection is the aërolite or stone meteorite known as Tomhannock. This is a small mass weighing about three and one quarter pounds, but it is nine-tenths of the entire stone that was found in 1863 on Tomhannock Creek in Rensselaer County not far from Troy, New York. It was first described by Mr. Bailey in 1887 and was always highly prized by him and other collectors.

Almost equally valuable from a scientific point of view, is the little fragment which forms practically the whole of the known residue of the aërolite Bethlehem which was seen to fall in the town of that name near Albany, New York, on August 11, 1859. The original size of this mass was only that of a "pigeon's egg" and the present fragment weighs but one-tenth of an ounce. The special interest of the fall lies in the fact that it occurred during an "August shower" of shooting stars.

Besides the two stone meteorites just mentioned, three irons have been described from New York State, namely: Burlington, Otsego County, the largest fragment of which (1528 grams) is in the Shepard collection at Washington, D. C.; Cambria, Niagara County, the largest portion of which (5239 grams) is in the British Museum, London; and Seneca Falls, Seneca County, the chief piece (820 grams) of which is in the Imperial Museum, Vienna. Of these, Burlington is represented in the Bailey collection by a slice weighing 25 grams and Cambria by one of 34 grams weight. Inasmuch as the Museum already possessed 44 grams of Seneca Falls, besides fragments of the other two irons, we now have all the known New York meteorites represented in our collection.

Another choice addition that was received with this collection is a polished slice weighing 908 grams of the N'Gourema, Africa, iron. This meteorite fell June 15, 1900, and is particularly valuable because only nine iron meteorites are known whose fall was seen.

Among other desired specimens likewise coming with the Bailey collection are a 735-gram slice of the Jamestown, North Dakota, iron: a 485-gram slice of the Smith's Mountain, North Carolina, iron; a 48-gram fragment of Tabory, Russia, a stone that was seen to fall August 30, 1877, and a 10-gram fragment of Ploschkowitz, Bohemia, a stone that fell June 22, 1723.

Some of the duplicate material in the collections has been exchanged for a 665-pound entire mass of the Amalia iron meteorite from Gibeon, German Southwest Africa, and a polished and etched slice of another mass of the same fall which shows exceptionally fine Widmanstätten lines, which are strangely curved near the edges of the plate, besides a place where, apparently, the mass broke and welded itself together again in the air, or more probably two masses collided and welded into one.

Other important accessions of meteorites, some of which have come through purchase and others partly through purchase and partly through exchange, are as follows: the entire mass (15,082 grams) of the undescribed Cruz del Aire siderite which was found December 24, 1911, near Sabinas Hidalgo, Nuevo León, Mexico; a 570-gram slice of the Kingston siderite from near Kingston, New Mexico; an 816-gram slice of the Casas Grandes siderite from the prehistoric ruins at Casas Grandes, Chihuahua, Mexico; a 116-gram slice of the Arizpe siderite from Sonora, Mexico; a 600-gram slice of the Shrewsbury siderite from Shrewsbury, Pennsylvania; a 5420-gram fragment of the Ahumada siderolite from Ahumada, Chihuahua, Mexico; a 532-gram fragment of the Admire siderolite from near Admire, Kansas; an entire mass (122,000 grams) of the Estacado aërolite which fell near Lubbock, Texas in 1880; a 650-gram polished slice of another fragment of Estacado to show the internal structure; an entire bolide (650 grams) of the Kansada, Ness County, Kansas, aërolite; a 370-gram slice of the Lampa aërolite from the Desert of Atacama, Chile, a 455-gram slice of the Cullison aërolite from Cullison, Pratt County, Kansas; and a large fragment (12,250 grams) of the Long Island aërolite from Long Island, Phillips County, Kansas.

Most interesting of all perhaps from the popular point of view, is a series of 1080 crusted fragments from a shower of aërolites that fell about 6: 30 P. M., July 19, 1912, near the flag station Aztec, six miles east of Holbrook, Arizona. These vary in weight from one-tenth gram (0.0035 of an ounce), the smallest fragment found, to 6650 grams (14.65 pounds), which is the largest fragment that has been found, and amount in all to 16,000 grams (35.2 pounds). The fall which will be known as Holbrook, comprises more than 14,000 fragments, having a total weight of about 220 kilograms (484 pounds) so that the Museum possesses about one-thirteenth of the whole, as to both weight and number of fragments. The series is interesting, not only from the variation of size represented, but also from the fact that the masses show primary, secondary and tertiary crust, formed on the meteorite as it passed through the air and burst in successive explosions.

AN EXPLORATION OF NORTHEASTERN KOREA[1]

By Roy C. Andrews

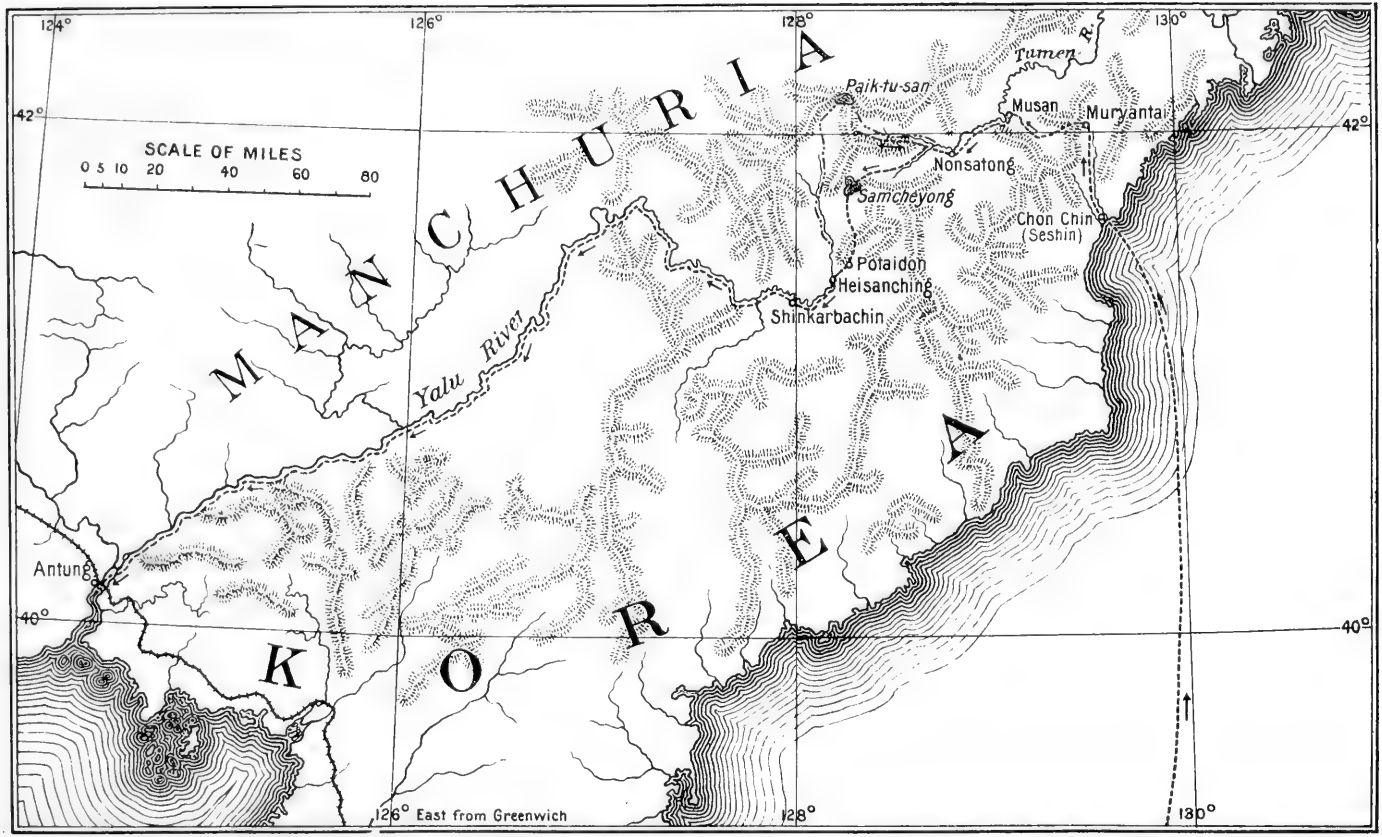
PREVIOUS to 1911 but very little zoölogical work had been done in Korea and that only in easily accessible localities. The few collections of birds and mammals which found their way to museums were from the bare, treeless hills of the south and what forms of animal life existed in the dense forests along the Manchurian boundary between the Tumen and Yalu rivers could only be conjectured. This region had never been visited by a white man, for until thirty years ago Korea offered a

The Museum's expedition leaving Chon Chin. The baggage was piled on three hand cars and pushed up the railway

barred door to the western world and foreigners have found their way but slowly into the remoter corners of the "Hermit Kingdom."

Except in the most general way, almost as little was known of the geography of this portion of Korea as of its zoölogy. The sacred Paik-tu-san, the "White-topped Mountain," lying just over the border in Manchuria on a series of wonderful, densely-wooded plateaus, was known to be the source of the great Yalu River which flows almost across Korea and empties into the Yellow Sea on the east. It had been visited by white men, who came from the north through China as early as 1709; and in 1886 three English explorers climbed its pumice-covered slopes and made known

[1] Article and pictures copyrighted, 1912, by Roy C. Andrews.



ITINERARY OF THE KOREAN EXPEDITION

Map drawn by F. Müller under the direction of Roy C. Andrews

to the western world the existence of the beautiful little lake, the "Dragon Prince's Pool," which lay cradled in its summit 8000 feet above the level of the sea. But the Koreans had prevented access to it from the south or west and until Japanese influence began to be dominant in the country, the secrets of the northern forests remained unknown.

The whale work, which was described in the October JOURNAL, was finished early in March and I went up to Seoul, the capital, to make preparations for the northern trip. Seoul is the seat of the present Japanese government of Chosen, as Korea is called by its natives, and before any non-resident foreigner can go into the interior, permission must be obtained from the Bureau of Foreign Affairs. This permission is usually freely given but is a formality rigorously enforced, for the Japanese insist upon knowing the "reason why" for the visits of all foreigners to the remote parts of their newly acquired possession.

The Museum's expedition was given the enthusiastic support of the government and I was furnished with one of their official interpreters, a Japanese who spoke Korean, Chinese and a little English. In Seoul a Korean cook who knew some English was engaged and became a valuable assistant.

We went by ship from Fusan to Chon Chin, called by the Japanese Seshin, an uninteresting little village of a few hundred inhabitants not far from the Russian city of Vladivostok. From Seshin we struck directly into the interior, the first stage of our journey being over an interesting little railroad up which we were pushed on small hand cars.

We spent the night at the old walled town of Puryon and next day left the railway at Muryantai traveling by bull-carts to Musan forty miles away. Musan, situated close to the Tumen River, is the largest town in northeastern Korea and is full of interest. It is typical of the old Korean cities having heavy walls and massive gates for its protection in the continual warfare which was waged in the early days between the Koreans of the north and invaders from China. During the Russo-Japanese war a few white men visited Musan, but the country beyond it was unknown to the western world.

Our objective was the little village of Nonsatong lying just at the edge of the great forests which stretch away to the west and south toward the Paik-tu-san. At Musan we had the greatest difficulty in securing horses for the trip into the wilderness. Absurd stories that wandering bands of Chinese robbers ranged along the borders of the forest had been rife since we left the coast, and had the Japanese gendarmes not ordered the Koreans to go we should not have been able to secure the necessary transportation for our food and equipment.

Until we reached Nonsatong, the country was a great disappointment; it was a succession of bare, treeless hills much like those of southern Korea

except for the fact that there were no terraced rice paddys as in the south, but when we came to the straggling line of huts which marked the last point of civilization, we could see in the distance the great mass of larch trees rising tier above tier on the mountain slopes until they were lost in the low-hanging clouds.

The inhabitants of Nonsatong had never seen a white man and to them I was an object of the greatest curiosity. They are timid, peace-loving, irresistless people, lazy but hospitable and good-natured. The interpreter told them that I would pay six *sen* (three cents) for any small mammals which they could catch. They did not believe at first that any man would

The expedition traveled by bull-cart from Muryantai to Musan

be foolish enough to pay such a price as that for something which could not be eaten, but after repeated urgings to try and see, on the second day the men of the village arrived en masse with a chipmunk. At once six *sen* was offered for it to the utter amazement of the Koreans. The next day there was an influx of chipmunks, for every man and child in the village turned out to catch them and by two in the afternoon they had nineteen. We spent ten days with them collecting birds and mammals and then started westward toward the Paik-tu-san. I did not care to climb the mountain itself, but wished to travel through the unexplored country to its base. Our route was along the Tumen River and the first fourteen miles was easy traveling, for there was an old half-obliterated trail which led to a deserted log cabin once used by hunters; this was the last habitation of any sort in

The valley up which we traveled on the way to Musan. This valley is cultivated and fields of oats and millet are found along the watercourse

On the right are the cliffs of China and on the left are those of Korea, the Tumen River at this point forming the boundary between Manchuria and Korea

The expedition crossing a burned tract on the way to the Samcheyong

The Samcheyong. Looking across the largest lake toward the island in its centre

The raft on which the Museum's expedition traveled some 350 miles of the way down the Yalu River

the wilderness. The collecting was not good at this log camp, and after a few days we continued deeper into the forest. The traveling was difficult, for as we ascended the plateaus the larch forest became so thick that at times we had to cut our way through the tangled branches. We followed the lines of least resistance twisting and turning to avoid impassable barriers and going entirely by compass. The Korean horsemen and in fact all the party came under the influence of the gloom and silence and it was difficult to force them to proceed.

After reaching the base of the Paik-tu-san we retraced our steps and struck southwestward across the watershed to the Tumen valley. I had learned from the Koreans that somewhere in the forests was located the Samcheyong, "Three Bodies of Water." So far as I was aware, Korea was a lakeless country and the Samcheyong seemed well worthy of investigation. We reached the lakes, as they proved to be, after a difficult march through the forest and found that there really were three bodies of water lying on the summit of the watershed which separates the region drained by the Tumen River from that drained by the Yalu River and its tributaries. The basins of the lakes are composed entirely of loose volcanic ash which probably came from some violent eruption of the Paik-tu-san many years ago. Upon returning to Seoul I found that the lakes were indicated upon a military map made during the Russian war, but that nothing more than the fact of their existence was known; they

The open larch forest near the log cabin in the wilderness where we camped. The forest became continually more dense as we proceeded

Mr. Andrews eating with Koreans at Nonsatong. These men had been making an offering to the god of the valley which was supposed to live in the rock and tree that stand near together at the right in the picture

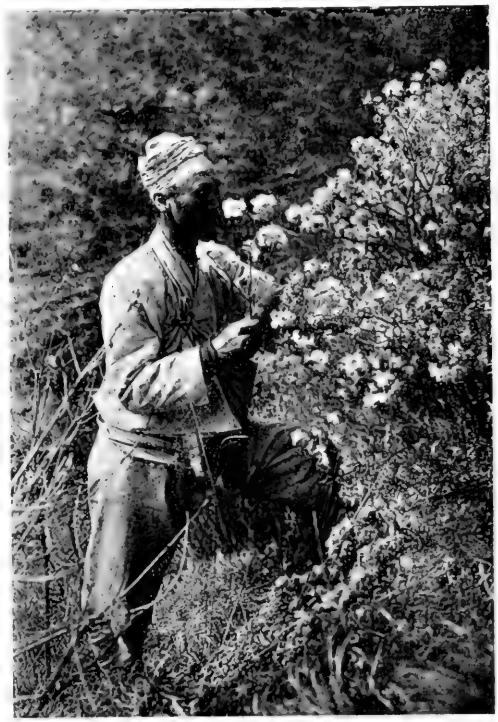
had probably been located by information obtained from the Koreans or from some ancient Chinese map.

After leaving the Samcheyong we continued through the forests across the watershed and eventually reached the Yalu where at the little town of Shinkarbachin, a raft was secured to take us down the river. We floated

Korean praying at a shrine just at the edge of the woods on the Yalu River side. Each one of the horsemen thanked the god of the mountain for his safe passage through the woods

as much as seventy miles a day in the upper reaches of the Yalu and landed at the Chinese city of Antung on the west coast, where connections were made for Seoul by train. We had traveled entirely across northern Korea.

Although the specimens secured upon this trip have not yet reached the Museum, the zoölogical results of the expedition cannot but be of considerable importance. The mammals of Korea are especially interesting in relation to the problems of the Japanese insular fauna and its origin, and specimens from the northern part of the peninsula will be of great importance in this study. Since the region had never been visited by a zoölogist it will undoubtedly be found that a large percentage of the small mammals are new to science. The birds, of which a considerable number were secured, will in many cases probably prove to be of the same species as those of northern Europe, for although thousands of miles away they are still in the same life zone which stretches entirely across the continents of Europe and Asia.



Korean gun-bearer picking azaleas. These flowers cover the mountain slopes about the first of June

It was interesting to find that the dense forests were practically without birds or mammals — at least during the time in which I visited them. Three species of small rodents were the only mammals which could be trapped, and birds were almost totally absent. Later in the year during the hot months of summer, the Koreans told me that bear, deer and a large stag were sometimes found near the Paik-tu-san, but that they did not go into the woods until the grass was long and the pasturage good.

As collecting was conducted across the watershed from the Tumen River region into that of the Yalu a very good representation of the fauna of this hitherto unknown section of Korea was secured for the Museum.

MUSEUM NOTES

Since the last issue of the Journal the following persons have been elected to membership in the Museum:

Patron, Mrs. William H. Bliss;

Life Members, Mrs. Samuel W. Bridgham, Messrs. Robert Sterling Clark, Adam W. S. Cochrane, R. D. O. Johnson, Alfred J. Klein, Benjamin Strong, Jr., Frederick Taylor and J. Watson Webb;

Sustaining Members, Mrs. John D. Archbold, Mrs. Sara Hermann, Mrs. L. H. Lapham, and Miss Mary Garner Tilney;

Annual Members, Mrs. Sidney C. Borg, Mrs. Arthur D. Brandeis, Mrs. John C. Breckinridge, Mrs. Frances I. Capen, Mrs. Carroll Dunham, Mrs. J. Clifton Edgar, Mrs. George S. Edgell, Mrs. Franklin Farrel, Mrs. George A. Helme, Mrs. Adolph Lewisohn, Mrs. Henry K. Pomroy, Mrs. A. Sumner Rose, Mrs. Grant Squires, Mrs. Florence M. Stowell, Mrs. Lewis S. Wolff, Mrs. John Alvin Young, Miss Justine V. R. Barber, Miss Emily Cross, Miss Emma Feuchtwanger, Miss Ruth B. Fisher, Miss Clara Friedlander, Miss Catherine Murray, Miss Marie F. C. Stockmann, Dr. Phineas Hillhouse Adams, Dr. F. R. Oastler and Dr. Howard C. Taylor, and Messrs. Gordon Auchincloss, Louis H. Barker, Alexander M. Bing, James Ellis Briggs, Algernon T. Burr, Irving L. Ernst, Zoheth S. Freeman, C. A. Grasselli, Eugene D. Hawkins, Alfred M. Heinsheimer, Rankin Johnson, Arthur Kaufmann, L. D. Kellogg, George H. Levy, Willis E. Lougee, David W. McNaugher, David B. Simpson, Jesse M. Smith and Simon Weiller.

The Third Annual Teachers' Day will be held at the Museum on Saturday, November 16. The program will include addresses by President Henry Fairfield Osborn and Superintendent William H. Maxwell and an illustrated lecture by the Arctic explorer, Vilhjálmur Stefánsson, just returned from four years' work in the far north.

It is through its permanent exhibits that the Museum is most useful to teachers. For example, its Indian and Eskimo halls teach the life and culture of these people to-day and in the past very fully. Few realize however, as they pass in review a long series of cases containing clothing, weapons or pottery with stories of their history and use, what work has been done, perhaps through many years, what money spent and sacrifices made to bring such collections to New York from the primitive race which used them. It is this exploration work of the Museum as preparation for the institution's usefulness to teachers that will be the theme of this Third Annual Teachers' Day. Fortunately there have arrived at the Museum some of the collections gathered by Mr. Stefánsson some four thousand

miles distant among the uncivilized Eskimo which he has discovered in the Coronation Gulf region of Arctic America. These collections have been placed on exhibition and will be open for inspection at the close of Mr. Stefánsson's lecture.

The Morgan collection of gems and gem material has received a recent addition of some superb mineral material. The most conspicuous of the specimens perhaps are the two crystals of kunzite (lilac-colored spodumene), seven and ten inches long respectively. After them in interest are three large rubellite (tourmaline) crystals. The deep gerardia tone of these is in one instance heightened by a partial immersion in the side of a gray translucent quartz. There are also a green tourmaline with pink nucleus in a heavy quartz block from Rumford, Maine, a shell of amethyst from the famous Brazilian grottoes, a large topaz pebble clouded on its surface by minute abrasions, a "water-bottle" (enhydros) from Salto, Uruguay, a mound of crystals of epidote from Alaska and three groups of the unrivaled Brazilian phenacite.

Besides the above, the gift includes also a quartz sphere, a quartz slab infiltrated with gold, one exquisite fresh water pearl and a valve of the pearl oyster (*Meleagrina margaritifera*). The last from Thursday Island is of most lustrous quality and bears an attached pearl.

President Henry Fairfield Osborn and Dr. J. A. Allen will represent the Museum at the Ninth International Congress of Zoölogy to be held at Monaco in March 1913.

An interesting specimen recently presented to the Museum is the skull of a walrus dredged from the bottom of Penobscot Bay, Maine. The donor, Mr. Langdon Gibson, has supplied the following record of its discovery. "It was found by Sidney Norton in his scallop dredge in December, 1911, in fifty fathoms of water, two miles to the southwest of Andrews Island, off Owl's Head, Penobscot Bay." The skull agrees fairly well with that of the Atlantic walrus, *Trichechus rosmarus*. One of the tusks is complete, the other lost, and the occiput and zygomatic arches are missing. The bone is in fairly good preservation and quite well petrified, indicating that the specimen is not at all recent; it must be thousands of years old to have attained this degree of petrifaction under ordinary circumstances.

The especial interest of this skull is that it shows the more southerly range of the walrus in former times, probably during the Glacial Epoch. At the present time the southern limit of range of the walrus is the Labrador coast. Fossil remains of walruses have been found along the Atlantic coast as far south as South Carolina, but it is doubtful whether they all belong to the modern species.

THE endowment fund of the Museum has recently received an addition of five thousand dollars from Mrs. William H. Bliss. Mrs. Bliss has been elected a patron of the Museum in recognition of her gift.

THE ANNUAL MEETING OF THE NATIONAL ASSOCIATION OF AUDUBON SOCIETIES was held in the east assembly room of the Museum on Tuesday, October 29, 1912. The report of the secretary and executive officer of the society, Mr. T. Gilbert Pearson, showed that the association had had the most successful year in its history. With an income of approximately sixty thousand dollars, new protective laws had been secured and existing ones enforced; wardens had been maintained on the fifty-odd bird reservations which have been established largely through the efforts of the association, and twenty-eight thousand school children had received systematic instruction in bird study.

At the afternoon session, the association was addressed by Mrs. Alice Hall Walter of Providence, Rhode Island, and by Mr. Gustave Straubenmüller, associate superintendent of schools of the Board of Education of New York City, on the educational value of nature study.

At four o'clock a public address was given in the large lecture hall by Professor Homer Dill of the University of Iowa, on the birds of Laysan Island in the Hawaiian Reservation. Shortly preceding Professor Dill's visit to this island, the United States government had arrested twenty-three Japanese poachers who were living on the island while slaughtering its birds to preserve their plumage for millinery purposes. It is estimated that no less than three hundred thousand albatrosses, terns, and other sea birds were thus destroyed, and Professor Dill found abundant evidence of the results of this destruction in acres of bleaching bones and thousands of wings which were in process of preservation at the time the poachers were apprehended by the United States revenue cutter "Thetis." Professor Dill learned that the poachers cut the wings from living birds which were left to bleed to death, while other birds, which were too fat to be readily prepared, were thrown into cisterns slowly to starve and thus reach a condition in which their plumage could be more readily preserved.

AT the meeting of the Executive Committee on October 16, the following persons were elected life members of the Museum in recognition of their interest in the institution: Messrs. Alfred J. Klein, R. D. O. Johnson, Benjamin Strong, Jr., and Frederick Taylor.

HENRY FAIRFIELD OSBORN, as President of the American Museum of Natural History, has been appointed a trustee in perpetuity of the Kahn Foundation for the Foreign Travel of American Teachers.

DR. J. G. KNOWLTON has presented to the Museum a few skulls and other specimens from the Eskimo of North Baffin Land. Among the latter are a

lot of miniature weapons, tools, etcetera, for the most part carved of wood, which Dr. Knowlton reports were found in a small cache at a grave. The objects were covered by a small heap of stones placed at the front of the corpse and were no doubt made that "their respective souls might accompany and serve the deceased in the future land."

Among the visitors to the Museum during the autumn was Dr. Carlos de la Torre, professor of geology in the University of Havana and one of the most distinguished Cuban scientists. Dr. La Torre is known not only as a naturalist of high repute, but also as an influential leader in the prolonged struggle which culminated in the independence of Cuba, and as a former mayor of Havana. He has brought to the Museum for study and comparison a remarkable collection of fossils more fully noticed elsewhere.

Mr. Julian S. Huxley, a grandson of the great English scientist, visited the American Museum early in October on his way to Houston, Texas, to take part in the inaugural ceremonies of the Rice Institute. He will be a member of the scientific faculty of the Institute, his duties commencing with the year 1913.

At the meeting of the Executive Committee on October 16, Mr. Alanson Skinner was appointed assistant curator in the department of anthropology.

Through the kindness of Dr. Aleš Hrdlička of the United States National Museum, the department of anthropology has received casts of all the large fragments of the famous Neanderthal man discovered near Düsseldorf on the Rhine in the spring of 1857. This skeleton must ever be renowned as the first positive evidence of a new and very ancient type of man. Since that date more complete and better preserved examples have come to light so that many European museums now possess real skeletons of this type.

The Museum has received from Mr. D. C. Stapleton the gift of valuable prehistoric objects in gold and platinum from the Province of Esmeraldas, Ecuador, and the head-waters of the San Juan River, Colombia, and has placed the collection on exhibition in the South American gallery on the third floor. The objects show examples of casting and beating, of plating where copper has been covered with thin gold, of the union of two pieces of gold by welding and of the soldering of two minute surfaces in such manner that it is difficult to detect the solder. The objects in platinum are of most interest, as it is not known that this metal was ever worked, except in this locality, by a prehistoric people.

Mr. Rodman Wanamaker has presented to the Museum the valuable collection of photographs made on the Rodman Wanamaker historical

expeditions for the study of the North American Indian in 1908–1909. The opening of the exhibition of these pictures on the evening of October 24 in the west assembly hall, was made the occasion of a reception given by the president and trustees of the Museum conjointly with the American Scenic and Historic Preservation Society. After the reception a lecture was given in the auditorium of the Museum by Dr. Joseph K. Dixon with colored slides and moving pictures illustrating the "Last Great Indian Council." The striking music accompanying the motion pictures was composed by Dr. Irvin J. Morgan, who used the phonographic records made during the Wanamaker expeditions as his source of Indian rhythms and themes. The JOURNAL hopes to reproduce in a later issue a series selected from the Wanamaker photographs presented to the Museum.

DR. R. M. ANDERSON of the Stefánsson-Anderson Arctic expedition, arrived in San Francisco November 2 on the steam whaler "Belvedere," the guest of Captain and Mrs. Cottle. The "Belvedere" picked up Dr. Anderson and the sixty cases of the expedition's collections at Baillie Island (Cape Bathurst), July 28 and carried them on a four months' whaling cruise, during which Dr. Anderson had the opportunity of seeing the capture of twelve specimens of the huge bowhead whale.

DR. ALEXIS CARREL, the recipient of the Nobel prize for research in medicine for 1912, lectured at the Museum November 11, under the auspices of the New York Academy of Sciences and the American Museum of Natural History. The subject of Dr. Carrel's lecture was "The Results of the Suture of Blood Vessels and the Transplantation of Organs."

ONE of the smaller archæological collections secured by Mr. Stefánsson is from Point Hope. This has now been catalogued. Among other things it contains a fine series of worked bone and ivory illustrating the methods and processes formerly used by the Eskimo. The ends of a piece of ivory were cut off by drilling holes in toward the middle, until the piece could be broken asunder; long slender pieces were cut off by grooves from opposite sides, and so on. A large series of chipped points and many ground slate knives accompany the ivory and bone objects.

AMONG interesting recent accessions to the department of geology, mention may be made of a particularly good slab of Tennessee marble showing sections of characteristic fossils and a large block of quartzite from Luverne County, Minnesota, with a highly polished surface produced by wind-blown sand. The department is in possession also of the most recent model of the Isthmus of Panama, showing the canal in its completed form.

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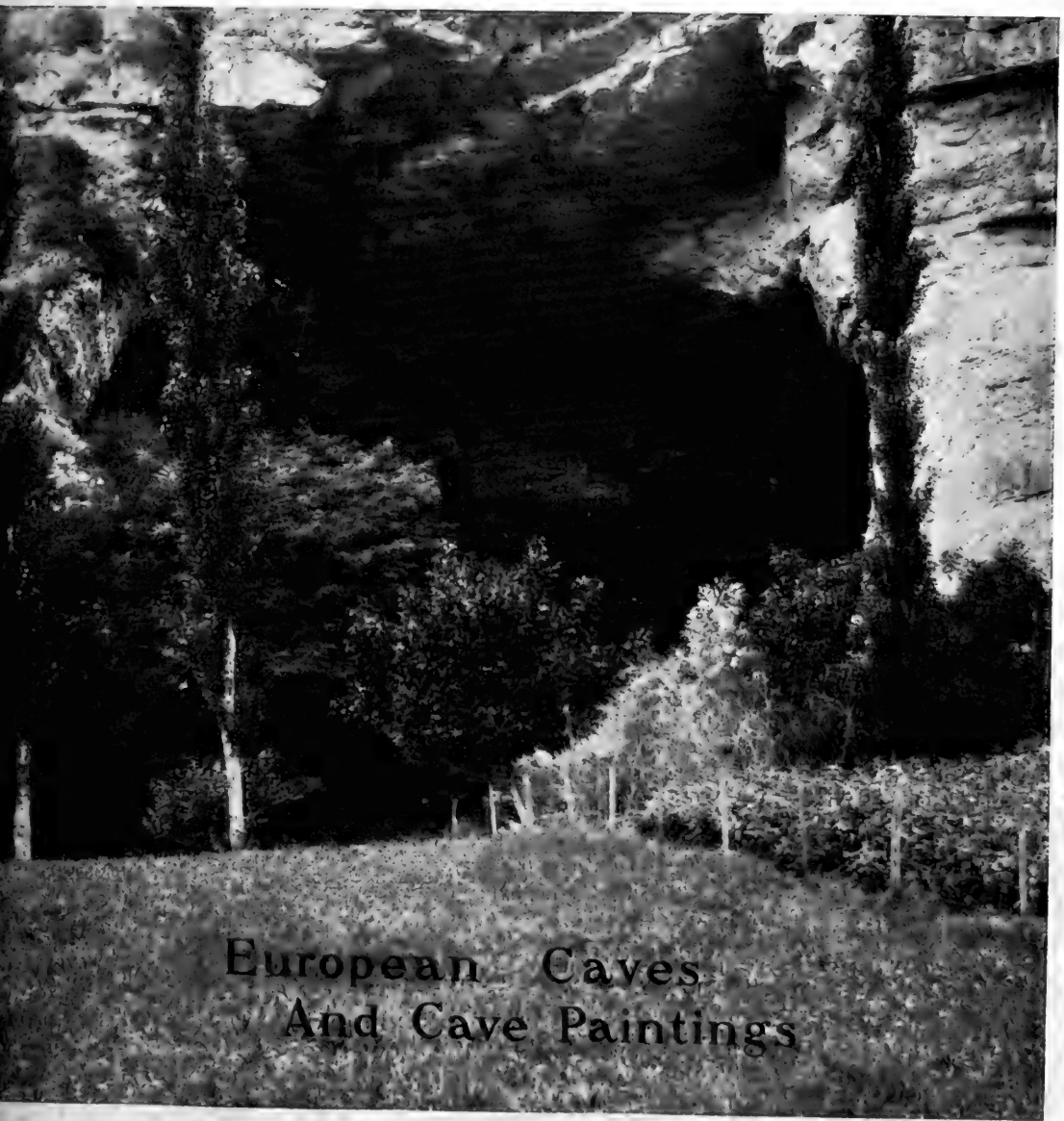
THE AMERICAN MUSEUM JOURNAL



European Caves And Cave Paintings

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GUIDES FOR STUDY OF EXHIBITS are provided on request by the department of public education. Teachers wishing to bring classes should write or telephone the department for an appointment, specifying the collection to be studied. Lectures to classes may also be arranged for. In all cases the best results are obtained with small groups of children.

WORKROOMS AND STORAGE COLLECTIONS may be visited by persons presenting membership tickets. The storage collections are open to all persons desiring to examine specimens for special study. Applications should be made at the information desk.

THE MITLA RESTAURANT in the east basement is reached by the elevator and is open from 12 to 5 on all days except Sundays. Afternoon Tea is served from 2 to 5. The Mitla room is of unusual interest as an exhibition hall being an exact reproduction of temple ruins at Mitla, Mexico.

The American Museum Journal

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC. OF THE AMERICAN MUSEUM JOURNAL

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F. A. LUCAS, *Director*

Sworn and subscribed before me this 18th day of December, 1912

Fred H. Smyth, *Notary Public* 65, New York County
(My commission expires March 30, 1913)

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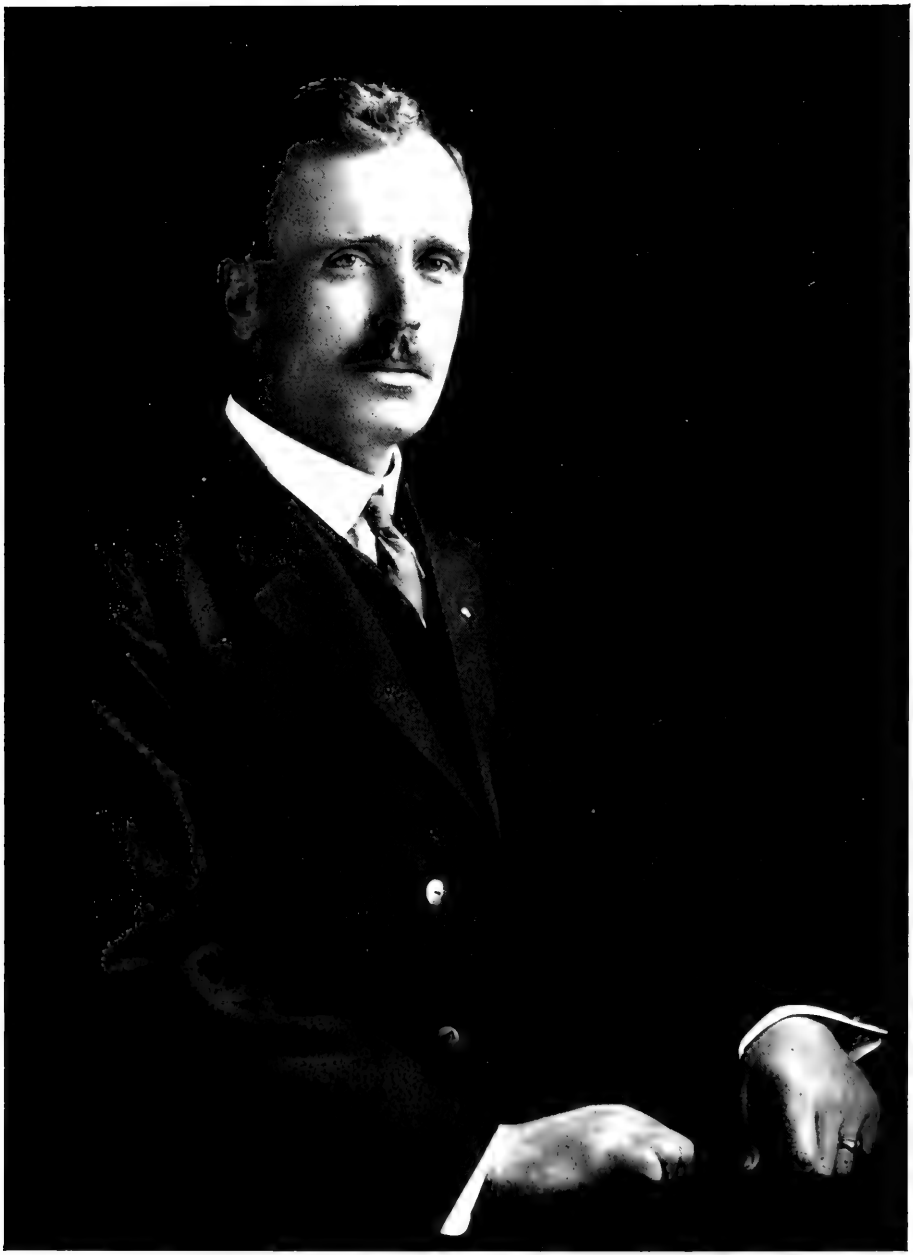


Photo by Marceau, 1912

DR. RUDOLPH M. ANDERSON

ZOÖLOGIST OF THE STEFÁNSSON-ANDERSON EXPEDITION, RECENTLY RETURNED TO THE AMERICAN MUSEUM OF NATURAL HISTORY FROM FOUR YEARS' WORK IN ARCTIC AMERICA

[*The Journal will publish in its January number an article by Dr. Anderson with many photographs taken in the newly explored country*]

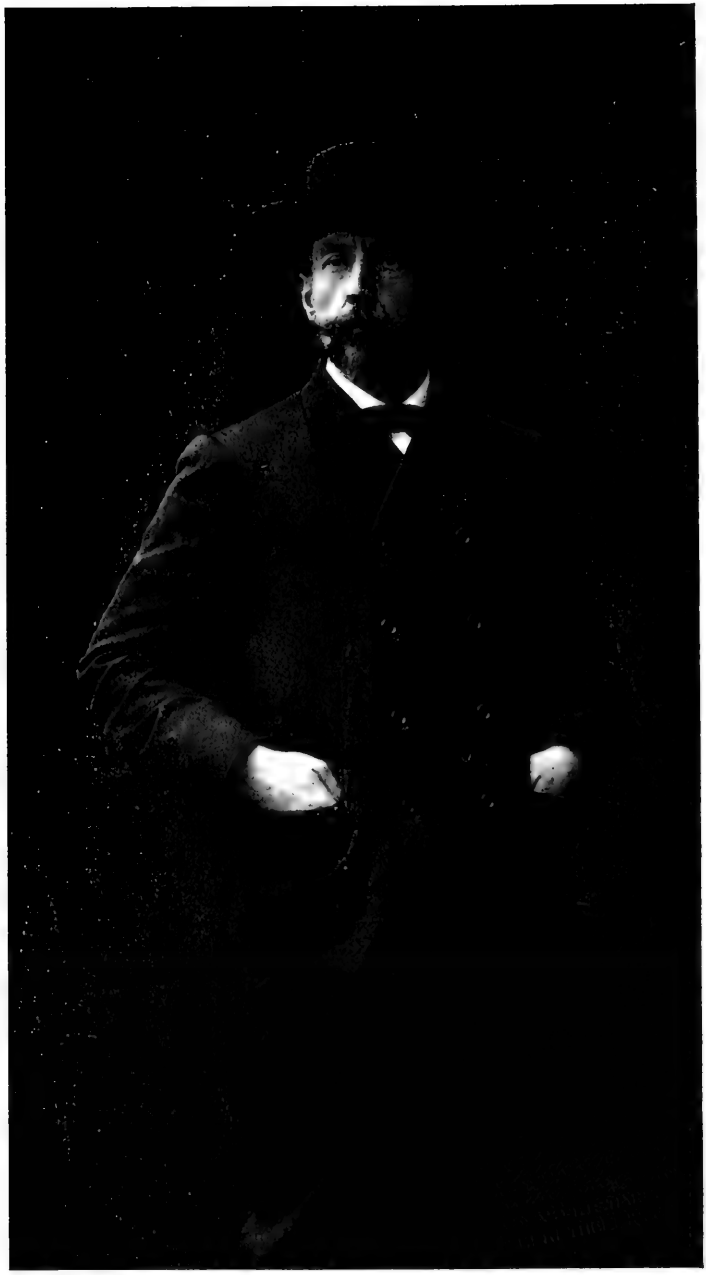


Photo by Szacinski, Christiania

CAPTAIN ROALD AMUNDSEN

DISCOVERER OF THE NORTHWEST PASSAGE AND OF THE SOUTH POLE

[*Captain Amundsen will address members of the American Geographical Society, the American Museum of Natural History and the Norwegian National League on January 14*]

MR. DONALD B. MACMILLAN

LEADER OF THE REORGANIZED CROCKER LAND EXPEDITION OF THE AMERICAN MUSEUM OF NATURAL HISTORY. MR. MACMILLAN WILL DEVOTE HIMSELF PARTICULARLY TO THE ANTHROPOLOGY AND METEOROLOGY OF THE EXPEDITION

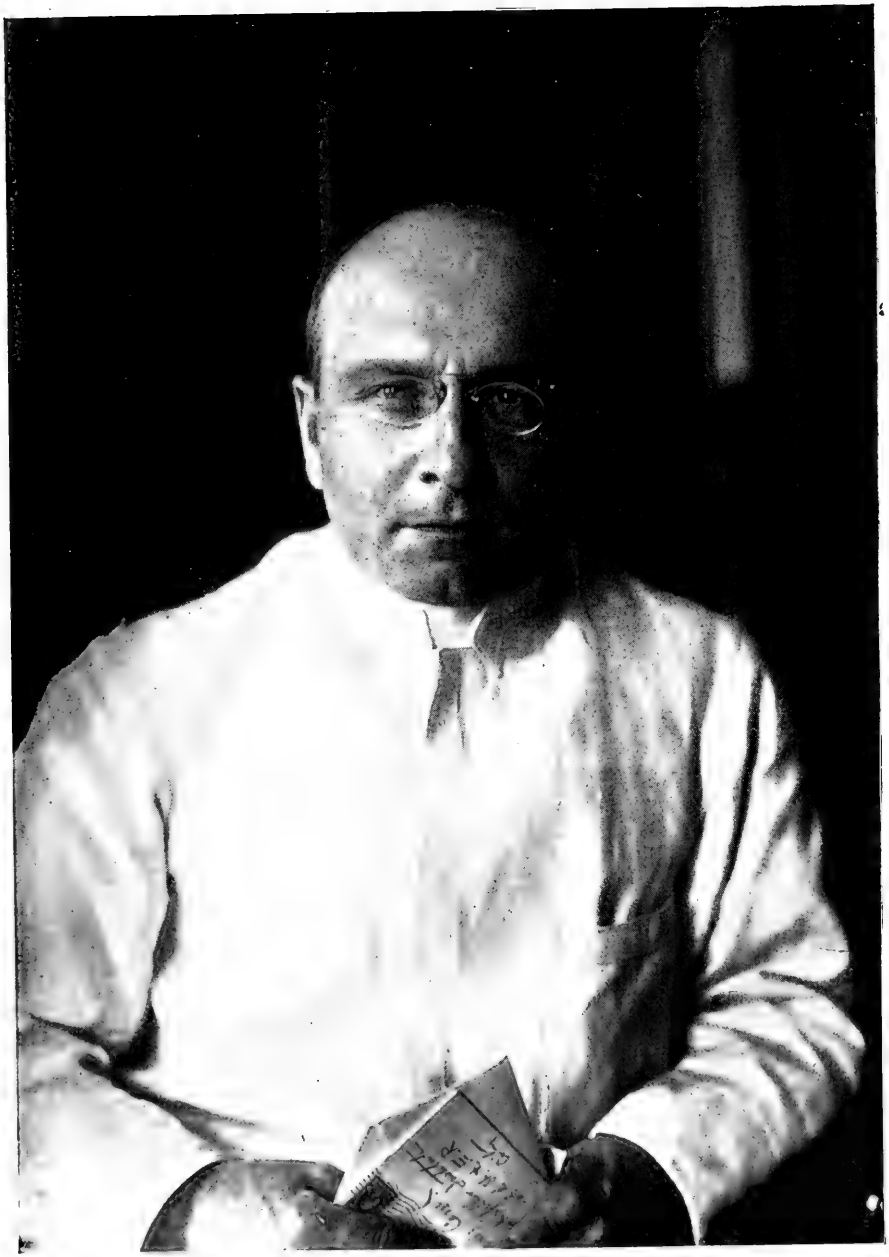
—"The Reorganized Crocker Land Expedition," page 309

Photo by De Graaff, Amsterdam

PROFESSOR HUGO DE VRIES

DIRECTOR OF THE LABORATORY OF PLANT ANATOMY AND PHYSIOLOGY AT THE UNIVERSITY OF AMSTERDAM. CHAMPION OF THE MUTATION THEORY IN EVOLUTION

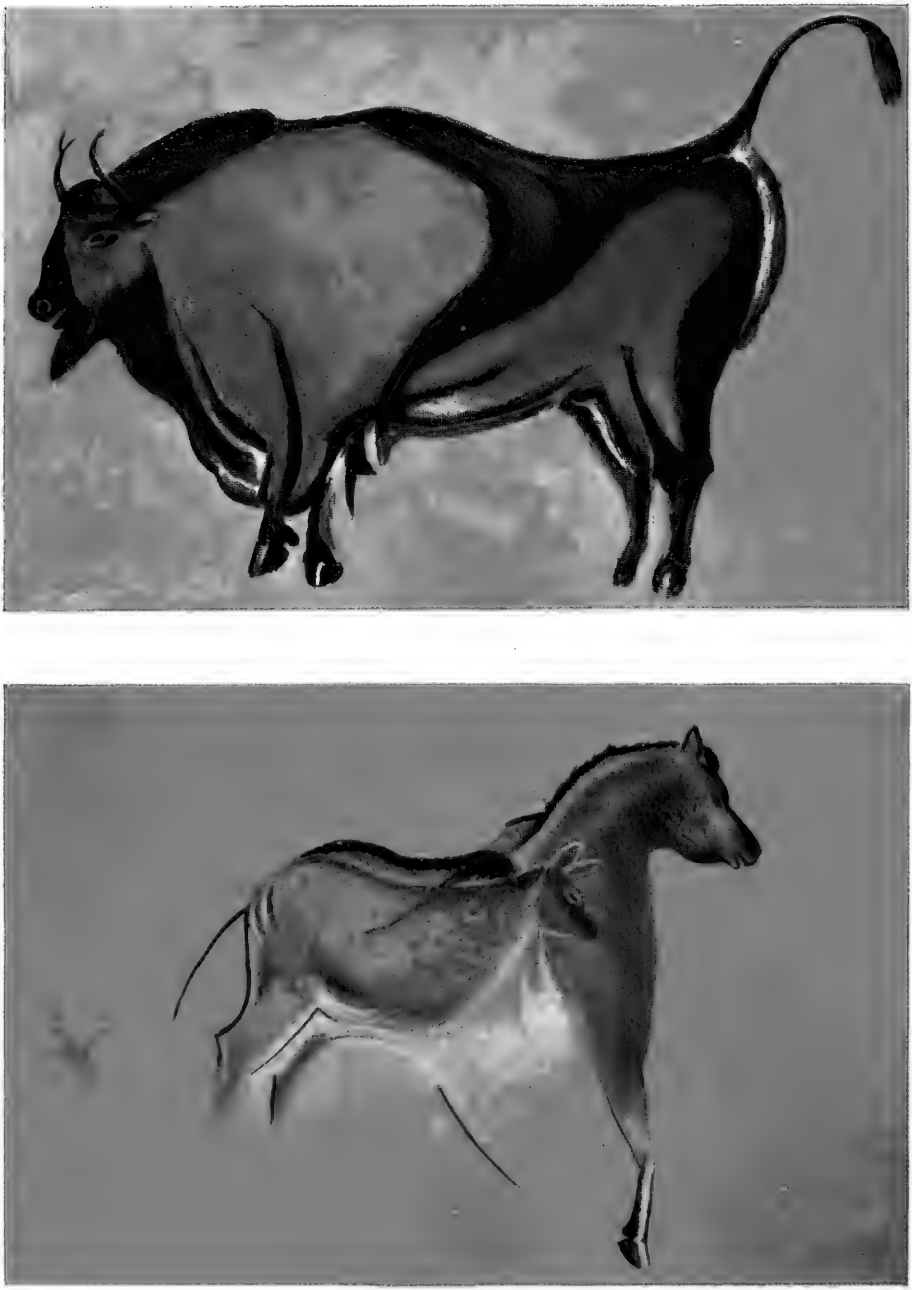
[*Professor De Vries lectured December 6 before members of the New York Academy of Sciences and the American Museum of Natural History*]



DR. ALEXIS CARREL

THE WINNER OF THE NOBEL PRIZE IN MEDICINE FOR 1912 THROUGH HIS WORK AT THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH, NEW YORK

[*Dr. Carrel lectured recently before members of the American Museum of Natural History and the New York Academy of Sciences on the researches which have won him the Nobel prize*]



CAVE PAINTINGS FROM ALTAMIRA, SPAIN

From a mural series in the American Museum

The American Museum Journal

Vol. XII DECEMBER, 1912 No. 8

MEN OF THE OLD STONE AGE

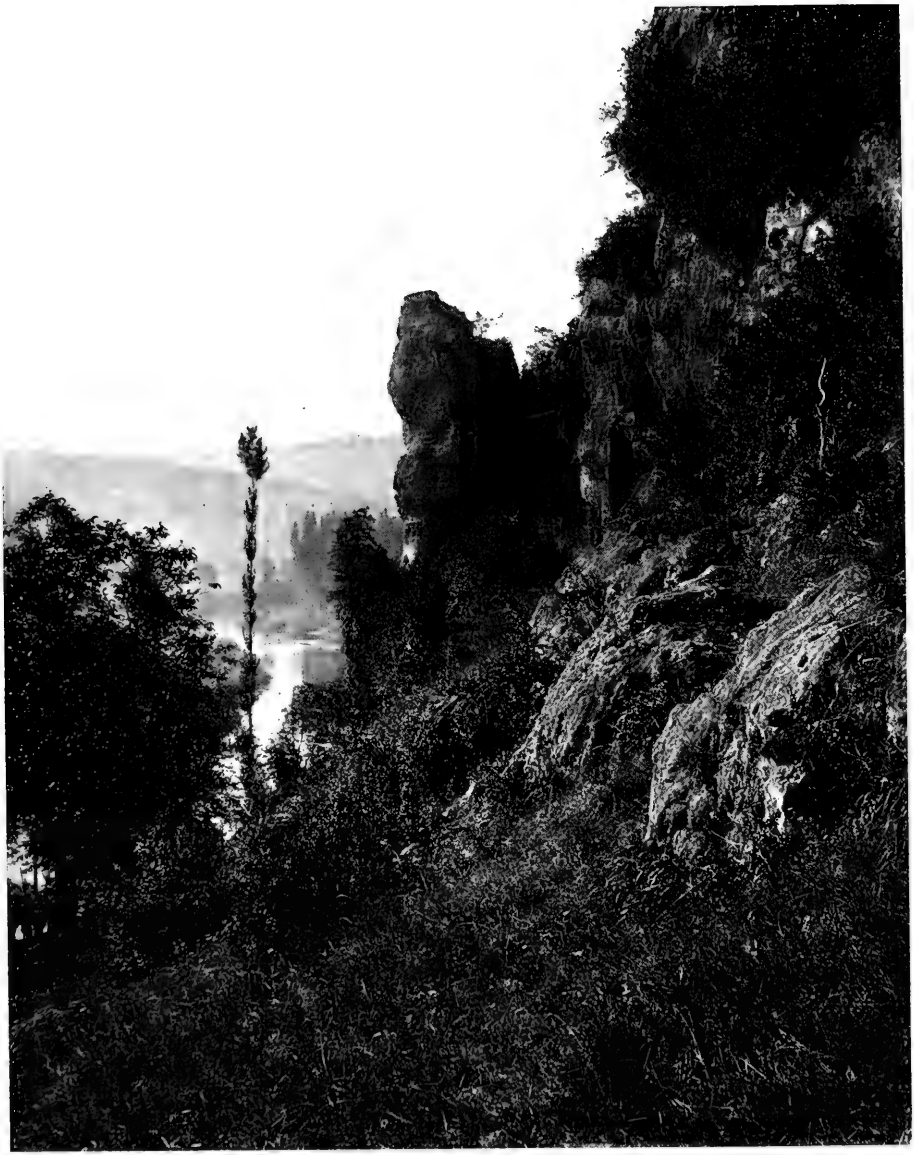
WITH AN ACCOUNT OF A MOTOR TOUR THROUGH THE PRINCIPAL CAVERN REGIONS OF SOUTHWESTERN EUROPE

By Henry Fairfield Osborn

THE Museum is slowly preparing a special exhibition of the early evolution of man in Europe. France is now leading the world in this branch of anthropology, and the discoveries which have been made during the last ten years bring the Old Stone Age almost within reach of the historian. The types of men who inhabited Italy, France and Spain have become known not only through their ancient burials but also through their paintings and sculptures; they were of superior intelligence and gifted with a strong artistic sense. Their history extends from the close of the last Glacial Age, 25,000 to 20,000 years ago, to the arrival of neolithic men, perhaps 10,000 years ago. There was a crude form of religion, the dead were reverently buried; society was broken up into groups according to special talents; there were undoubtedly chiefs or rulers, hunters, flint-makers, and especially sculptors and painters, whose art exceeds that of any other primitive men ancient or modern.

The sculpture of the Old Stone Age had long been known through the labors of Piette, a French magistrate. He gave his hours off the bench and all his spare income to the sculptures on bone, ivory and stone by the men of the upper part of the Old Stone Age, his great collection being preserved in the Museum Saint-Germain near Paris. To-day his brilliant pupil, Abbé Henri Breuil, is devoting his life to a study of the draftsmen and painters whose work has only recently been rediscovered — although originally discovered as long ago as 1879 — in the grotto at Altamira on the northern coast of Spain.

As can be traced on the accompanying map, the tour that I made of these grottoes and caverns during August last, together with Professor George Grant MacCurdy of Yale University, followed the beds of limestone from the caverns of Grimaldi on the east near Mentone to the famous caverns south of Toulouse scattered about the headwaters of the Garonne in the foothills of the Pyrenees, northward to the still more famous and historic caverns grouped around Les Eyzies in Dordogne near the junction of the Vézère and Dordogne rivers. Finally we passed into Spain beyond Bilbao



LA VÉZÈRE NEAR LE RUTH IN THE DORDOGNE CAVERN REGION

The largest group of French caverns is in the limestone country along the Vézère. These caverns were used as habitations by men of the Old Stone Age throughout palæolithic times. Excavations show that the floors are often made up of superimposed layers containing evidences of successive cultures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ESLA
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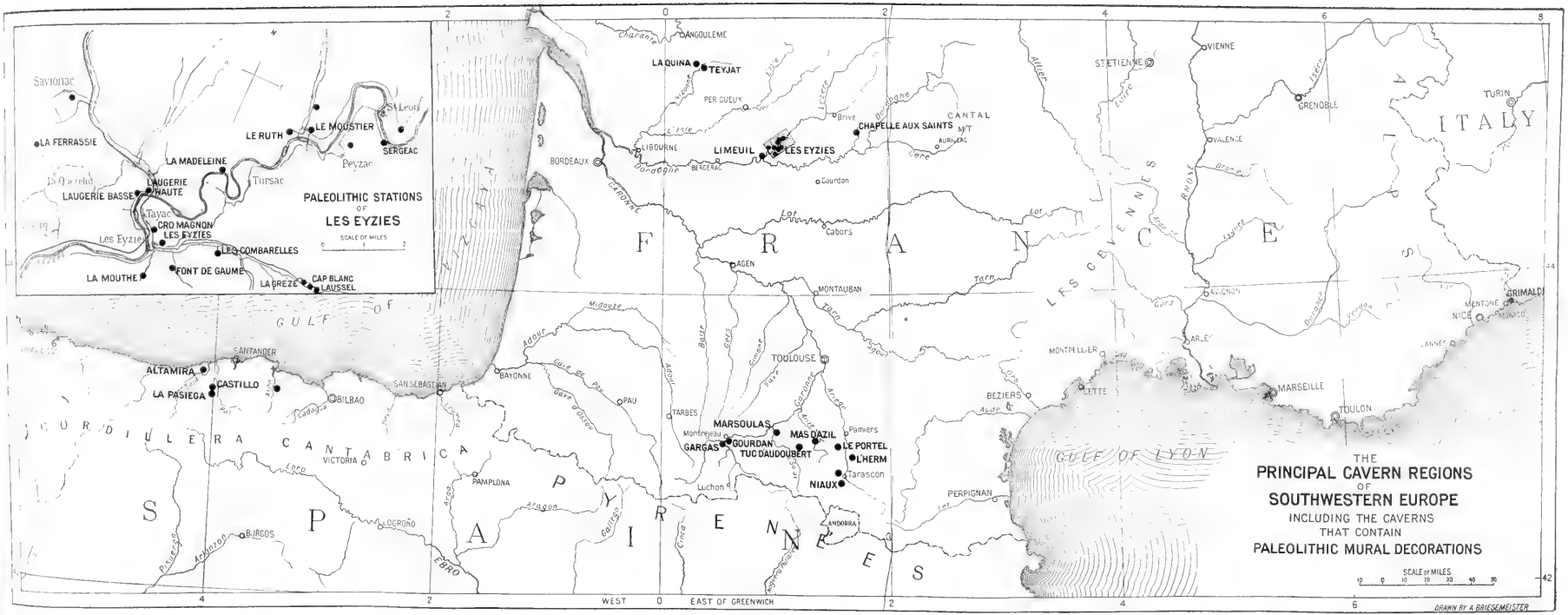

PALEOLITHIC STATIONS OF LES EYZIES
SCALE OF MILES
Savignac
LA FERRASSIE
LE RUTH
LE MOUSTIER
St Leon
SERGEAC
Peyzac
LA MADELEINE
La Quercille
LAUGERIE HAUTE
LAUGERIE BASSE
Tursac
Tayac
CRO MAGNON
LES EYZIES
Les Eyzies
LES COMBARELLES
FONT DE GAUME
LA MOUTHE
LA GREZE
CAP BLANC
LAUSSEL
THE
PRINCIPAL CAVERN REGIONS
OF
SOUTHWESTERN EUROPE
INCLUDING THE CAVERNS
THAT CONTAIN
PALEOLITHIC MURAL DECORATIONS
SCALE OF MILES
DRAWN BY A. BRIESEMEISTER
ANGOULEME
LA QUINA
TEYJAT
PER GUEUX
Brive
CHAPELLE AUX SAINTS
AURILLAC
LIBOURNE
LIMEUIL
LES EYZIES
BORDEAUX
BERGERAC
Gourdon
Cahors
AGEN
MONTAUBAN
TOULOUSE
CANTAL
FRANCE
ITALY
ST ETIENNE
VIENNE
GRENOBLE
VALENCE
TURIN
AVIGNON
ARLES
NICE
MENTONE
GRIMALDI
MONACO
MONTPELLIER
BEZIERS
SETTE
MARSEILLE
TOULON
PERPIGNAN
GULF OF LYON
SANTANDER
ALTAMIRA
CASTILLO
LA PASIEGA
BILBAO
SAN SEBASTIAN
BAYONNE
PAU
TARBES
MARSOULAS
Montrejeau
GARGAS
GOURDAN
TUC D'AUDOUBERT
MAS D'AZIL
Pamiers
LE PORTEL
L'HERM
Tarascon
NIAUX
Luchon
ANDORRA
PAMPLONA
VICTORIA
BURGOS
OCRONO
EBRO
CORDILLERA CANTABRICA
SPAIN
PYRENEES
WEST
EAST OF GREENWICH

to another limestone country threaded with caves, the most famous of which are Altamira and Castillo.

Sheltering cliffs and grottoes in the front of these caverns were sought as working places, shelters and communal homes by succeeding races of lower and upper palæolithic peoples during an enormously long period of time, estimated by geologists at over 50,000 years; but it is only in the upper palæolithic that the real development of the art of sculpture and painting begins and may be followed step by step from the crudest stages up to a high impressionistic stage in which wonderfully naturalistic effects are produced by the combination of three colors, black, ocher and red, in the so-called "polychrome" paintings. Throughout all this region, a single culture existed; and probably a single race known as the "Cro-Magnon," tall and large-brained people, nomadic in habit, living only by the chase.

Accompanied by Professor Emile Cartailhac of the University of Toulouse, we first entered the great cavern of Niaux, three hundred feet above a small tributary of the Ariège near Tarascon. Advancing half a mile into the interior we reached a splendid chamber in which the smooth, polished walls were covered with black outlines of game animals drawn in oxide of manganese mingled with grease, giving an imperishable lithographic effect on the smooth limestone. Occasionally the animals are laid on in solid masses of black, as in the case of that species so greatly admired by palæolithic man, the majestic bison depicted with superb crests, fine eyes and muzzle most perfectly drawn. There are also stupid-looking horses, with dull eyes very like the wild Przewalsky horses which can be seen in the New York Zoölogical Park. Here too are the ibex, the chamois, some spirited examples of the stag, but no reindeer or mammoth.

The day following our visit to Niaux we traversed the extremely narrow passages of Le Portel, often being obliged to crawl on hands and knees. In this cavern the drawings are inferior in style to those of Niaux but red color has been used with the black. The best drawing of bison was seen here, the feet especially being thoroughly and finely drawn.

Then our motor route carried us directly through the vast tunnel of Mas d'Azil, traversed by the Arize River, where the last stages of upper palæolithic art are found representing the time just prior to the disappearance of the great race of art-loving hunters before the coming of the first wave of neolithic weavers and agriculturalists. The discovery of the already famous cavern Tuc d'Audoubert had taken place only three days previous to our visit, and the sons of the Comte de Begouen, who had made the discovery, paddled us in an improvised boat into the entrance of this cave. The chambers were brilliant with exquisite limestone stalactites. As the Comte had discovered, favorable wall surfaces bore sculptures in very low relief of all the characteristic animals of the upper palæolithic period, namely, bison, horses, reindeer, stag and mammoth. It is in this cavern

Professor Emile Cartailhac of the University of Toulouse and Professor George Grant MacCurdy of Yale University at the entrance to Niaux cavern

that the first clay models of the palæolithic artists have quite recently been found, two statuettes of the bison, modeled in clay with the fingers.

Each of the caves of this region, Marsoulas, Gourdan and the great cavern of Gargas, exhibits stages in the development of palæolithic art — that is, each cave belongs to a distinct period of development.

In the Dordogne group around Les Eyzies we found the birthplace of palæolithic history. Here human history is recorded in a continuous current for a period of 60,000 years, passing from the lower palæolithic of Le Moustier through all the barbaric and mediæval stages to the hamlets of the peasant and the chateaux of the French nobility. In the centre of this Dordogne group is the little hamlet of Cro-Magnon where was first discovered many years ago the grave of a member of this great hunting and artistic race. Here the earliest explorers, Lartet and Christy, laid the foundations of the successive chapters of palæolithic development; but it is only in recent years that the successive culture or industry stages have been sharply distinguished, so that now the flint implements furnish the key to all the successive periods and subperiods of human development. We were guided by Abbé Breuil and M. Peyrony along the picturesque valleys and cliffs of the Vézère and Beune, tracing the whole series of inventions in flint implements and all the stages of cavern mural art from the crudest drawings

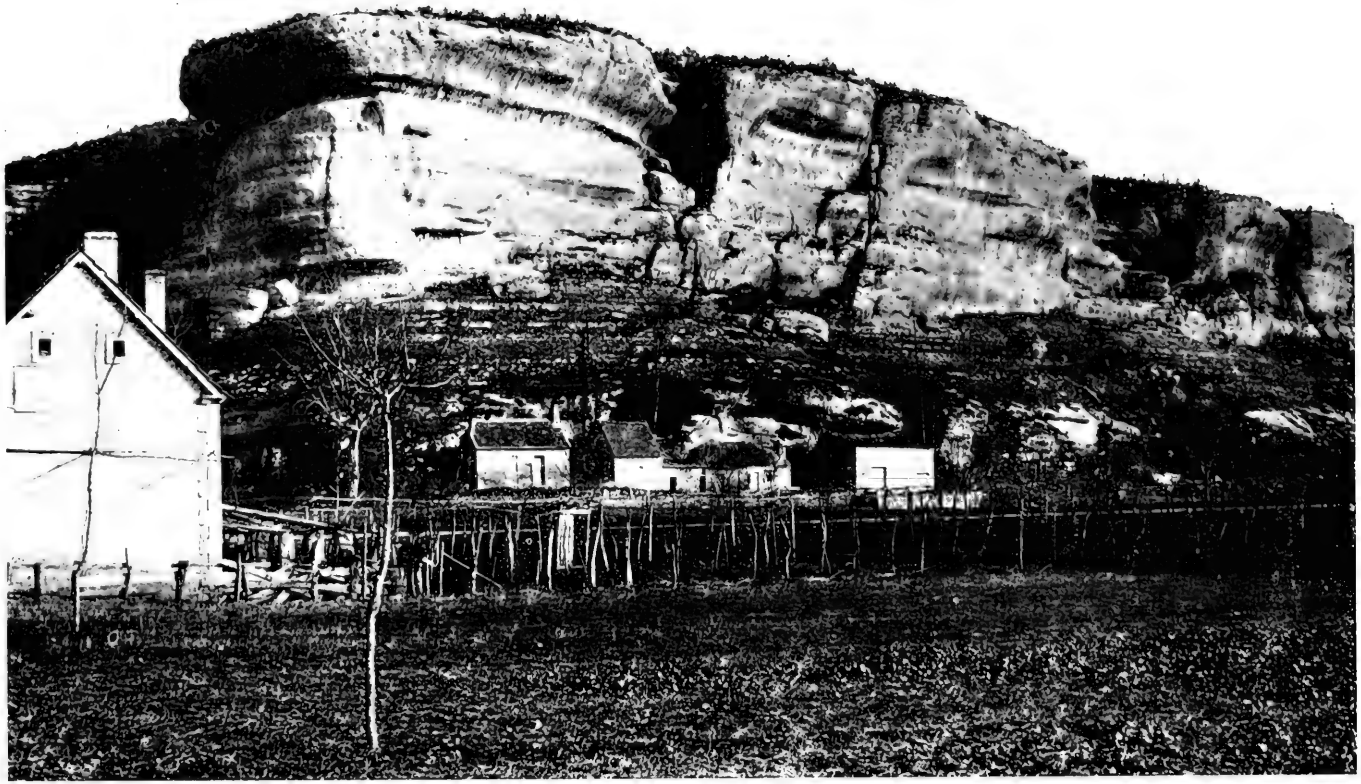
and etchings of the mammoth to the superb polychrome frescoes on the walls of the cavern of Font-de-Gaume, where a high stage of art is displayed, although many of the paintings have greatly suffered from a natural incrustation of lime which covers them like a partly transparent veil.

Through Bayonne and San Sebastian we reached Santander where Professor Hugo Obermaier, another able member of a most remarkable group of anthropologists, guided us in a tour of the Spanish caves. Near Puente Viesgo is the cavern and grotto of Castillo, which towers above the valley. At the entrance of this grotto is the most complete continuous succession of cultures which has ever been found, dating from the middle of the older palæolithic or Acheulian to the beginning of the age of Copper and Bronze. During intermittent periods of occupation the successive races have made their fireplaces and left their implements. This succession was selected as a type for a large model in the American Museum, which will be prepared through the kind coöperation of Professor Obermaier himself. The cavern is filled with crude drawings and many handprints of palæolithic men.

Professor Cartailhac lighting an acetylene lamp at the entrance to Le Portel.

THE HAMLET OF CRO-MAGNON, IN DORDOGNE, THE BIRTHPLACE OF PALAEOLITHIC HISTORY

In a cavern at Cro-Magnon was first discovered the remains of a man of the Old Stone Age, a "Cro-Magnon" or cave man



FONT-DE UME — ENTRANCE TO THE CAVERN AT THE EXTREME RIGHT

This cavern of the Dordogne region contains the finest panels of "polychrome" paintings discovered in France, surpassed in Europe only by those of Altamira. The authenticity of palæolithic cave paintings is no longer questioned: the animals shown are either extinct to-day or, like the bison, reindeer and rhinoceros, no longer occur in the given region, while in the cave floor deposits, which are unquestionably palæolithic, engravings and figures in the round and in relief ... the same fauna and the same art. The walls of Font-de-Gaume are bare for some sixty feet from the entrance, the elements probably having erased the paintings through centuries of exposure

CLIFF AND RUINS OF LA MADELEINE

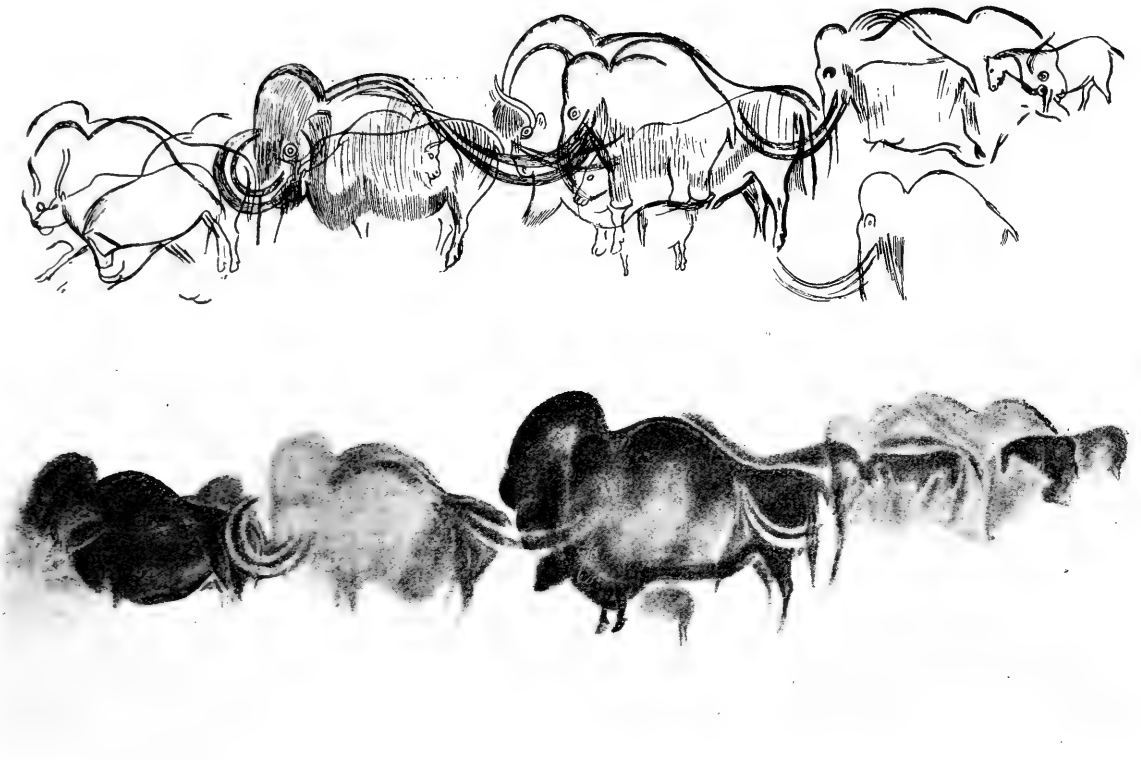
The Station in which evidences of Magdalenian man were first discovered. Upper palæolithic times

On the other side of the same mountain is the recently discovered cavern of La Pasiega, with small and extremely difficult passages leading to a room where there is a natural chair of limestone, on the arms of which the soiled hands of palæolithic men left their impressions. This "throne room" or "altar room" is the latest proof, in the opinion of Professor Obermaier, of the religious or ceremonial significance of these caves in the minds of the palæolithic races.

The greatest impression however was reserved for the last, in our visit to Altamira, near the decayed Spanish capital of Santillana. The frescoed ceiling of Altamira more than sixty feet in length, with its splendid polychrome bison, horses, stags and wild boar, is the finest expression of palæolithic art. Not even the faultless reproductions of Abbé Breuil can convey any idea of the impression produced by this wonderful chamber. It ranks for palæolithic times with the great gallery of Velásquez in the Prado of Madrid, and deserves the close guardianship of the Spanish government.

After Cartailhac and Breuil

A portion of Altamira cavern; the opening to remoter parts is on the right. The frescoes which are distributed over the ceiling are the finest palæolithic paintings in Europe, rivaled only by those of Font-de-Gaume



After Capitan and Breuil

PAINTINGS FROM THE CAVERN OF FONT-DE-GAUME, AURIGNACIAN STAGE

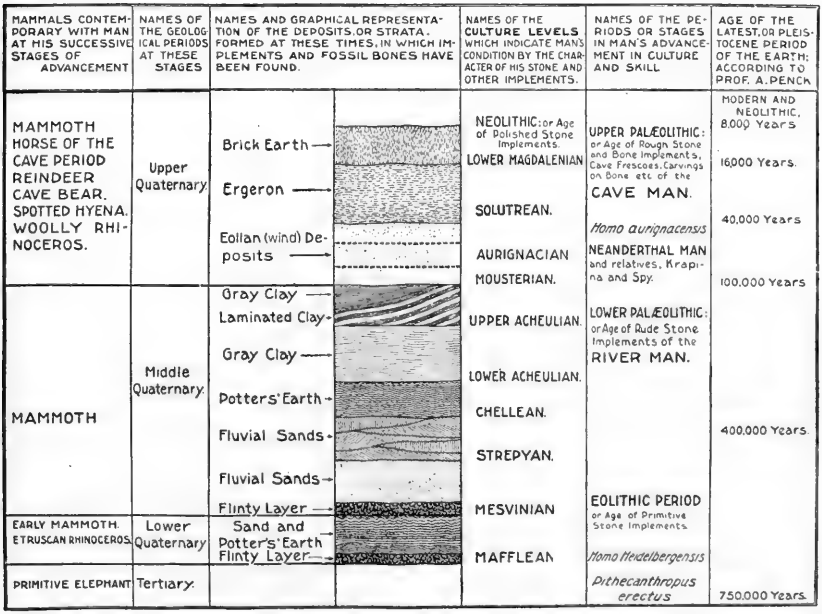
Part of a procession of mammoths, bison and other animals chosen for reproduction on one of the panels in the Museum. This illustration in particular [see line cut above] shows how the same cavern wall was used over and over. Here the artist seems to have but imperfectly erased a bison to make way for a mammoth, and many other parts of figures still visible attest to the industry and skill of these ancient painters

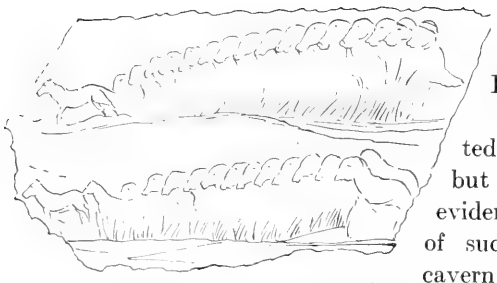
THE ART OF THE CAVE MAN

By Clark Wissler

ONE of the oldest art galleries in the world is the cavern of Altamira, Spain. It is so old that when we look backward to it from the present, the time since Egypt, Greece and Rome flourished, seems but as a century or two. The artists whose work has thus come down to us could not have known the use of pottery or metals, but though not even clay work had yet been invented, these primitive Europeans did invent pictorial art. It is the anthropological conception that even pictorial representation is a true invention whose underlying processes are not essentially different from those involved in the invention of the steam engine or the electric light. This is one aspect of the cultural conception, a theory which holds about the same place in anthropology as does evolution in the biological sciences.

But to return to our subject, everyone is sure to ask how old are these first preserved paintings. As to this we can but guess. Some would have it that they are less than 25,000 years old, others more than 200,000 years. Perhaps somewhere between these extremes is the true date. They were made by a people living in the Aurignacian culture stage. Geologists have a way of scaling out the history of the earth by considering the period in which we still live as the Recent and the one immediately preceding it as the Quaternary or Pleistocene Period. There are many others extending backward beyond the reach of the imagination, but they are irrelevant





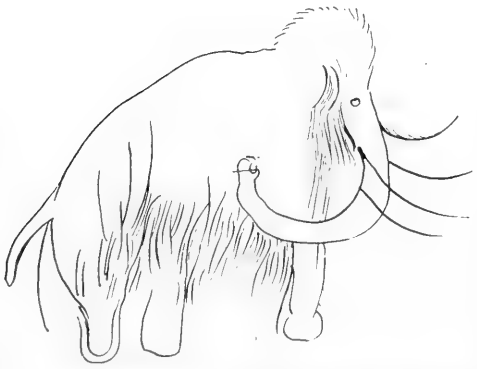
After Cartailhac

Two troops of horses, each with its leader, engraved on a slab of stone, from Le Chaffaud (Vienne). Magdalenian stage

here because no certain traces of man appear before the dawn of the Pleistocene Period.

Possibly pictorial art was invented long before Aurignacian time, but it is not until then that we find evidences of it. The first discovery of such evidence was in 1879 in the cavern of Altamira. Before this date many traces of early man had been found in France and Spain, especially in caves and rock-shelters, whence came stone implements and bones from which anthropologists began to piece out the story of the ages. Yet no one ever dreamed of finding picture art galleries. So it was that in 1879 a Spanish nobleman, Marcellino de Sautuola, was industriously digging in a cave on his estate for stone implements and bones, while his little daughter who accompanied him amused herself otherwise. She looked up at the vaulted ceiling overhead and began to shout "*Toros! Toros!*" with such spontaneous excitement that the more prosaic father paused to investigate. Thereupon stone implements were forgotten. It is safe to say that this little Spanish girl was the first person within many thousand years to set eyes on those prehistoric paintings.

What she saw can scarcely be described. The outlines of the figures as shown in the drawing will give an idea and the color plate will perhaps enable us to form a notion of the whole scheme. As we gaze at the pictures one of the first things to impress us is the excellence of the drawing, the proportions and the postures being unusually good. The grand bison shown in the frontispiece and the charging boar are masterpieces in this respect. The next observation may be that in spite of this perfection of technique there is no perspective composition — that is, no attempt to combine or group the figures, each standing alone as it were oblivious of all others yet crowding upon and even over its many neighbors, regardless alike of position, form or size. Except in case of the foal and mother there is not the least suggestion of natural association and even that example may be largely accidental.



After Capitan and Breuil

Engraving of a mammoth, spirited study of an extinct animal from the walls of Les Combarelles. Aurignacian stage

In addition to these remarkable sketches in color, the other walls of

After Cartailhac and Breuil

Miniature diagram of frescoes from the ceiling of Altamira cavern, showing how the figures are thrown together with little regard for composition or position. It seems that each animal was worked out independently. Some of the bison are in peculiar kneeling attitudes, but in this case it happened that the natural rounded surface of the rock itself suggested the form, the ancient artist simply adding the color and outline. Thus we have a curious case of the suggested use of sculpture, possibly one of the hints that led to its invention

The horses and the lordly bison of the frontispiece may be seen in this sketch in their actual association with other paintings of Altamira

Altamira have numerous figures in black outline and also engravings. What is especially curious is that the two modes are frequently combined, some parts of a figure being engraved, others traced in black.

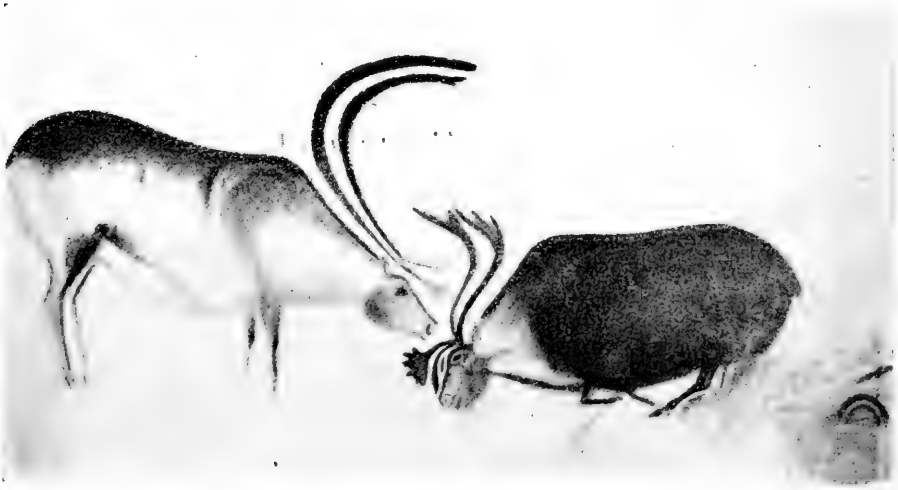
After Cartailhac and Breuil

A charging wild boar, one of the best paintings from Altamira cavern. [See upper right hand figure in diagram above.] The colors are sepia and red

It is also clear that the work of many different artists is represented, covering a considerable period of time. The walls show traces of many other paintings that were erased to make way for new work. According to some students it is even possible to trace a development from the cruder outline sketch to those in polychrome. This point is one of several strongly supporting the theory that this type of art was invented during the Aurignacian stage.

The cavern of Altamira is by no means the only example of Aurignacian art. Many caves have been discovered in northern Spain and in France, some of which rival Altamira in the variety and magnificence of their art. Yet in all we find the same type of art, making it certain that Aurignacian culture flourished throughout Spain, France, Belgium, parts of Germany and perhaps England. The anthropological significance of the preceding facts is considerable; they make it clear that the cultural view of modern man applies equally well to the man of antiquity and that we are quite right in interpreting Aurignacian culture by what we know of living races. We believe that no one can look at the illustrations in this article without recognizing that their artists must have accomplished their work just as we would and moved along in the construction of their culture by steps analogous to our own. In other words, the universal human was there in that dim remote past, as it is with us still.

The subjects chosen by these artists were almost exclusively the large mammals of the time, the bison, mammoth, reindeer, horse, wild boar and



After Capitan and Breuil

Two reindeer fronting each other in the cavern of Font-de-Gaume, chosen for the central framed panel in the Museum series of murals. In the original the artist traced part of the outline by engraving and the remainder with crayon, then laying on the colors. The combination of drawing, painting, engraving, and sculpture is one of the striking characteristics of Aurignacian art

rhinoceros. Their relative frequency of occurrence is almost in the order just stated. Occasionally we find deer, ibex (?) and rarely birds. Of carnivorous animals there are a few examples, surprisingly few. What we should most like to see would be a portrait of Aurignacian man himself, but this seems to have been a subject religiously avoided, perhaps tabooed for some reason. This is quite in contrast to our own art where the human form is usually present and often the main feature in the composition. Yet in the Spanish cavern of Cogul there are a few crude sketches of women in costume and one or two nude men. Perhaps stranger still, two women are drawn as if herding oxen not unlike the domestic cattle of to-day. While the cattle are shown with all the precision and fidelity of Aurignacian art, the human figures are very crude and indefinite: thus even in the exception we prove the rule.

After Cartailhac and Breuil

Outlines of a painting from the cavern at Cogul, Spain. We have here the unmistakable characteristics of domestic cattle with a hunting scene in the background. This cavern furnishes about the only known attempt to portray human beings. Probably Aurignacian stage

We may now give a passing thought as to what became of this art. Did it vanish or did it survive in a living sense with varying fortunes down to the days of Greece and Rome?

Following the Aurignacian culture is another called the Magdalenian, but the change seems to have been far from abrupt. Even the experts have some difficulty in agreeing as to what is Aurignacian and what is Magdalenian, and there is great probability that some of the cave paintings are truly Magdalenian. Yet what we have here is after all but a marginal distribution, for polychrome art is certainly not a characteristic of Magdalenian culture, the presumption being that it exists in Magdalenian time only as a fringe of Aurignacian culture. Magdalenian man on the other hand developed work in bone and decorated many of his implements with engravings equal if not superior in technique to his Aurignacian predecessor. As noted in the table, a culture called Solutréan falls between Aurignacian and Magdalenian, a stage during

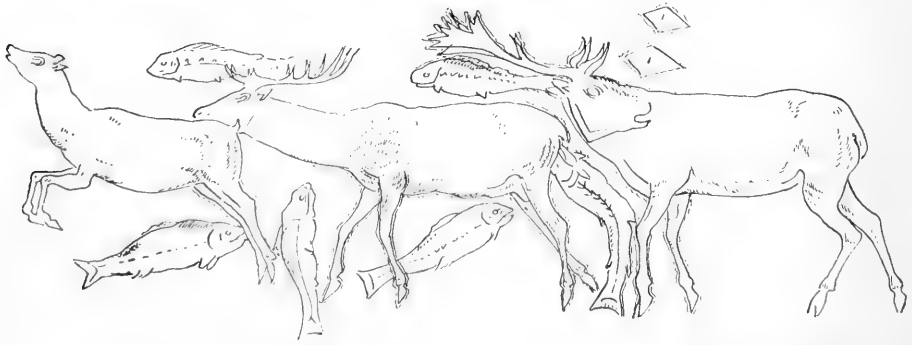
Unfinished sketch of a lion (?), Font-de-Gaume

After Sollas

A reindeer grazing, from the cavern of Kesslerloch, near Thayugen, Switzerland, engraved on a shaft-straightener. This is a famous Magdalenian masterpiece and is reproduced in about its original size

which there seems to have been some painting but so far as known nothing distinctive.

In our day we are apt to think of decorative art as either geometric or highly conventionalized in design. This is especially noticeable in the Museum's collection from the Plains Indians, and in the specimens of Peruvian cloth, Navajo blankets and Indian basketry. One looks almost in vain for such technique among the works of Aurignacian and Magdalenian man. It is true that there are occasional attempts at geometric forms on the walls among the cave paintings, but these are far from being the ever repeated series of true decorative designs. It is true that decorative design appears on certain bone and ivory implements of the Magdalenian stage, but it is clearly subordinate to and far less numerous than the pictorial engravings. One may read in books that in the palæolithic period man was very skillful in realistic art, but pictorial not decorative art, while in the subsequent neolithic period he did no drawing but contented himself with the elaboration of



After Ray Lankester

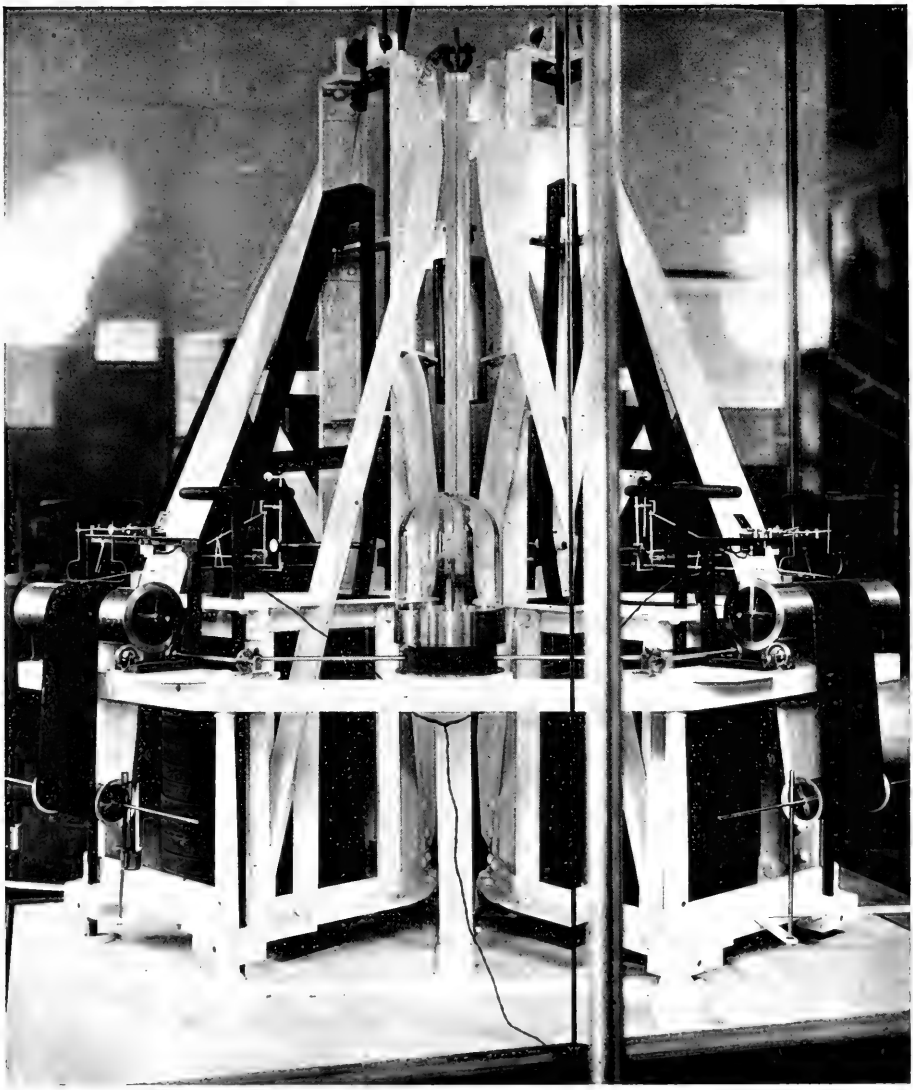
Restoration of a remarkable engraving on horn from the cavern of Lorthet. In many respects this is the finest example of Magdalenian art. We still have however a trace of the disregard of composition so characteristic of the whole period

geometric patterns. In the main this is true, but we should note that some attempts at geometric art appear in palæolithic work and of course there was some drawing in the neolithic period. We should not therefore take too seriously the view that the natural evolution of art is from the representative to the conventional, since the facts of anthropology as a whole make Aurignacian art, for instance, appear only as a school of art or a form of culture that developed but to be displaced by another. In this case so far as we now know, realistic art did precede the geometric, but this is merely a historical fact and not a biological one. There seems to be no inherent reason why geometric art might not have developed first, had the attention of Aurignacian man been focused upon it.

It may not be out of place to add however that the recent tendency among students of art is to regard the development of geometric art or decorative design as an outgrowth of weaving technique. So far as known the textile arts did not take definite form until the neolithic period. In so far, this is consistent, but the cultural point of view ever reminds us to be cautious since we are dealing with a psychological phenomenon rather than a biological one.

For the same reason we must not be too dogmatic in the application of the "no-composition" interpretation of Aurignacian art, for while the artists seem not to have discovered true perspective, they have frequently grouped their figures in a way that can scarcely be accidental. In the previous discussion of the paintings in Altamira we noted the apparent disregard of composition, but we must be cautious at jumping at conclusions. These sketches are on the ceiling and the artist may have placed them more or less deliberately in certain conceived relation to one another, since in every cavern so far discovered most of the sketches on the side walls are right side up, showing that position was not by any means disregarded. Then again we find the stately procession of bison and mammoth shown in the drawing where it is difficult to believe that the artists had no definite scheme of composition. To this may be added the herd of cattle in Cogul, the group of horses facing a feline in Font-de-Gaume and several others. What is lacking however is a definite notion of perspective. On the other hand when we come to Magdalenian art we find some suggestion of perspective and some definite composition. In the herd of wild horses we have an example, and again a masterpiece in the grazing reindeer and also in the running herd from Lorthet.

In short it seems that rudimentary composition is as pronounced in Aurignacian art as initial perspective is in the Magdalenian. It appears that, as in other traits of culture, palæolithic man moved along in the solution of his art problems by halting and wavering steps, but never really lost his grip upon a solution once attained. As in our day, each difficulty overcome but widened the horizon of unsolved problems.



GENERAL VIEW OF MAINKA SEISMOGRAPH

Presented to the New York Academy of Sciences by Emerson McMillin, president of the Academy, and deposited in the American Museum of Natural History. It is the largest seismograph in this country and was made at the order of Mr. McMillin by J. and A. Bosch of Strassburg. It is installed in the corridor off the North Pacific hall where freedom of motion uninfluenced by surroundings was obtained by means of a concrete pier firmly cemented to the solid rock beneath the building. The first record of the new seismograph was made by an earthquake in Alaska (3100 miles away) on the morning of November 7. This record is on exhibition. Like all seismographs, the instrument is sensitive to barometric changes, heavy wind, and wave beats on the sea beach, all of which cause pressure on the surface of the earth

THE SEISMOGRAPH AT THE AMERICAN MUSEUM

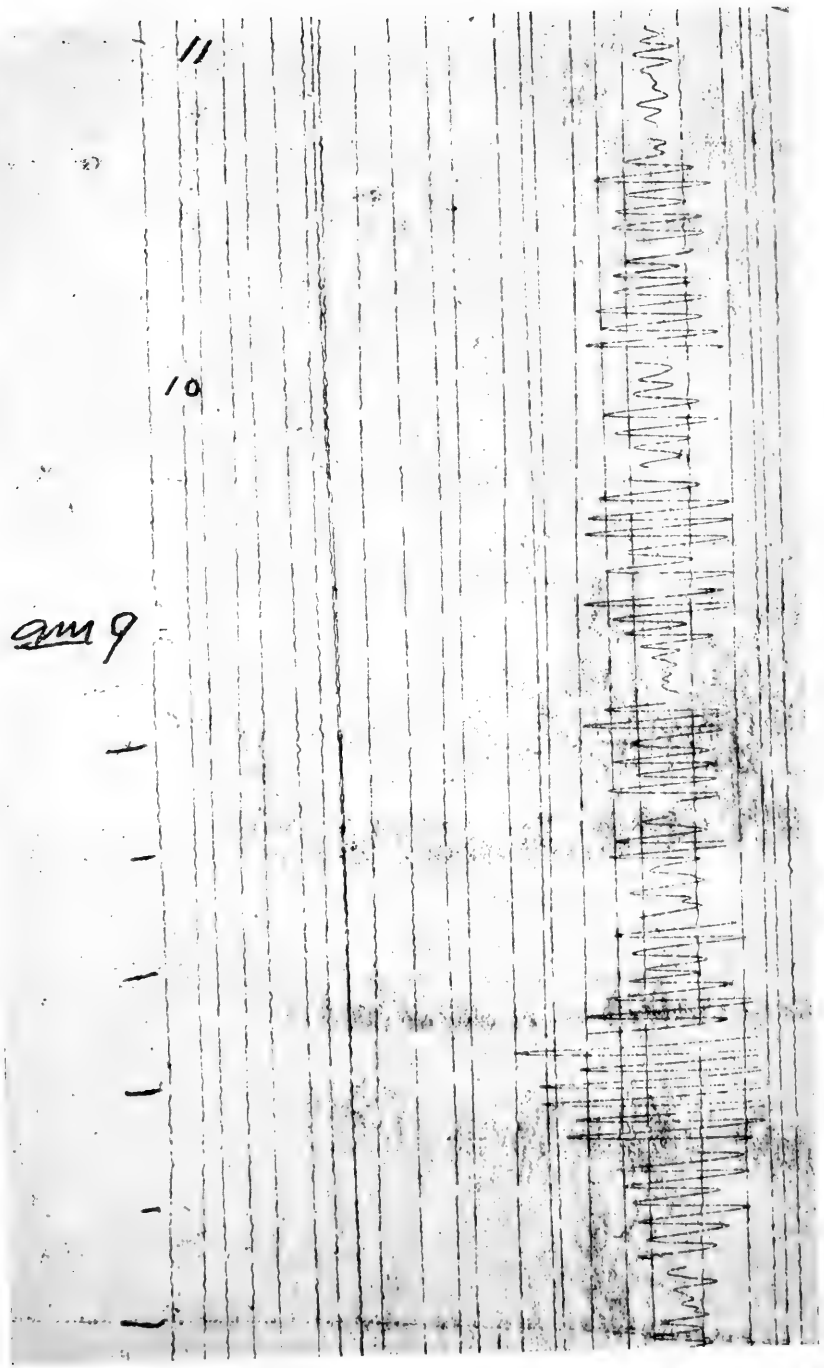
By Edmund Otis Hovey

THERE are several kinds of seismographs or instruments for detecting and registering the passage through the earth of the waves which are caused by the disturbances whose results are familiarly known as earthquakes, but all make use of the same principle of action—namely, the inertia of a weight freely suspended or supported above the earth. When a shock passes beneath the weight or "steady mass," as it is called, the earth tends to vibrate back and forth without causing motion in it. In order to obtain this freedom of motion in the instrument which was recently installed in the Museum, a strong frame of angle iron supporting the steady mass rests on a concrete pier whose base is firmly cemented to the solid rock. The pier, furthermore, is entirely free from contact with the building or its floors, so that no local vibration can be transmitted to the delicate registering apparatus.

The steady masses are of iron and lead and each weighs about 450 kilograms or 990 pounds. They are suspended in such manner that they act as horizontal pendulums, so that their own plane of oscillation is tangent to the surface of the earth. The horizontal axes of the masses, along which they are free to move, are at right angles to each other, one lying true north and south and the other lying true east and west. The differential motion between the earth and the pendulums is what is recorded and measured by means of a stylus that rests lightly upon the surface of smoked paper which is drawn slowly under it, making a white line. Each stylus is connected with its steady mass by means of a system of levers which ends in the center of the pendulum. The steady masses would soon acquire a pendulum swing of their own, hence a part of the system of levers is a "damper" of sheet aluminum close-fitting within a box. The observer can regulate the pressure of the air against the aluminum sheet, thus checking the induced oscillation.

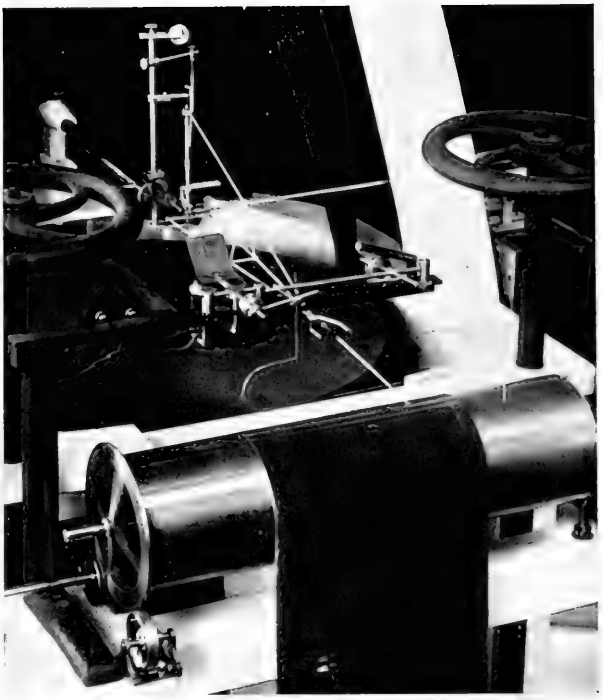
The strip of recording paper is coated with lampblack and then put over a pair of drums which are rotated at a uniform rate of speed by clockwork mechanism arranged to run at the rate of fifteen millimeters (0.59 inch) per minute. At the beginning of each minute the needle is raised from the paper by means of an electromagnet connected with an accurate clock. The break thus made lasts for four seconds and therefore is one millimeter long and the successive breaks enable an observer to determine the time when any part of the paper passed under the stylus.

The heavier the steady masses, the greater the degree of magnification of the actual movement of the earth that may be obtained and the greater the degree of sensitiveness of the whole apparatus. The instrument at the Museum being very large, it is possible by the varying of the relative lengths of the levers in the system connected with the stylus, to vary from 130-fold



Seismograph or earthquake record. Solar print from the smoked paper band showing a record produced by the earthquake of the early morning of November 7, 1912. About twelve minutes of the main shock are shown by the wavy line. The straighter lines are the usual record of the instrument. The motion of the band as reproduced here was downward

to 250-fold the degree of magnification of the actual movement of the earth particles. The instrument is now arranged to record a magnification of about 150-fold, so that if the recording needle swings one and one-half inch, the actual movement of an earth-particle is one-hundredth of an inch, provided that the direction of wave motion be either north-south or east-west. Waves whose direction lies between these points of the compass produce effects on the needles which can be calculated on the principle of the parallelogram of forces in physics. Thus the direction from which the waves come can be learned.

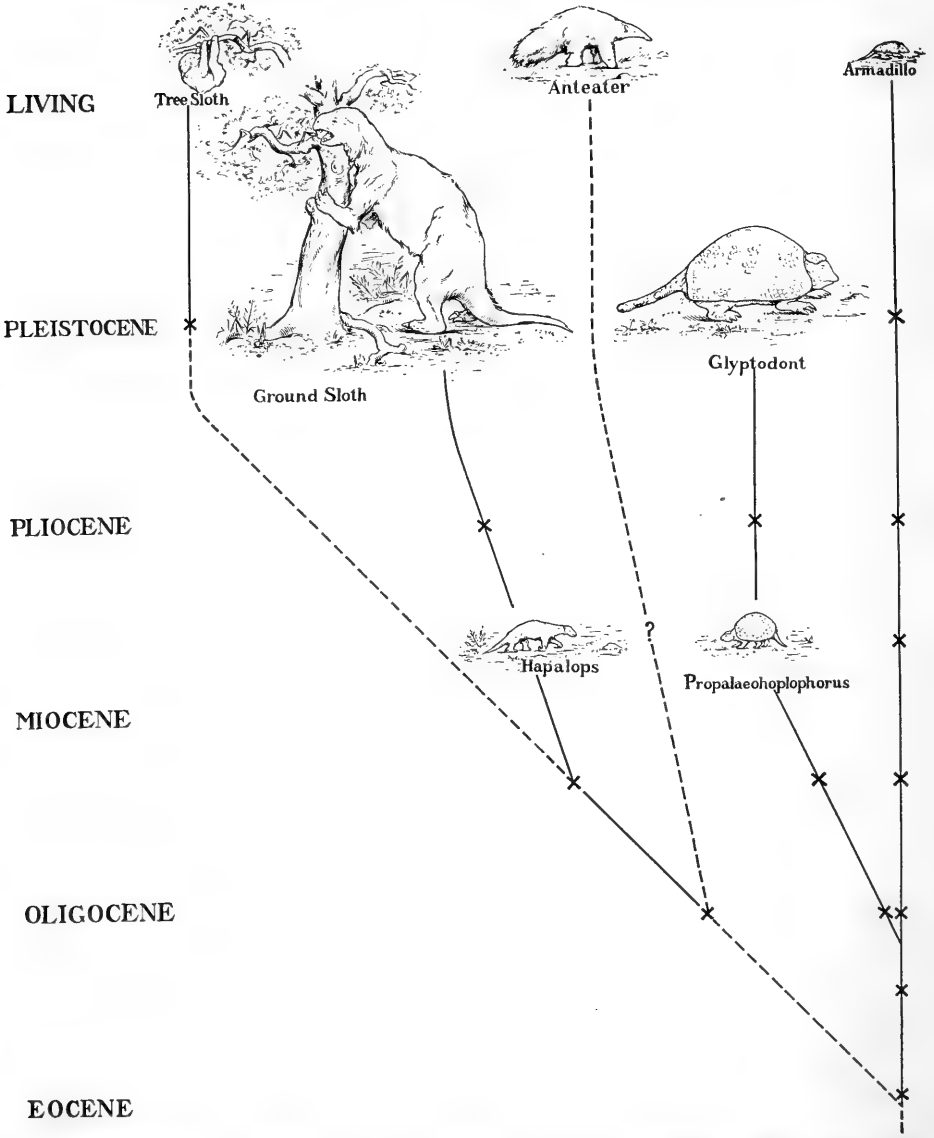


The drum in the foreground rotates toward the observer, drawing a band of smoked paper beneath a recording needle. This needle is pivoted to an arm running back to a point directly over the center, where it connects by a system of levers with the exact center of the steady mass, to which it is rigidly fastened

A heavy quake produces waves which are felt or recorded all over the earth, reaching the instrument in three ways. They come through the earth's mass by the shortest line, producing the first preliminary tremors, or by reflected lines, producing the second preliminary tremors; through the earth's crust by the shortest distance, the minor arc, producing the long waves and the trailers; and through the earth's crust by the longest distance or major arc. Sometimes the first preliminaries are not recorded on a machine like that at the Museum because they come from so great a distance as to emerge in a nearly vertical direction and the machine is not affected by such wave motion. It is not easy for the amateur to recognize the record produced by the waves arriving by the major arc.

The seismograph at the Museum, a large-model Mainka, manufactured by J. and A. Bosch of Strassburg, Germany, has been deposited with the institution by the New York Academy of Sciences, to which it was given by Mr. Emerson McMillin.

PEDIGREE OF THE EDENTATES



The Edentates are a peculiarly South American group of quadrupeds. They evolved in that continent during the Age of Mammals from small ancestors into a great variety of widely different animals some of huge size. The progressive steps in their evolution and divergence can be traced in the successive geologic formations. The lines of the diagram represent their genealogy and relationships, dotted where questionable, drawn in full when reasonably certain. The outline sketches represent a few of the better-known forms, all drawn to the same scale of size; the crosses represent other stages in the evolution of each race that have been found as fossils in each epoch

THE ANCESTRY OF THE EDENTATES[1]

AS ILLUSTRATED BY THE SKELETON OF *Hapalops*, A TERTIARY ANCESTOR OF THE GROUND SLOTHS

By W. D. Matthew

THE tree sloths, anteaters and armadillos which inhabit the forests of South America are relics of a group of animals which played a very important part in the mammalian life of that continent during the Age of Mammals. These are the Edentates, animals of very diverse proportions and habits but all having in common a number of anatomical peculiarities, so that they are grouped into a single order. The first of these peculiarities, as indicated by the name, is the absence of teeth, or at least their imperfection, for when present they have no true enamel: anteaters are entirely toothless, while tree sloths and armadillos have simple peglike teeth, imperfect in comparison with the complex grinders of higher mammals. A second peculiar feature of Edentates is the thick heavy tail, almost like that of a reptile.

The tree sloths live wholly in the tops of trees, hanging upside down from the branches, and feeding on the foliage. The anteaters live partly in the trees, partly on the ground, and feed upon ants and other insects. The armadillos are terrestrial animals and great burrowers, eating carrion, insects and maggots. They are protected by bony plates arranged in a series of rings and by the habit of coiling in the presence of danger into a ball whose bony surface is impenetrable to the attacks of ordinary Carnivora.

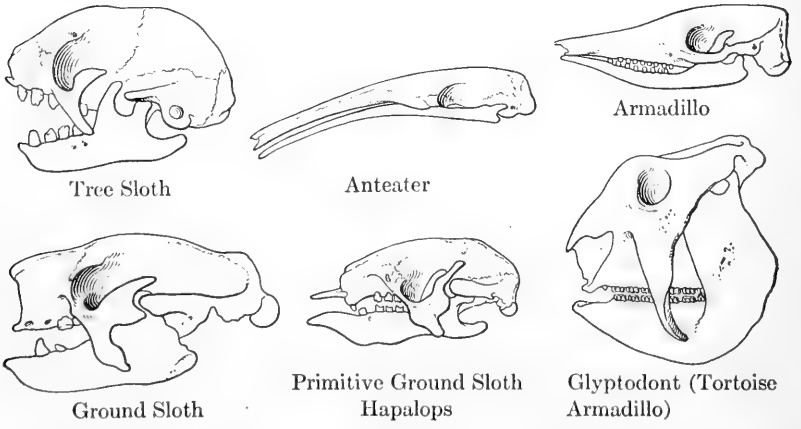
At about the time when man first appeared on earth (so far as geology teaches) that is in the Pleistocene Epoch, there were living in South America great numbers, not only of armadillos, and presumably anteaters and tree sloths, but also of two related groups of Edentates of very much larger size, the ground sloths and the glyptodonts, both now extinct. Some of these were of huge bulk, and all of them at that time, large animals. The ground sloths, huge, terrestrial, foliage-eating animals are illustrated by the central group in the Quaternary hall. They are nearest to the tree sloths, but in a few features they approach the anteaters. The glyptodonts were more or less related to the armadillos, but of very great size with a solid carapace over the body, the feet short, round, hoofed instead of clawed, and the teeth elaborated into a complex mechanism for grinding food, instead of the simple peglike grinders of the armadillos. They suggest in their outer form a gigantic land tortoise, and have been called "tortoise armadillos."

These strange-looking animals appear to have evolved in South America

[1] Dr. Matthew's article on the "Ancestry of the Edentates" is published as a separate with further illustrations and without omissions made necessary in this JOURNAL because of lack of space. This separate is for sale at the Museum together with other separates, guide leaflets and handbooks published by the institution.

during the Tertiary Period, when it was an island continent, inaccessible to the contemporary land animals of the northern world. Toward the end of the Tertiary, South America and North America became united, and the animals of the northern world were enabled to invade South America, where their competition finally resulted in the extinction of all but a remnant of the native fauna. The South American Edentates also invaded North America, for the remains of ground sloths and glyptodonts have been found in various parts of the United States. But they were unable to maintain their foothold here and (except for the little Peba armadillo which ranges as far north as southwestern Texas) there are to-day no living Edentates in the United States or Canada.

The evolutionary history of the Edentates can be followed through the successive formations of the Tertiary Period in South America, just as that of the horse, camel or elephant can be traced through the successive Tertiary formations of the northern continents. Just as we find the horse, tapir and rhinoceros converging toward a common ancestral stock in the early Tertiary of the northern world, so in South America we find the widely different tree sloths, ground sloths, anteaters, glyptodonts and armadillos apparently converging toward a common ancestral stock. The evidence is not so clear or complete, for exploration in South America has not yet progressed so far as in Europe and the United States. Especially in the early Tertiary of South America our knowledge is as yet very fragmentary and incomplete. In the later Tertiary we have much better material, the Santa Cruz formation (Miocene) in Patagonia being an especially rich collecting ground. In these Miocene beds we find remains of primitive glyptodonts, ground sloths and armadillos already quite distinct from each other



Skulls of South American Edentates. The three upper figures are of living types, the lower ones extinct. *Hapalops* is much older than the others and is most like the ground sloths, but retains from a common ancestry the small muzzle and rounded occiput of the tree sloths, and in the length of the muzzle there is some suggestion of the anteater

but of much smaller size and not so widely divergent as their descendants. In succeeding Pliocene formations we find remains of species intermediate in size and character connecting them with the giants of the Pleistocene Epoch of the age of early man.

The American Museum and Princeton Museum obtained during the years 1898 to 1900 splendid collections from the Patagonian Miocene, which have been studied and described by Professor W. B. Scott. Among the skeletons in this Museum is one of *Hapalops*, which has recently been mounted by Mr. Albert Thomson under the direction of the curator. It is, according to Professor Scott, a collateral ancestor of the giant ground sloths, and illustrates very well what their direct ancestors were probably like.

From the study of the construction of the animal in order to discover its probable habits as a guide to its pose, we concluded that like the anteaters, it was partly arboreal and partly terrestrial. The living anteaters, when they are walking along the branches of trees, step upon the palm of the fore foot and sole of the hind foot, as do most quadrupeds, but when they walk on the ground the large claws of the fore foot are in the way, so they are apt to walk upon the knuckles, although the hind foot with its smaller claws rests flat. Arboreal apes very commonly walk on the ground in the same way, partly from the difficulty of bending the hand backward into an unusual position, partly to protect the delicate tips of the fingers.

It seemed probable that the *Hapalops* with its large front claws would find it most convenient to walk in this manner when on the ground. This position habitually taken would tend in the course of time in a terrestrial descendant to be modified by resting on the outer side of the hand, and in this way the peculiar twist in the fore foot of the giant ground sloths is very exactly accounted for. The hind foot also became twisted inward, but from a position resting on the sole of the foot, and this again explains how various peculiarities in the hind foot construction of the great ground sloths arose. The general resemblance in the construction of the hind foot in *Hapalops* to that of the anteaters gave reason to believe that it was equally limited in its motion, so that the animal stepped off the ends of the toes without much bending of the foot at the ankle and first row of phalanges.

We see then in this ancestral ground sloth a very marked approach toward the common ancestor of ground sloths, tree sloths and anteaters. It does not show any notable approach toward the glyptodonts and armadillos. But when we obtain a more complete knowledge of the early Tertiary ancestors of the Edentates, we shall hope to confirm what the fragmentary remains known to us seem to indicate, that all these Edentates were derived from a common ancestral source.

LAKE HANNINGTON, AFRICA

At the south end of the lake, where the water was comparatively fresh owing to the springs at the base of the escarpment, many shore birds and water birds congregated. Conspicuous among these were avocets and Egyptian geese. There were also a few crocodiles and hippopotamuses here. No flamingos were within a mile of the south end

Busily skimming the surface of the foul water with their bills

FLAMINGOS OF LAKE HANNINGTON, AFRICA

By Carl E. Akeley

LAKE Hannington lies just under the Laikipia Escarpment at the east side of the Rift Valley, a few miles north of the Equator, Lake Baringo better known to sportsmen being about twenty miles farther north. The caravan route from Nakuro on the Uganda railway to Lake Baringo swings in close to the escarpment just at the north end of Hannington, and travelers usually get their first view of the lake at this point where few flamingos are to be seen except in breeding season and where the water is shallow, bordered by low mud flats crusted with a deposit of salts mingled with feathers, bones and the droppings of the great colony. If the general unattractiveness of the place as seen from the north end were not sufficient to discourage a disposition to explore the lake, the sickening stench from the green waters must dishearten anyone who has not a definite object in further investigation. It is not strange that so few have seen the real beauties of Hannington.

On our first visit to the lake in January, 1910, we were fortunate in our ignorance of the region. We approached from Eldama Ravine on the west side of the Rift Valley and having had a glimpse of the lake from an elevation before reaching the Nakuro-Baringo trail, we kept on our way across to a spur of the escarpment that rises abruptly from the south end of the lake, ignoring the trail which would have led us to the north end. After we had gained the one glimpse of the lake and had taken our bearings, we continued on through a hot, waterless, thornbush region for several hours, hoping as we ascended each rise to see the lake again. It lies low in a secondary rift of its own however, and long before we caught the second glimpse of it, we began to fear that we had been following a mirage.

As we neared the escarpment we found a small stream of crystal clear water, and although it was too warm to be palatable, we were delighted with the discovery since the porters and horses were sadly in need of water. We decided to make camp here and while selecting a place for the tents, the

cook discovered a spring of boiling water which he appropriated for his uses. A little farther on, a spring of ice-cold water was located, so at the camp we had all modern improvements as far at least as water supply was concerned.

After making camp, an hour's walk brought us to the top of a rocky hill from which we had an excellent view of nearly the entire length of the lake, an irregular sheet of water eight or ten miles long by perhaps two miles at the widest point. It lay before us a shimmering blue-green mirror with occasional strips of snow-white beach. At the south end, that part nearest us, the water was much darker in color owing to its greater depth, and the steep slopes of the escarpment were mirrored in its surface. Here and there along the shores, jets and clouds of steam spurted forth from the numerous boiling springs and immature geysers. Far away toward the center of the lake what seemed great peninsulas and islands of rosy pink broke the placid surface of the lake — these were the flamingos that we had come to see.

When the birds had gone from the fishing grounds we would hurriedly construct a crude blind of green branches and await their return. Within a half hour they would come, some of them on wing and some swimming slowly in

On approaching the great flock as they fled in the shallow water near shore, they would rise with a great roar of beating wings and splashing water, circle about in drifting pink clouds and finally settle down in mid lake

Next morning we hunted along the east shore of the lake under the escarpment and met with rhinoceros, buffalo and greater kudu in the strip of bush that fringes the shores. In the meantime the flamingos moved across to the western shore and we failed to get photographs of them. On the second day after a two hours' journey up the tortuous rock-strewn western shore, we came to the region which seems to be their favorite haunt.

On our approach the great flocks rose from the water and flew across toward the opposite shore many alighting in mid-lake. As the birds arose the splashing of water made by their running over the surface to get a start, the beating of wings and the "kronk-kronk" of their calls created an indescribable din, while the charm of the marvelously beautiful sight was tempered by the odors that arose from the putrid waters churned by the activity of the birds.

The flamingos that had settled

The sandy beaches of the lake were at places buried in windrows of pink and white feathers; this at the edge of the blue and green scum-coated water made a striking color picture

in mid-lake soon began to drift back in our direction and we hurriedly constructed a rude blind of green boughs on the shore. Here I awaited their return, camera in position, and within half an hour was surrounded by acres of the beautiful creatures. The greater number of the birds proved to be of the small, more brilliantly colored species of African flamingo, *Phœnicopterus minor*, although a few of the larger species, *Phœnicopterus roseus*, were in small isolated flocks or scattered here and there among their smaller relatives.

Evidently flamingos spend the entire year at Lake Hannington. At times however, small numbers of both species are said to be found at the other lakes of the Rift Valley, Nakuro, Elementeita, Naivasha and Baringo.

So greatly did the flamingos interest us in this January visit that we returned to Hannington in May hoping to find them nesting, but we were some six weeks too late. The young birds in their gray plumage were abundant and traces of the nests were to be seen at the north end of the lake.

Lake Hannington was named after Bishop Hannington, the pioneer missionary who was killed by order of Mwanga, the king of Uganda. The body of Bishop Hannington lies in the churchyard of the cathedral at Kampala.

THE REORGANIZED CROCKER LAND EXPEDITION

ANNOUNCEMENT BY EDMUND OTIS HOVEY, CHAIRMAN OF THE COMMITTEE IN CHARGE

THE Crocker Land expedition has been reorganized, as was necessitated by the lamentable death by drowning April 28 last of its leader, Mr. George Borup, which was recorded in the May JOURNAL. Mr. D. B. MacMillan, who was to be coleader with Mr. Borup, has been made leader and is to take with him as large a scientific staff as may be permitted by the funds available. Mr. MacMillan, besides having general charge of all the work of the expedition, will devote himself particularly to anthropology and meteorology. Mr. W. Elmer Ekblaw of the University of Illinois has been selected as geologist and biologist, and Ensign Fitzhugh Green has been detailed from the United States Navy to duty on the expedition. He will be an assistant in geology and glaciology and will take care of a portion of the map work. The chief topographer of the expedition has not yet been appointed, nor has the surgeon been selected, although there are applicants for both positions. The surgeon will be expected to do some of the biological work for which plans have been made. The party will probably also include in its complement of white men a general scientific assistant to look after meteorological, seismological and other instruments, besides a general assistant to serve as cook and mechanician.

The reorganized Crocker Land expedition therefore has a thoroughly high-grade nucleus for its scientific staff, and its success seems assured. The hearty coöperation of the Navy Department is an indorsement that is highly appreciated. Its financial position was impaired however by the heavy expenditures made necessary by the postponement of its departure, and additional subscriptions of about $15,000 are needed to carry out the plans and bring the party safely back to New York.

After exploring Crocker Land for one or two seasons, as circumstances may determine, the party will divide, one portion going southwestward from Cape Thomas Hubbard to explore the region north of the Parry Islands and connect with the third Stefánsson expedition, coming home by way of Bering Strait. The other subdivision, after completing the coast-line work from the northern extremity of Axel Heiberg Land eastward along the northwestern coast of Grant Land, will return to Flagler Bay and will make a journey from Inglefield Gulf to the summit of the Greenland ice cap, if circumstances are favorable.

A revised prospectus giving more in detail the plans of the reorganized expedition will be issued shortly.

A SECTION OF THE GIANT SALAMANDER GROUP IN THE AMERICAN MUSEUM

This shows a branch of the Allegheny River in western Pennsylvania where uncouth salamanders or "hellbenders" live in natural caverns under the rocks. It is difficult to distinguish in the photograph where the horizontal real foreground meets the vertical painted background

A NOTE ON THE GIANT SALAMANDER GROUP

SOME PROBLEMS IN PANORAMIC GROUP CONSTRUCTION

By Mary Cynthia Dickerson

THE salamanders commonly known are small, only a few inches in length. Two species however grow to great size, the giant salamander (*Megalobatrachus*) of rocky streams among the mountains of Japan and the "hellbender" or "waterdog," also called "giant salamander," (*Cryptobranchus*) of the Ohio River and its tributaries in America. The former is the largest member of the amphibia, occasionally measuring four feet in length; the hellbender does not attain a size of more than two feet.

A panoramic group recently built in the Museum to show the life history and habits of the American species, is interesting because it presented in the building various problems in technique. A group constructed somewhat previous to this, the bullfrog group, first of a series of panoramic reptile groups under construction, was a departure from other groups in the Museum in that it had to show animal life under water, as well as that above the surface. Thus when the giant salamander group was planned, in which all the animal life had to be represented below the surface of the water, because the salamanders are thoroughly aquatic, this problem of group making had already been solved.

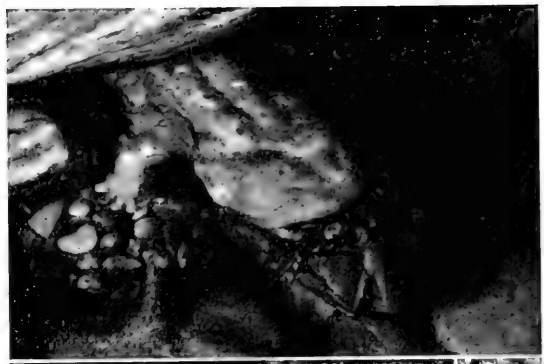
There were others however which seemed insurmountable. One was imposed by the nature of the haunt of the hellbender which lives in rapid flowing rivers and has its nests under rocks with the openings away from the current on the down side of the stream. It seemed no easy task to represent a river as if flowing directly toward the observer, and especially to do this within the limits of seven feet of horizontal foreground — in which the real objects could be displayed — and a vertical painted canvas joined to the foreground at the rear and sides. How well the technical difficulties were overcome must be judged by each observer of the finished group. He can see most of the means to the end: the upward slope of the foreground to meet the background; the arrangement and the varying size and color of rocks and accessories to produce perspective; the peculiar curve given to the canvas for the sake of perspective [compare with the bullfrog group]; and the focusing of artificial lights on definite parts of the group to call attention to the immediate foreground and to the sunlight in the distance on the river, leaving the line of union of canvas and foreground in dimness. Many small details also have been inserted for the sake of realism, such as floating foam on the surface of the water and grasses beneath swept by the current. Again, rocks on the canvas are built out with papier-maché to make them more

SECTION OF THE GIANT SALAMANDER GROUP — THE RIGHT BANK OF THE RIVER

Wild asters and turning sycamore leaves tell that the time is September. Many giant salamanders (*Cryptobranchus alleghenieusis*) are shown below the surface of the water engaged in their various life activities

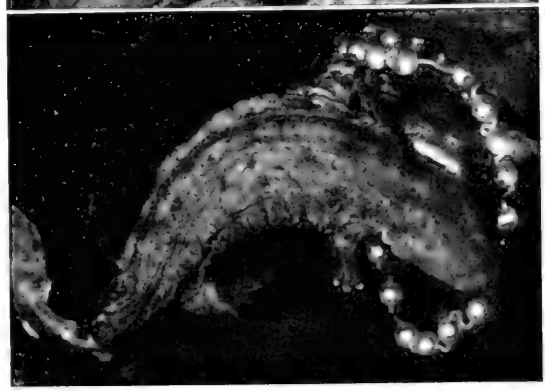
realistic and the rocks at the rear in the foreground have their reality lessened by a spray of purple color.

Another problem had to do with the technique of making casts of the salamanders. They are thin-skinned and soft-bodied and when taken from the water keep their form about as well as does a jelly-fish and in truth are just about as satisfactory to cast. The impossibility of getting casts of soft-bodied, aquatic amphibians has spurred on some experiment and much discussion in the taxidermy shops of the Museum for a year or more. Casts made from the frozen animals and from forms killed and slightly hardened in formaldehyde had given little more than caricatures of the salamanders and no medium had been found which would harden in water and thus replace plaster of Paris in the mold-making. One day however one of the Museum sculptors, who has studied in Paris art schools, was heard to tell the story of his experience in making a mold of a delicate flower under oil instead of in air. This gave the clue. The salamanders were killed with ether, then immediately posed under oil — kerosene oil was used which is clear and transparent — where the soft specimens with their delicate rufflings of skin were buoyed up as if alive in water. Then the molds were made, the salamanders still under the oil and the plaster hardening in this medium quite as in air. Thus the wax casts of the group are lifelike not only in matters of pose and form but also in every minute detail of surface texture. Seven of the nine



He reaches from under the rock to seize a crayfish from the crevices. Wax cast from a model in clay

Shedding the skin. He pulls it off the tail, then greedily swallows it. Wax cast from life



Contest between a salamander on guard at his nest and a cannibalistic intruder who has stolen a string of the eggs. Wax casts from life

full-grown salamanders of the group are such wax casts. The two others are cast from a model in clay made from a study of the living animal.

The background of the group, painted by Mr. Hobart Nichols of the American National Academy, is peculiarly successful in its effect of distance brought about by a broadly suggested treatment of river, trees and sky as in a mural decoration. The new group is on exhibition with the bullfrog group in the east tower of the second floor.

COÖPERATION WITH THE NEW YORK ENTOMOLOGICAL SOCIETY

By Charles W. Leng

AT the entrance to the east tower room on the third floor there is a sign reading "Local Collection of Insects in the Custody of the New York Entomological Society." This is the public evidence of the coöperation that is in force between the American Museum and this society. As such extensive coöperation is peculiar to this Museum, and in fact to its department of entomology, the history of its origin and results may be interesting. The writer has always believed that the only excuse for the existence of societies, apart from their social features, is the accomplishment of work too comprehensive for an individual to undertake alone, while one of the functions of a public museum is to facilitate such associated efforts and preserve their results. It was therefore encouraging to find that the ideas of the American Museum's director and its scientific staff were entirely in harmony with these thoughts. Consultations were held with leading members of the New York Entomological Society as to the direction in which museum aid could profitably be applied. A permanent meeting place was the first step. Improvements in lighting, increased library facilities, the installation of current entomological literature in the meeting place, the purchase of needed books rapidly followed, and culminated for the time in the commencement of the Local Collection of Insects.

The knowledge of our local insects at this time was divided among about one hundred entomologists scattered over the city and suburbs. Each of these men knew something about a few insects from personal observation, knew their names, their habits and food plants, and something about the literature concerning them. Out of the hundred, a few of the older men knew more than the average, and their collections served to aid the others in obtaining names for their insects. For example Mr. William T. Davis of Staten Island, had a private collection in which, after more than thirty years of incessant field work and study, a goodly part of our local insects could be

found accurately named by specialists, and labeled with exact locality, date of capture and often valuable ecological data in addition. To assemble the scattered information possessed by these entomologists, to form a local collection of insects, complete, accurately determined by specialists, labeled as it should be labeled, was the task undertaken by the Museum with the hearty coöperation of the members of the society. Individual response has of course varied with the amount of scientific spirit individually possessed, but all the really active members have contributed specimens as well as time to the improvement of the series. To represent the Local Collection as complete would be far from the truth; it is merely in active progress. Frequently on Saturday afternoons during the winter, eight or ten entomologists will be found hard at work, comparing specimens with descriptions, adding to the collection, exchanging one with the other, and bringing the Local Collection each time a little nearer to completion. At these meetings the taxonomic characters of each species are in turn pointed out, duplicates from the larger private collections are distributed to the collections of the Children's Museum and of the Staten Island Association of Arts and Sciences and to the smaller collections; data of exact localities, food plants and dates of capture are collected and kept in permanent form; and every one present gains information and specimens personally as well as aiding the Local Collection by his attendance and gifts.

The number of species to be dealt with is appalling, certainly not less than fifteen thousand, and the taxonomic difficulties are increased by the microscopic size of many species, the absence of such comprehensive books as exist in Europe, and the neglect of certain orders by practically all local collectors. These difficulties must be overcome by the Museum staff, which is at present far too small in this department for rapid progress. The gaps in the Local Collection however, are gradually being filled, and a complete collection that will be of inestimable service to future generations of entomologists is actually in sight, as one of the first fruits of coöperation between the Museum and the New York Entomological Society.

Further results are to be noted in field work, which in coöperation with members of the Entomological Society has been prosecuted locally in Florida, in Newfoundland, Labrador and elsewhere, resulting in the addition to the Museum collections of many thousands of specimens annually. The work that has been done has enlisted also the aid of specialists outside of the society, who noting the activity resulting from this coöperation, have gladly contributed their information. Thus Mr. C. W. Johnson, Mrs. Annie Trumbull Slosson, Mr. E. A. Schwarz, Mr. J. H. Emerton, Colonel Thomas L. Casey, Colonel Wirt Robinson and others have been in active communication with the department.

Nor is this all. Entomology is essentially a practical science, and although one of the youngest, one of the most important in its relations to

problems of evolution and distribution on the one hand and to economic and medical science on the other. Its actual importance is undoubtedly underestimated even by generally well-informed people. The damage wrought by domestic insects, by those of the garden, by those of the forest and the farm, as well as by the insect carriers of disease, is enormous. Already the collections of insects in the American Museum aggregate more than one million specimens, the care of which it may be parenthetically mentioned devolves upon four persons. The foundation for future work necessarily rests on stable, established nomenclature, which involves a wearisome study of descriptions and comparison of specimens, and this is what the Local Collection is designed to facilitate. The superstructure involves the study of the relation of insects to their environment. It is in this respect that the coöperation between the scientific staff of the Museum and the members of the Society has already brought forth the most gratifying results. The *Journal* of the Society was once largely filled with contributions from outsiders; it is now difficult to find space for all the articles contributed by members of the Society. The minutes of the Society a few years ago record interesting captures, exchanges and taxonomic characters, those of to-day the habits of the larvæ, the distribution of insects in time and space, and discussion from an entomological point of view of the most intricate points of science. The association of the practical entomologists of the Society with the trained scientific staff of the Museum has taught the entomologists to group and to present their facts more logically and see their chosen science from new points of view, while to that staff the importance of entomology may have become more evident.

Such are some of the results of coöperation of the Museum with a scientific society in four short years. What will be the results in twenty years? Is it too much to anticipate on the one hand, the accumulation in the American Museum of the greatest collection in the world, better arranged, better named, more useful to science than was ever known elsewhere; and on the other hand the growth of the New York Entomological Society, with the library, collections, field work and scientific staff of the Museum at its service, into the greatest of all entomological societies, surpassing in its usefulness anything heretofore conceived, and embracing in its scope every department of entomology? The writer believes that the beneficial results of coöperation are already too plain to doubt its value, even if the consummation that we hope for may not thus be speedily attained.

MUSEUM NOTES

Since the last issue of the Journal the following persons have been elected to membership in the Museum:

Patron, Mr. Rodman Wanamaker;

Fellow, Mr. Charles Deering;

Life Members, Mrs Frank Pierce Frazier, Mrs. W. R. Grace, Mrs. D. Hunter McAlpin, Mrs. John Markoe, Mrs. Francis Eyre Parker, Mrs. Louis D. Ray, Mrs.W. Watts Sherman, Miss Jean Walker Simpson and Messrs. F. Gray Griswold, Paul A. Isler, James de Lancy Verplanck, Hamilton Fish Webster and Solomon Wertheim;

Sustaining Members, Messrs. John W. Frothingham, William R. Stewart and Oswald W. Uhl;

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Under the auspices of the American Geographical Society, the American Museum of Natural History, and the Norwegian National League, Captain Roald Amundsen will give at Carnegie Hall on the evening of January 14 his story of the discovery of the South Pole. President Henry Fairfield Osborn will introduce Captain Amundsen and the American Geographical Society will present to him a gold medal in recognition of his historic work as the discoverer of the Northwest Passage and of the South Pole.

Mr. Nels C. Nelson, assistant curator in anthropology, has just returned from an archæological expedition to the Southwest. This expedition confined its work almost entirely to the Rio Grande drainage. A systematic search for archæological sites was begun at Ysleta del Sur, a few miles below El Paso, and completed northward to the latitude of Santa Fe. Within this section of the drainage 115 sites of more or less interest were located and about half of these were inspected. Actual excavations were conducted in two localities. First a group of seven large Tanos pueblo ruins, located on the border of the Galisteo Basin twenty-five miles south of Santa Fe, were worked to the extent of determining their age and culture relations; and later one entire Keresan pueblo ruin, located on the Jemez National Forest seven miles north-

west of Cochiti, was cleared. Besides digging trial trenches and examining refuse heaps, four kivas and 573 ground-floor rooms were cleared. The débris removed from these rooms ranged in depth from two to twelve feet and represented, with a few exceptions, two and three story houses. The resulting collections comprise sixty more or less complete human skeletons and about two thousand artifacts.

THERE has recently been placed in the forestry hall a bronze bas-relief of Morris Ketchum Jesup, president of the Museum from 1881 to 1908, as an expression of the admiration felt for Mr. Jesup by the late Mr. John J. Claney. The panel is by Mr. James E. Fraser and is very convincing both as a portrait and as a work of art. In historic and decorative value it is in the spirit of the plans for development of this hall, that it shall remain a fitting memorial to the man who brought together what is to-day the world's greatest collection of the trees of North America. A photograph of the bas-relief will be reproduced in the January JOURNAL.

PRESIDENT HENRY FAIRFIELD OSBORN gave an address on the subject, "Recent Developments in the Theory of Evolution," at the Pratt Institute Free Library before a meeting of the Long Island Library Club on December 5.

PROFESSOR HUGO DE VRIES, of the University of Amsterdam, lectured at the Museum on "Experimental Evolution" Friday evening, December 6, before the members of the American Museum of Natural History and the New York Academy of Sciences. At the close of the lecture an informal reception was tendered Professor de Vries.

THE department of education entertained some four hundred crippled children from the various public schools of the city on December 16. The children were carried from the schools to the Museum by special conveyance provided through a transportation fund. the gift of Mr. Henry Phipps. At the Museum they saw Mr. Carl E. Akeley's African moving pictures and heard him tell the story of the pet monkey "J. T. Junior," who, captured during the first month of Mr. Akeley's African travels, remained a member of the exploring party for two years.

THE total number of children from the public schools attending the fall course of lectures given by the Museum was 16,601. The subjects of the lectures were under three heads: American history and civics; geography of the world, and great industries of North America.

MR. VILHJÁLMUR STEFÁNSSON of the Museum's Arctic expedition recently returned to New York, has addressed during the past month various organizations interested in geographical exploration on the subject of his experiences in the Coronation Gulf region. The list includes the Geographical Society of Philadelphia, National Geographic Society in Washington, Harvard Travelers Club in Boston, and Peary Arctic Club, Explorers Club and Campfire Club in New York. On January 7, Mr. Stefánsson will lecture in New York before the American Geographical Society.

DR. J. A. ALLEN gave recently in *Science* a preliminary note on his latest researches as to the time of extinction of the musk ox in northeastern Alaska. It seems that reports made by the Stefánsson-Anderson Arctic expedition not merely confirm previous evidence of living musk oxen in this region as recently as fifty to sixty years ago but also emphasize what has been said before by important additional information. The new facts rest on knowledge existing among natives and white residents of the region and on collections made by the expedition, skulls

found on the surface of the earth, in such condition of preservation that they represent recent rather than Pleistocene origin, and skins discovered in the excavation of old houses.

THE MUSEUM has received from Tokyo Bay through the courtesy of the Oriental Whaling Company, by an arrangement effected by Mr. Roy C. Andrews on his expedition to Japan in 1910, a complete skeleton of the ziphiioid whale *Berardius bairdii* Stejneger, the type locality of which is Bering Island. The National Museum reports this whale represented in its collections by three skulls and three skeletons all from Alaska except one taken at Centerville, California. The species has not heretofore been recorded from any other localities. Thus the knowledge that it occurs in Tokyo Bay — the Imperial Museum of Tokyo has had a skeleton on exhibition for some time — makes a notable extension of range for both genus and species. As far as known the specimen now in New York and those in Washington and Tokyo are the only examples of this rare species which have been preserved.

MR. ALANSON SKINNER of the department of anthropology has recently been elected honorary curator of anthropology of the Staten Island Association of Arts and Sciences.

MR. JOHN D. CRIMMINS has presented to the Museum a mounted specimen of a sixty-two-pound sailfish (*Istiophorus nigricans*) which he took with rod and reel off Palm Beach, Florida. The specimen has been repainted to emphasize its brilliant metallic colors and is now on exhibition in the hall of recent fishes.

WHILE investigating certain geological formations in Central America and British Guiana, Mr. William Warfield, a graduate student of geology at Princeton University, has made an interesting collection of about two hundred fishes and one hundred and seventy-five moths and butterflies for the Museum.

PROFESSOR C–E. A. WINSLOW, curator of public health, presented to the section of biology of the New York Academy of Sciences on December 9 a review of the American Museum's work in the formation of a comprehensive permanent collection of living bacteria. This collection, housed on the sixth floor of the building and open to inspection only on request, represents the first attempt to present in this country to university and medical interests the opportunity for comparative study of the germs of disease. Seventeen hundred cultures have already been distributed without charge to one hundred and twenty-two different teaching and research laboratories.

A SMALL Navajo group has been placed on exhibition in the Southwest hall. The human figures in the group were modeled by Miss Nessa Cohen and the other parts by Mr. Otto Block. The whole composition represents a Navajo home, with the ever-present flock of sheep in the corral, the women weaving blankets and the men making silver ornaments.

THE SOCIETY OF AMERICAN BACTERIOLOGISTS will meet at the Museum on January first and the members will be entertained at luncheon in the Mitla room as the guests of the Museum.

ON the evening of December 5, Professor C–E. A. Winslow opened the first seminar of a series to be given by the department of biology at Trinity College.

PROFESSOR HERSCHEL C. PARKER of Columbia University, under the auspices of the American Museum of Natural History and the American Scenic and Historic Preservation Society, lectured in the auditorium of the Museum December 9 on the "Scenic Beauties of Alaska, with Special Reference to the Ascent of Mount McKinley."

Mr. Leo E. Miller having returned from his very successful expedition to Colombia, on which he secured material for a group illustrating the nesting habits of the cock-of-the-rock, sailed on November 26 for the Orinoco region to be gone one year. Mr. Francis X. Iglseder accompanied Mr. Miller as assistant.

Eight pearl oysters (*Meleagrina margaritifera*) showing newly-formed pearls *in situ* have been sent to the Museum by Mr. Gaston J. Vives, manager of the pearl fishery at La Paz, California. Two of the specimens bear large saclike cysts such as are believed to contain a majority of the pearls found. The attached pearls are apparently spherical and vary in size from about one-quarter grain to three grains. One specimen shows two pearls close together, one about four times as large as the other. All of the pearls are located on some portion of the free mantle of the oyster, generally on the branchial surface of the inner edge, and all are thinly covered by the epidermis.

There are probably no specimens of this character in any museum of the country. The pearl-shell company of which Mr. Vives is the manager has for a few years been engaged in the artificial cultivation of the pearl oyster and has already succeeded in growing a considerable quantity of pearl shell for the market. The company has an extensive station on Espiritu Santo Island near La Paz.

The department of geology has received as a gift from Mr. Marcos J. Trazivut of New York City an officer's sword which he found this year in the ruins of the military barracks at St. Pierre, Martinique, a memento of the great eruption of Mont Pelée which took place in 1902.

A new group in the insect hall shows a nest of the mound building ant (*Formica exsectoides*) and about four hundred of the workers. The latter are so small as to require careful looking to see them, yet they make mounds which, as illustrated in this exhibit, are frequently more than four feet in diameter and two feet high. Detailed activities of ants and other social insects will be shown in nearby railing cases.

The recent publication in the *Bulletin* of the American Museum of a list of 619 types and cotypes of insect species which have been deposited in the Museum, emphasizes not only the great amount of work being done and to be done in discovering undescribed insects but also the esteem in which the Museum is held as depository of these priceless objects. The number listed is exclusive of Lepidoptera and ants, and additional to former lists.

A group showing the marine invertebrates on the piles of old wharves is being prepared for the Darwin Hall, and will be ready for exhibition early in January. The anemones, sponges, hydroids and other animals which live on these piles cluster in large colonies often of great beauty and delicacy, and since in most cases it is impossible to preserve the real creatures they have been represented in this group by models of wax, glass and celluloid, accurate in form and color. The photographic transparency background portrays the shore of Vineyard Haven, Massachusetts, where field studies for the group were made.

Through an exchange of specimens with the United States National Museum, the American Museum has now come into possession of all the objects belonging with the remarkable mummy found in November, 1899, in the Restauradora Copper Mine, Chuquicamata, Chile. These objects are such as were used in collecting copper ore — three stone hammers and a large stone maul, all with wooden handles; two scrapers, one of wood and the other of stone, and three baskets and a hide bag for holding copper ore. They are now on exhibition beside the mummy in the case in the South American gallery.

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Rhinoceros on the walls of Font-de-Gaume