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THE NATIONAL GEOGRAPHIC MAGAZINE

AUGUST, 1915

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20 Pages in Four Colors

American Game Birds

HENRY W. HENSHAW

With 76 Illustrations; 72 in Colors from Paintings by Louis Agassiz Fuertes

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GEORGE SHIRAS, 3rd

With 36 Illustrations and 2 Colored Maps

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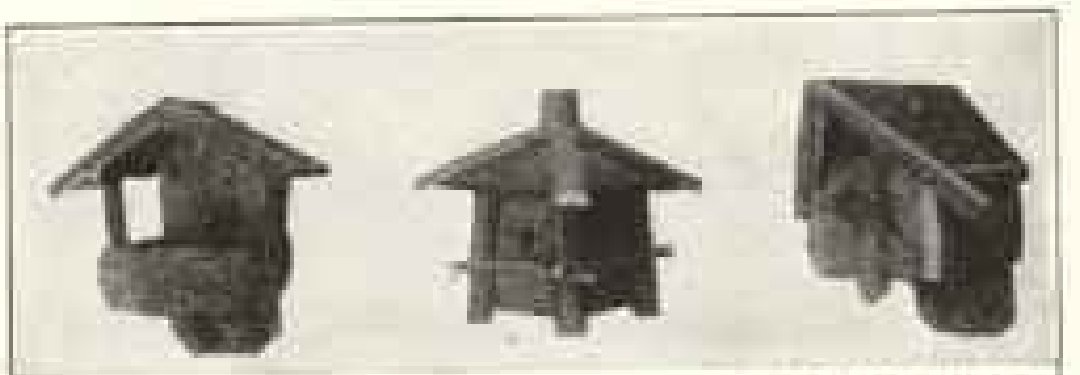

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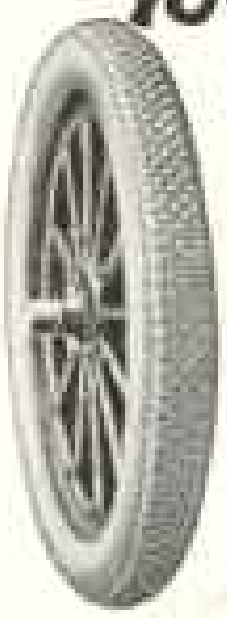

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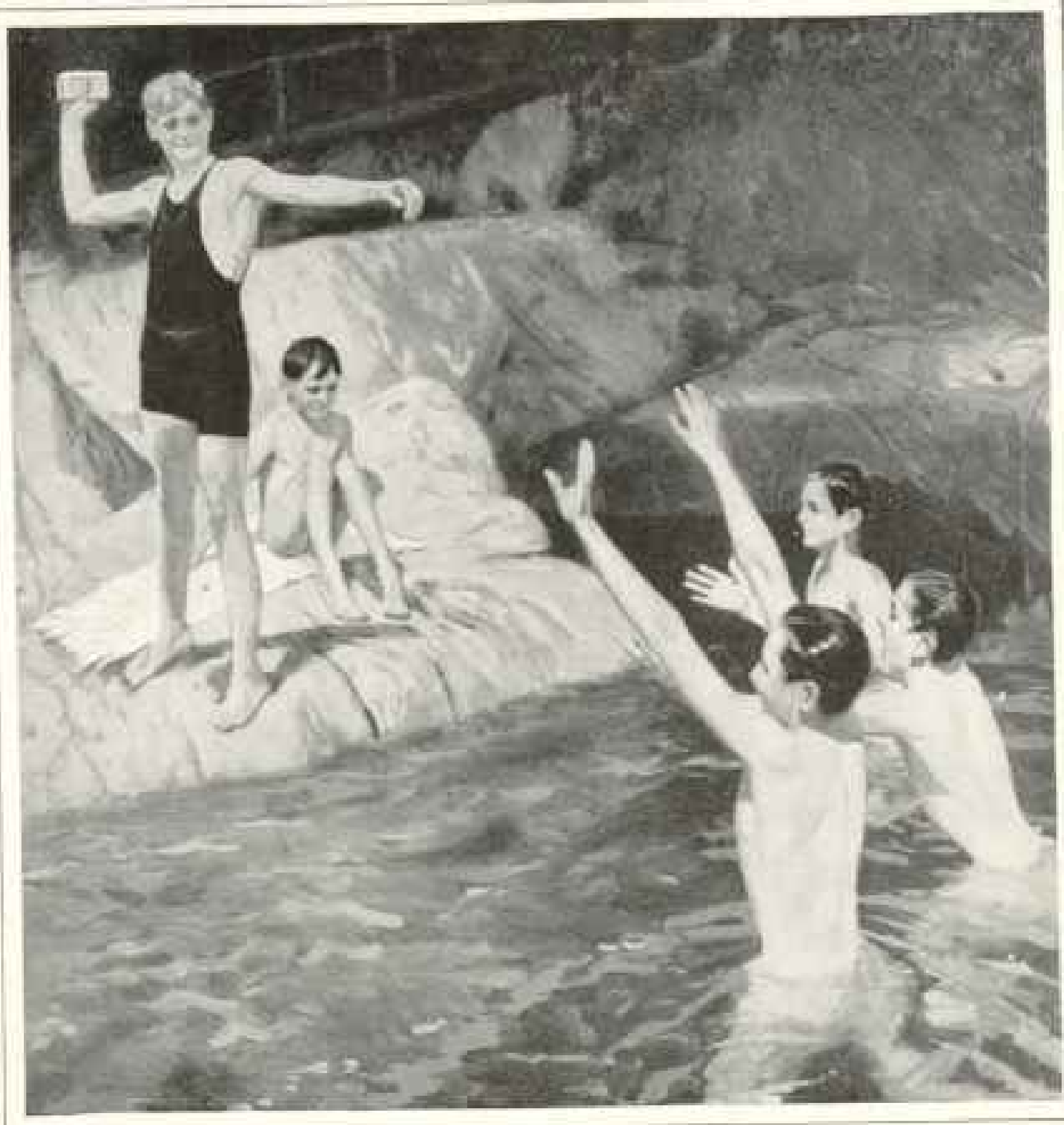

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VOL. XXVIII, No. 2 WASHINGTON AUGUST, 1915

THE NATIONAL GEOGRAPHIC MAGAZINE

AMERICAN GAME BIRDS

By HENRY W. HENSHAW

CHIEF OF THE U. S. BIOLOGICAL SURVEY AND AUTHOR OF "COMMON BIRDS OF TOWN AND COUNTRY," IN THE NATIONAL GEOGRAPHIC MAGAZINE

With Illustrations from Paintings by Louis Agassiz Fuertes

FROM the time of the earliest settlement of the country the wild game of America has proved a national asset of extraordinary value. Nowhere in the world, except in Africa, was there ever greater abundance and variety of wild life.

The forests of America were filled with game birds and animals, large and small: its streams, lakes, and ponds were covered with waterfowl, and its rivers and shores furnished highways for myriads of shorebirds as they passed north and south. Nature would appear to have stocked the continent with lavish hand. Indeed, but for the wild game our predecessors, the Indians, would not have been able to maintain existence, much less to advance as far as they did in the arts that lift peoples toward the plane of civilization.

And at first our own forebears were scarcely less dependent than the aborigines upon game for food. Many years of toil and struggle had to pass before the rude husbandry of the colonists sufficed to free them measurably from dependence on venison and wild fowl.

Nor will any student of American history doubt that, but for the services of our pioneer hunters and trappers who literally hunted and trapped their way from the Atlantic to the Pacific, the course of empire westward would have been halted for decades. As a consequence, the settlement of much of our fair land would have been long delayed, if, indeed, the land had not passed into the possession of other peoples.

Moreover, it was in the pursuit of game that the hardy frontiersmen developed skill as marksmen and acquired many of the rude border accomplishments which later made them effective soldiers in the war for independence.

Game existed everywhere, for the Indian, though wasteful of wild life and knowing naught of game laws, took what toll he would of the game about him, and yet made no apparent impression on its quantity; so that it passed into the hands of his successors, along with his lands, practically in its original state.

AMERICAN WATERFOWL AND SHOREBIRDS

And what a rich heritage it was! In addition to the upland game birds of the forests and open glades, great numbers of ducks and shorebirds found on our western prairies and in the innumerable lakes and ponds the food, solitude, and safety necessary during the nesting period. More important still as a nursery for wild fowl and shorebirds were, and

still are, the tundras of Alaska and the barren grounds that, dotted with countless lakes and rivers, stretch to the Arctic.

Here, in these northern wilds, solitude reigns supreme, and vast multitudes of waterfowl breed, assured of both food and safety. On these Arctic plains Nature has provided in a remarkable way for her winged servants by supplying an inexhaustible crop of berries. As the short summer season wanes the berries ripen and furnish a nutritious food upon which the waterfowl fatten and gain strength for their long southern journey.

Then the Ice King takes the remainder of the crop in charge, wraps it in a mantle of snow and ice, and keeps it safe in Nature's cold storage, ready for delivery in spring to the hungry migrants. Without this storehouse of berries it is doubtful if our waterfowl could sustain life in the Arctic, and the so-called barrens, instead of being a nursery for myriads of fowl, would indeed be barren so far as bird life is concerned.

When the short Arctic summer closes and the young birds acquire strength for the journey, multitudes of ducks, geese, swans, and shorebirds, anticipating the Arctic winter, wing their way to southern lands. Including these winged hordes from the Arctic that visit our territory and the birds that nest within our own limits, America possesses upward of 200 kinds of game birds, large and small, many of which are in the front rank, whether viewed merely from the economic standpoint as food or through the eyes of the sportsman.

FORMER ABUNDANCE OF GAME BIRDS

While the aggregate numbers of game birds are very great, they sink into insignificance when compared with their former abundance. The statements of the early chroniclers regarding the multitudes of ducks, plover, and wild pigeons almost defy belief. When, in the records of the first part of the last century, one reads of clouds of pigeons that required three days to pass a given point in a continuous moving stream, and again of flocks estimated to contain more than two billion birds, credulity is taxed to the limit.

Yet not only one such flock was observed, but they were of periodic occurrence during many years of our early history, and the accounts of them are too well attested to be doubted. As throwing a curious sidelight on the abundance of wild fowl and the hardships to which the slaves of the period were subjected, I quote a paragraph from Grinnell (American Game Bird Shooting), who states that "in early days slave owners, who hired out their slaves, stipulated in the contract that canvasback ducks should not be fed to them more than twice each week"!

CAUSES OF DECREASE OF GAME BIRDS

What, then, has become of the teeming millions that once possessed the land? Before attempting to answer this question it may be well briefly to review certain general causes that contribute to the depletion of the ranks of game birds. Among these may be mentioned natural diseases; natural enemies, both winged and four-footed; forest, brush, and prairie fires; the drainage of swamps and the general elimination of nesting grounds by the advance of agriculture; and finally, most potent of all the agencies of destruction—firearms.

From the nature of things, no data are available to show exactly the relative importance of the above causes of decrease or of their separate or combined effect. Nevertheless we can arrive at an approximate idea of their relative effect.

Natural diseases seem to play a comparatively unimportant part in causing the death of birds, except perhaps indirectly. In a state of undisturbed nature there are few sick or old birds, for the reason that the sick, the heedless, and the old, as soon as their strength begins to fail, are promptly eliminated by natural enemies, who, while foes of individual bird life, nevertheless do good service to the species in keeping the vigor of the stock at a high standard by promptly weeding out the unfit.

While the annual loss of game birds by attacks of predatory birds and mammals is no doubt very great, it is to be noted that it is relatively far less at the present time than formerly, owing to the

general destruction of birds of prey and of wild four-footed animals of whatever name or nature.

The contrary is true of that predatory animal, the house cat. Never were house cats more destructive of bird life than now. While the annual loss of insectivorous birds by them is far greater than that of game birds, the loss of woodcock, quail, grouse, and upland-breeding shorebirds is by no means small. Taking into account bird life in general, the cat is undoubtedly the most destructive mammal we have, and the aggregate number of birds annually killed by them in the United States is enormous.

Of late years serious losses have been reported among the ducks of certain localities in the West. The causes are yet obscure, but they are probably not due to epidemics, as commonly believed. They will probably prove to be very local and of comparatively modern origin, and to be dependent on drainage contaminations or unnatural crowding into unfavorable feeding grounds. It is hence highly probable that such losses can be eliminated either in whole or in part.

Before the coming of the whites, forest and prairie fires were due to lightning or were purposely set by the Indians to facilitate the pursuit of large game. While they were no doubt common at certain seasons and probably fatal to many birds, they were too insignificant to have played an important part in the reduction of numbers.

FIREARMS THE CHIEF CAUSE OF DECREASE

The destruction of former breeding grounds through drainage and the general advance of agriculture is a very important cause of the diminution of certain species. But while agriculture usurps the breeding grounds of many kinds, especially ducks and geese, its effect in this direction is to some extent lessened, since it prepares the way for other species, like the upland game birds, and furnishes food and breeding grounds for them. While these and other causes that might be enumerated have tended to diminish the numbers of game birds, even taken collectively they have played only a minor part in the great reduction of these birds as a whole.

It is the gun that has been the chief cause of the destruction of our game, large and small. Whatever weight may be attached to other causes, these fade into insignificance when compared with the effect of firearms.

It is nothing short of marvelous how little time was required by the early pioneers, even with the crude firearms of the time, to make an impression on the abundance of American game. What the Indian with his bow and arrow and his rude nets failed to do in thousands of years, the handful of white men with powder and shot accomplished in a few decades.

Writing within 40 years after the first settlement in New England, Josselyn states that already the wild pigeon had diminished greatly, "the English taking them with nets"; and he adds that the English and Indians, who by this time were supplied with guns, had "destroyed the breed of wild turkeys, so that even at that early day it was very rare to meet one in the woods."

Thus two of our most important game birds, in less than half a century after the first settlements, had already begun to disappear from the neighborhood of the New England colonies. Nor is there reason to believe that it was different in other parts of the country. Game abounded, was needed for food, the supply seemed inexhaustible, and it was shot regardless of consequences, and at first, no doubt, without thought of them.

It is undoubtedly true that up to the present time far more strenuous efforts have been made in this country to destroy game than to preserve it. Even to-day a vastly greater number of individuals are interested in game as something to kill than as something which deserves protection. Clubs having for their chief object the pursuit of game of all kinds have existed since early days; but organizations having for their chief object the preservation of game are relatively few in number and of comparatively recent origin.

AMERICA A SPORTSMAN'S PARADISE

America has always been a paradise for sportsmen, but of late years the number of those whose chief relaxation is the pursuit of game has greatly increased,

AMERICAN MERGANSER (Mergus americanus).

Range: Breeds from southern Alaska, southern Yukon, Great Slave Lake, central Keewatin, southern Ungava, and Newfoundland south to central Oregon, southern South Dakota, southern Minnesota, central Michigan, northern New York and northern New England; winters from Aleutian Islands, British Columbia, Idaho, northern Colorado, southern Wisconsin, southern Ontario, northern New England, and New Brunswick south to Lower California, northern Mexico, Texas, Louisiana, and Florida.

The narrow, serrated bill of the goosander as contrasted with the broad, smooth bills of most ducks would suggest to the merest tyro that its habits must differ widely from those of most of its kin. In fact, the goosander's bill, with its saw-like teeth, is specially adapted to seizing and holding slippery prey of various kinds including small fish which, though not its sole food, constitute the most important part of it. Water insects, frogs, and crawfish, are by no means disdained. The goosander's long, narrow body eminently fits it for swift progress under water where it spends much of its time. Cold weather and ice have no terrors for it, and the bird may winter wherever open water is assured, provided only that food is abundant. Not many goosanders remain within our territory to breed, and these retire to the mountains where they find along the foaming mountain torrents the surroundings they prefer. The merganser follows the general custom among ducks and nests on the ground, but unlike many it nests also in hollows of trees. As it does not associate in large flocks and has learned to care well for its safety, the bird is holding its own very well.

RED-BREASTED MERGANSER (Mergus serrator).

Range: Breeds from Arctic coast of Alaska, northern Mackenzie, Cumberland Sound, and Greenland (lat. 73°) south to southern British Columbia, southern Alberta, southern Minnesota, central Wisconsin, northern New York, and southern Maine; winters in southern Greenland, Commander Islands, and from southern British Columbia, Utah, Colorado, southern Wisconsin, southern Ontario, and Maine south to southern Lower California, Louisiana, and Florida.

The red-breasted merganser is the second of our mergansers in size, and while its habits in general correspond well with those of the larger goosander, they differ in some important respects. The red-breast, for instance, frequents salt water far more than its relative, though it, too, inhabits the interior lakes and ponds. It swims and dives with wonderful skill, and in clear, rapid mountain streams, even the swift and wary trout is not safe from its prowess. This merganser used to breed rather commonly in New England, and it still nests in the northern parts, though in diminished numbers. Apparently it never breeds in hollow trees but conceals its nest on the ground among rocks or bushes. Like its larger relative, this duck does not "flock," and the little parties of five or eight probably represent parents and young, which from motives of attachment or safety, keep together. Eaton ascribes to this merganser a habit which would argue unusual intelligence and cooperative ability. He says, "These mergansers are often observed to hunt in company, a large flock sometimes advancing with wide, extended front, driving the fish before them and diving simultaneously, so that whichever way their prey may dart there is a serrated beak and capacious gullet ready to receive them."

HOODED MERGANSER (Lophodytes cucullatus) (See page 120).

MALLARD (Anas platyrhynchos).

Range: Breeds from Pribilof Islands, northwestern Alaska, northern Mackenzie, central Keewatin, and Greenland south to Lower California, southern New Mexico, southern Kansas, central Missouri and southern Indiana; winters from Aleutian Islands, central Alaska, central Montana, Nebraska, southern Wisconsin, northern Indiana, Ohio, Maryland, south to Mexico, the Lesser Antilles, and Panama.

This fine duck is monopolized by no one country nor even continent, but includes in its range both hemispheres. Its size, abundance, and excellent flavor make it perhaps the most important of its family, and its value to mankind is still further enhanced by the fact that it lends itself so readily to domestication that many of our domestic varieties are derived from it. Before the settlement of the West the ponds and sloughs swarmed with mallards, which nested there by thousands, and in fall and winter, as migrants and winter residents, covered the water courses to the south. To-day there is a very different story to tell. Many of the mallards' old breeding grounds are now farms, and the bird is now represented by a few hundreds where once there were myriads. The mallard is one of our most carnivorous ducks, and nothing in the way of mast, grain, or small animal life comes amiss. In the far West it has the habit, shared to the same extent by no other duck, of resorting to the stubble for waste grain, and the epicure need ask for nothing more delicious than a fat corn- or wheat-fed mallard. The domestication of this duck is easy, and the owners of estates with suitable ponds can render good service in the cause of wild-fowl preservation by raising mallards for liberation.

BLACK DUCK (Anas rubripes).

Range: Breeds from central Keewatin and northern Ungava south to northern Wisconsin, northern Indiana, and southern Maryland; winters from Nova Scotia south to southern Louisiana and Colorado; ranges west in migration to Nebraska and central Kansas.

The black duck is essentially confined to the Eastern States, usually migrating no farther west than Kansas, and that rarely. It is a favorite object of pursuit by sportsmen, and in the struggle to maintain existence has learned its lesson so well that it is still comparatively numerous in localities where less wary species would long ago have been exterminated. Originally a diurnal-feeding species, like most ducks, persecution has taught the black duck to seek safety on the broad ocean during the hours of daylight, and to resort to inland ponds for the purpose of feeding only after sunset. In order to protect this and other waterfowl one of the regulations under the Federal migratory bird law forbids shooting after sunset and before sunrise, and the enforcement of this regulation will probably do more for the preservation of the black duck than any other provision that could be devised. That protection for this species is sorely needed appears from the fact that throughout its range, except in a few localities, the black duck has of late years steadily diminished in numbers.

The black duck is excellent eating, and as experiments prove that it can be reared in captivity it may be raised for the market or be freed for restocking suitable localities.

The Florida black duck is a closely allied species, with similar habits, and is resident in Florida and along the Gulf Coast.

Male Female Male Female

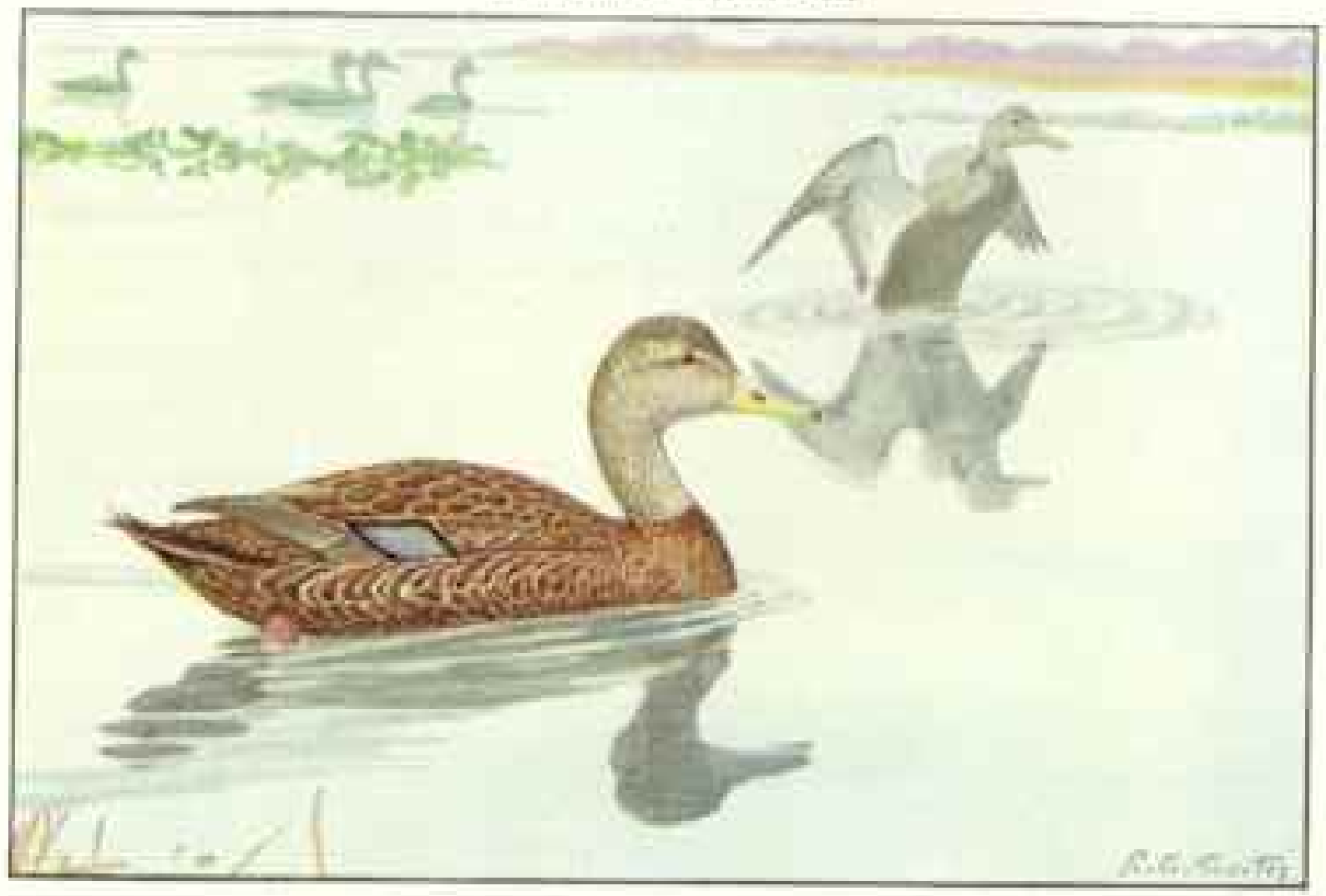
AMERICAN MERGANSER RED-BREASTED MERGANSER

Female Male

HOODED MERGANSER

Male Female

MALLARD



BLACK DUCK

GADWALL (Chaulelasmus streperus) (See page 126).

GREEN-WINGED TEAL (Nettion carolinense).

Range: Breeds from Aleutian Islands, northwestern Alaska, northern Mackenzie, central Keewatin, northern Ungava, and Newfoundland south to central California, northern New Mexico, northern Nebraska, northern Illinois, southern Ontario, Quebec, and New Brunswick; winters from Aleutian Islands, British Columbia, Nevada, southern Nebraska, northern Indiana, western New York, and Rhode Island south to southern Lower California, the West Indies, and Honduras.

Though still numerous in parts of the far West, the green-winged teal has ceased to be even common in the Atlantic States, where it is likely soon to be quite exterminated. The green-wing does not frequent large lakes and open water but shows a marked preference for fresh-water marshes and grass-fringed ditches. It is remarkable in how small a waterway a flock will hide away and if undisturbed feed contentedly for hours. The reasons for the marked decrease in the number of this species are not far to seek. Few ducks decoy better, and when a number of the flock are stretched on the water, the survivors will anon and again return to their comrades as if totally unable to grasp the situation or to realize the necessity of saving their own lives by flight. This teal is not much of a diver, for the shallows in which it usually feeds do not require exercise of the art. Many will attest to the excellence of roast teal, but few will agree with Audubon in his opinion that when teal are feeding on soaked rice or wild oats they are far superior to the canvas-back.

BLUE-WINGED TEAL (Querquedula discors).

Range: Breeds from central British Columbia, Great Slave Lake, central Ungava, and Newfoundland south to central Oregon, northern Nevada, northern New Mexico, central Missouri, southern Indiana, northern Ohio, western New York, and Maine; winters from southern British Columbia, Arizona, southern Illinois, Maryland, and Delaware south to the West Indies and South America as far as Brazil and Chile.

Formerly abundant and nesting over much of eastern United States, the bluewing still inhabits most of its former range, but is numerous only in the Middle West. Though found west of the Rockies it is there replaced for the most part by the cinnamon teal. Its habits may be described in much the same terms as those of its congener, the green-wing. Like that bird, it also is a lover of fresh-water ponds and streams with grassy banks. The bluewing migrates south early, and teal shooting in early September in some localities is one of the sporting events of the year. Extremely fond of wild rice, this duck is generally regarded as a tidbit, and it is at its best when it has fattened on this nutritious seed. Though extremely swift of wing, its speed avails it little in the long run since it is tame and unsuspicious, decoys well, and is easily approached and potted when feeding in its grassy coverts. How much the abolition of spring shooting will accomplish for this and the green-wing remains to be seen. Should it fail, then the most stringent protective measures as to short open season and bag limit will have to be adopted if these attractive little teal are to remain with us.

BALDPATE (Mareca americana).

Range: Breeds from northwestern Alaska, northern Mackenzie, and central Keewatin south to Oregon, Nevada, Utah, Colorado, Kansas, southern Wisconsin, and northern Indiana; winters from southern British Columbia, Arizona, southern Illinois, Maryland, and Delaware south to southern Lower California, the West Indies, and Costa Rica.

The beautiful baldpate is widespread over the fresh-water lakes and ponds of the United States from ocean to ocean. Formerly this bird nested in great numbers in the Western States, but of recent years its nesting grounds have been greatly restricted, and now most of the ducks that visit the United States come from farther north. The baldpate used to be one of the most abundant of ducks, and only recently was to be met with in large flocks, but it has been so greatly reduced in numbers by sportsmen and market gunners, that it can be said to be abundant in only a few localities. When disturbed in ponds near the coast, it has learned to find safety on the ocean, returning to its feeding grounds only when it thinks all danger has passed. It has become one of the wariest of ducks and, like the black duck, has reversed its natural habits in many localities and become a night feeder, devoting the hours of daylight to safeguarding its life by incessant watchfulness. Like most other ducks, the baldpate is fond of wild celery, but as its skill as a diver is small, it essays the role of highwayman, and when the canvas-back or redhead appears on the surface with a bill full of the coveted grass, the fruit of honest toil, it snatches the booty and makes off with it.

EUROPEAN WIDGEON (Mareca penelope).

Range: Occurs occasionally in winter and in migration from Wisconsin, Michigan, New York, Nova Scotia, Newfoundland, and Greenland south to Nebraska, Missouri, Indiana, Ohio, North Carolina, and Florida, and in Alaska, British Columbia, and California.

In general appearance the European widgeon rather closely resembles our baldpate. The males are easily identified, but a rather careful comparison is needed to distinguish the females. For one thing the head and throat of the female European widgeon are browner than the corresponding parts of our baldpate. A better distinguishing mark, however, is found in the axillars, or long feathers under the wings of both sexes, as noted by Bangs. In our baldpate these are white, while in the European widgeon they are grey. Particular attention is directed to these distinguishing marks, as sportsmen should know the two birds apart, and thus be enabled to record the fact when they bring to bag the European widgeon. The bird has long been known to occur in our waters, but its presence has been thought to be only casual. Of late years it appears to seek our shores in increasing numbers; at all events it is being reported oftener. This is probably due less to an actual increase of numbers than to the fact that sportsmen are becoming better acquainted with its appearance. The bird may indeed prove to be, as Forbush believes, a permanent resident of North America. There are more records of its occurrence along our Atlantic coast than elsewhere, but the bird has been found also in Nebraska, California, and Alaska. The habits of the European widgeon while in our waters offer nothing particularly worthy of note, as distinguished from those of our own baldpate. The call note of the male, Saunders tells us, is a shrill whistling "whe'e-you," whence the local names "whewduck" and "whewer."

CINNAMON TEAL (Querquedula cyanoptera) (See page 126)

SHOVELER (Spatula clypeata) (See page 126).

Male Female

GADWALL.

Female Male

BALDPATE.

Male

EUROPEAN WIDGEON

Male Female Male Female

GREEN-WINGED TEAL. BLUE-WINGED TEAL.

Male Female Female Male

CINNAMON TEAL. SHOVELLER.

PINTAIL (Dafila acuta).

Range: Breeds on Arctic coast from Alaska to Keewatin and south to southern California, southern Colorado, northern Nebraska, northern Iowa, and northern Illinois; winters from southern British Columbia, Nevada, Arizona, southern Missouri, southern Wisconsin, southern Ohio, and Delaware south to Porto Rico and Panama.

The pintail, one of our most beautiful ducks, is easy of recognition owing to its long slender neck and elongated pointed tail. The latter has caused it to be known locally in England as the "sea pheasant." It is no longer common in the Eastern States but continues to exist in considerable numbers in the West. It is swift of wing, and an old pintail coming down wind will tax the nerve and skill of the most experienced sportsman. In California I once witnessed a life and death race between an adult male pintail and a prairie falcon. The duck covered a half mile at its topmost speed, but notwithstanding its swiftness, the falcon outmatched it, and would have dined on duck that October day had not the fowl, apparently realizing the extremity of its danger, swerved in a half circle toward me, the interested spectator, when the falcon, too distrustful of man to follow, gave up the chase in disgust. Most wild ducks are fond of berries, and Nelson states that in far-off Alaska in August the pintail fattens on berries and becomes the most delicious waterfowl of the region. The pintail is one of the few ducks that braves the long two-thousand-mile trip from the Aleutians to the Hawaiian group apparently for the pleasure of wintering in those sunny islands.

CANVAS-BACK (Marila valisineria).

Range: Breeds from central British Columbia, Fort Yukon, Great Slave Lake, and southwestern Keewatin south to Oregon, northern Nevada, Nebraska, and southern Minnesota; winters from southern British Columbia, Nevada, Colorado, Illinois, Pennsylvania, and western New York south to central Mexico (Jalisco) and the Gulf coast.

The canvas-back, perhaps the most famous of American waterfowl, has purchased its fame at a price. So highly is it prized by the epicure that to-day he who can afford to dine on canvas-back sets the mark of luxurious living. Not that the canvas-back differs essentially from other ducks, but its exceptional flavor is due to the fact that its favorite food is "wild celery," a long ribbonlike grass which grows in shallow ponds and estuaries. As the plant roots several feet under the surface, only the diving ducks can secure it and the plebeian kinds have to be content with such floating fragments as they can pick up or can steal from their more aristocratic relatives. In Oregon and Washington the canvas-back lives much upon wapato, a bulblike root formerly a staple article of food among many Indian tribes, and their exceptional flavor is said to be little, if any, inferior to that of the celery-fed canvas-back of the East. Elsewhere the flesh of the canvas-back is in nowise superior to that of other ducks, and in some localities on the west coast, indeed, is inedible because of its rank smell and taste. Thus prized alike by the sportsman and by the epicure the ranks of the canvas-back have been depleted by the relentless pursuit to which it has been subjected. However, the greater number of these ducks breed far to the northward where they are safe, and under present laws their numbers should increase to something like their former abundance.

REDHEAD (Marila americana).

Range: Breeds from southern British Columbia, central Alberta, central Saskatchewan, and southwestern Keewatin south to southern California, Utah, southern South Dakota, southern Minnesota, and southern Wisconsin; winters from southern British Columbia, Utah, New Mexico, Kansas, Illinois, Maryland, Delaware, and Massachusetts south to southern Lower California, central Mexico, and Florida.

In the minds of epicures and sportsmen the redhead is closely associated with the canvas-back. Both species often frequent the same feeding grounds and, as the redhead is an expert at diving as its cousin, it has no difficulty in obtaining its share of the coveted wild celery. This naturally imparts to its flesh the same highly prized flavor which constitutes the canvas-back's chief claim to distinction, and he must possess a delicate taste indeed who can distinguish the difference. Yet, at times there is much in a name and our redhead pays for his taste for celery and his general undesirable likeness to the canvas-back by being sold in the market as bona fide canvas-back. The redhead is much more numerous east of the Rocky Mountains than to the west of that chain and, while many visit the bays and estuaries of the east coast, the duck's preference appears to be for inland lakes and ponds where it subsists upon various aquatic plants, as also upon insects, snails, acorns, beechnuts, and in fact upon almost anything that is edible by waterfowl standards. Under such circumstances its flesh is no whit better than that of a dozen other species. Of late years a serious reduction of the numbers of this fine fowl has occurred, but it is believed that the abolition of spring shooting will materially aid in checking further decrease.

GREATER SCAUP DUCK (Marila marila).

Range: Breeds from Aleutian Islands, northwestern Alaska, Great Slave Lake, and central Keewatin south to southern British Columbia and northern North Dakota; winters from Maine to Florida and the Bahamas, and from Aleutian Islands, Nevada, Colorado, and Lake Ontario south to southern California, southern New Mexico, and southern Texas.

Both on the east and the west coast the scaup duck is emphatically a bay or estuary species and prefers salt or brackish water. Formerly it frequented such localities in flocks of thousands, often associated with the lesser scaup from which it is not readily distinguishable at a distance. Notwithstanding the fact that both scaups breed chiefly in the far North, their numbers have been greatly depleted of recent years, and the immense rafts that formerly used to gladden the heart of the sportsman are things of the past. The greater scaup used to winter in great numbers in the estuaries of the Gulf States, and in the troubled waters of Lake Borgne. In heavy gales, I have seen "rafts" of bobbing, black heads that apparently extended for miles. Even in those days (1871) the scaup had learned wisdom, and in open water it was only with great difficulty that a shot was to be obtained from skiff or sail boat. As the craft approached nearly within range the birds rose in dense masses and settled down a safe distance ahead, to repeat the performance till the patience of the sportsman was exhausted. Both scaups are expert divers, and are formidable competitors of the canvas-back and redhead in their quest for the rootstocks of wild celery. In the interior their food is much like that of other ducks, and many of the insects, snails, and other food they eat, including wild rice, are obtained without the trouble of diving.

LESSER SCAUP DUCK (Marila affinis) (See page 127).

RING-NECKED DUCK (Marila collaris) (See page 127).

Male Female

PINTAIL

Male Female

REDHEAD

Female Male Female

CANVASBACK

Male Female Male Female Male Female

GREATER SCAUP LESSER SCAUP RING-NECKED DUCK

GOLDEN-EYE (Clangula clangula americana).

Range: Breeds from central Alaska, northern Mackenzie, central Keewatin, northern Ungava, and Newfoundland south to southern British Columbia, southern Montana, northern North Dakota, northern Michigan, northern New York, and northern New England; winters from Aleutian Islands, Utah, Nebraska, Minnesota, Lake Erie, Maine, and New Brunswick south to southern California, central Mexico, and Florida.

Though classed in the books as a "bay or sea duck," the golden-eye, or whistler, is partial to broad rivers or estuaries, and formerly abounded in the Eastern States. Though by no means the only duck to make a whistling sound with its wings as it hurtles through the air, the golden-eye "whistles" louder than any other, and sometimes, indeed, announces its approach by its whistling wings before its oncoming form can be distinguished. Certain of our ducks, among them the whistler, have been taught, probably by bitter experience, that there are many four-footed prowlers with a taste for duck eggs, and that a nest full of eggs is never quite safe when entrusted to Mother Earth, no matter how artfully concealed. Hence, these birds, wiser than their relatives, lay their eggs in hollow trees often many feet from the ground, whence at the proper time the young, with or without the aid of their parents, find the way to the nearest water. The whistler is an excellent diver, and in some localities utilizes its skill to procure mussels from the bottom. The bird has not only learned the range of a shotgun to a nicety, but also the dangers that lurk in blinds, sink boats, and the like, and in a general way by cunning and wariness has shown itself well able to care for its safety. Nevertheless, there are few, if any, places where whistlers exist in their former abundance.

BARROW'S GOLDEN-EYE (Clangula islandica).

Range: Breeds from south central Alaska and northwestern Mackenzie to southern Oregon and southern Colorado, and from northern Ungava to central Quebec; winters from southeastern Alaska, central Montana, the Great Lakes, and Gulf of St. Lawrence south to central California, southern Colorado, Nebraska, and New England.

The resemblance which Barrow's golden-eye bears to the common whistler is extraordinarily close. The males, as a glance at the illustration will show, are easily enough distinguished when close by, but to tell the females and young apart with absolute certainty is impossible. It comes to us as a migrant in the late fall and sojourns along our northern borders, where it is often shot and sent to market with the more numerous common whistler.

OLDSQUAW (Harelda hyemalis).

Range: Breeds from islands of Bering Sea, Arctic coast of Alaska, Melville Island, Wellington Channel, Grinnell Land, and northern Greenland south to Aleutian Islands, east-central Mackenzie, northern Hudson Bay, and southeastern Ungava; winters from Aleutian Islands south regularly to Washington, and in southern Greenland, and from Gulf of St. Lawrence south regularly to the Great Lakes and North Carolina.

Breeding, as it does, in far away Arctic lands, and visiting the United States only in late fall and winter, this beautiful and graceful duck is known to only a few and these chiefly sportsmen. The flesh of the old-squaw does not commend itself to civilized palates, and yet under the guise of sport thousands are annually slaughtered, especially in spring, because, forsooth, their swift flight makes them tempting marks for the wing shooter. Bags of two or three hundred are not uncommon, although so little are they esteemed that, as Forbush states, many, both dead and crippled, are allowed to drift away with the tide. The old-squaw has a habit, unusual among ducks, of circling high in air and then descending in spirals with a resounding rush of wings. Flocks of a hundred or more sometimes participate in this pastime, for such it appears. This duck is a master diver and according to Eaton, individuals have been netted in the Great Lakes at the extreme depth of 162 feet. As a family, the ducks are by no means noted for their musical ability, and yet Nelson tells us that during the nesting season in Alaska the male old-squaws utter a series of rich musical notes which are so deep and reed-like that they have earned for the bird among the fur traders the title of "organ duck."

BUFFLEHEAD (Charitonetta albeola).

Range: Breeds from upper Yukon, lower Mackenzie, Great Slave Lake, and central Keewatin south to British Columbia, northern Montana, and central Ontario; winters from Aleutian Islands, British Columbia, Idaho, Colorado, Missouri, southern Michigan, western New York, and New Brunswick south to northern Lower California, central Mexico, and Florida.

The common name of this little duck is strikingly suggestive of its appearance, for the head, with its white markings and fluffy feathers, seems too big for the diminutive neck and body. An equally suggestive name in fall, when it becomes very fat, is "butterball." Though by no means strictly confined to fresh water, the buffle-head prefers fresh water, and is more abundant on the larger lakes and ponds of the far West than in eastern waters. Wherever found, east or west, it is extremely friendly, and when the gunner puts out a flock of wooden decoys our little duck immediately responds to the invitation to alight and be sociable. Taking advantage of this amiable weakness—some might call it stupidity—the gunner has already greatly reduced the number of buffle-heads, and left scarcely a tithe of their former thousands. Very few ducks can dive more quickly at need than the buffle-head, and in this respect it almost rivals the little grebe known as the "water-witch" or "hell diver." This skill as a diver is of great service to the duck in its search for food. It is adept at catching small fish and, perhaps, because of this and of other animal food, its flesh is not greatly esteemed.

HARLEQUIN DUCK (Histrionicus histrionicus).

Range: Breeds from Kowak and Yukon rivers, Alaska, Arctic coast, and Greenland south to southwestern British Columbia, central Mackenzie, northern Ungava, and Newfoundland, south in mountains to central California, southwestern Colorado, northeastern Asia and Iceland; winters on Pacific coast from Aleutian Islands to Monterey, California, in interior to Colorado, Missouri, Lake Michigan, and western New York, and on the Atlantic coast from Gulf of St. Lawrence regularly to Maine.

The name "harlequin" suggests the unusual and somewhat bizarre plumage of this duck which, nevertheless, deserves to be classed among our most beautiful waterfowl. Rare everywhere in the United States except along our northwest coast, the harlequin breeds commonly in Alaska and uncommonly in the States from Colorado and California northward. Unlike most other ducks, the harlequin disdains to nest in the lowlands, but in summer withdraws itself from its kind and flies to the mountain solitudes where it dwells on the swift alpine streams, its only companion the water ouzel. In fall it resorts to the coast and assembles in small bands with flocks of other species, among which the male harlequins are rendered conspicuous by their striking markings.

Female Male
GOLDEN-EYE

Female Male
BARROW'S GOLDEN-EYE

Male Female
BUFFLEHEAD

Female Male Winter Plumage
OLD SQUAW

Male Female
HARLEQUIN DUCK

STELLER'S EIDER (Polysticta stelleri).

Range: Breeds from Point Barrow, Alaska, to northern coast of Siberia and south to Aleutian Islands; winters on Aleutian Islands and Kenai Peninsula, Alaska, and south on the Asiatic coast to Kuril Islands.

Steller's hardy and beautiful duck is American by virtue of our possession of Alaska, for even in winter it does not venture south as far as either the Atlantic or the Pacific Coast States. According to Nelson the coast and islands of Bering Sea constitute the eastern range of this eider, and it breeds by tens of thousands on the North Siberian coast. Nelson found these ducks rather numerous in the quiet waters of bays and fjords of the Aleutian Islands the last of May, but they were very shy and he failed to secure a single individual. They winter in such of the Alaskan bays as are free from ice, and at this season the natives who depend upon them for winter food kill great numbers. This eider is a true sea duck and Turner notes that it keeps well off shore except in boisterous weather. Needless to say then that its food consists of animal life gleaned from the sea and that the bird is a skillful diver, reaching great depths and staying under a long time, as do eiders generally.

SPECTACLED EIDER (Arctonetta fischeri) (See page 127).

LABRADOR DUCK (Camptorhynchus labradorius).

Range: Formerly, northern Atlantic coasts; supposed to have bred in Labrador; wintered from Nova Scotia south to New Jersey.

The Labrador duck's history is shrouded in mystery. It is now known to be extinct but of the causes of its disappearance we know little or nothing. Occupying as it did such a restricted range, the bird was probably never abundant, at least in historic times. Many years ago George N. Lawrence told me that in his recollection, somewhere probably about 1850, it was by no means uncommon in Fulton Market, and no one at that time appears to have suspected that the bird was in any particular danger of extinction. Apparently its habits were those of a sea duck, and as it could have possessed no great value for the table there would seem to have been no particular incentive for its pursuit. We know so little about the bird that speculation as to the cause of its extinction is useless but, as suggested by Forbush, the slaughter of waterfowl on the Labrador coast in the eighteenth century may have had much to do with it. The lesson to be drawn from its fate is that if a game bird like the Labrador duck can become extinct in historic times from no assignable cause we should be doubly careful not to reduce the numbers of any of our valuable game birds to a point which threatens their future, since when reduced beyond certain limits, the precise limits being as yet unknown, recovery seems to be impossible, as witness the history of the passenger pigeon and the Eskimo curlew.

So far as known, the last Labrador duck seen alive by man was taken at Grand Menan on the Maine coast in 1871. Fortunately, some forty-odd specimens are known to be in museums and in private collections.

PACIFIC EIDER (Somateria dresseri).

Range: Breeds from southern Ungava and Newfoundland to southeastern Maine, and on southern half of Hudson Bay; winters from Newfoundland and Gulf of St. Lawrence south on Atlantic coast regularly to Massachusetts.

The American eider is the eider of northeastern North America, and differs only slightly from its European representative, the "northern eider," from which is derived much of the eiderdown of commerce. The female anticipates the needs of her ducklings for a warm and soft bed by lining the nest with down plucked from her own breast. But this downy lining is coveted by the Icelanders, who regard the summer's crop of down as a substantial addition to their annual harvest and who accordingly appropriate it. The male, equally solicitous for the welfare of the nestlings, in turn denudes his breast of its down and replaces the lining. This also is taken, after which the pair are allowed to rear their brood in peace. Needless to say, the eider is carefully protected in Iceland, and hence the crop of down is a perennial one. This duck was formerly abundant and indeed nested along the coast from Maine northward. Eiders are much less numerous than formerly within our territory, for the sufficient reason that they have been ruthlessly killed. No doubt they would soon be extinct were it not for the fact that they breed in the north far from harm. The eider is a true marine duck and well deserves the title of "sea duck" bestowed upon it by gunners. So hardy are these birds that they choose to keep to the open sea during the severest storms, and rely for their preservation on their unsurpassed powers of swimming and diving. Eiders live largely upon mussels, which they secure in fifty feet or more of water. Dependent in no wise upon man and doing him no harm, they ask only for the universal boon of life.

KING EIDER (Somateria spectabilis) (See page 127).

WHITE-WINGED SCOTER (Oidemia deglandi).

Range: Breeds from the coast of northeastern Siberia, northern Alaska, northern Mackenzie, and northern Ungava south to central British Columbia, Alberta, northern North Dakota, and southern Quebec; winters on the Asiatic coast to Bering Island, Japan, and China, and in North America from Unalaska Island to San Quintin Bay, Lower California, the Great Lakes, and the Atlantic coast from the Gulf of St. Lawrence south (rarely) to Florida; non-breeding birds occur in summer as far south as Rhode Island and Monterey, California.

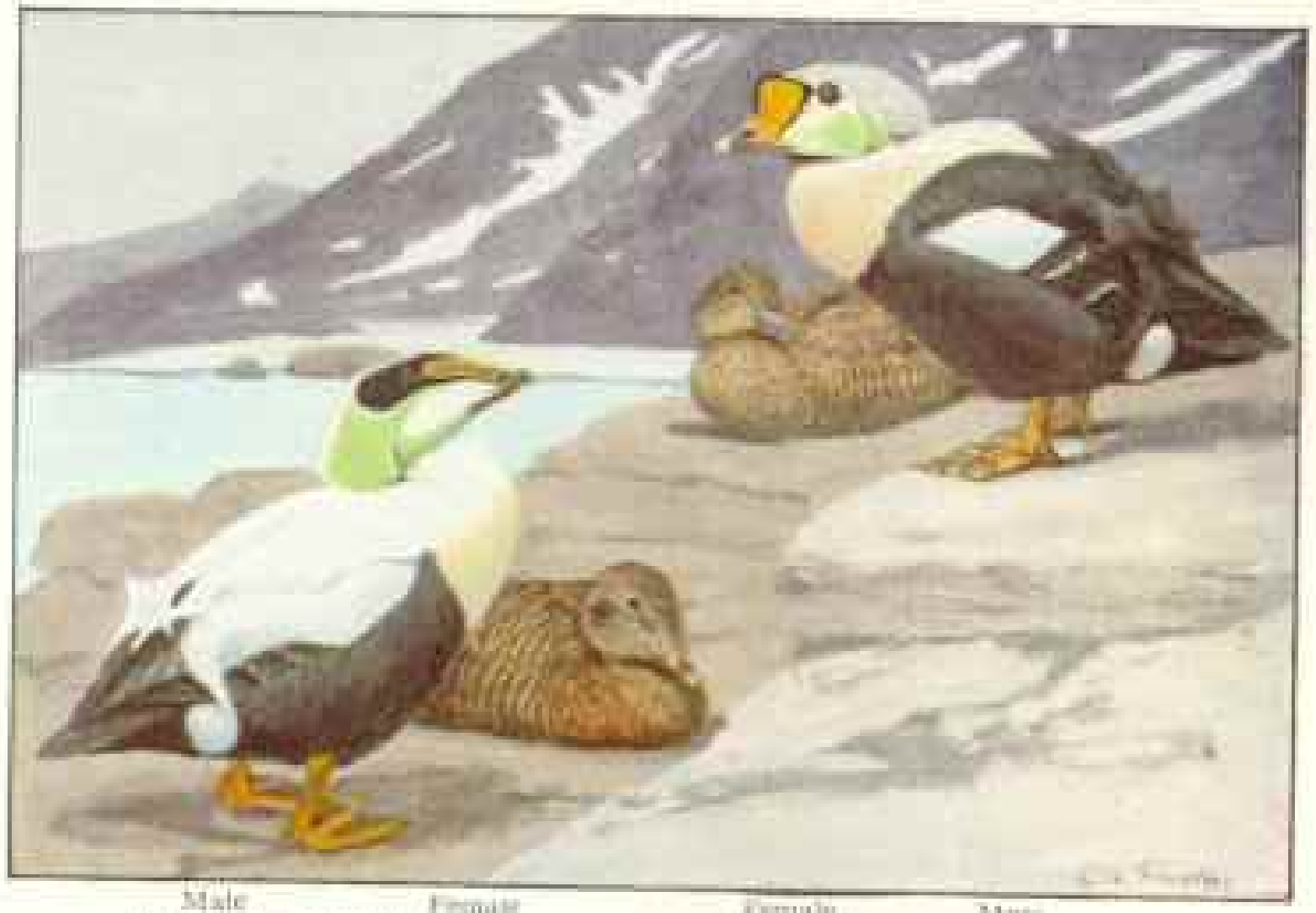
The general habits of this scoter correspond closely with those of its relatives. It winters in great numbers in company with other scots on the coasts of the New England and Middle States, and also along our west coast, especially in Oregon and Washington. Scoters are denizens of the sea and are almost as much at home there as the fish, crustaceans, and shell fish upon which they feed. So large are some of the shell fish that have been found in their stomachs that it is difficult to understand how the birds manage to swallow them, and equally difficult to comprehend how they can digest the hard, thick, calcareous shell. This they do, however, with ease and celerity, and the digestive feat is one an ostrich might well be proud of.

SURF SCOTER (Oidemia perspicillata) (See page 146).

AMERICAN SCOTER (Oidemia americana) (See page 146).

STELLER'S EIDER

Female Male
SPECTACLED EIDER



Male Female
PACIFIC EIDER

Female Male
KING EIDER

Male Female
LABRADOR DUCK

Female Male Female Male Male Female
WHITE-WINGED SCOTER SURF SCOTER AMERICAN SCOTER

RUDDY DUCK (Erismatura jamaicensis).

Range: Breeds from central British Columbia, Great Slave Lake, southern Keewatin, and northern Ungava south to northern Lower California, central Arizona, northern New Mexico, northwestern Nebraska, southern Minnesota, southern Michigan, southern Ontario, and Maine; winters from southern British Columbia, Arizona, New Mexico, southern Illinois, Maine and Pennsylvania, south to the Lesser Antilles and Costa Rica.

The ruddy duck, or "dumb bird," as it is called in New England, alias the rook of the Potomac region, has a wide range in the United States from seacoast to seacoast, and formerly nested over much of this wide territory. That it is not unknown to sportsmen and others is attested by the fact that Trumbull in his "Names and Portraits of Birds" gives sixty-seven synonyms under which it appears. Some of these, as "deaf duck," "fool duck," "dumb bird," are indicative of its disposition; while others like "bull neck," "spine-tail duck," mark certain physical peculiarities. In appearance it is quite unlike any other duck, and when swimming, its plump, round body and uplifted tail serve to distinguish it to the merest tyro. It is extremely sociable and unites in large flocks, sometimes in company with other species. Over most of its range the little ruddy duck was formerly lightly esteemed for food, and consequently enjoyed comparative immunity from the pursuit of sportsmen and even from market gunners. As other more highly prized species diminished in numbers, the ruddy attracted more attention, and in waters like the Potomac River, where the rookies formerly gathered in fall by thousands, only a beggary remnant remains. Ruddies are the more easily killed because they do not readily take wing, but being expert divers endeavor, when pursued, to escape by diving. The gunner aware of this weakness has only to persist in pursuit of the birds, one after another, to secure most or all of a flock.

FULVOUS TREE-DUCK (Dendrocygna bicolor).

Range: Breeds from central California, middle-western Nevada, southern Arizona, and central Texas south to the Valley of Mexico and Michoacan; winters from central California and central Texas to southern Mexico.

The tree-ducks are tropical species, two of which, the black-bellied and the fulvous tree-duck, extend their range into the United States. In this country at least there is little to warrant the name of tree-duck, as the bird is no more arboreal, if as much so, than the wood-duck. No doubt it alights in trees in wooded districts, and very probably it occasionally nests in hollow trees, as do several others of our ducks; more often, however, it nests on the ground for the sufficient reason that much of the territory it inhabits is practically treeless. The only place in which I ever saw this species was Washoe Lake, Nevada, and there its habits are so similar to other ducks that frequent shallow lakes that at first I hardly recognized it. It is much more numerous in southern California than in Nevada, but migrates farther south in winter. This duck is credited with laying an unusually large clutch of eggs, from fifteen to thirty, but very probably the larger number is the result of two or more females laying in the same nest on a cooperative basis.

WOOD DUCK (Aix sponsa).

Range: Breeds from southern British Columbia, central Saskatchewan, northern Ontario, New Brunswick, and Nova Scotia south to central California, southern Texas, Florida, and Cuba; winters chiefly in the United States from southern British Columbia, Kansas, Illinois, Indiana, Pennsylvania, and New Jersey south to southern California and the Gulf of Mexico.

However divided the sportsmen of America may be on the many questions affecting their rights and privileges, they should one and all unite in an attempt to preserve the existence of the wood duck, perhaps the most beautiful of the duck tribe. It is true that in some sections of the country the wood duck is still far from uncommon, but no one conversant with the present state of affairs can examine the records of its former range and abundance without being convinced that the danger threatening the species is real and imminent; nor need recorded evidence alone be relied upon, for there are many sportsmen alive to-day whose memories go back to the time when this beautiful bird abounded in most of the wooded sections of eastern United States, where to-day few, if any, remain. A regulation under the Federal migratory bird law provides a closed season for the wood duck until 1918, and if this prohibition is faithfully observed, there is every reason to believe that the species will materially increase, more particularly as in States where it is wholly protected, or protected in spring, an increase in numbers has already been noted. It will be to our everlasting shame if this, one of the most perfect of Nature's creations, is allowed to meet the same fate as the passenger pigeon. Practically all the wood ducks nest and winter within our own boundaries and it is for us to say what shall be their fate.

WHITE-FRONTED GOOSE (Anser albifrons gambeli).

Range: Breeds on and near the Arctic coast from northeastern Siberia east to northeastern Mackenzie and south to lower Yukon Valley; winters from southern British Columbia to southern Lower California and Jalisco.

Though occasionally met with on the Atlantic coast and not uncommon in the Mississippi Valley, the white-fronted goose is essentially a bird of the far West, and is particularly abundant in the Pacific Coast States. This is one of the geese which used to visit the wheat fields of California in such numbers as to threaten the crop, and which men were hired to kill and frighten away. The hordes of former days are now represented by comparatively small numbers, and as the flesh is toothsome the problem of the near future is not how to destroy the birds most cheaply but what methods to employ to preserve them. White-fronted geese were found by Nelson breeding abundantly in the Yukon delta from the last of May till well into June. Their nests are placed on the grassy borders of lakelets, whence the young can be quickly led into the protecting water. In far-off Alaska this and the numerous other species of waterfowl that summer there in multitudes not only find comparatively safe solitudes in which to nest but, what is equally or more important, abundant food for themselves and their young. When they arrive in Alaska, late in April or early in May, according to the season, they find the previous year's crop of heath berries awaiting them in cold storage. Again in August and September the new crop of berries is ripe, and upon this the geese fatten and prepare themselves for the trip southward. Thus Alaska, the acquisition of which from Russia has more than fulfilled our expectations in many ways, proves to be the mecca of our waterfowl which, resorting there in spring by thousands, return in fall in fourfold numbers.

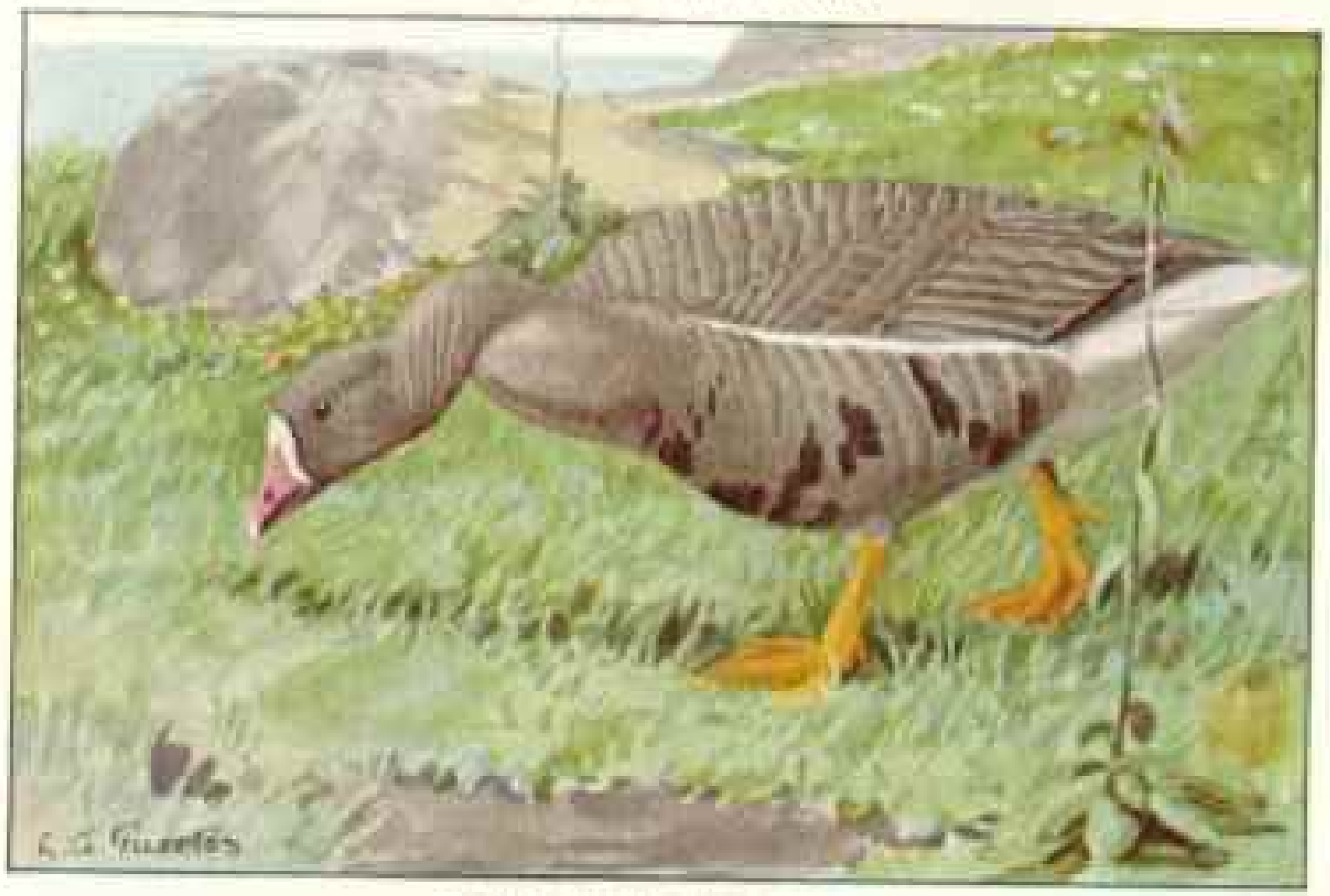
Male Female

RUDDY DUCK

FULVOUS TREE DUCK

Male Female

WOOD DUCK



WHITE-FRONTED GOOSE

BLUE GOOSE (Chen cærulescens)

Range: Breeds probably in interior of northern Ungava; winters from Nebraska and southern Illinois south to coasts of Texas and Louisiana.

We know comparatively little of the life history of the blue goose. That it breeds in the far North is certain and it is surmised that it nests in the interior of Ungava. Few ornithologists have ever seen the bird, even in migration, though it is known to pass down the Mississippi Valley in considerable numbers. If, as is said, this goose migrates by night as well as by day, one reason for its apparent scarcity is evident. A new chapter was added to the bird's history when, in 1910, McAtee and Job found it wintering by thousands in the delta of the Mississippi River. These observers report that the geese were in such numbers as to inflict great damage on pasture lands. Like all its relatives, this species is a strict vegetarian and is particularly fond of the tender shoots of grass or grain. Eaton, in his "Birds of New York," after remarking that the blue goose is one of the rarest waterfowl which visits the waters of New York State, gives the following synonyms under which the bird is known locally: blue snow goose, blue-winged goose, blue wavy, white-headed blue brant, white-headed goose. The list would seem to indicate that at some time or other the goose was more widely distributed or better known than at present.

SNOW GOOSE (Chen hyperboreus hyperboreus) (See page 146).

BRANT (Branta bernicla glaucogastra).

Range: Breeds on the Arctic Islands north of latitude 74° and west to about longitude 100°, and on the whole west coast of Greenland; winters on the Atlantic coast from Massachusetts south to North Carolina.

The brant has a peculiar interest for eastern sportsmen since, while its nesting grounds are within the Arctic Circle, the bird winters on the Atlantic coast from New England south to North Carolina. Brant have always been favorite objects of pursuit by sportsmen, and many clubs have been formed the main object of which is brant shooting. Whatever be the cause, or the combination of causes, the brant is nowhere near as abundant as it was formerly, and while there would seem to be no danger of immediate extinction, a halt should be called on the indiscriminate destruction of the bird before it is too late. As pointed out by Forbush, while brant are well protected in summer by the remoteness and inaccessibility of their nesting grounds, the short Arctic season with the possibility of early storms exposes their young to great danger. One or more unfavorable breeding seasons in the Arctic, combined with the activity of sportsmen along the south Atlantic coast, might quickly jeopardize the safety of the species. The brant is not a diver and it procures its favorite food, eel-grass, when the tide is low, and when the rising water interferes with its activities it has to content itself with the floating fragments. Its apparent inability to dive for its food seems all the more remarkable since when wounded it not only can dive well but swim under water for a considerable distance. The flesh of the brant is usually excellent, although, as is the case with waterfowl generally, its flavor depends largely upon a variety of circumstances, especially upon the nature of its food for a few weeks prior to its being killed.

BLACK BRANT (Branta nigricans) (See page 146).

CANADA GOOSE (Branta canadensis canadensis).

Range: Breeds from the valley of lower Yukon, northwestern Mackenzie, and central Keewatin south to southern Oregon, northern Colorado, Nebraska, and Indiana; winters from southern British Columbia, southern Colorado, southern Wisconsin, southern Illinois, and New Jersey south to southern California, Texas, and Florida.

This, one of the largest of our waterfowl, is notable in many respects other than mere size. The wedge-shaped flocks of wild geese that, spring and fall, with melodious honking, wing their way respectively to their breeding and wintering grounds are a very familiar sight, and advertise in a most spectacular way that wonderful phenomenon—bird migration. The bird observer of speculative mind may find interest in answering the question—Why do geese usually fly in wedge formation? Is it because the powerful wings of the leader make easier the passage of those behind him or, as suggested by Forbush, does the wedge formation enable each individual member of the flock to see better?

Formerly the Canada goose, despite its name, nested in much of our territory and as far south at least as Massachusetts. To-day comparatively few geese nest within our borders, although flocks of goslings, convoyed by their parents, may still be seen on some of our western lakes. The "honker" is still far from extinct, and owes its present numbers both to the fact that it nests chiefly in the unfrequented territory of the far North, where its only enemies are the wild beast and the roving Indian, and to its wariness, the result of much and long-continued persecution.

CACKLING GOOSE (Branta canadensis minima) (See page 147).

EMPEROR GOOSE (Philacte canagica) (See page 147).

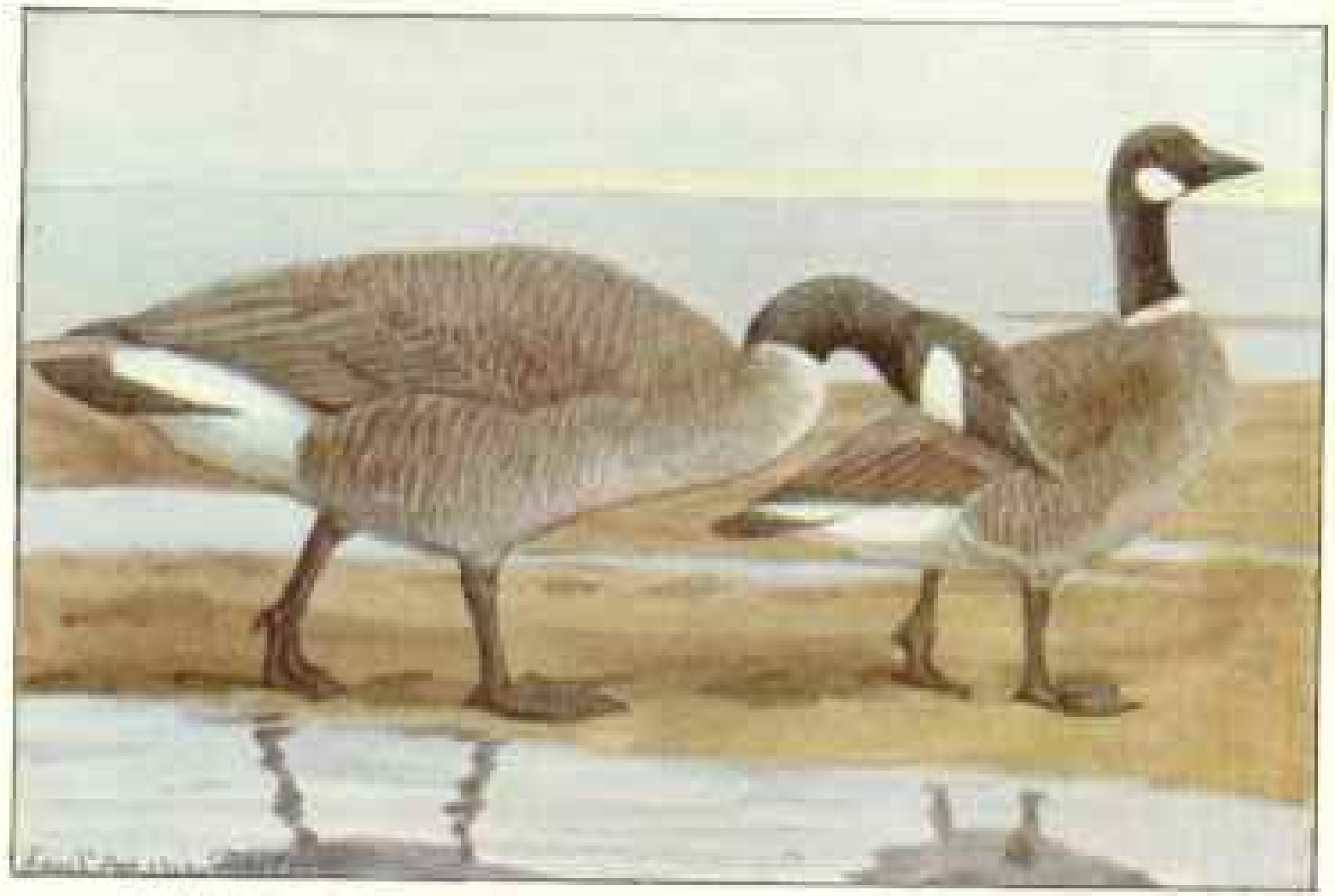
TRUMPETER SWAN (Olor buccinator).

Range: Breeds from the Rocky Mountains to the western shore of Hudson Bay and from the Arctic Ocean to about latitude 60°; winters from southern Indiana and southern Illinois south to Texas, and from southern British Columbia to southern California.

This swan, the largest of American waterfowl, though by no means an infrequent visitor to both coasts, is by preference a resident of the interior where formerly it was very numerous. It used to nest in our northern tier of States west of the Mississippi, and Cooke states that it nested in Iowa as late as 1871. Its former breeding resorts were and still are in the region west of Hudson Bay. The bird, however, has become extremely rare, and there is little doubt that the days of the species are numbered. Several causes have contributed to this end. Swans are not divers and have to procure their food, mainly aquatic roots and grasses, in shallow water, their long necks greatly aiding them to secure the coveted delicacies three feet or so under the surface. Thus, when feeding, they are greatly exposed to attack by hunters who can pot them almost at will. Then, too, in the days of Hudson's Bay Company, swans' skins formed a regular article of trade with the Indians, who killed large numbers also for the pot. These may be considered contributory causes, but it was the shotgun and rifle in the hands of our gunners that settled the fate of this superb species.

The whistling swan, a near relative of the trumpeter, and only a little smaller, has not suffered to the same extent, as it breeds farther north. Still it, too, has diminished greatly, and it must soon follow the fate of its larger relative.

BLUE GOOSE SNOW GOOSE



CANADA GOOSE CACKLING GOOSE

BRANT BLACK BRANT

EMPEROR GOOSE TRUMPETER SWAN

WHOOPING CRANE (Grus americana).

Range: Mainly restricted to southern Mackenzie and northern Saskatchewan; winters from the Gulf States to central Mexico.

If we go back about a century we find this, the largest of our cranes, abundant and nesting over a vast area stretching from the Mackenzie region to Iowa, a strip 1,500 miles long by less than 300 miles wide. Cooke states that eggs of this species were taken in Iowa as late as 1894, and at Yorkton, Saskatchewan, as late as May 16, 1900. In its day and generation the whooping crane, big and conspicuous as it is, was common enough, as is attested by numerous authorities. Thus, Nuttall, speaking of a night on the Mississippi in December, 1811, says, "the whole continent seemed as if giving up its quota of the species to swell the mighty host. The clangor of their numerous legions, passing along, high in air, seemed almost deafening." To-day what a contrast! The clangor of passing multitudes no longer fills the air, for this noble bird, whose number was legion a century ago, is now practically extinct in the Atlantic States, while only a few pairs manage to maintain themselves in far out-of-the-way places, and so to delay for a few years the final extinction of the species.

In early colonial times the whooping crane was taxed with pillaging corn fields, and doubtless suffered for its crimes. Moreover, its flesh was reputed to be excellent, and no doubt this fact contributed to its destruction. One of the regulations under the Federal law fixes a closed season till 1918 for our three species of cranes, whooping crane, sandhill crane, and little brown crane, but, so far as this species is concerned, the regulation probably comes too late.

SANDHILL CRANE (Grus mexicana).

Range: Resident in Louisiana and Florida; bred formerly from southern British Columbia, Saskatchewan, Manitoba, and western Ontario south to California, Colorado, Nebraska, Illinois, and Ohio; winters from California, Texas, and Louisiana south to Mexico.

The big sandhill crane seems most at home on the broad expanse of the western prairies and marshes, which offer it food and security. It is still common, however, in Louisiana and southeastern Florida, where the prairies and savannas are large enough to suit its tastes. Thus, as pointed out by Cooke, the two breeding areas of this species are separated by a distance of more than 600 miles. As the crane struts majestically about, it keeps a watchful eye for enemies, and when the danger proves threatening, it spreads its broad wings and with measured beats flies slowly away. Its loud bugelike notes, when heard coming from mid-air, as the birds slowly pass out of sight, have a delightful musical quality. The food of this crane consists of a large variety of animal life, among which are grasshoppers and meadow mice, so that a distinct claim of economic usefulness may be made for it. Unfortunately for its safety its meat is by no means unpalatable and in some localities it is much sought after for food. Unquestionably, however, the restriction of its breeding and feeding grounds by settlement has had more to do with the decrease in its numbers than firearms. Probably the fate of such a large bird, requiring so much space and freedom, can not be averted, but it can at least be postponed, and every man who carries a gun should do his part by refraining from making a target of its big body.

Of the three species of cranes living in the United States the brown crane is the smaller and is confined to the Middle West.

KING RAIL (Rallus elegans).

Range: Breeds from Nebraska, southern Minnesota, Ontario, New York, and Connecticut south to Texas, Florida, and Cuba; winters mainly in the southern part of its breeding range.

The king rail, the largest and handsomest of its family, is trim of form, moves with an air of conscious grace, and is tastefully garbed in soft brown and black, which harmonize wonderfully well with the vegetation of swamp and meadow, among which it passes its life. Moreover, it possesses in the highest degree that form of beauty which consists in the perfect adaptation of means to end, for its entire make-up is wonderfully in keeping with its mode of life. Anyone familiar with the appearance of the Virginia rail will recognize the king rail on sight since it is a near counterpart of that bird, except in size. It lives exclusively in fresh-water meadows where it hides in the thick cover after the manner of its kind. So adept is it at the game of hide-and-seek that, though you may mark one down to a foot, it is rarely that either man or dog can put it up a second time, though the cover may appear to be insufficient to conceal even a sparrow. When on the wing the bird appears to fly with great effort. As a matter of fact, it can fly well enough for all practical purposes, but it has a pair of stout legs quite capable of taking their owner out of harm's way under ordinary circumstances, and it usually prefers to entrust its safety to these members rather than to its wings. Apparently the rail is nowhere very numerous, but it is difficult to say how far this seeming scarcity of the bird is due to its secretive habits. As it is prolific, laying from seven to twelve eggs, and offering no great temptation either to the sportsman as a mark or to the gunner as a market bird, this handsome rail should long continue a denizen of our fresh-water marshes.

CLAPPER RAIL (Rallus crepitans crepitans).

Range: Breeds from Connecticut to North Carolina; winters mainly south of New Jersey.

The distribution of the clapper rail complements that of the king rail, for the clapper inhabits the salt-water marshes as its relative does the fresh-water meadows. Though occasional as far north as Massachusetts, the clapper rail does not begin to be numerous until Long Island is reached. Further south it inhabits the salt marshes in great numbers. It used to nest abundantly on Cobb's Island and other sandy islands along the Atlantic coast which are fringed on the landward side by dense beds of rushes. When on Cobb's Island, I once offered a small boy a quarter apiece for some of the young clappers, as I had never seen them. In about an hour he returned and to my astonishment turned out of his cap more than a dozen of the quaint, black, fluffy youngsters, some of which apparently had just chipped the shell. It appeared that an unusually high tide had driven the birds from their usual haunts, and the nestlings were to be had by the dozen by wading through the reeds and picking them off the piles of floating debris. I had the pleasure of returning most of them to their native haunts, and the rapidity with which they lost themselves among the reeds showed that they needed no parental lectures on the art of concealment.

A closely allied species, the California clapper rail, represents the eastern bird on the Pacific coast of Oregon and California. As the name implies, clapper rails are noisy birds, and their harsh notes are often heard coming from the thick reeds when the callers are invisible. They lay from seven to a dozen eggs and are so prolific that with a decent regard for seasons and bag limits, they should hold their own to the end of time.

Young Adult

WHOOPING CRANE

Adult Young

SANDHILL CRANE

KING RAIL

CLAPPER RAIL

SORA (Porzana carolina).

Range: Breeds from central British Columbia, southern Mackenzie, central Keewatin, and Gulf of St. Lawrence south to southern California, Colorado, Kansas, Illinois, and New Jersey; winters from northern California, Illinois, and South Carolina through the West Indies and Central America to Venezuela and Peru.

Though distributed generally throughout the United States and breeding in fresh-water meadows almost everywhere, the sora is far more abundant east of the Mississippi than west of it. However abundant it may be, its chosen haunts of swamp and meadow are so rarely visited and the bird is of such secretive habits that it may abound in a given neighborhood and few be aware of the fact. Towards the nesting season the sora becomes garrulous, and its low, whistled notes form a pleasant addition to the early summer chorus that comes from the reedy recesses. Even in fall one has only to make an unusual noise near a sora swamp, as a sharp tap of the paddle on the boat, to elicit a chorus of protesting "kuks," which announce the presence of hundreds of the rails. But it is as a tidbit for the table and as a game bird that the sora is best known in the Atlantic States, where sora shooting is looked forward to as an annual experience not to be lightly foregone. Wherever wild rice abounds there the rails congregate by thousands to feed on the ripening grain. At high tide the gunner in a light skiff is poled among the reeds, and as the birds rise, sometimes a dozen at a time, they form easy marks. Every fall many thousands of the rails are killed and, although the birds lay from eight to fifteen eggs, soras are steadily decreasing.

PURPLE GALLINULE (Ionornis martinicus).

Range: Breeds from Texas, Tennessee, and South Carolina south through Mexico and the West Indies to Ecuador and Paraguay; winters from Texas, Louisiana, and Florida southward.

The bright colors of the purple gallinule suggest a tropical origin, and the bird in fact is far more at home in tropical lands than in temperate climes. It not only runs nimbly and with grace over the leaves and stems of floating aquatic vegetation, but swims and dives well, and when suspecting danger progresses under water with only the bill visible. The general habits of the two gallinules are very similar.

FLORIDA GALLINULE (Gallinula galeata).

Range: Breeds from central California, Arizona, Nebraska, Minnesota, Ontario, New York, and Vermont south through the West Indies and Mexico to Chile and Argentina, and in the Galapagos and Bermuda; winters from southern California, Arizona, Texas, and Georgia southward.

Although in no proper sense of the word a game bird, the Florida gallinule looks so much like a rail or a coot, and moreover so commonly frequents the same general localities as these birds, that it is frequently mistaken by the gunner and shot. Although it inhabits the Florida swamps, it is by no means restricted to that State, but possesses a wide range westward to the Pacific, northward as far as Massachusetts, and south well into the tropics.

The gallinule's habits are a combination of duck, coot, and rail, and the bird is most at home amid the tangle of vegetation that grows on the borders of fresh-water ponds, where it is careful to keep well concealed during the hours of daylight. After dusk gallinules feel safe in the open, and then may often be seen swimming across broad stretches of open water. The gallinule has little to commend it for the table, and as it is absolutely harmless, sportsmen will do well to acquaint themselves sufficiently with its appearance to avoid shooting it by mistake.

VIRGINIA RAIL (Rallus virginianus).

Range: Breeds from British Columbia, southern Saskatchewan, southern Keewatin, Ontario, southern Quebec, and New Brunswick south to southern California, Utah, Kansas, Missouri, Illinois, New Jersey, and eastern North Carolina; winters from Oregon, Utah, and Colorado to Lower California and Guatemala; also in the Lower Mississippi States, and from North Carolina to Florida.

The Virginia rail is a denizen of both fresh- and brackish-water marshes, though with a decided preference for the former, especially in the nesting season. Its thin, wedge-shaped body eminently adapts it for a life among sedge and tule, through the stems of which it glides so swiftly and noiselessly that the sharpest-eyed observer rarely catches a glimpse of it. Where notified of its presence by its grunting notes, which Brewster aptly compares to the sounds of a hungry pig, one has only to sit down in a favorable spot and patiently await the time when our brown Knight of the Reeds steps daintily forth into the open in search of food and sunlight. He is never quite at home, however, outside the friendly shelter of reeds and grasses, and in the open ever betrays by his alert actions the consciousness of possible danger. The slow, wavering flight of this rail appears to betray the novice. Nevertheless, these same wings that seem to be overtaxed in a flight of fifty yards or so are capable of carrying their owner over long distances in migration. Cooke thinks that many soras cross the Gulf of Mexico in their passage to South America, and the Virginia rail is probably capable of an equally protracted flight. The distance in fact between its extreme habitat, southern Canada and Guatemala, is approximately 2,100 miles. All rails migrate by night and as a rule fly low, as though conscious of their inferior wing powers.

COOT (Fulica americana).

Range: Breeds from central British Columbia, southern Mackenzie, Manitoba, Quebec, and New Brunswick south to northern Lower California, Texas, Tennessee, and New Jersey; also in southern Mexico, southern West Indies, and Guatemala; winters from southern British Columbia, Nevada, Utah, the Ohio Valley, and Virginia south to Colombia.

Though neither a rail nor a gallinule, "Blue Peter" belongs to the same family as these birds, and if habits and appearance are taken into account, may be considered a sort of connecting link between the rails and the ducks. His waxy, white bill, and his lobed feet may be depended upon to distinguish him from the rest of the rail family and also from all other birds. He swims well and also is a good diver, though he never essays great depths. Coots are extremely sociable, even in the nesting season, and where one pair is, more may be expected. Their nests are bulky structures of reeds and grasses floating on the water, and are kept from drifting away only by the rushes among which they are built, and which serve both to anchor and to conceal them. Fortunately for themselves, coots are little esteemed for food and, indeed, in most parts of the United States are contemptuously ignored by sportsmen. As a consequence, "Blue Peter" still flourishes in the rivers and ponds of some sections of the United States, although in reduced numbers.

This was one of the few waterfowl to discover the Hawaiian Islands, that little archipelago in mid-ocean, 2,000 miles from Alaska, whence the birds originally came. So well satisfied were the early explorers with their new discovery that they founded a permanent colony in Hawaii, and still exist in considerable numbers, having changed very little in appearance and not at all in habits.

Adult Young

SORA

VIRGINIA RAIL

PURPLE GALLINULE FLORIDA GALLINULE

COOT

HOODED MERGANSER (Lophodytes cucullatus) (See page 109).

Range: Breeds from central British Columbia, Great Slave Lake, central Keewatin, central Ungava, and Newfoundland south to southern Oregon, northern New Mexico, southern Louisiana, and central Florida; winters from southern British Columbia, Utah, Colorado, Nebraska, Illinois, Indiana, Pennsylvania, and Massachusetts south to Lower California, Mexico, and the Gulf States.

This, the smallest and most beautiful of the mergansers, ranges from Alaska to Mexico, and formerly was abundant in the East where it nested in many States, including New England. Of late years it has diminished greatly in numbers, as would be expected of a bird of its habits. Unlike its near relatives, it prefers still-water ponds and rivers, and is often found in company with the wood duck. Its flesh is said to have little of the ungulatable fishy flavor of its congeners, and this would seem to imply a more varied diet, including probably seeds and grasses. Nevertheless, nature did not endow the merganser with the serrated bill of its kind without a purpose, and its skill in diving and seizing its finny quarry proves that fish, or at least aquatic creatures of some sort, are its natural food. The hooded merganser nests in hollow trees, sometimes thirty or more feet up, and the wonder is how the tiny ducklings find their way to the nearest water as they certainly do in a very few hours after emerging from the egg. Sometimes the mother may act as a common carrier for her brood, and again, when the height is not too great, the ducklings may drop to the ground or water as the case may be.

GADWALL (Chaulelasmus streperus) (See page 111).

Range: Breeds from southern British Columbia, central Alberta, and central Keewatin south to southern California, southern Colorado, northern Nebraska, and southern Wisconsin; winters from southern British Columbia, Arizona, Arkansas, southern Illinois, and North Carolina south to southern Lower California, central Mexico (Jalisco), and Florida.

Though seemingly as well fitted for the struggle for existence as any of its fellows, the gadwall apparently was never very abundant in any part of its range. Formerly it was not uncommon in New England and in the Middle and Eastern States, but for a quarter of a century or more the bird has been practically unknown to the sportsmen of the Atlantic seaboard, though still found in considerable numbers in Texas, and other Western States. I have never seen the gadwall in large flocks, but usually singly or by twos or threes in company with ducks of other species, and such seems to have been the experience of many other observers. It is a denizen of fresh water and is fond of shallow lakes and ponds, where its habits somewhat resemble those of the mallard. It is a good diver when the need arises, but usually finds little occasion for the exercise of its skill, since it frequents the shallow margins of ponds and lakes in company with mallards and other species. I have frequently seen the gadwall literally stand on its head in shallow water grubbing for food on the muddy bottom, when only its feet and the tip of its tail were sticking out. Its bill of fare is varied and includes aquatic grasses, seeds, nuts, insects, mollusks, in short almost any edible substance it can obtain.

SHOVELLER (Spatula clypeata) (See page 111).

Range: Breeds from northwestern Alaska, northwestern Mackenzie, and southern Keewatin south to southern California, central New Mexico, northern Texas, northern Missouri, and northern Indiana; winters from southern British Columbia, Arizona, New Mexico, southern Missouri, southern Illinois, Maryland, and Delaware south to the West Indies and Colombia.

The shoveler is cosmopolitan in its range and, while no longer common in the Eastern States, it is still numerous in several States of the far West where it breeds. The shoveler likes reedy ponds and sloughs, where it grubs in the shallows, and obtains a rich feast of insects, tadpoles, worms, and larvæ of various kinds, which its shovel-shaped bill seems expressly designed to enable it to scoop up and strain out of the reedy ooze. By many it is accounted one of our best table-ducks. And as it is not shy and is often killed in large numbers, it has suffered a notable decrease in numbers. The shoveler is a swift flier and is capable of enduring flight, as is apparent from the fact that annually it finds its way from Alaska over the 2,000 miles of intervening ocean to the Hawaiian Islands. There it winters, and the few that escape the ardent pursuit of the island sportsmen retrace their way across the trackless ocean in spring for the purpose of nesting.

CINNAMON TEAL (Querquedula cyanoptera) (See page 111).

Range: Breeds from southern British Columbia, southwestern Alberta, southeastern Wyoming, and western Kansas south to northern Lower California, northern Chihuahua, southern New Mexico, and southwestern Texas; winters from southern California, central New Mexico, and southern Texas south to southern Lower California and central Mexico.

Though a stray individual the cinnamon teal is occasionally seen east of the Mississippi, and though the bird is known to breed as far east as western Kansas, the true home and center of abundance of this species is west of the Rocky Mountains. Its favorite resorts in summer are the extensive marshes that surround shallow fresh or alkali lakes. Well within the recesses of these, it selects a dry spot and on it builds its nest. When the young are hatched they are led by the anxious mother to the shelter of the tall rushes that surround these inland lakes by a broad strip of dark green, and here they are safe, at least from most four-footed enemies. Though the cinnamon teal summers to some extent in British Columbia, and a greater or lesser number winter south of our borders, as a species the teal may be said to pass its life within our boundaries. At present it does not receive adequate protection at any season of the year, and in many places large numbers are killed before they can fly. If thoroughly protected during the summer and if reasonably protected at other seasons, the teal will hold its own indefinitely, or until, in the interests of agriculture, all its marshy fastnesses have been turned into ploughed fields which, fortunately for waterfowl and bird lovers, will not be for many years to come.

LESSER SCAUP DUCK (Marila affinis) (See page 113).

Range: Breeds from Yukon Valley, Alaska, and Fort Anderson, Mackenzie, south to central British Columbia, southern Montana, Colorado (casually), northern Iowa, northern Indiana, and western Lake Erie; winters from southern British Columbia, Nevada, Colorado, Lake Erie, and New Jersey south to the Bahamas, Lesser Antilles, and Panama.

So closely do the two scaups or blue-bills resemble each other and so similar are their general habits that, except as regards their distribution, what is said of one applies almost equally well to the other. Like its congener, the lesser scaup is prone to associate in immense flocks, and on this account is sometimes called the "raft duck." Because of this habit and because it decoys well, this scaup is a favorite with gunners, and immense numbers are killed every season and find their way to the markets. Naturally they are nothing like so numerous as formerly though, everything considered, they still hold their own fairly well. I found the lesser scaup abundant in Florida and in the Gulf States in winter in the early seventies, and Chapman thinks they are more southern in their winter distribution than is the greater scaup. This species ranks among our best divers and its food habits are such as to insure it a warm welcome on the table of the epicure. It is very fond of wild rice, and in fall, when the crop of this grain ripens, frequents the inland lakes by thousands, and soon becomes fat on this nutritious diet. In protected waters it it surprising how soon this duck and its congener, the greater scaup, become tame. I have often approached flocks within half a gun shot that were apparently quite indifferent to my presence, and yet elsewhere the same individuals were wary enough to insure their own safety. No doubt the scaups would readily lend themselves to semi-domestication.

RING-NECKED DUCK (Marila collaris) (See page 113).

Range: Breeds from southern British Columbia to northern California, and from northern Alberta and Lake Winnipeg south to North Dakota, northern Iowa, and southern Wisconsin; winters from southern British Columbia, New Mexico, northern Texas, southern Illinois, and New Jersey south to Porto Rico and Guatemala.

So much alike are the ring-neck and the lesser scaup in size, flight, and general appearance that it is only when the sportsman has bagged his bird that he can fully assure himself of its identity. Without doubt the ring-neck is much more uncommon in the Atlantic States than formerly, though Chapman states that in winter it is still abundant on the Florida fresh-water lakes. It is fairly numerous in migration in the far West in the marshes of large ponds and lakes, and still continues to breed in considerable numbers in Minnesota and North Dakota and perhaps elsewhere in our northern frontier States. I have never seen the ring-neck in large flocks, so characteristic of the scaups, and usually have observed it either in small companies consisting exclusively of its own species, or associated in large flocks of other species, and such, I believe, has been the experience of most other observers. The ring-neck has no fondness for salt water, but is preeminently a fresh-water species. Like other members of the genus it is an excellent diver, and where wild celery is to be had, gets its share of the coveted grass. In point of excellence for the table it may be ranked with the two scaups, but does not equal the redhead or canvas-back.

SPECTACLED EIDER (Arctonetta fischeri) (See page 117).

Range: Breeds in Alaska from Point Barrow to mouth of Kushokwim, and on the northern coast of Siberia west to mouth of Lena River; winters on Aleutian Islands.

Nelson's observations show this species to be strictly limited to the salt marshes bordering the east coast of Bering Sea, and thus favoring the shallow, muddy, coast waters, which appear so distasteful to Stellar's eider. The same observer estimates that, all told, the spectacled eider does not occupy over 400 miles of coast line in the breeding season, while the width of the breeding ground will not exceed one or two miles. Writing as long ago as 1881, Nelson said of the struggle for existence the species was even then undergoing: "The species has to contend against thousands of shotguns in the hands of the natives. The diminution in all the species of waterfowl breeding along the coast is more and more marked each season, and while this may mean a desertion of one region for another in the case of the great majority of geese and ducks, yet for such narrowly-limited species as the spectacled eider, and to a less extent the emperor goose, this diminution is but the beginning of extermination; moreover, the present scarcity of large game along the coast is having great effect in causing the natives to wage a continually increasing warfare upon the feathered game."

KING EIDER (Somateria spectabilis) (See page 117).

Range: Breeds along coast of northern Siberia and Arctic coast of America from Icy Cape east to Melville Island, Wellington Channel, northern Greenland, northwestern Hudson Bay, and northern Ungava; winters on Pacific coast from Aleutian Islands to Koliak Island, in the interior rarely to the Great Lakes, and from southern Greenland and Gulf of St. Lawrence south regularly to Long Island.

The king eider is a resident of Arctic realms, and visits the Great Lakes and our North Atlantic coast only in winter. At Point Barrow, on the Arctic coast, Murdoch found this the most abundant bird, but even there it occurred chiefly as a migrant. The king eider is almost as much at home in the water as a fish, and is able to keep to the open sea during the severest winter weather. In fact probably the bulk of the species never migrate at all, or only move south a sufficient distance to reach permanent open water. The bird feeds largely upon mussels, and as the beds are in deep water all its natatorial powers are brought into play in diving for its daily fare. It has actually been taken in the gill nets of fishermen in more than 150 feet of water, as Eaton states, a fact which sufficiently attests its skill and hardihood, more particularly as the water at this season is icy cold.

Like its relatives, it nests among rocks and bushes. The eiders are not so prolific as many of our smaller ducks, and this one commonly lays only five or six eggs. The king eider is one of the species the Icelanders depend on to furnish the harvest of down which is one of the important crops gathered by these northern people. The Icelanders are not the only ones who are dependent on this and other eiders for the necessities of life, for as Nelson tells us "the skins of all the eiders, but especially of this species and the Pacific eider, are used in making clothing by the Alaskan Eskimo, and the skin of the female, split down the back, with head, legs, and wings removed, is a very common article of foot-wear. It is used inside of the sealskin boots, and is very comfortable in winter."

BLACK-NECKED STILT

WOODCOCK

WILSON'S SNIPE

Summer and Winter Plumage
DOWITCHER

Summer and Winter Plumage
KNOT

BLACK-NECKED STILT (Himantopus mexicanus).

Range: Breeds from central Oregon, northern Utah, and southern Colorado to southern California, southern New Mexico, southern Texas, coast of Louisiana, and in Mexico, and from central Florida and Bahamas throughout the West Indies to northern Brazil and Peru; winters from southern Lower California, southern Texas, southern Louisiana, and southern Florida south through Central America and the West Indies to northern Brazil, Peru, and the Galapagos.

So commonly associated are the stilt and avocet and so similar are the general habits of these two very dissimilar species that the same account applies almost equally well to both. Like the "blue stockings," the stilt used to be rather common in the Atlantic States, but it has suffered at the hands of gunners till few of the present generation know the bird by sight. In 1871 I saw a lone stilt in Florida at the head of the Miami River, where it debouches from the Everglades—my sole experience with the species east of the Mississippi. But in the far western States I have seen many hundreds leading their natural lives by lakeside or slough in company with avocets. Even the most unobservant could not compare the general structure of these two species and not draw the inference that their habits must be very similar. The long bill of the stilt, indeed, is straight instead of being curved, but otherwise the stilt is as well equipped as the avocet to wade in shallow waters and extract a living beneath the muddy surface. It is true that its toes are not webbed, but our stilt seems not to have discovered its deficiency in this respect, and, when deep water intervenes, launches in with confidence born of long experience.

AVOCET (Recurvirostra americana) (See page 147).

WILSON'S SNIPE (Gallinago delicata).

Range: Breeds from northwestern Alaska, northern Mackenzie, central Keewatin, and northern Ungava south to northern California, southern Colorado, northern Iowa, northern Illinois, Pennsylvania, and New Jersey; winters from northern California, New Mexico, Arkansas, and North Carolina to Colombia and southern Brazil.

Wilson's or the English snipe is a bird of fresh-water swamp and meadow, in which it finds concealment among the grass or grassy tussocks. It is particularly fond of places where the soil is boggy enough to permit probing with its sensitive bill, for it finds much of its food beneath the surface in the shape of succulent worms. Owing to the nature of its haunts and its secretive habits, the snipe is familiar to but few outside the guild of sportsmen. Even nature lovers know the bird chiefly by its sharp "scaip, scaip," as it flushes suddenly from among the grasses. So quickly does the snipe get under way that one is apt to catch only a glimpse of a brown and black body as it cuts the air on powerful wings with many a twist and turn. It is this peculiar flight that endears the snipe to the sportsman, since a steady hand and a quick eye are needed to stop the bird when bent on escaping from a dangerous neighborhood. Most States until recently have permitted spring snipe-shooting. The practice is held by many to be the more excusable inasmuch as some States get little or no snipe-shooting in fall, and to forego spring shooting means no snipe-shooting at all in such States. No one, however, who has marked the steady decline in the number of snipe that migrate across our territory can doubt that the continuance of spring shooting means the extinction of this highly-prized game bird.

WOODCOCK (Philohela minor).

Range: Breeds from northeastern North Dakota, southern Manitoba, northern Michigan, southern Quebec, and Nova Scotia south to southern Kansas, southern Louisiana, and northern Florida; winters from southern Missouri, Ohio Valley, and New Jersey south to Texas and southern Florida.

The woodcock, another member of the royal family among game birds, is practically the exclusive property of the American people to deal with as they list. It is true that a greater or lesser number of woodcock cross our northern frontier to breed, but the bulk of the species never leave our own borders. As a prerequisite to its presence the woodcock requires soft, moist earth in which to probe for earthworms, and its range may be said to be largely determined by the presence or absence of its favorite food. Study him at what season you will, meet him where you may, the woodcock is always an interesting bird. His spring-flight song, given as the hours of darkness approach—for the woodcock is chiefly of nocturnal habits—is unique among the long-billed, long-legged fraternity, and the many details connected with his housekeeping are well worth attention. And what music so sweet to the sportsman's ears as the silvery whistle of the woodcock's wings when the bird, suddenly roused from his snug shelter beneath bush or bracken, mounts upward through the silver birches! Nor is any other prize among game birds so dear to the sportsman's heart as this many-hued denizen of swamp and hillside when brought to bag in fair, sportsmanlike fashion. All the more keenly then must sportsman and bird lover regret the fact that the woodcock is passing. While there is no present danger of extinction, spring and summer woodcock-shooting should be abolished as a crime alike against a fine game bird and fair sportsmanship.

DOWITCHER (Macrorhamphus griseus griseus) (See page 147).

KNOT (Tringa canutus).

Range: Breeds from northern Ellesmere Land south to Melville Peninsula and Iceland; also on Taimyr Peninsula, Siberia; winters south to southern Patagonia, and from the Mediterranean to South Africa, India, Australia, and New Zealand.

The knot is cosmopolitan in range and occurs on every continent and on many islands, large and small. It is strong of wing, and when migrating appears not to regard distance, for it spans the territory that separates Grinnell Land and the Straits of Magellan. It is a characteristic bird of the sea beach, and its food is obtained by following the receding waves and seizing the minute crustaceans and mollusks momentarily uncovered by the surf. Apparently, the robin snipe never was so abundant on the Pacific coast as along the Atlantic, but the species promises to last longer on the Pacific because less persecuted there. Enormous bags were formerly made on the eastern coast, more particularly during the last of May and early June. Thus the birds were pursued not only in fall but till near the opening of the nesting season, a sufficient cause of their diminution. In further explanation of the present small numbers of the knot, however, the fact counts for much that until recently there have been practically no bag limits for our shorebirds, and many gunners have shot as long as the birds and their ammunition lasted. All shorebirds that associate in large flocks are unsuspicious, as though safety lay in numbers. When the sportsman is to be reckoned with the reverse is true. Easily decoyed by wooden stools, or by the whistled imitation of their own note, or that of the black-bellied plover, a flock of robin snipe will swing in to within gunshot, and repeat the dangerous experiment two or three times, or until the flock is reduced to a few survivors.

SPOTTED SANDPIPER

PECTORAL SANDPIPER

Summer and Winter Plumage
SANDERLING

UPLAND PLOVER

SPOTTED SANDPIPER (Actitis macularia).

Range: Breeds from tree limit in northwestern Alaska, northern Mackenzie, central Keewatin, northern Ungava, and Newfoundland south to southern California, Arizona, southern Texas, southern Louisiana, and northern South Carolina; winters from California, Louisiana, and South Carolina to southern Brazil and central Peru.

This ubiquitous little sandpiper is probably better known to the residents of the United States than any other of its kind. From Alaska to Florida it may be looked for with confidence along the seashore or wherever river, pond, or slough offers it food and congenial surroundings. The sound of its sweet "weet weet" often announces its presence in the most unexpected places. As if its ordinary every-day activities were not sufficient for its energetic little body, it incessantly bows its head and teeters its tail, and so honestly comes by its vernacular name of "tip up" or "teeter." Unlike most of its kin this sandpiper never assembles in flocks, and hence offers no especial temptation to the gunner who, if he pursues it at all, must content himself with securing one tiny body at a shot; and although in fall our sandpiper becomes a perfect ball of fat, few consider the game worth the candle. Such being the case, we may expect to see this small wader survive many larger members of its tribe which, less fortunate than it, have a market value. The spotted sandpiper includes in its diet many insects that are harmful.

SANDERLING (Calidris leucophæa).

Range: Breeds from Melville Island, Ellesmere Land, and northern Greenland to Point Barrow, Alaska, northern Mackenzie, Iceland, and in northern Siberia; winters from central California, Texas, Virginia, and Bermuda to Patagonia.

The sanderling breeds on the far-away Arctic coast, and in early fall begins its wanderings southward. These take it pretty much over the known world. Even the Hawaiian Islands, in mid-ocean, more than 2,000 miles distant from the bird's nearest breeding grounds, are not too remote to attract it, though it is never numerous there. The sanderling is well named "beach bird," for sandy beaches are its favorite places of resort. No prettier sight can be imagined than a flock of these little white birds when busily engaged hunting for food. As the foam-topped breakers rush up the beach, and retreat to gather force for another dash, they plough up the sand, and expose for a few brief seconds multitudes of sand fleas and minute shell fish. These are the chosen food of the sanderlings, and to gather their harvest they keep pace with the progress of the waves, now advancing, now retreating, ever ready to snatch any hapless creature less nimble than they. Sanderlings fly in small companies, and often a few individuals mingle with flocks of larger species. Though naturally so tame and unsuspicious as hardly to recognize the presence of man, they associate in such small numbers that they are not greatly exposed to slaughter by the sportsman who, indeed, not long since, would have scorned such small game. But nowadays, when the larger shorebirds are scarce, the humble small fry must take their place and help fill the bag.

UPLAND PLOVER (Bartramia longicauda).

Range: Breeds from northwestern Alaska, southern Mackenzie, central Keewatin, central Wisconsin, southern Michigan, southern Ontario, and southern Maine to southern Oregon, northern Utah, central Oklahoma, southern Missouri, southern Indiana, and northern Virginia; winters on the pampas of South America to Argentina.

Though a member of the sandpiper family and in excellent standing, the upland plover has the habits and the melodious voice of both plover and curlew. It inhabits grassy prairies and pastures. Though sometimes found in companies of considerable size, the bird does not associate in compact flocks, as do many sandpipers, plovers, and curlews. Formerly it nested over much of the United States, though its center of abundance was always the Prairie States, where not many years ago it was found literally by thousands. By nature the upland plover is unsuspecting and, even after much persecution has taught it to be shy and wary of man, it may easily be approached on horseback or in a vehicle. Because of its approachability and its excellence for the table, the sportsman and the market gunner between them have practically exterminated the bird in much of its eastern territory, and it is no longer abundant anywhere. By the terms of the Federal law it is now unlawful to kill upland plover anywhere at any season, but it is to be feared that little attention is paid to the prohibition in the remote regions of the bird's habitat. The destruction of the species is the less excusable, as there are few of the family which are so valuable, whether viewed from the standpoint of the sportsman, the epicure, or the farmer. Every farmer should know that nearly half this plover's food consists of grasshoppers, crickets, weevils, and many other kinds of insects; while it behooves the cotton planter of Texas and other States to realize that among the insects the bird consumes is the cotton-boll weevil.

PECTORAL SANDPIPER (Pisobia maculata).

Range: Breeds on the Arctic coast from northern Alaska to mouth of Yukon and northeastern Mackenzie; winters in South America from Peru and Bolivia to northern Chile, Argentina, and central Patagonia.

The "grass bird," or "krieker," does not share the predilection of many of its relatives for the sea beach but prefers mud flats and marshes. In late fall the grass on the salt-water marshes is high enough to hide the krieker, and yet not offer resistance to its progress, and it is surprising how difficult it is to see one as it stands motionless watching the enemy with unalarmed eyes. This sandpiper arrives on the Bering Sea coast to breed in May, and Nelson's account of its song will surprise those who know the species only when migrating. Speaking of a night passed in the Yukon delta, he says: "As my eyelids began to droop and the sense to become indistinct, suddenly a low, hollow, booming note struck my ear. Again the sound arose nearer and more distinct, and with an effort I brought myself back to the reality of my position and, resting upon one elbow, listened. A few seconds passed and again arose the note; a moment later and, gun in hand, I stood outside the tent. The open flat extended away on all sides, with apparently not a living creature near. Once again the note was repeated close by, and a glance revealed its author. Standing in the thin grasses ten or fifteen yards from me, with its throat inflated until it was as large as the rest of the bird, was a male *A. maculata*. The note is deep, hollow, and resonant, but at the same time liquid and musical, and may be represented by a repetition of the syllables too-u, too-u, too-u, too-u, too-u, too-u, too-u, too-u."

MARBLED GODWIT

Summer Plumage Winter Plumage
HUDSONIAN GODWIT

Summer Plumage Winter Plumage
WILLET

LONG-BILLED CURLEW HUDSONIAN CURLEW ESKIMO CURLEW

MARBLED GODWIT (Limosa fedoa).

Range: Breeds from valley of Saskatchewan south to North Dakota; winters from southern Lower California, Louisiana, Florida, and Georgia to Guatemala and Belize.

The marbled godwit, one of the largest and finest of American shorebirds, formerly nested in Nebraska and Iowa. A few may still breed in North Dakota but the bulk of the species retire beyond our northern boundaries to rear their young. Though in summer an inhabitant of the interior prairies and marshes, the marbled godwit prefers to winter on the seacoast, and Cooke notes the remarkable fact that it "presents the unique spectacle of a bird breeding in the middle of the American continent and migrating directly east and west to the ocean coasts." While it is easy to prove that the marbled godwit formerly was much more abundant than it is now, it is doubtful if the bird ever existed in numbers comparable to certain other shorebirds, as the curlews and various sandpipers. Wherever it was found, the bird carried with it its own death warrant in its large size, excellent flesh, and its trusting disposition, which not only made it easy to decoy but prompted it to return once and again at the call of wounded comrades. Strict observance of the Federal regulation which prohibits the killing of this and certain other shorebirds until 1918, may possibly save the marbled godwit from extinction, but friends of our shorebirds may well watch with anxious foreboding the history of this bird during the next few years.

WILLET (Catoptrophorus semipalmatus semipalmatus).

Range: Breeds from Virginia (formerly from Nova Scotia) south to Florida and the Bahamas; winters from the Bahamas to Brazil and Peru.

The willet, including under this name both the eastern and the western forms, ranges widely over the United States and formerly bred in suitable localities over much of our territory. On the Atlantic it nested from Nova Scotia to the Gulf of Mexico, and probably small numbers yet nest on some of the sandy islands southward. At first thought it may seem strange that a bird so abundant and so widely distributed as the willet should have been so reduced in numbers, but the real wonder is that any remain after the treatment the species has been subjected to. The bird is wary enough and when alarmed informs the whole neighborhood by its loud outcries of the presence of danger. Yet as the result of being shot in season and out of season the species has at length been brought within measurable distance of the end. This statement applies more particularly to the eastern bird. The western form has escaped better, and in fall many of the western-bred birds visit the Atlantic coast. The process of exterminating our eastern willet was accelerated along the coast by the quite uniform practice of robbing the nests for the large and palatable eggs. Under the circumstances, no prophet was needed to foretell the inevitable end. To what extent the willet will be affected by the present Federal regulations remains to be seen. The essential facts regarding the willet and the fate that awaits it are known to many sportsmen, but it is to be feared that the destruction of this and other species may be hastened by the feeling among them that if the residents of one particular State or locality do not get the few remaining shorebirds others will.

HUDSONIAN GODWIT (Limosa haemastica).

Range: Breeds from the lower Anderson River southeast to central Keewatin; winters in Argentina, Patagonia, and the Falkland Islands.

Nothing less than two continents suffice to satisfy the roving disposition of the Hudsonian godwit which, according to Cooke, probably breeds on the barren ground from the mouth of the Mackenzie to Hudson Bay. The species winters in Argentina and Chile and after leaving our northeast coast probably reaches winter quarters by an all-sea route. On the return journey in spring the godwit reaches Texas in April, and follows up the Mississippi Valley, thus, in a general way, duplicating the route of the golden plover. The Hudsonian godwit has been greatly aided in its struggle with fate in the shape of merciless sportsmen by the fact that its breeding grounds are in a distant and desolate region where its parental duties are little interfered with. Though to-day more numerous than the marbled godwit, its destiny is equally sure and almost as imminent. Nothing short of absolute protection for a term of years will save the species from extinction. Under the Federal regulations, the Hudsonian godwit, like some of its relatives, is given a close season till 1918. Such regulations are easy to enact but are difficult of enforcement, especially in remote districts, and unless the cordial cooperation of the devotees of the shotgun can be secured, the fate of this species, and some others as well, is only too certain.

LONG-BILLED CURLEW (Numenius americanus).

Range: Breeds from central British Columbia, southern Saskatchewan, and Manitoba to northeastern California, northern New Mexico, and northwestern Texas; winters from central California and southern Arizona south to Guatemala, and on Atlantic coast from South Carolina to Florida, Louisiana, and Texas.

Few in our times have known this big curlew in the Atlantic States, although a century or less ago flocks of considerable size were not uncommon. Many of us, however, have made the acquaintance of the bird in the Western States, where it breeds or did breed, from Canada to Texas. Those best acquainted with the recent status of the bird see little hope for it. The natural extension of agriculture has greatly limited its breeding grounds, and for this there is no remedy. Nor should one be desired, since in the mind of every right thinking citizen farms are more important than breeding grounds for curlew. Nevertheless, the curlew is not an over-shy bird, and, if accorded reasonable treatment, and left undisturbed during the breeding season, would long survive in its old haunts. Protected till 1918 under the Federal law, it needs in addition only the protection of public sentiment to live on indefinitely. Its flesh is rather tough and dry, even on the prairies where it feeds much upon insects and berries, while in its seaside resorts, where it subsists on marine life, its meat is too strong to be palatable. As the bird eats many insects and crawfish, we may plead its utility as an additional argument in its favor, and beg sportsmen and others who may be said to hold the life of the species in their hands to abstain from killing curlews. Continued shooting means speedy extinction.

HUDSONIAN CURLEW (Numenius hudsonicus) (See page 148).

ESKIMO CURLEW (Numenius borealis) (See page 148).

GREATER YELLOW LEGS LESSER YELLOW LEGS

Male Female
RUDDY TURNSTONE BLACK TURNSTONE (Top)

Winter Plumage Spring Plumage
BLACK-BELLIED PLOVER

Winter Plumage Summer Plumage
GOLDEN PLOVER

GREATER YELLOW-LEGS (Totanus melanoleucus).

Range: Breeds from Lake Iliamna, Alaska, and southern Mackenzie to southern British Columbia, Ungava, Labrador, and Anticosti Island; winters from southern California, Texas, Louisiana, and Georgia south to Patagonia.

The yellow-legs is one of the largest and most conspicuous of our shorebirds, and though greatly reduced in numbers, is still comparatively abundant. Like many other shorebirds, its numbers vary locally and with different years, such fluctuations being chiefly due no doubt to favorable and unfavorable breeding seasons in the far North. On the eastern coast the yellow-legs has learned that flight over the sea to its winter quarters in South America is safer than an all-land route where expectant gunners beset the shores, and this practical knowledge has greatly aided in conserving the species. The bird has a loud and mellow call note which is easily imitated and is often employed in connection with wooden decoys to lure a flock within range of the deadly shotgun. Experience, however, soon teaches the yellow-legs to be shy and suspicious, and its long neck and still longer legs eminently fit it for the post of watchman in a flock of shorebirds. For our big wader has a most friendly disposition, and associates on the closest terms with other members of the long-legged fraternity, both large and small. Hence among them its loud call has come to be recognized as a warning of danger.

LESSER YELLOW-LEGS (Totanus flavipes) (See page 148).

BLACK-BELLIED PLOVER (Squatarola squatarola).

Range: Breeds on the Arctic coast from Point Barrow to Boothia and Melville Peninsulas; also on the Arctic coast of Russia and Siberia; winters from California, Louisiana, and North Carolina to Brazil and Peru.

The "beetle-head" bears a rather close superficial resemblance to the golden plover, with which it sometimes associates, but the sportsman with quarry in hand can instantly distinguish them by a glance at the toes. If there are three toes in front and one behind, his bird is the beetle-head. The golden plover has only three toes. Like the golden plover the beetle-head breeds in Arctic lands, but unlike that bird it uses practically the same fly lines summer and fall. It inhabits both the Atlantic and Pacific coasts and also a wide strip of the interior, including the Mississippi Valley. The black-belly was formerly very abundant over most of its range, but has suffered a marked decrease in the past fifty years. It is possible that the abolition of spring shooting in a few of the Atlantic States has had an effect in retarding its decrease. It is to be hoped that this is true and that, as all shooting of this species is prohibited until 1918, the beetle-head will make substantial gains. If sportsmen and others interested can be convinced that protective measures are effective, and that under them some of our more important game birds are materially increasing, it may be possible to secure their cooperation in a really effective enforcement of protective regulations, not only in favor of the present species, but of shorebirds generally.

RUDDY TURNSTONE (Arenaria interpres morinella).

Range: Breeds on Arctic shores from Mackenzie River east, probably to Melville Peninsula, and north to Melville Island; winters from central California, Texas, Louisiana, and South Carolina to southern Brazil and central Chile.

The curious little turnstone or "calico-back" differs in many respects from other shorebirds. It has a short stout bill, short stocky legs, and a vigorous compact body, and this unusual combination enables it to perform stunts unknown to shorebirds generally. Thus it obtains no inconsiderable part of its food by prying over stones, shells, or sods with its bill, for the purpose of securing the small insect life that lurks underneath. Forbush states that formerly the turnstone was of much economic importance along the New England coast, where it was known to gunners as "chicken plover," and was shot in great numbers. This turnstone is notable as being one of the first shorebirds to figure in protective measures, being protected at night under a Massachusetts law passed in 1835, together with the plover, curlew, and doughbird. Though enjoying legal protection, as the phrase goes, the bird was little protected in fact, as results show. It is true that the species has lasted till now, but it has because comparatively uncommon. Its existence to-day is due less to the protection it received in the past than to the inaccessibility of its breeding grounds in the far North. In the southern islands, where it winters, it sometimes plays a remarkable role. Who would imagine that one of our small shorebirds could be made to do duty as a game cock! But Dr. Finsch states (Ibis, 1881) that the natives keep turnstones in cages for pets, and match them against each other, as game cocks are elsewhere matched.

BLACK TURNSTONE (Arenaria melanocephala) (See page 148).

GOLDEN PLOVER (Charadrius dominicus dominicus).

Range: Breeds from Kotzebue Sound along the Arctic coast to mouth of Mackenzie, and from Melville Island, Wellington Channel, and Melville Peninsula south to northwestern Hudson Bay; winters on the pampas of Brazil and Argentina.

At one season or another the golden plover occurs over practically all of the United States and formerly its numbers were enormous. The migrations of this plover are unique among shorebirds. Under ordinary circumstances, the route the bird follows to its Argentine wintering grounds protects it completely, since when it leaves Labrador it boldly strikes across the ocean and, unless deflected by storms, apparently does not fold its wings until it reaches the South American Continent. So long a flight without resting may seem impossible for a bird as small as this plover. We know, however, that a close relative, the Pacific golden plover, flies from Alaska to the Hawaiian Archipelago, a distance of quite 2,000 miles. While the Atlantic species might stop to rest if it would, the Pacific coast species has no stopping place between its starting point and its destination. Probably, as Cooke surmises, from food consideration the Atlantic coast species returns in spring by an all land route, and passes up the Mississippi Valley in great numbers. Though protected in fall from sportsmen by the route it follows, spring shooting in the Mississippi Valley has depleted the ranks of this plover to a pitiful remnant of its former numbers. The time has indeed long passed when a party of sportsmen, however large, can kill forty-eight thousand plover in a day, as Audubon states was done near New Orleans in 1821, and now the question to be solved is whether protection during its spring migration comes too late to save the species.

KILLDEER

BAND-TAILED PIGEON

Male Female

PASSENGER PIGEON

Male Female

MOURNING DOVE

KILLDEER (Oxyechus vociferus).

Range: Breeds from central British Columbia, southern Mackenzie, central Keewatin, and central Quebec south to Gulf coast and central Mexico; winters from California, Arizona, Texas, Indiana, New Jersey, and Bermuda south to Venezuela and Peru.

The killdeer is unquestionably one of the most widely distributed and one of the best known of the plover tribe. The bird student who makes its acquaintance need not ask its name, for the bird never tires of repeating it at all seasons. Its vociferous iteration of "kill-deer, kill-deer" brings down on its offending head the wrath of the sportsman whose cherished plans for a successful stalk of a flock of ducks are upset by its excited cries, rightly interpreted by the ducks as signals of danger not to be neglected.

Though the killdeer is a plover, he cares very little for the seacoast, nor overmuch for the neighborhood of water, but finds all his wants supplied in upland pastures and plowed lands. His bill of fare is a long and varied one, and includes many pestiferous kinds of insects. As the bird's flesh is little esteemed and its services are of decided value to man, no very good reason appears why the species should not flourish. But though the bird is still numerous, it has been exterminated in many localities. As it is now protected under the Federal law we may look to see it again occupy territory from which it has been long absent. There is the more reason to expect this since the killdeer responds quickly enough to decent treatment, as is evidenced by the fact that a pair has nested for three successive seasons on a golf course near Washington, D. C. Despite the fact that the location of the nest was known to at least a hundred players and caddies, and that the piece of "rough" in which the nest was located was invaded scores of times daily, the birds were successful in bringing out their young each year, though plovers never had a more exciting time doing it.

PASSENGER PIGEON (Ectopistes migratorius).

Range: Bred formerly from middle western Mackenzie, central Keewatin, central Quebec, and Nova Scotia south to Kansas, Mississippi, Pennsylvania, and New York; wintered principally from Arkansas and North Carolina south to central Texas, Louisiana, and Florida.

On September 1, 1914, aged twenty years, departed this life the sole surviving passenger pigeon. This brief obituary records the disappearance from earth not only of the last survivor of a notable American game bird, but, what is infinitely sadder, the passing of a species. The history of the passenger pigeon from the first settlement to and including our own times reads like a romance, but a romance tinged on every page with man's cruelty, rapacity, and shortsightedness. Early accounts of the enormous numbers of this pigeon that migrated from section to section read like fables, but they are too well attested to be doubted. Wood's account of the passenger pigeon (1629-34) is so quaint I subjoin part of it:

"These Birds come into the Countrey, to goe to the North parts in the beginning of our Spring, at which time (if I may be counted worthy to be believed in a thing that is not so strange as true) I have seene them fly as if the Ayrie regiment had beene Pigeons; seeing neyther beginning nor ending, length or breadth of these Millions of Millions."

Audubon states that he rode through a winter roosting-place in Kentucky which was more than forty miles long and three miles wide. It may be doubted if in the prime days of this pigeon its numbers were ever equalled by any bird, either in the Old World or the New. Only its great numbers enabled it to survive the assaults of its enemies as long as it did. Then came the market netter, and everywhere the hapless pigeons were taken in season and out of season, with eggs in their bodies ready for the nest and with nests full of young. While neither the netter nor the sportsman is responsible for the extermination of the last passenger pigeon, it is nevertheless true that by the combined assaults of the two, the species was reduced to such a low ebb that it could not recover. Protective legislation was too late.

BAND-TAILED PIGEON (Columba fasciata fasciata).

Range: Breeds from southwestern British Columbia, western Washington, western Oregon, northern Utah, and north-central Colorado south through southwestern United States and Mexico to Nicaragua, and east to western Texas; winters from southwestern United States southward.

Though bearing no very close resemblance to the passenger pigeon, the band-tail may be said to represent that bird on the Pacific coast. Like the pigeons generally, the band-tails are sociable, and flocks of hundreds used to be common in the oak groves of southern California.

They are extremely fond of acorns, and although of late years persecution has made them wary they will risk much to obtain their favorite food. When they find a well-laden oak tree they will swallow acorns till they are full to the very bill. As their soft bills are totally inadequate to hull the acorn, they swallow shells and all, and such are their powers of digestion that they can dispose of at least two full meals every day. They are said to breed in Arizona nearly every month of the year, and Vernon Bailey found them nesting in the Guadalupe Mountains, Texas, as late as August. Their note in the breeding season is a hoot singularly like an owl's, but most of the year they are silent. On the west coast for years they have been persistently hunted, and as they breed in the mountains, which are much resorted to by summer campers, the limits of the close season are by no means always observed. It is high time to take active measures for the preservation of the band-tail; otherwise it will soon meet the same fate as the passenger pigeon.

MOURNING DOVE (Zenaidura macroura carolinensis)

Range: Breeds from British Columbia, Saskatchewan, Manitoba, Ontario, and southern Nova Scotia south throughout the United States and Mexico, and locally in Lower California and Guatemala; winters from southern Oregon, southern Colorado, the Ohio Valley, and North Carolina to Panama.

The mourning dove is in no present danger of extinction. Several traits contribute to its safety. Although sociable enough, it never assembles in vast flocks which act as a unit, but the pairs nest more or less apart and only in fall and winter assemble in large numbers in their favorite feeding places. Hence, netting the bird on a large scale is impossible. Then, too, though the mourning dove never lays more than two eggs and sometimes only one, it is very prolific, since it often nests twice, and sometimes three times in a year. Its prowess of wing renders it indifferent to miles, and we used to see mourning doves in the western deserts, miles away from their nesting places, traversing with swift pinions the desert spaces toward some distant watering hole which they alone knew of. The thirsty prospector, when he observes numbers of doves hurriedly pursuing the same line of flight in the hotter hours of the day, shapes his course accordingly and usually finds water.

MOUNTAIN QUAIL

Male Female

VALLEY QUAIL

Female Male

GAMBEL'S QUAIL

SCALED QUAIL. CHESTNUT-BELLIED SCALED QUAIL

MOUNTAIN QUAIL (Oreortyx picta picta).

Range: Pacific coast from southwestern Washington south to Monterey County, California.

All our American quail are beautiful, but this superb denizen of the mountain sides bears away the palm. Its elegant form, rich coloration, its long, nodding black plumes, its brown gorget, and its alert carriage lend the bird an air of rare distinction. Our plumed knight of the mountains loves not the low country with its dry watercourses, its heat and dust, but chooses for his permanent home the mountain valleys and hillsides with their pure air and numerous streams. This quail, with its two varieties, is strictly limited to the west coast where it ranges from Lower California into Washington. Formerly it was abundant over most of its range, and it is yet numerous in many localities. In Oregon it used to be trapped in great numbers, and as long ago as 1880 was commonly exposed in the city markets in crates containing twenty or more. Even the market men decried the practice, but nevertheless cheerfully sold the birds at three dollars per dozen. A sad sight it was to see these beautiful creatures captive and exposed for sale. My own experience with the mountain quail dates back many years. All the covies I saw in California and Oregon were comparatively small, always less than ten, and the bird appears rarely, if ever, to associate in great gatherings composed of several or more independent covies, as does the valley and Gambel's quail. When in their ordinary mountain haunts, plumed quail are tame enough, altogether too tame for their own safety, but I am told that where much pursued by sportsmen with or without dogs, they rapidly lose their unsophisticated ways and learn to take good care of themselves.

VALLEY QUAIL (Lophortyx californica californica).

Range: Pacific coast region from southwestern Oregon south to Monterey County, California; introduced into Vancouver Island, Washington, and Colorado.

The two forms of quail inhabiting the coast and valley regions of Oregon and California, though differing enough in plumage to constitute races, are very similar in habits. As its name implies, the bird prefers valleys to mountains, although it may range upward as high as four thousand feet, at about which point it meets the habitat of its larger relative, the mountain quail. The valley quail is widely distributed, and being very prolific, it is, or was, exceedingly abundant over most of its range. Eastern sportsmen, knowing only our Bob-white, would find it difficult to credit tales that might be told of the numbers of valley quail that formerly congregated in favorable localities. Flocks of over two hundred were common enough, but in the late seventies and eighties I have occasionally seen several thousand assembled together near water. When flushed, successive bands of hundreds rose simultaneously with an extraordinary whir of wings, and the air was filled with their flying forms. Such sights are of the past, although the valley quail is still numerous in many regions. It is on good terms with civilization and is prone to frequent cultivated tracts, especially vineyards and gardens, even on the outskirts of populous towns. Its fondness for grapes does not endear it to the vine grower, and he often has to resort to extreme measures to protect the bunches of ripe fruit which probably furnish the quail not with food but with water, for this quail discovered the virtues of grape juice long before it was put on the market.

GAMBEL'S QUAIL (Lophortyx gambeli).

Range: Desert region of southern California, southern Nevada, Arizona, and southwestern Utah, east to the southwestern corner of Colorado; also in southwestern New Mexico to the Rio Grande Valley and the El Paso region of extreme western Texas, and south into the northeastern corner of Lower California and to Guaymas, Sonora.

Though differing markedly in coloration from the valley quail of the Pacific coast, Gambel's quail so closely resembles that bird in size and general habits that in my mind the two are inseparable. That the quail themselves are sometimes misled by the likeness would appear from the fact that the two readily hybridize, and I have seen a number of the hybrids from southeastern California. This quail prefers cañon bottoms and rocky hillsides for hunting grounds, and the speed with which the individuals of a frightened covey can make good their escape among rocks and bushes is surprising. Gambel's quail trusts for safety first to its legs and only secondarily to its wings, while it is rare indeed that it resorts to Bob-white's favorite ruse of close hiding. Ordinarily in fall it associates in large bands —they can scarcely be called covies, since they are the aggregate of many covies— and under these circumstances the pot hunter who cannot slay his scores must indeed be a bungler. Gambel's quail is no stranger in vineyard and garden, although for the most part it frequents scantily inhabited districts. In one respect both Gambel's and the California valley quail have greatly the advantage over Bob-white since, if these two western species ever roosted on the ground, they long ago abandoned the habit in favor of trees and thick undergrowth, where they are safe from most prowlers of the darkness.

SCALED QUAIL (Callipepla squamata squamata).

Range: From central Arizona to western Texas, north to southern Colorado and over most of the Panhandle of Texas, east nearly to central Texas, and south to the Valley of Mexico.

The cottontop, as the scaled quail has been dubbed from its conspicuous whitish crest, has a restricted range in the United States along our southern border. The country it frequents is dry and barren, and chaparral and mesquite form its favorite cover. On account of the dry nature of quails' food they are greatly dependent upon water, and hence the presence of large numbers of cottontops may be taken as a pretty sure indication that a stream or waterhole is not far away. Western quail of whatever species have learned to trust to their legs rather than their wings to carry them out of harm's way, and the cottontop forms no exception to the rule. When alarmed, a bevy will scatter hither and yon among the rocks or brush, to come together again when the supposed danger is past. When hard pressed it is an adept at close hiding. The bluish gray plumage of the cottontop harmonizes well with its usual surroundings and no doubt the confidence the bird reposes in its protective coloration is justified by long experience. Protected by the remoteness of its desert home this quail should long survive the fate of some of its less fortunate relatives, though the automobile, with its power to annihilate distance, is a new danger which it has yet to meet.

The habits of the chestnut-bellied scaled quail are so similar to those of the present species as not to call for separate mention. The bird ranges from the lower Rio Grande Valley in Texas to Coahuila and Nuevo Leon, Mexico.

Male Female

MEARN'S QUAIL

Male Female

BOB-WHITE

Male

RUFFED GROUSE

Female Male Male

SPRUCE GROUSE FRANKLIN'S GROUSE

MEARN'S QUAIL (Cyrtonyx montezumæ mearnsi).

Range: From central Arizona and central New Mexico east to central Texas, and south to the mountains of northern Coahuila, Chihuahua, and eastern Sonora.

Mearn's quail is a Mexican species which crossed our borders long before there were political boundaries, and established itself in the low mountain ranges of our western border States, where in time it changed somewhat from the parent stock. Although I have spent considerable time in the country it inhabits, chiefly in eastern Arizona, I never found it numerous, and though I searched persistently only occasionally discovered a small covey. If I am to judge by my rather limited experience, Mearn's quail is the tamest of its kind, and well deserves the epithet of "fool quail" locally bestowed on it. So closely does the bird lie after being once started that I found it almost impossible to flush one a second time unless I marked it down to the foot. I have observed one sitting motionless on a log by the side of the trail, within riding-whip distance of a passing mule train, apparently so petrified with astonishment as to be incapable of motion.

RUFFED GROUSE (Bonasa umbellus umbellus).

Range: Eastern United States from Minnesota, Michigan, southern New York, and southern Vermont south to eastern Kansas, northern Arkansas, Tennessee, and Virginia, and in the Alleghenies to northern Georgia.

This, the partridge of the northern woods, the pheasant of the South, may well be termed the prince of American game birds. Its high position, however, is likely soon to be vacant and its place taken by some lesser member of the game-bird galaxy unless vigorous efforts are made to check its decrease. Possessed of a vigorous constitution which enables the bird to brave the northern winter and defy all ordinary vicissitudes of weather, vigilant and shy where much persecuted, strong of wing and skilled in many a wile by means of which to elude the sportsman and his keen-scented dog, our partridge is well equipped to make a brave fight for existence. And how bravely has it faced its fate! Though usually a resident of extensive forested tracts it is amazing how long the ruffed grouse will continue to live in leafy swamps of a few acres, or on little wooded islands, mere relics of its former forested domain. Gun and dog, natural diseases, sleety storms, and unfavorable breeding seasons are most potent for harm, while the high price placed on its flesh in the market is having its natural effect. In much of its range little time remains in which to save it. It is non-migratory, and hence only the States in which it lives can avert its impending doom. That the bird can be propagated in confinement is much in its favor, and a little of the money spent in attempts to introduce foreign game birds would go a long way toward rehabilitating the partridge. No sound that echoes through our woods has quite the effect on the wayside stroller as the martial summons of the ruffed grouse, and it will be thrice a pity if future generations must miss the spring and fall roll call of this woodland drummer.

BOB-WHITE (Colinus virginianus virginianus).

Range: Eastern North America from South Dakota, southern Minnesota, southern Ontario, and southwestern Maine south to eastern and northern Texas, the Gulf coast, and northern Florida; west to eastern Colorado.

Whatever this little friend of ours says to us in spring, whether "bob-white," as many interpret it, or "more-more-wet," according to the practical farmer, he utters it in such vigorous, albeit mellow tones, that he thereby endears himself to all hearts. And how many there are who, as the promises of spring are fulfilled by opening summer, listen for the cheerful message of this blithe whistler of fence post and thicket and are made happier when they hear it. And "Bobby" is no recluse of the thick woods. He loves the brier patch, the brown stubble, and the open, weedy field. The bright sunlight shines for him, and his loud, cheery call is sounded from some vantage point in the open as though he would have all the world hear his challenge to produce anything more beautiful than his little brown mate snugly hidden away near by. Long may his cheery whistle sound through the land. There is no reason why it should not, save the too ardent zeal of the sportsman and the greed of the epicure. Bob-white is prolific, knows pretty well how to take care of himself, and, if need be, can be reared in captivity. The fate of Bob-white, as of some other non-migratory game birds, rests solely with the several States within which he dwells. Unquestionably, in most States, the present bag limit is altogether too high and should be materially reduced. The farmer, too, should have a word to say in the premises since the food of Bob-white is such that he cannot afford to permit unlimited quail-shooting over his farm, but should jealously guard his coveys and be sure that enough pairs are left to insure the future of the species.

SPRUCE GROUSE (Canachites canadensis canace).

Range: Manitoba, southern Ontario, and New Brunswick south to northern parts of Minnesota, Wisconsin, Michigan, New York, and New England.

The history of the spruce partridge must be written mostly in the past tense, so far at least as the United States is concerned. It used to be common in Michigan, the Adirondack region of New York, and in northern New England, but in all three districts is now either rare or altogether wanting. The unsuspicious nature of this grouse and its total obliviousness to danger from human beings, or rather inhuman beings, probably had more to do with its sad end than anything else. It is said that when a flock was surprised in trees, one after another could be shot down till the last one was gone. As the grouse is practically non-migratory, its preservation depends solely on the States in which it lives, and upon them must rest the responsibility for its fate.

FRANKLIN'S GROUSE (Canachites franklini).

Range: Southern Alaska, central British Columbia, and west-central Alberta south to northern Oregon, central Idaho, and western Montana.

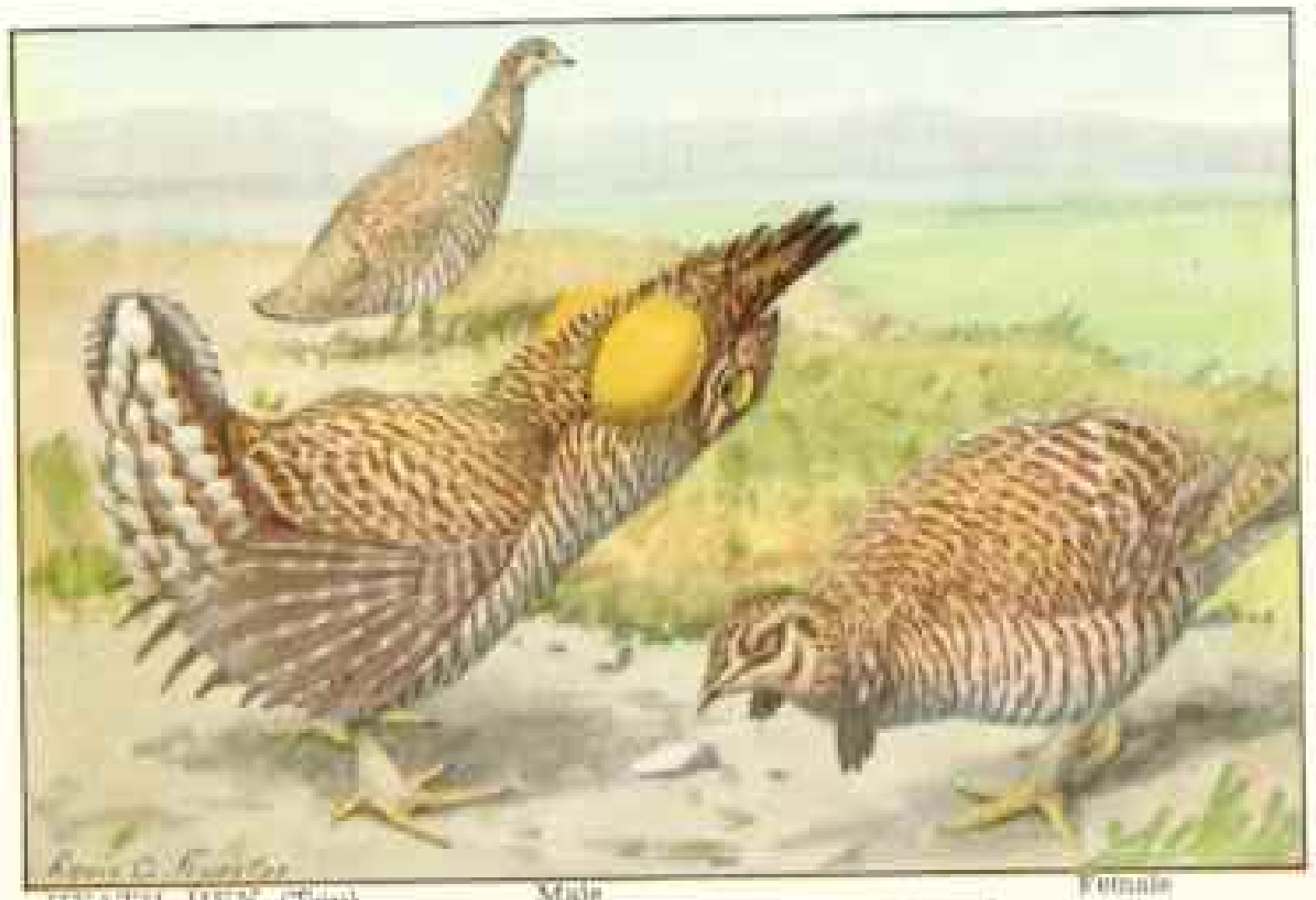
Franklin's grouse was first described by Lewis and Clarke who saw it in Idaho while on their memorable trip to the Pacific coast. While thus known for more than a century, surprisingly little has been recorded concerning its mode of life. From the close similarity it bears to the spruce partridge of the East, it no doubt possesses very similar habits. At least it has the same confiding disposition as that bird, as is attested by the fact that its habit of standing in amazed curiosity to watch the movements of an approaching foe intent on its destruction has earned it the contemptuous epithet of "fool hen." Like our ruffed grouse, this bird is a drummer, but instead of sounding the roll from rock or log, the male drums, according to Dawson, by rapidly beating the air with his wings as he slowly sinks from some elevated station or mounts upwards to it.

Male Female

DUSKY GROUSE

Male Female

SAGE HEN



HEATH HEN (Top) Male PRAIRIE CHICKEN Female

SHARP-TAILED GROUSE

DUSKY GROUSE (Dendragapus obscurus obscurus).

Range: Rocky Mountains from northern Utah and northern Colorado to central western New Mexico and central Arizona, and west to East Humboldt Mountains, Nevada.

This large and beautiful grouse affords an excellent illustration of the effect of the gun on the disposition and habits of a game bird. An inhabitant of the mountains and too small to be much hunted by the Indians when larger game was so abundant, this grouse in early days exhibited the extreme of tameness and indifference. I have many times seen parties of from six to a dozen that scarcely took the trouble to move out of the trail, so entirely unconscious of danger were they and so curious as to the errand of the intruder. Under such circumstances, when alarmed by a gun the flock is apt to betake itself to the nearest trees and sit motionless on the branches, evidently believing themselves to be invisible. The term "fool hen," by which they are known, rather aptly describes their conduct and demeanor on such occasions. Even the "fool hen," however, can profit by experience, and the lesson of caution once learned, it is as shy as it previously was tame. Its flesh is delicious eating and the mountain camper rarely loses an opportunity to feast on it. In spring the loud and sonorous hooting of the grouse coming from some giant pine in ravine and cañon, can be heard for long distances, and has such marked ventriloquial effect that it is difficult to locate the boomer or to tell whether he is far away or close at hand.

HEATH HEN (Tympanuchus cupido).

Range: Island of Marthas Vineyard, Massachusetts.

So late as the first year of the present century the heath hen was still more or less common in the Middle and Eastern States. Still earlier the bird was probably rather generally distributed over the territory east of the Alleghenies. We have no reason to be proud of the course taken by legislation in favor of the heath hen, though we need not go back to the last century for even more flagrant examples of the failure of protective legislation. First, as is usual in such cases, all legislation halted till the bird was well on the road to extinction. Then laws were passed, adequate enough, if properly enforced; but they were openly and frankly ignored or repealed or modified no doubt under the time-worn arguments of the present day: the importance to sportsmen of an open season; the need for meat; with the corollary, that the species at that particular period was in no danger. And the result was the same as in the case of the passenger pigeon, and as it will be soon in the case of the prairie chicken.

Marthas Vineyard, Massachusetts, now holds the last pitiful remnant of this fine game bird which, under the protection of the State, has increased from a few couples to about two hundred. How long this little band of survivors will be able to hold fate at bay remains to be seen. It would seem to be the part of wisdom to found other colonies and so increase the chances of survival.

PRAIRIE CHICKEN (Tympanuchus americanus americanus).

Range: Southeastern Saskatchewan and southern Manitoba to eastern Colorado, northeastern Texas, Arkansas, western Kentucky, and Indiana.

"The chicken" is a lover of the open prairie and as a substitute readily accepted the wheat and cornfields of the early settlers, in which it was, and still is, a valuable ally of agriculture. However great its value to the farmer, if we are to judge from present appearances, this fine prairie grouse must soon be written of in the past tense. Formerly abundant all over the Mississippi region from Manitoba south to Louisiana and Texas, and extending as far west as Colorado, to-day only a scant remnant of its former numbers is left, and this remnant is fast dwindling under the combined attacks of sportsmen who should know better, and of gunners who neither know nor care for consequences. Ranging only a short distance north of our boundaries, the prairie chicken is in the strict sense of the word an American game bird, and one must go far to find a finer. Being non-migratory, it is State property, and its fate rests solely with the individual States within which it resides. Considering its past abundance, the fine sport its pursuit affords to the legitimate sportsman, its delicacy for the table, and the valuable service it renders the farmer in destroying his insect enemies, the record of its treatment is a shameful one. In many States no protection whatever was given the bird till its extinction was practically assured, while in the States in which adequate legislation has been enacted, open seasons, too large bag limits, and inadequate enforcement of the laws have produced their inevitable effect. Nothing short of a closed season for a term of years will turn the tide and save this noble bird from extinction.

SAGE HEN (Centrocercus urophasianus).

Range: Sagebrush plains from middle southern British Columbia, southern Saskatchewan, and northwestern North Dakota to middle eastern California, northwestern New Mexico, and northwestern Nebraska.

To make the acquaintance of the sage hen, the largest of the grouse family in the United States, one must leave the region of forests and greenery and betake himself to the barren plains country where grows in abundance the Artemisia or sage brush. This aromatic plant furnishes the bird not only safe cover but also food. Indeed, sage leaves constitute such a large part of the regular fare of the old birds that their flesh becomes strongly tainted, and he must be hungry indeed who relishes it. The flesh of the young, however, is excellent. Owing to its large size and its tameness it makes the easiest of marks, and unless special attention is given to its preservation the bird will before long become rare. The yellow air sacs on the neck of the male are inflated to enormous size during the mating season, and together with his curious antics no doubt suffice to render him irresistible to the female.

SHARP-TAILED GROUSE (Pediœcetes phasianellus phasianellus).

Range: Central Alaska and northwestern British Columbia east through central Keewatin to central western Ungava, and south to Lake Superior and the Parry Sound district, Ontario.

The sharp-tailed grouse, including under this name its three forms, has an extensive range in the far West, but formerly extended far enough eastward to meet the range of the true prairie hen in Wisconsin and Illinois where, however, it has been nearly if not quite exterminated. As a rule, it inhabited wilder and rougher country than the prairie hen, and never was so abundant. The free use of the shotgun in recent years has taught the sharp-tail some important lessons, and its wariness, seconded by its powerful wings, are sufficient to insure the perpetuity of the species if the Western States in which it lives, profiting by the sad lesson of the prairie chicken and heath hen in the East, afford it the needed protection. Unless, however, its pursuit be carefully regulated, its race will soon be run, and another name added to the lengthening list of extinct American game birds.

Male and Female Summer Plumage — Winter Plumage

WILLOW PTARMIGAN

Male and Female Summer Plumage — Male in winter Plumage

WHITE-TAILED PTARMIGAN

Female — Male

RING-NECKED PHEASANT

Female — Male

WILD TURKEY

WILLOW PTARMIGAN (Lagopus lagopus lagopus).

Range: Breeds from northern Alaska, northern Banks Land, and central Greenland south to eastern Aleutian Islands, central Mackenzie, central Keewatin, James Bay, and southern Ungava; south in winter to northern British Columbia, Saskatchewan Valley, Minnesota, Ontario, and Quebec.

To make the acquaintance of the willow ptarmigan in its chosen home one must visit the open tundras on the borders of Bering Sea and the Arctic coast. Though not known to breed south of Labrador, the bird migrates in winter to the St. Lawrence, and occasionally a straggler crosses our own boundary. In Alaska in autumn willow ptarmigan unite in great flocks, numbering thousands, and migrate to the neighborhood of the Yukon and its tributaries, finding there both food and shelter. During the winter ptarmigan play an important role in the life of both the Eskimo and the Indian and are snared and shot in great numbers, often indeed forming the natives' only resource against the ever-recurring periods of want and even famine. On the Kaviak Peninsula the Eskimo have taken advantage of the habitual low flight of the bird—only a few feet above the surface—to net them in a curious way. Nelson thus describes it: "Taking a long and medium fine-meshed fishing net they spread it by fastening cross-pieces to it at certain distances; then taking their places just at sunset in early November or the last of October, on a low, open valley or 'swale,' extending north and south, they stretch the net across the middle of this highway, with a man and sometimes two at each cross-piece, while the women and children conceal themselves behind the neighboring clumps of bushes. As twilight advances the net is raised and held upright. Ere long the flocks of ptarmigan are seen approaching, skimming along close to the snow-covered earth in the dim twilight, and a moment later, as the first birds come in contact with the obstacle, the men press the net down upon the snow sometimes securing fifty to sixty birds."

RING-NECKED PHEASANT (Phasianus torquatus).

Range: First introduced from China into the United States near Portland, Oregon, in 1881. At present established in many other localities, including the following: Puget Sound; Vancouver Island; British Columbia; Cape Cod, Massachusetts; Genesee Valley, New York; and Jekyll Island, Georgia.

This splendid game bird is a native of China, whence it has been introduced into British Columbia, Washington, Oregon, and California, and less successfully in eastern United States. From the first the bird throve wonderfully in Oregon, as introduced game rarely does, and to-day it is probably the most abundant game bird in that State. The pheasant has not escaped censure on the score of its damage to crops, and it is undoubtedly true that it has a keen appetite for corn, peas, grain, and even potatoes. The introduction of a large game bird like the pheasant into our domains is very different from the introduction of a small species like the English sparrow. Unlike the damage done by the sparrow, the mischief of the pheasant can be checked at any time desired by simply extending the open season. Pheasants, however, are naturally hardy and prolific, and once established in a region need only reasonable protection to insure their perpetuation for all time.

WHITE-TAILED PTARMIGAN (Lagopus leucurus leucurus).

Range: Rocky Mountains from northern British Columbia and central Alberta south to Vancouver Island, Washington, northwestern Montana, Colorado, and northern New Mexico.

This hardy ptarmigan, including its Rocky Mountain representative, is an inhabitant of the mountain tops above timber line, and here it lives contentedly summer and winter. Having few foes to contend with, and man being only a casual visitor to its fastnesses, it is likely to continue indefinitely its lonely life among frowning rocks and glistening glaciers. Their mottled plumage in summer and their white robes in winter greatly aid the ptarmigan in their hard struggle for existence, and to some extent at least the birds appear to realize their invisibility. Thus, the members of a flock when surprised will often remain motionless as though depending on their likeness to their surroundings for immunity. Though protected by law, the best protection for the ptarmigan is its protective coloration and its habitat, so remote from the bounds of the arch enemy, man. May they long continue to insure this timid and inoffensive bird immunity.

As is well known, as winter approaches the ptarmigan changes its plumage from a much-mixed dress of rufous, black, and white, to a snowy white. The summer dress is very inconspicuous among the vegetation which the bird frequents, while white winter robes render it no less inconspicuous when the earth is carpeted with snow. Such is one of the many ways in which Mother Nature provides for the safety of her wards.

WILD TURKEY (Meleagris gallopavo silvestris).

Range: Eastern United States from Nebraska, Kansas, western Oklahoma, and eastern Texas east to central Pennsylvania, and south to the Gulf coast.

America may well be proud of this, the King of all game birds. Wherever found, the turkey was originally very plentiful, being sufficiently intelligent and wary to hold its own against the Indian and its numerous natural enemies, particularly the wild cat and cougar. As recently as the late eighties I knew of a flock that had ranged for at least ten years not far from the banks of the Potomac within sight of the Capitol dome. Nature has furnished the turkey a pair of stout legs that enable it to range daily over a wide extent of hill and valley in its search for seeds, grasshoppers, insects, and berries. Inclined to trust to its legs when confronted by danger, it either dashes off at full speed or sneaks quietly away through the bushes, although when forced to fly its powerful wings carry it at a rapid rate. It roosts in the tops of huge trees and this habit is a strong factor for safety. In the seventies I found turkeys very numerous on the headwaters of the Gila in Arizona, and as they probably never had been hunted they were almost as tame as barnyard fowls. One might easily have killed a wagon-load in a day. To what extent the Aztecs had domesticated the wild turkey before the coming of the Spaniard is not known, but undoubtedly it was kept in captivity and had been known to the Montezumas for centuries. It is interesting to note that the turkey originally introduced into Europe from Mexico by the Spaniard was a different subspecies from our eastern wild turkey. Subsequently, the Mexican bird was reintroduced into America, particularly the Eastern States, from Europe. Easily domesticated, our wild turkey even more readily drops its acquired habits and resumes its primitive mode of life. Thus in several of the Hawaiian Islands the forests have been stocked with domesticated birds which, after a season or two, became as wild as ever.

SURF SCOTER (Oidemia perspicillata) (See page 117)

Range: Breeds on the Pacific coast from Kotzebue Sound to Sitka, and from northwestern Mackenzie and Hudson Strait to Great Slave Lake, central Keewatin, and northern Quebec; winters on the Pacific coast from Aleutian Islands south to San Quintin Bay, Lower California, and on the Great Lakes.

The surf duck is possibly the most abundant of the three species of scoter ducks, and in fall and winter it visits the northern parts of the United States on both coasts in great numbers. It appears off the coast of Massachusetts early in September. Some idea of the vast numbers of these birds may be gained from the observations of Nelson who, late in the breeding season of 1878, saw near Stewart Island, Alaska, a continuous raft of them about ten miles long and from a half to three-fourths of a mile in width. All these appeared to be males and therefore represented only half of the birds of this species breeding in the locality. The surf scoter is a powerful swimmer and a superb diver and is almost as much at home in the surf as a fish. It lives on various kinds of shellfish, chiefly mussels. Naturally, having no means of breaking open the bivalves, it has to swallow them whole, and such are the bird's powers of digestion that it has no difficulty in disposing of the thick shells.

As bearing directly on the question of spring shooting, Mackay states that between April 15th and April 25th he has taken eggs from the ovary of the female scoter that varied in size from that of a cherry stone to that of a robin's egg. Such birds were probably mated some time before, although, as a matter of fact, it is highly probable that the adults of many, if not most, ducks mate for life, and that the pairs consort together till one or both are killed.

AMERICAN BLACK SCOTER (Oidemia americana) (See page 117).

Range: Breeds in northeastern Asia and from Kotzebue Sound to Aleutian Islands, including Near Islands; also on west shore of Hudson Bay, Ungava, and Newfoundland; winters on Asiatic coast to Japan and from islands of Bering Sea south rarely to Santa Catalina Island, California

The American scoter is abundant in Alaska, where it breeds. It is abundant also in winter off the coast of the New England and Middle States, where it associates with the white-winged and surf scoters, the three species at this season possessing similar habits.

At St. Michaels these ducks are never seen in spring until the ice begins to break offshore and the marshes are dotted with pools of open water. Toward the end of May, writes Nelson, they leave the leads in the ice and are found in abundance among the salt- and fresh-water ponds on the great marshes, from the Yukon mouth north and south. The mating is quickly accomplished, and a nesting site chosen on the border of some pond. The spot is artfully hidden in the standing grass, and the eggs, if left by the parent, are carefully covered with grass and moss. As the set of eggs is completed, the male gradually loses interest in the female, and soon deserts her to join great flocks of his kind along the seashore, usually keeping in the vicinity of a bay, inlet, or the mouth of some large stream. A set of fresh eggs was taken on August 3d, and a brood of downy young was obtained on September 9th. Nelson adds: "They are good weather indicators, and frequently, ten or twenty hours in advance of a storm, they come into the sheltered bays, sometimes to the number of a thousand or more. At such times they show great uneasiness and frequently pass hours in circling about the bay, sometimes a hundred yards high and again close over the water, the shrill whistling of their wings making a noise which is distinctly audible nearly or quite half a mile."

SNOW GOOSE (Chen hyperboreus hyperboreus) (See page 121).

Range: Breeds from the mouth of the Mackenzie east probably to Coronation Gulf and Melville Island; winters from southern British Columbia, southern Colorado, and southern Illinois south to northern Lower California, central Mexico, Texas, and Louisiana.

For all practical purposes, the snow goose or white brant may be considered a western bird. It is, however, so much like the greater snow goose, except in size, that the eastern records of the two species are much confused, and it is difficult to determine to which bird any particular account applies. No doubt varying numbers of the lesser snow goose used to visit the Eastern States where, however, the larger goose was and is more numerous. The smaller snow goose breeds in northern latitudes, and in fall migrates in great numbers to our Southwestern States. In the early days of California it was no uncommon sight in winter to see stubble fields and pastures so covered with white brant as to seem like great snow-fields. And very beautiful these snowy tracts appeared under the bright mid-winter sun of California. The ranchmen, however, looked with no friendly eyes on these multitudes of geese, since the tender leaves of wheat are greatly relished by them. When they nip off the blades of the growing grain, little damage is done, and many claim, indeed, that the crop stools the better for it. No doubt, however, great damage sometimes resulted from too frequent cropping, and it was no uncommon practice to hire men to ride from grain field to grain field and keep up a constant fusillade to kill or scare away the geese. Though the multitudes of earlier days no longer visit California, the bird is still numerous there.

BLACK BRANT (Branta nigricans) (See page 121).

Range: Breeds on the Arctic coast and islands from Point Barrow east to near mouth of Anderson River, north probably to Melville Island; common on Siberian coast, Chukchi Peninsula, and west to New Siberian Islands; winters on Pacific coast from British Columbia south to San Quintin Bay, Lower California, and in the interior of Oregon and Nevada.

The black brant is the Pacific counterpart of the brant of the Atlantic coast, and like that bird an object of keen pursuit by the sportsmen of the region it frequents. Like its relative it retires well within the Arctic Circle in summer, and like it also is an exclusively salt-water species, feeding on marine grasses and small marine life. When in search of food, Dawson tells us, the black brant dives as well as a dipper. This brant winters on the Pacific coast in great numbers from Puget Sound southward. Twenty-five years ago it wintered in great numbers in San Diego harbor, and there was so tame and unsophisticated that only moderate skill and caution were necessary to insure a reasonable bag in a very short time. The bird was usually shot from blinds or from points as the flocks passed to and from their feeding grounds. Nelson states that this brant rarely reaches the mouth of the Yukon before May 15th, when the main flight of the other geese has passed, and many of those which remain to breed have already paired.

CACKLING GOOSE (**Branta canadensis minima**) (See page 121).

Range: Breeds in western Aleutians and from Norton Sound south to northern coast of Alaska Peninsula; winters from British Columbia south to San Diego County, California.

The cackling goose is simply a dwarf form of the Canada goose with somewhat darker colors. It is chiefly limited to the West-Coast States. Nelson found this the most common and generally distributed goose breeding along the Alaska coast of Bering Sea. His spirited account of it as he saw it in the Yukon Delta gives an excellent idea of the nature of the visits of this and other waterfowl to Alaska. He says: "The first goose of the season is hailed with delight by both natives and white residents, who set at work repairing their guns and making ready for the welcome change from a diet of fish, eaten all through the winter, to geese, which soon become the staple. As May advances and one by one the ponds open, and the earth looks out here and there from under its winter covering, the loud notes of the various wild fowl are heard, becoming daily more numerous. Their harsh and varied cries make sweet music to the ears of all who have just passed the winter's silence and dull monotony, and in spite of the lowering skies and occasional snow-squalls every one makes ready and is off to the marshes. The flocks come cleaving their way from afar, and as they draw near their summer homes raise a chorus of loud notes in a high-pitched tone like the syllable 'luk' rapidly repeated, and a reply rises upon all sides, until the whole marsh re-echoes with the din, and the newcomers circle slowly up to the edge of a pond amid a perfect chorus raised by the geese all about, as if in congratulation. Even upon first arrival many of the birds appear to be mated, as I have frequently shot one from a flock and seen a single bird leave its companions at once and come circling about, uttering loud call-notes."

EMPEROR GOOSE (**Philacte canagica**) (See page 121).

Range: Breeds from Kotzebue Sound south to the mouth of the Kuskokwim, on St. Lawrence Island, and also on Chukchi Peninsula, Siberia, near East Cape; winters from Commander and Near lands east through Aleutians to Bristol Bay and Sitka.

Geese are strong of wing and of adventurous disposition and to most of the tribe a migration of a thousand miles or so is a trifling matter. The emperor goose appears to be as strong as any of its fellows and equally good on the wing, which makes all the more remarkable the limited area it occupies in Alaska. It ordinarily ranges only from the Aleutian Islands to the vicinity of Bering Strait, and the life of the species is practically restricted within this narrow territorial compass.

Nelson enjoyed the unusual opportunity of observing the emperor goose in Alaska. "By the Aleuts these birds are called 'beach geese,'" he says, "from their habit of frequenting the island beaches to feed. These geese arrived in force in the Yukon delta about the first of June, while the river was still under a firm sheet of ice and heavy snow banks covered half the earth. Soon after arrival they paired, the males when mated being very pugnacious. They nested on the salt marshes, and the eggs, five to eight in number, were frequently deposited among the driftwood below high-water mark. The young appear about the last of June and the adults moult from the last of July to the middle of August. Now comes the opportunity of the Eskimo, who set long lines of nets across the marshes, into which they drive the hapless waterfowl which have moulted their quill feathers and cannot fly. The slaughter is enormous and the natives make it worse by killing thousands of young birds for no other purpose than to prevent them being in the way next drive."

AVOCET (**Recurvirostra americana**) (See page 128).

Range: Breeds from eastern Oregon, central Alberta, and southern Manitoba south to southern California, southern New Mexico, northwestern Texas, northern Iowa, and central Wisconsin; winters from southern California and southern Texas to southern Guatemala.

Though not a game bird in any proper sense, the avocet finds mention here because it furnishes a shining mark for the gunner, and in consequence has practically disappeared from the Atlantic coast. Numbers of avocets are still to be seen along the borders of sloughs and ponds in the far West, though even there the bird by no means enjoys the immunity from persecution it deserves. Its striking colors, its vociferous voice, long neck and bill, and its longer legs, combine to render the avocet so conspicuous that its only chance for safety rests in seeing its enemies before it is seen by them. Its long legs have another function as they enable the bird to wade in the shallows, where its food is chiefly obtained, while its webbed toes enable it to swim easily when need arises. Its slender, upward-curved bill may well excite wonder, but Nature knew what she was about in designing it, for its form admirably adapts it for finding and seizing any prey that may rest on the surface of the muddy ooze, or for probing for various larval forms common in fresh water. It nests on the margins of the ponds which it frequents, and no sooner does an intruder appear than it flies to meet him with loud outcries that unmistakably betray the secret it is so anxious to conceal. The avocet, so innocent and beautiful, is now protected by the Federal law and, as its flesh is worthless, neither sportsmen nor gunners have any excuse for slaughtering it.

DOWITCHER (**Macrorhamphus griseus griseus**) (See page 128).

Range: Breeding range unknown, but probably northern Ungava; winters from Florida and the West Indies south to northern Brazil.

The dowitcher, or brown back, as it is known in many places, is one of our most important shorebirds, both by reason of its great numbers, its excellence for the table, and the sport it furnishes. If we include under the name "dowitcher" the western form, with its longer bill and other slight differences, the bird may be said to visit all parts of the United States in its migration. It is, however, far more common on the coast than in the interior, and formerly it visited the Atlantic shore in multitudes. The brown-back, however, is one of the most unsuspicious of our shorebirds, and comes to wooden decoys with the utmost readiness. Even after a flock is decimated and the dead and dying cover the ground, the survivors will return again to the fatal spot. No wonder that the multitudes spoken of by many earlier writers no longer visit our shores. There is every reason to believe that the absolute prohibition of the shooting of this bird for a term of years will do much toward rehabilitating the species. Then, with the prohibition of spring shooting and with a small bag limit, it may be possible to retain the brown-back on the list of game birds. But sportsmen may rest assured that anything short of drastic measures will be followed by the extermination of this important wader.

HUDSONIAN CURLEW (Numenius hudsonicus) (See page 132).

Range: Breeds on coast of Alaska from mouth of Yukon to Kotzebue Sound, and on coast of northern Mackenzie; winters from lower California to southern Honduras, from Ecuador to southern Chile, and from British Guiana to mouth of Amazon.

Within the memory of many still living, the jack curlew, as this bird is best known to sportsmen, was the least abundant of the three species of curlew here mentioned. To-day it is the most numerous if, indeed, we still may speak of the Eskimo curlew as a living species. The journeys of the jack curlew north and south rarely take it into the interior, and except when nesting, it sticks rather closely to the vicinity of salt water. It is difficult to explain just why this curlew should have maintained its numbers so well when its relatives have been so reduced, but persecution has taught it the art of self protection and it is now no easy matter to bag a Hudsonian curlew. Then, too, its inaccessible nesting-grounds aid in its preservation, although in this respect it is no better off than was the Eskimo curlew, while the latter bird had the advantage of an overseas route to South America. It is possible, however, that while the passage over the ocean saved the Eskimo curlew from the onslaught of sportsmen, except in easterly storms which drove it in large flocks on our coast, it exposed the flocks to the fury of the elements during off-shore gales.

The bristle-thigh, our fourth species of curlew, is little known in America. It certainly summers and probably breeds in Alaska, and in fall disperses widely over the South Pacific islands. It is one of the few water birds that winter in considerable numbers in Hawaii.

ESKIMO CURLEW (Numenius borealis) (See page 133).

Range: Breeds on the barren grounds of northern Mackenzie; winters in Argentina and Patagonia.

The Eskimo curlew is an interesting example of the rapidity with which a game bird, apparently numerous enough to defy fate, may be suddenly swept off the face of the earth. Forty years ago, and even less, as many witnesses besides myself can testify, Eskimo curlews might often be found in the markets of Boston, New York, and other large eastern cities, and apparently no one then had a suspicion that the species was nearing its end. Audubon, speaking of his experience in Labrador in 1833, likened the numbers of this curlew to the flocks of passenger pigeons, and as late as 1850 Packard noted a flock in Labrador which was perhaps a mile long and nearly as broad. Not many years ago the fishermen of Labrador and Newfoundland were salting them down by the barrelful for winter's consumption. Because of its uncommon fatness and the excellence of its meat, it was generally known in New England as the "dough bird." No doubt these qualities were the chief cause of the curlew's extinction. Thus the very qualities that should have insured the perpetuation of the species for the benefit of posterity led to its destruction by our improvident selves. The bird is spoken of here as extinct since, to all intents and purposes, it is so, although a few probably still survive. The lesson to be drawn from the destruction of the curlew and the passenger pigeon is that in the case of any given game bird we cannot tell exactly when the danger line is crossed and the safety of the species begins to be threatened. The untimely end of the curlew and pigeon shows that it is the part of wisdom to apply the brakes before the bottom of the hill is reached—in other words, to adopt effective preventive measures before it is too late.

LESSER YELLOW-LEGS (Totanus flavipes) (See page 134).

Range: Breeds from Kotzebue Sound, Alaska, northern Mackenzie, central Keewatin, and southern Ungava to valley of the Upper Yukon, southern Saskatchewan, and northern Quebec; winters in Argentina, Chile, and Patagonia.

The mention of the lesser yellow-legs inevitably recalls to mind its larger relative, for the two birds resemble each other in many ways. Formerly the lesser yellow-legs was extremely abundant over most of the United States east of the Rockies, west of which range it occurs only casually. Like so many of its relatives this bird seeks the seclusion of the far North to nest, and reaches the Mackenzie River region by the Mississippi Valley route the early part of May, thus being, as Professor Cooke notes, about the earliest of our shorebirds to reach high northern latitudes. Naturally it is one of the first to complete its nesting, and it begins its southern journey early in July, the greater number having left the barren grounds by the end of August. Its principal migration route in fall appears to be the Atlantic coast, and not many years ago early yellow-legs shooting was eagerly looked forward to by the impatient sportsmen. No doubt many flocks join the curlew and plover on their journey over the ocean and reach South America by the all-water route. Were a census of the yellow-legs possible it would show a woeful diminution of numbers in the last fifty years. Both Audubon and Nuttall appear to have regarded the bird as one of the most numerous of American waders, and many who are still active hunters can recall the days when big bags were common. The yellow-legs, however, decoys well, and when a flock has been decimated by the first discharge will frequently return at the whistled call. The trustfulness of shorebirds is great, their wiles few and ineffective, and they have to pay the natural penalty, since there is little pity in the heart of the man with a shotgun.

BLACK TURNSTONE (Arenaria melanocephala) (See page 134).

Range: Breeds from Kotzebue Sound south to the valley of the Lower Yukon; winters from British Columbia south to Santa Margarita Island, Lower California.

The black turnstone is the Pacific-coast representative of the common ruddy turnstone of Atlantic shores. Little is to be said of its habits that is not equally applicable to its fellow, of which, except for color, it is a near counterpart. Black turnstones arrive at the mouth of the Yukon about the middle of May. Nelson found it far more numerous in summer on the Bering Sea coast than the ruddy turnstone, and it was nesting wherever found. Like its near relative, the black turnstone resorts to the interior only to nest, and as soon as the young are able to accompany their parents all betake themselves to the coast where on the sea beaches and the rocky islands they find the small marine creatures upon which chiefly they live. They winter mostly on the coast of Lower California. At the present time the black turnstone is more numerous than the ruddy. Turnstones are still comparatively numerous on the west coast, chiefly no doubt owing to the abundance of more highly prized game. Indeed, in California and other Pacific States, it is only in comparatively recent years that the smaller species of shorebirds have received any attention at the hands of sportsmen, or even gunners. When I first visited San Diego in 1887, the shores of the northern end of the bay were dotted with many kinds of shorebirds, including curlew. They were very tame, and apparently were never disturbed by a hostile shot. Indeed they were considered hardly fit to eat, and certainly not worth powder and shot when ducks, brant, and geese were to be had with very little trouble.

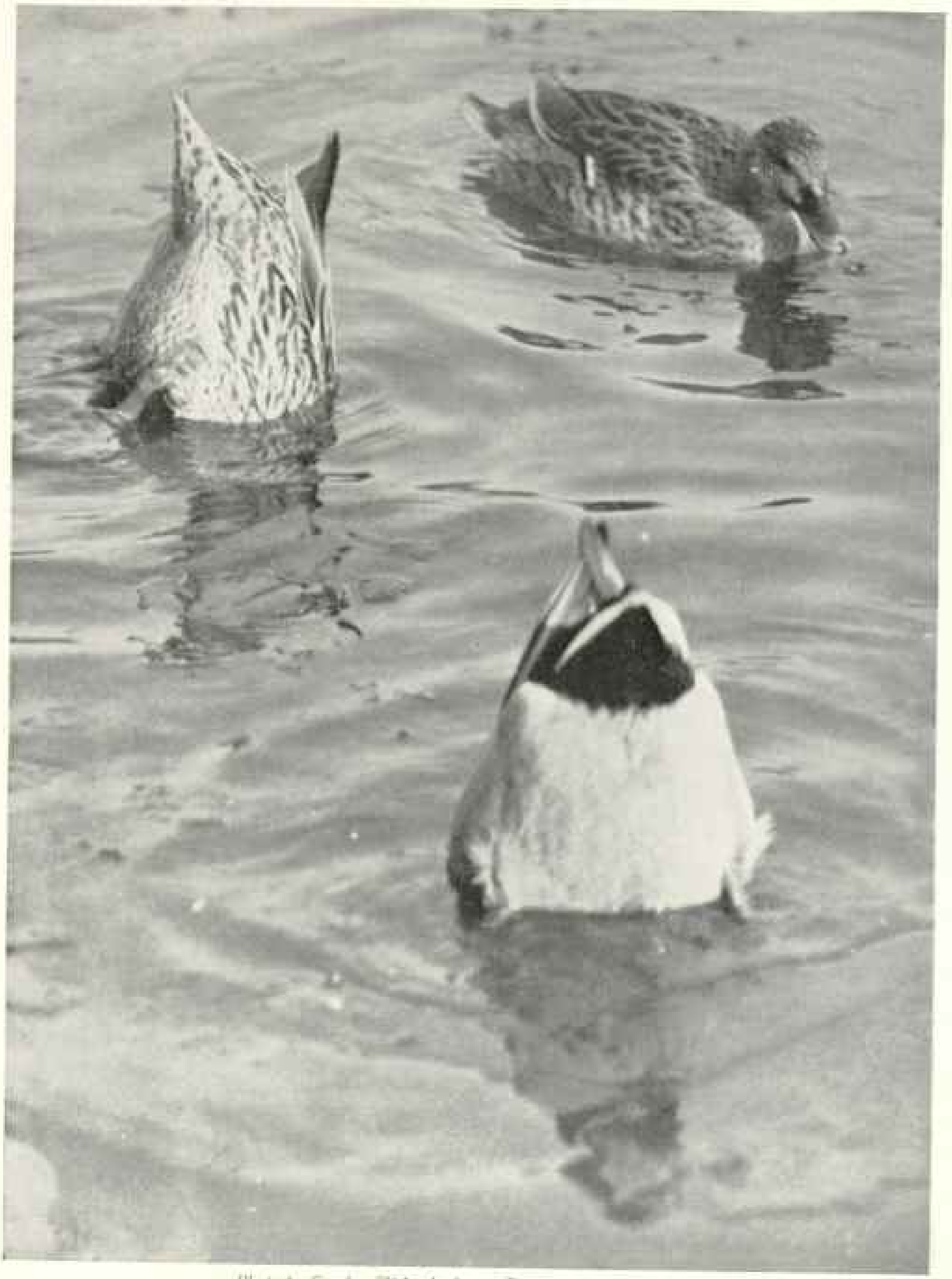


Photo by Stanley Clisby Arthur. Courtesy of the Conservation Commission of Louisiana

A HAPPY FAMILY: MALLARDS "TIPPING UP" ON THE LOUISIANA STATE GAME PRESERVE

The water bottoms of the lowlands grow duck food in abundance

and to-day there are probably not far from five millions who are interested in the pursuit of game!

The enormous number of men in a single State who hunt appears from a statement of the Secretary of the Game Commission of Pennsylvania, who says that "during the season of 1913 there were 305,028 resident hunter's licenses issued in this State. During the season of 1914, from reports at hand, there were fully as many licenses issued.

"When we consider that the landowner with his tenants and their families may hunt under the provisions of law without paying this license, and add to this those who hunt in violation of law, we are led to believe that fully 100,000 more men hunted in this State during each of these seasons than were licensed, making all together an army of more than 400,000 men, who, for a certain period and for good reason, are permitted to destroy game that in the aggregate amounts to millions of pieces and thousands of tons in weight."

Large as the figures seem, and they are the largest for any State in the Union, it should be remembered that they represent but 5 per cent of the total population of Pennsylvania, while in the Northwest, notably in Idaho and Montana, more than 10 per cent of all the people are licensed hunters.

What this army of five million hunters means to the large and small game of America can better be imagined than described! Modern guns and ammunition are of the very best, and they are sold at prices so low as to be within the reach of all. Added to these very efficient weapons for killing small game, are innumerable devices for killing waterfowl, as sneak-boats, punt-guns, swivel-guns, sail-boats, steam-launches, night floating, night lighting, and others.

While it is true that most of these devices are illegal, they are nevertheless in use at the present time, and in out-of-the-way places offenders are difficult of detection, especially as they are often intrenched behind local sentiment, which countenances and even encourages the practice because "it brings money into the county." To the above devices for the destruction of game must be added the automobile, and it may be doubted if any other modern invention is so potent for harm. It is possible for a party of three or four in a speedy machine to hunt over territory in a single morning that formerly would have required a week or more.

MONEY VALUE OF GAME BIRDS

Passing by for the moment all esthetic considerations, the money value of the vast number of game birds that breed within the several States or visit them in migration is so great as alone to entitle the birds to careful protection. This point of view is being taken by several States. Thus Oregon values her game resources, which consist in no small part of game birds, at five millions of dollars annually, while Maine and California respectively claim their game to be worth twenty millions annually.

To permit the extermination of any part of this valuable food asset, valuable alike to State and Nation, by continuing the wasteful methods of the past is an economic crime against present and future generations. And here it is important to point out that while the majority of our ducks, geese, and swans breed outside our jurisdiction they winter within our own borders. Failure adequately to protect them, therefore, in their winter quarters means their ultimate extinction.

SALE OF GAME BIRDS

Intimately connected with the problem of conserving our wild game is the killing of game for market. Many of those who have studied the subject earnestly do not hesitate to express the conviction that under the conditions now prevailing in the United States the conservation of our ducks, geese, and shorebirds is impossible if their sale in open market continues.

In considering the present effect of the sale of wild game, it must not be forgotten that the demand for game in the United States has enormously increased in the last decade. Even with our present population the market demand is infinitely greater than the supply, and all

the ducks and geese that now breed within our borders and that visit us from the North would not suffice to supply the inhabitants of New York and Chicago, to say nothing of a dozen or twenty of our other large cities, for more than a few short weeks.

Indeed, were the market demand for game to be fully satisfied, all the winged game of America killed during the next two or three seasons could be marketed and eaten. Reaching the great markets in the comparatively small quantity that it now does, game of all kinds commands prohibitive prices for any but the wealthy. As Forbush justly remarks, the present market price of quail is so high as practically to amount to a bounty on the birds' heads and is a constant temptation to the market hunter to kill his quarry, despite State or Federal law, in season and out.

STATE PROTECTIVE LAWS

State or colonial ownership of game was indeed early recognized, but only grudgingly in so far as it was restrictive of the right of the individual to hunt wild game when and where he pleased. Everywhere the feeling prevailed that all wild game belonged to the people, to be killed whenever necessity or inclination prompted, and it may be said that no little of this feeling remains to the present day. The change from the old belief that wild game belonged to him who could take it, to the theory of State ownership of game, marked a long step forward in game preservation. To-day few principles of American law are more firmly established than this, though it was not until 1896 that the principle was formally enunciated by the Supreme Court of the United States.

If the several States, under the principle of State ownership, have failed adequately to protect their game, it has not been for lack of game legislation. Even in the colonial period laws regulating the manner of taking game were passed. As early as 1708 heath hens, ruffed grouse, quail, and wild turkeys were protected in New York; but it was not till 1791 that woodcock were given legal protection. In 1710 a law was enacted in Massachusetts prohibiting the use of boats and canoes with sails, or canoes disguised with hay, sedge, or seaweed, for hunting waterfowl.

Snipe were protected in Massachusetts in 1818, and ducks in Rhode Island in 1846; Connecticut and New Jersey protected their doves and insectivorous birds in 1850, and in 1851 Wisconsin passed protective laws in favor of the prairie chicken. It is worth noting in connection with game legislation that it was not until 1878 that the first bag-limit law was enacted. This limited the bag of game birds in Iowa to 25 in one day—a limit which has remained practically unchanged for 37 years.

Since early times, and especially of late years, game legislation has so flooded the country that it is difficult to keep track of it. Over 1,300 laws were enacted during the first decade of the present century (1901-1910). Despite this great volume of legislation, some birds, as geese, were never given a close season in California, Texas, Arkansas, and other States.

STATE GAME LAWS DIVERGENT

It needs only a glance to show that State laws and regulations affecting game differ widely, even in adjoining States; thus a game bird may be adequately protected by law in one State and be only partially protected in a neighboring State, or not protected at all.

Moreover, the history of game preservation since colonial times in many States reveals no well-defined policy, but a series of regulations constantly changing according to the ever-shifting points of view of State and game officials and the political exigencies of the moment. Even the funds raised by the sale of hunting licenses, in most States ample for effective enforcement of the laws, have not always been devoted to the cause of protection, but often have been diverted to very different uses.

So great is the divergence in the nature and purpose of game legislation of the several States that there would seem to be little hope that the inconsistencies and shortcomings will ever be reconciled. Some who do not realize what has been

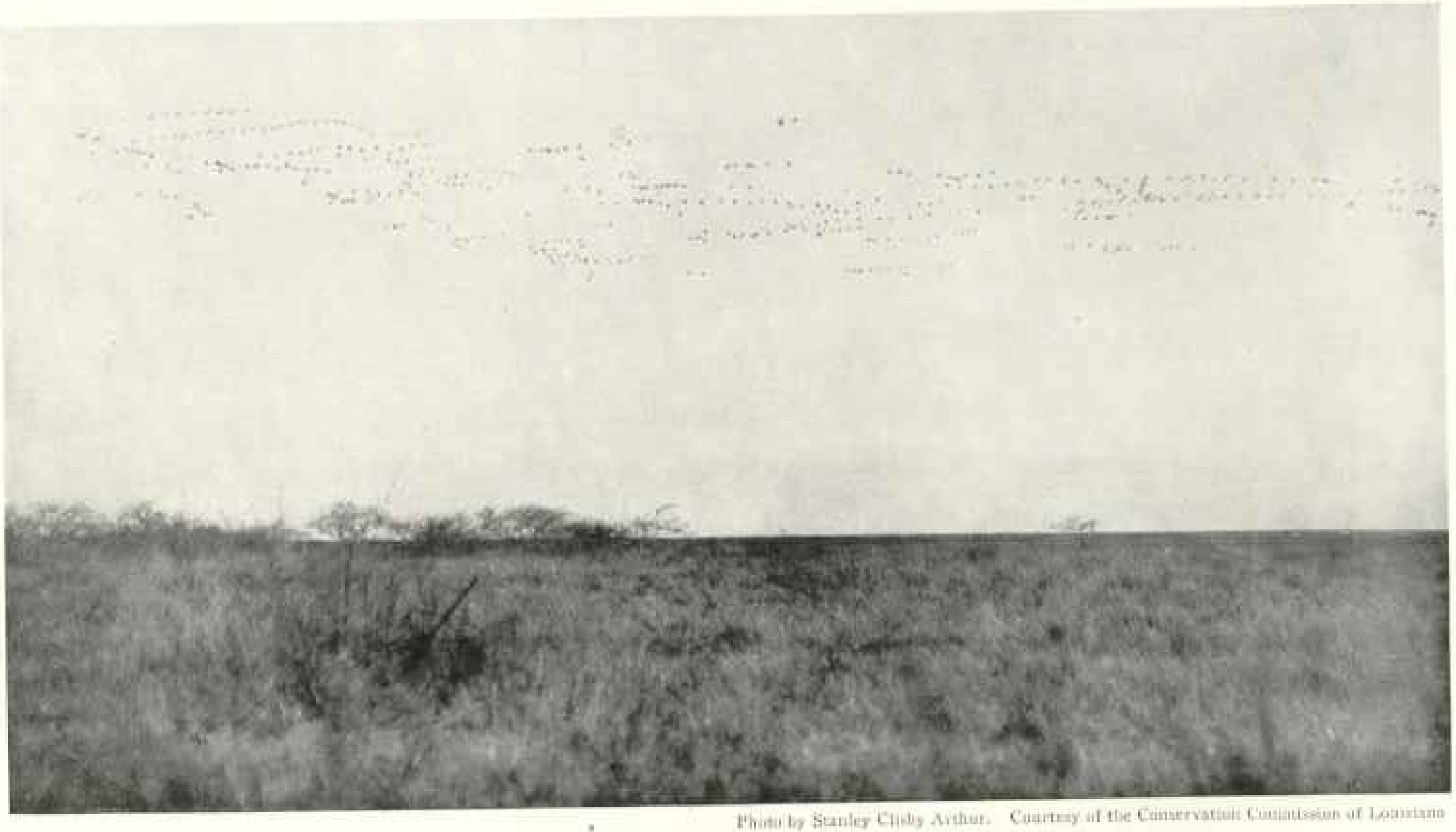


Photo by Stanley Clisby Arthur. Courtesy of the Conservation Commission of Louisiana

WILD GEESE OVER MARSH ISLAND, LOUISIANA

Five varieties of geese seek the succulent grasses of Mrs. Russell Sage's gift and in flocks that defy count. "Several of the States now have extensive game preserves or refuges of their own, and a large number of private sanctuaries have been set apart, aggregating many square miles in extent. Conspicuous examples of these are the Ward-McIlhenny preserve, dedicated to wild-life conservation by Charles Willis Ward and E. A. McIlhenny; Marsh Island, acquired through the generosity of Mrs. Russell Sage; and the Rockefeller preserve. All these are in Louisiana" (see text, page 155).

accomplished in recent years are inclined to despair.

Meantime, after a century of experiment by the States, the depletion of our game birds continues, and the end of several species is in plain view. It must be evident to all that, so far as the conservation of wild life is concerned, State control has proved a failure. Not a single State has succeeded in adequately protecting its own resident game, to say nothing of the game that migrates through it.

FEDERAL MIGRATORY BIRD LAW

It is the belief of many that what the States have failed to do for the conservation of our bird life can be accomplished by the Federal government, and they further believe that the act approved March 4, 1913, commonly known as the Federal Migratory Bird Law, marks a long step in advance in game protection. By this act the migratory game and insectivorous birds which do not remain permanently within the borders of any one State or Territory are declared to be within the custody and under the protection of the government of the United States.

This act, be it noted, provides protection only for game and insectivorous birds that migrate; hence many of our finest game birds, like the bob-white, valley quail, mountain quail, ruffed grouse, prairie hen, sage hen, blue grouse, wild turkey, and others, being non-migratory, have been left in charge of the several States in which they reside. Here we may leave them, trusting that, notwithstanding past failures, the measures enacted for their benefit will stay the fate with which most of them are threatened.

Migratory birds are on a very different basis from others. Such of the ducks, geese, and shorebirds as still breed within our limits, including Alaska, migrate early to more southerly localities, where they winter. Some of them, in fact, especially the shorebirds, pass beyond our borders and winter south of the tropics. But by far the great majority breed in foreign territory far to the northward of our possessions, and we have no claim on them save as they tarry on their journey for a time along our coasts or on our lakes and rivers or winter in the Southern States.

It seems eminently fitting that these migrants, as they traverse our territory, feeding in one State to-day, in another State to-morrow, should be under Federal control, subject to such regulations as seem likely to preserve the species. The law giving Federal protection has, after a year's trial, met with general approval. Moreover, although its constitutionality has been questioned, its main purposes have been indorsed by the great majority of sportsmen, though among them are many who dissent from certain regulations because they abridge the privileges enjoyed under State law.

In this connection it may not be out of place to direct the attention of sportsmen, many of whom seem to have somewhat misconstrued the purpose of the Federal law, to the fact that the intent of the law was not primarily to increase shooters' privileges by lengthening the open season and enabling them to kill larger bags of game, but to preserve game birds in general, more particularly the ones threatened with extinction.

If the accomplishment of this laudable end curtails to some extent the present privileges of sportsmen, they should not complain, since the ultimate result of the law, if it be enforced, will be largely to increase the number of our game birds. Should it then somewhat curtail the privileges of the present generation of sportsmen, it will at least insure to future generations the perpetuity of our game birds.

Here it may be pointed out that if the present Migratory Bird Law, now before the United States Supreme Court, should fail to meet the test of legal requirements and be pronounced invalid, bird conservationists need not be discouraged, since two courses are open: first, so to amend the law that it will stand every legal test; second, to obtain a constitutional amendment which will effect the desired end.

Amendments to our constitution are proverbially difficult to secure, but who can doubt that with the widespread interest in bird life of the present generation of Americans such an amendment can be obtained in due time.

Photo by Stanley Cleby Arthur. Courtesy of the Conservation Commission of Louisiana

PINTAIL IN FLIGHT: THE LOUISIANA STATE GAME PRESERVE OFFERS SANCTUARY TO BILLIONS OF MIGRATORY WATERFOWL EVERY WINTER

SPORTSMEN AS CONSERVATORS OF GAME

There are many good citizens in the United States who believe that hunting is wrong and who consider all sportsmen arch enemies of wild life. There are sportsmen and sportsmen, and the genuine lover of gun and dog will almost invariably be found to be a lover of nature and at heart a conservationist of wild life.

Be the sportsman what he may, the sportsmen of the United States, as a body, constitute a very important factor in the present struggle to keep wild creatures from total extinction. Many of us who love wild life and who long ago abandoned the use of the gun, nevertheless believe that game exists for reasons other than esthetic. Only extremists insist that all animal life is sacred and must on no account be taken. Birds, in addition to their esthetic value and their importance as allies of the farmer in his warfare on insects, are important as food.

They are also important because they furnish a healthful and exhilarating pursuit to an army of men who at certain seasons take to the woods and fields and because of their outdoor life make better men and better citizens.

BOTH FEDERAL AND STATE LAWS NECESSARY

Since game birds have such strong claims on our interests, it cannot be doubted that both State and Federal laws are necessary for their protection, and the more cordial and complete the cooperation between State and Federal officers, the more effective will be the administration of the laws. Even more essential in the long run is the recognition of the importance of our wild life by the people at large and their hearty sympathy and active coöperation as individuals with efforts for its protection.

Nor should sportsmen and sportmen's clubs be backward in cordial cooperation, since they are among the chief beneficiaries of measures for the preservation and increase of game birds. The need is not for more laws, but rather for fewer, simpler, and more comprehensive statutes. It is the multiplicity of legal enactments subject to constant change, coupled with their non-enforcement, that has been largely responsible in the past for the general decline in the number of our game birds. Fewer laws with better enforcement should be the rule for the future.

THE PRESERVATION AND INCREASE OF GAME BIRDS IS FEASIBLE

A few words may be added on certain practical means, other than restrictive measures, for the preservation and increase of our game birds. One of the most effective is the establishment of sanctuaries where birds may safely resort to nest and feed during migration.

The Federal Government has already demonstrated the utility of this method and has established no fewer than 68 bird reservations in different parts of the United States, including Alaska. If the national parks, large game preserves, and national monuments are added to the list, the government now has more than 100 sanctuaries, some of which include thousands of acres, where birds of all kinds are protected at all seasons.

The example thus set by the government has stimulated both State authorities and private individuals. Several of the States now have extensive game preserves or refuges of their own, and a large number of private sanctuaries have been set apart, aggregating many square miles in extent.

Conspicuous examples of these are the Ward-McIlhenny preserve, dedicated to wild-life conservation by Charles Willis Ward and E. A. McIlhenny; Marsh Island, acquired through the generosity of Mrs. Russell Sage; and the Rockefeller preserve. All these are in Louisiana. That private means are being thus devoted to the public welfare through the protection of birds speaks well for the future.

In furtherance of the sanctuary plan, there would seem to be excellent reasons why the several States, in the interests of their citizens, should set apart tracts of land, and specifically designate them as bird sanctuaries, where all shooting should be prohibited, as it is in the greater part of the District of Columbia. Such tracts, especially if public parks, not only serve the important end of

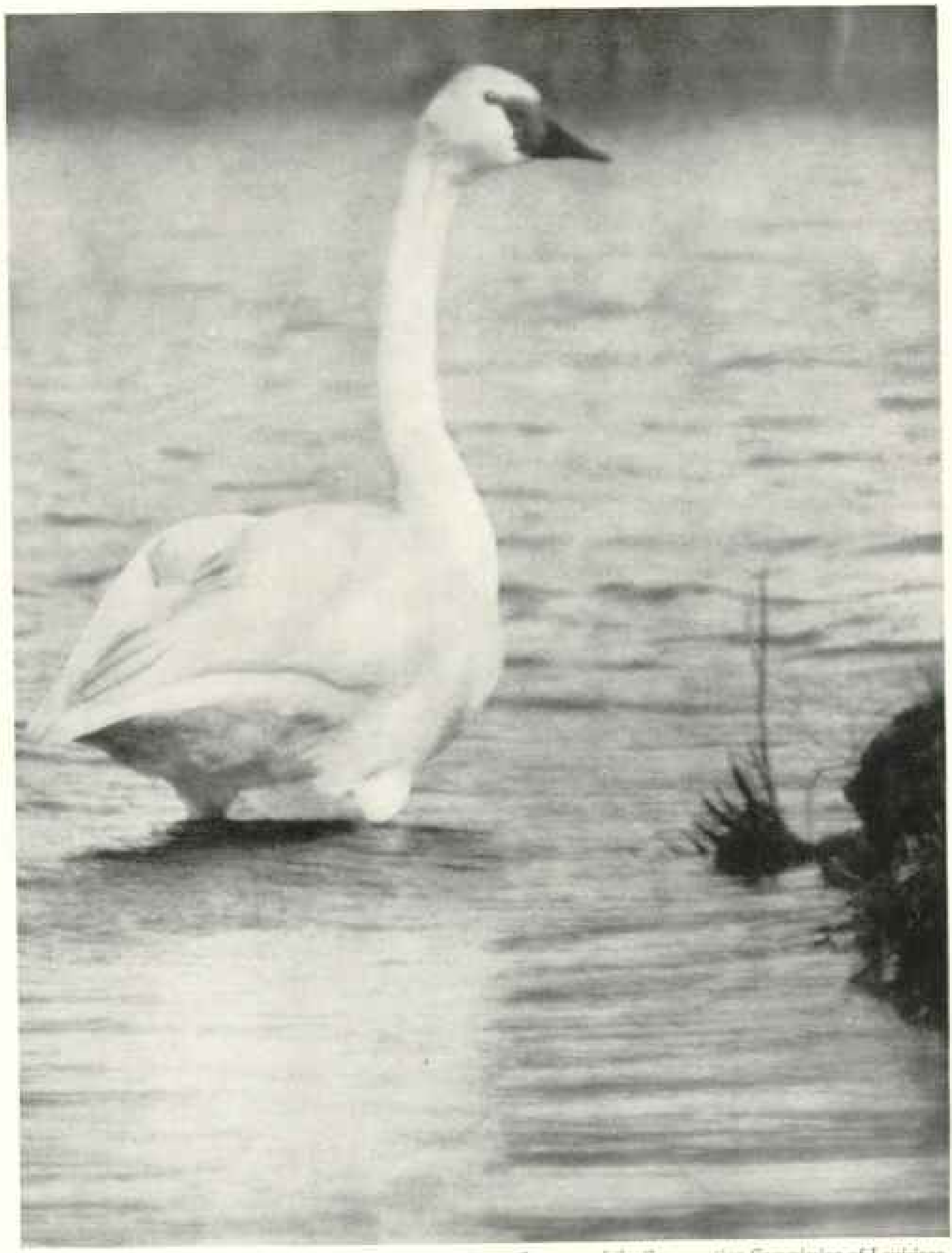


Photo by Stanley Clisby Arthur. Courtesy of the Conservation Commission of Louisiana

ONE OF THE LAST OF HIS RACE

The millinery trade has almost caused the trumpeter swan to join the passenger-pigeon in oblivion. A male bird of this rare species visited the Louisiana State Game Preserve the winter of 1914-1915 and it is hoped this sanctuary will attract others.

conserving bird life, but possess added value to the public as pleasure resorts. They serve also the cause of education by providing readily accessible places where the habits of wild birds may be studied by school children and others.

VALUE OF BERRY-BEARING SHRUBS

Another important way of caring for both game and insectivorous birds is to provide food for them, especially in winter and during deep snows. This method is particularly effective, since the expense entailed is small and it can be practised everywhere by private individuals. Pittsburgh has a special superintendent whose peculiar care is the birds in the public parks. Several States, as Massachusetts, Connecticut, Vermont, Delaware, and Pennsylvania, have, or recently had, State ornithologists, whose usefulness in practical ways is unquestioned. Their duties include the study of the habits of birds from the economic point of view, and the preparation of reports thereon to aid in the framing of protective legislation.

The planting of berry-bearing shrubs and trees in public parks and along public roadsides is another effective method of caring for our bird life. Already many women's clubs, quick to recognize their opportunity, have taken up this work and are urging park commissioners to make special provisions for the needs of our birds. Such methods bear more directly on the welfare of our seed-eating and insectivorous birds, but they also have a beneficial effect on game birds, especially bob-white and the ruffed grouse.

PRIVATE AND STATE ORGANIZATIONS

Such organizations as the Meriden Bird Club, of New Hampshire, are especially to be commended. This is a local community club as distinguished from the public or private preserve or sanctuary. Its purposes, as stated in its constitution, are as admirable as they are direct and simple: "The objects of this club shall be the increase and protection of our local wild birds, the stimulation of interest in bird life, and the gradual establishment of a model bird sanctuary."

Of wider scope and aims are such organizations as the National Association of Audubon Societies, with its many affiliated State societies; the American Game Protective Association; the Wild Life Protective Fund; and the State Game Protective Associations. The work of these various bodies, individually and collectively, has proved a most important factor in the nation-wide movement to conserve our valuable bird life.

Of recent years instruction as to the economic value of birds and the best ways to conserve them has received much attention in the public schools of many States, and the results are likely to prove fruitful, both now and in the years to come.

MANY GAME BIRDS CAN BE REARED IN CAPTIVITY

Finally, the artificial propagation of our game birds has a direct and important bearing on their present and future welfare. It has already been demonstrated that bob-white and other quail can be reared in captivity and used to stock depleted covers, while Canada geese, mallards, black ducks, wood-ducks, and others of the goose and duck tribe can be reared under suitable conditions almost as readily as domestic fowls and be used to stock public lakes and ponds. This is a work which may properly be undertaken by State game commissions and in fact has already been begun.

If in consequence of the cessation of spring shooting the numbers of our waterfowl and shorebirds increase, as is confidently expected they will, the sale of hunting licenses in most of the States will provide ample funds for all necessary experiments in the artificial propagation of game on a large scale, and thus be an important factor not only in preserving the species now in danger, but in furnishing game for sport and food.

LIST AND INDEX OF AMERICAN GAME BIRDS

NATURE'S TRANSFORMATION AT PANAMA

Remarkable Changes in Faunal and Physical Conditions in the Gatun Lake Region

By George Shiras, 3rd

Illustrations by the Author and H. E. Anthony

THE world-wide interest in the Panama Canal, from an engineering standpoint and the great economic changes destined to follow the use of this new channel of trade and intercourse, has been evidenced by thousands of visitors and the many articles bearing upon the various aspects of this wonderful work.

One of the essential features in the plan of construction has been somewhat subordinated when viewing the project as a whole, namely, Gatun Lake; for beyond regarding it as a convenient part of the passageway across the Isthmus, few realize that it is the basis of the whole scheme. Not only is it the largest freshwater lake ever created by man—a navigable viaduct almost bridging the two oceans and reached by terminal elevators in the form of locks—but, in addition, a vast reservoir for the adjoining watersheds, assuring throughout the year a sufficient water supply for the operation of the locks, for electric power, for the establishment of inland fisheries, and for potable and other domestic uses, besides allowing greater freedom in the movement and speed of vessels and the opening up of the many lateral valleys to local navigation.

A BOUNTIFUL WATER SUPPLY

The great saving of time and money in thus utilizing a part of the surface of this reservoir, instead of excavating a narrow and deep canal all the way across the intervening land, was inconsequent, however, compared with the original purpose—a continuously abundant supply of water for operating the canal locks—thus insuring the regular daily movement of vessels throughout the year. Without the converging watersheds of 1,400 square miles, without a large natural basin for impounding these waters, and so located that a water-tight and stable dam could be built across the Atlantic end, only a sea-level canal could have been considered—a much more costly and probably an impracticable scheme.

However narrow the Isthmus, nature has aided as much more in a combination of low rolling hills, with wide valleys only a little above sea-level, an almost continuous rainfall, while the compact but easily excavated soil made the canal construction rapid, its banks water-tight, and the subsequent use of much of the excavated material a great economy in the building of the great earth dams.

The original plans, under which the initiatory work of the French syndicate was begun, called for a much smaller lake, ignoring the advice of its most brilliant engineer, M. de Lipiany, by not including the waters of two large rivers—the Gatun and the Trinidad. Judging from the amount of water required at the locks and for various other purposes, the de Lessep plans seem fundamentally defective.

BIRTH AND GROWTH OF THE LAKE

When the information came from Panama that the great basin for holding the waters of the proposed Gatun Lake was finally completed by the long embankment at the north end, thus closing the only gap in the rim of hills left open by nature, and that month by month the gathering waters of tributary streams were slowly covering the lowlands, creeping up the wild tangled valleys, drowning the mighty forests and the rank tropical jungles, flooding out native villages and destroying scattered plantations, marooning wild creatures like the monkey, ocelot,

NEWLY FLOODED FOREST ON THE RIO TRINIDAD: IN THE PHOTOGRAPH AN IGUANA CAN BE SEEN ON THE UPRIGHT STUMP AND A WHITE EGRET ON THE LOG AT THE CENTER

The new lake of this region has now an extent of 164 square miles and a depth in places of 70 to 90 feet

peccary, armadillo, and the sloth on hilltops unexpectedly converted into permanent islands, submerging the mud-flats of the herons and the ibis, driving the deer, the jaguar, the tapir, iguanas, and monster snakes through the rising waters to less hampered retreats, and opening up a new and larger home for the swamp alligator and the stream-confined fish, it seemed a proper time to study and to attempt a record of these changes.

While necessarily representing a transient condition, where organic decay and the dispersal of wild life was epochal only in the sense of marking a definite break between the past and the present, yet in the very processes of transition there would be much of present interest and of possible future value.

Gatun Lake, at a surface elevation of 85 feet above the sea-level, is estimated to cover 164 square miles, and extends not merely over the previously existing swampy ground of the Chagres Valley, but it has risen so far above the floor of the lowlands as to extend for miles between the hills, forming estuaries, lagoons, and ponds, turning rapid, unnavigable streams into deep, sluggish rivers, and converting hilltops into beautiful islands, some of them miles in length, while the thousands of acres of flooded and fallen timber, into which stretch or circle narrow necks of land, practically defy any accurate estimate of the so-called shore-line of the new lake.

SHORES UNSURVEYED

From what we could learn through inquiry and exploration, no one knows the size, shape, or location of much of the partly submerged lands; nor can satisfactory surveys now be made at the water-line without cutting down possibly a hundred miles of dying trees and bushes. Even then a 5-foot fluctuation in the lake's surface, as may be expected between the dry and wet periods, will necessarily vary the superficial area of the lake and the lines of the shore to a considerable degree.

Some day, however, the warm and ever-present waters will destroy the obstructing forests, and then the heretofore half-shrouded lake will glisten, near and far, in the tropic lights, while the surrounding shores, each bay and promontory, the islands big and little, will become defined by a new and permanent border of bamboo and other semi-aequatic growths.

When, in the fall of 1911, the locks of the spillway at the Gatun dam were closed, so as to begin the flooding of the Chagres Valley for the first and final time, the immediate use of the then shallow waters invited the coming of the gasoline launch and native dug-out. In the beginning this great dam, one and one-half miles in length and 100 feet wide at the summit, towered many feet above the incipient lake, greatly reducing the effect of the trade winds, while the numerous islands and projecting points gave additional shelter to all small boats returning against the wind.

Each week, but usually on holidays and Sundays, canal employees went down the lake on hunting trips, and an easy and safe return could be counted on. But on our arrival, early in 1914, the lake had risen to its full height; island after island and point after point had sunk out of sight forever, while the steady diurnal winds of the Caribbean Sea, whirling across the narrow and now low crest of the embankment, brought the waves into life a few yards away, ever increasing in size in the long course down the lake.

LIKE A WORK OF NATURE

As one gazed across the broad expanse of water, with its ruffled surface, it was hard to realize that it was the recent creation of man or responding for the first time to the action of the tropic winds.

On one occasion when coming to Gatun after gasoline the launch encountered a heavy head sea in mid-lake and the small pump was unable to keep the boat clear of the breaking waves, so that it nearly filled, putting the engine out of service, and we drifted back several miles into a dead forest in peril of being wrecked by a collision with some large, tottering tree or buried beneath a falling top brought down by the impact.

Like most natives of the Southern Hemisphere, the Indians of Panama,

OUR HOUSE-BOAT CRUISING IN THE FLOODED FOREST OF GATUN LAKE

It was because of the flooding of the Gatun and Chagres valleys by the huge dam at the Gatun locks, thus causing abrupt changes in the faunal conditions, that an expedition was undertaken. The house-boat formed the base camp, from which trips were made by launch or small boat, sometimes along rivers which heretofore have been inaccessible, owing to shallow water. The house-boat had sides of cheese cloth and copper screen to keep out mosquitoes (see page 165).

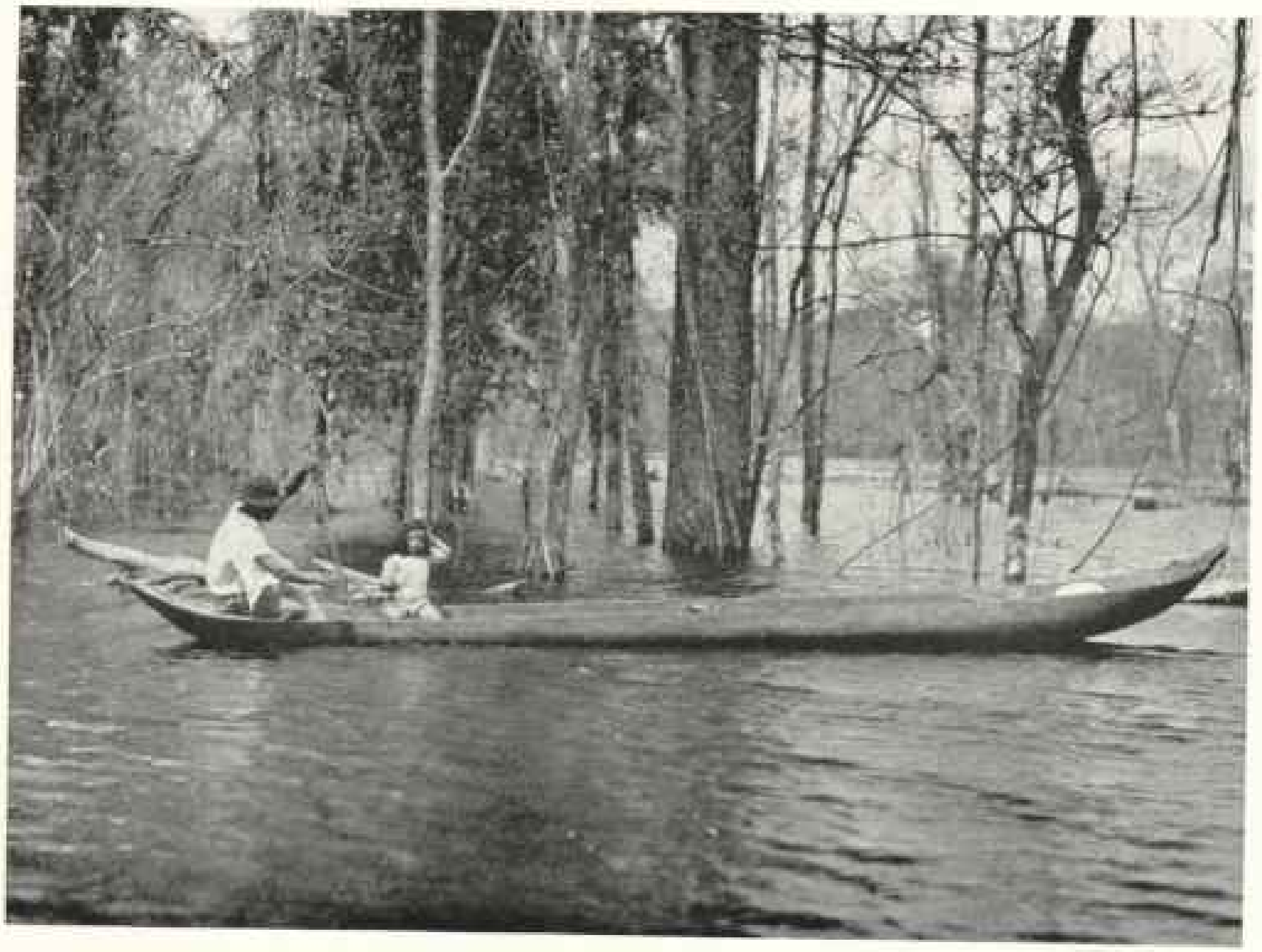
when using the interior waterways for travel, employ the dug-out, or *cayuca*, in which they are experts in poling or paddling the swiftest of streams (see page 163). On the first coming of the lake it was easy to reach the construction towns along the shore in boats heavily laden with fruits and other products, but as the waters rose and the wind and waves began to interfere it was discovered that not one among them all knew how to handle a canoe safely under such conditions, so that now the lake is paddled in the stillness of the night or by dodging in and out through the flooded forests near the shore

Eventually, however, skilled canoemen will be able to buffet the waves, and then this picturesque craft will be seen from the great steamers gliding across the white-tipped surface, so seemingly insignificant to ships that have just come in from the turbulent waters of adjacent seas.

DOOMED TO SLOW STARVATION

Probably in no other country is there such an interesting area continuously covered with deep, still waters, where much of the original timber is standing. Here one can find trees slowly dying, with great pendant termite nests filled with restless ant-like creatures, isolated and doomed to slow starvation (see page 166).

Here are trees that died on the first coming of the flood and others green and apparently vigorous, with roots and trunks under water for several years. On the decaying branches are many beautifully colored orchids—tillandsias, ferns, vines, and mosses—replacing for a time the lost foliage and tropic blooms, while upright stumps and floating logs



The common method of navigation of small streams by the native Panamans is by means of the *cayuca* or dugout, which varies in length from 8 to 35 feet and is cut from a single tree. These boats are used by the natives for bringing fruit and produce to market, and it is a common sight to see them loaded with sugar-cane cut in sections 8 or 10 feet in length.

are green with long-leaved plants, the intervening pools bearing purple clumps of drifting water hyacinths (see page 167).

Here, too, are floating islands, with waving grasses and slender reeds, destined to live forever, and when anchored by projecting snags or hemmed in between tree trunks, will gradually become great tremulous bogs, unsafe alike for man and all sharp-hoofed animals, but a place of sunshine and of comfort to the coming alligators, a refuge and a feeding place for the herons, ibises, and other water birds, long exiled on the shoreless trees, where little frogs will be speared and many a minnow lifted from along the ragged edges.

Day after day we explored these unknown wastes, ever alert in avoiding the sudden fall of tree-tops and massive limbs weakened by inward decay or by heavily burdened masses of parasitic plants. Twice we were nearly overwhelmed and once the camera and flashlight at the edge of the shore were buried out of sight.

The anticipated encroachments of the lake resulted in a timely relocation of the Panama Railroad along the Chagres Valley (as shown in the comparison maps, pages 180 and 181); but most of the foot-trails were obliterated and the narrow, well-defined canoe routes became lost in a maze of flooded forests, the tortuous channels no longer indicated by wooded banks or rapid currents.

WHERE A RIVER GOT LOST

In going up the estuary formed by the flooded valley of the Trinidad, there was no suggestion of the swift stream of former years, once navigable for many miles in a canoe, for now the broad, stagnant, forested waters were covered here and there by floating vegetation and driftwood that often blocked the old

A STUDY IN TREE TRUNKS AT THE NORTH END OF GATUN LAKE

route, making travel uncertain. Then resort must be had to the compass, for here no land was visible, no blazed trails or flowing waters to indicate direction, and one might be lost for hours in locating the temporary anchorage of a launch or house-boat.

The timidity of the natives in exploring these flooded forests is in keeping with their fear of the open lake, and as guides we found them quite useless in reaching hunting grounds by boat. Accustomed to follow the ancestral trails and streams, knowing nothing about a compass or the direction indicated by the prevailing winds or the position of the sun, we could not trust any of the Indian guides to lead in exploration.

At Gatun we found several canal employees, and one in particular, who could take a launch at full speed through densely timbered districts, swerving here and there with wonderful skill and seldom in doubt of the direction taken or where and when the launch would reach the open water.

THE ADVANTAGES OF A HOUSE-BOAT IN COLLECTING AND EXPLORATION

Many years' use of a house-boat in the wilderness about Lake Superior had shown its great convenience as a movable habitation and its great superiority over tent or cabin in most places accessible by water. In the tropics such advantages I felt would be tenfold greater.

Before starting for Panama arrangements had been under consideration for converting a small scow or flatboat into a house-boat by merely erecting a frame that would support a canvas roof and wire netting along the sides—simple changes, excluding the sun or rain and visits from many forms of troublesome insects. With a swift and powerful launch we could tow the house-boat from place to place, using the former for extended daylight excursions.

On arriving at the lake it was found that the expectation of getting a small scow was too sanguine, for the suitable ones were in continuous service by the government and the others too bulky for use. Rather than take the time necessary in building, we were able to convert a floating boat-house into a very comfortable house-boat. In size it was 9 x 30 feet, with a zinc roof, a covered tool-house at one end, suitable for storage purposes, and the sides and front open.

By flooring over the slip in which a launch had been berthed, putting on a V-shaped prow at the towing end, and tacking on screening between the roof and floor, the craft was superior to the kind originally sought, except for its heavy draft and a deck so low that it would be awash when running into a head sea.

ADVANTAGES OF HOUSE-BOAT LIFE

We now had all the comforts of a commodious yacht, very much freer ventilation, and a continuous opportunity of viewing the landscape or wild life from the open sides, besides plenty of room for storing a bulky outfit where it would always be accessible, with pleasant quarters for identifying and preserving the material collected.

Cots and hammocks for beds, a large oil stove, a thirty-gallon tank for pure water, a long table hinged to the side of the boat for the serving of meals and as a work-bench, comprised the additional improvements.

With the house-boat one escapes the cumulative annoyances connected with breaking camp every few days, the repacking of fragile or loose articles, and the selection and clearing out of new sites in the ever-present brush, where giant vine-tangled trees, too formidable for the axe, exclude the light, air, and every outlook, converting the jungle camp into a gloomy hothouse, surrounded by prickly plants and subject to the raiding ants in daytime, the fever-bearing mosquitoes at night, and the vicious activity of red bugs and ticks, unlimited in the hours of visitation.

My companion on the trip, Mr. H. E. Anthony, of New York, representing the American Museum of Natural History, came as my guest for the purpose of studying and obtaining specimens of mammals, and he proved a most agreeable and capable collector, while C. J. Anderson, of Michigan, a guide and as-

A TERMITE'S NEST IN THE FLOODED DISTRICT

These ant-like creatures were still active, but doomed to slow starvation

sistant on many former expeditions, accompanied me again in the same capacity.

In the interim of selecting and then reconstructing the boat-house, we made a number of excursions by launch, the principal ones up the Gatun and Chagres valleys, referred to elsewhere.

A STRANGE-LOOKING CRAFT

Late in the afternoon of March 6 the house-boat was ready, and in the tow of the launch came to the wharf for our outfit. Such a strange-looking craft and the first of its kind on Gatun Lake excited considerable interest among the natives and canal employees, who half an hour later saw us depart with Captain Brown, the owner of the launch, at the wheel. Our destination was the Trinidad River, where we were to leave the flooded valley several miles up and enter a *trocha* leading to a new plantation, three miles inside the flooded forests, following the narrow lane that had been cut out by felling the larger timber before the coming of the lake.

Of the thousands of employees about the locks none had ever visited the plantation except our pilot, for this particular region was regarded as a most likely one to get lost in, and of this we were warned by the resident engineer. A heavy but favorable sea was running, and as the waves surged harmlessly along the low deck we wondered what would be the rate of speed or the condition of the boat were we headed into it.

Before dark the interior of the house-boat was put in order, interrupted now and then as the wheelsman took a short cut through the dead timber, when all hands with boat-hooks and oars assisted in keeping clear of the trees and floating logs. It was several hours after sunset and under the light of a half moon that we reached the nearly submerged point indicating the entrance to the valley of the Trinidad.

AN ENTERPRISING CHINAMAN

Here at the base had once been the native village of Escobal, now covered except for several huts on top of the ridge (see page 171), in one of which lived an enterprising Chinaman, who made a poor living selling groceries and a better one dispensing various intoxicants; for he was safely located a few yards beyond the zonal line of Federal prohibition.

By previous arrangement the Chinaman had two native guides for us, and, with these aboard, we quickly departed, in order to reach the plantation before the setting of the moon. Seated within and facing the open side, we were able to watch the course through the tops of the great dead forest, where the deep waters had destroyed or covered over many of the smaller trees.

Running at low speed, we were several hours crossing over, but by a combination of good luck and skill Captain Brown found the entrance of the *trocha* just ahead, unmarked except by the knowledge he had of trees near the mouth. How the house-boat ever got up this narrow and more or less blocked passageway was a mystery, for while running it later, in daylight, with the launch, we often got astray or fouled on snags a foot or two below the surface.

JUNGLES TOO DENSE TO BURN

At midnight, in rounding a turn, there was a barking of dogs and we could see the glowing embers of scattered fires, for in clearing such ground the cut timber is stacked and then burned continuously during the dry season. This unexpected condition I feared would alarm the wild animals of the neighborhood, which, un-

FLOATING LOGS WERE A MASS OF LONG-LEAVED PLANTS AND SLENDER REEDS, SURROUNDED BY BLUE-TINTED AND FRAGRANT WATER HYACINTHS (SEE PAGE 163)

like those of the North, that are so partial to "burnings" and the tender vegetation, were likely to abandon a section unexpectedly covered with smoke and disturbed by crackling flames, since in the dense and humid jungles fires are rare and seldom progress very far, even with the aid of man.

After the house-boat had been tied up to a large tree, a few yards from shore, we were visited by the native superintendent and given a generous welcome. As Captain Brown was anxious to return to Catun before the morning wind had roughened the lake, he left with Anderson, who was to bring the launch back the next day. Less than a mile away a mass of floating logs was encountered, and the moon now being below the horizon, we were compelled to stop until daylight.

In the morning, as the sun arose, flocks of chattering parrots flew over, and occasionally a pair or two alighted on the higher trees, peering down on the half-screened boat. A shot from the cabin in the clearing, a descending object and a thud proclaimed a doubtful addition to the larder, an oft-repeated occurrence, showing that nothing was spared by the native hunters, for there are no game laws outside the Zone and no effort to preserve even the ornamental birds of the country.

The well-earned outings of the canal employees were too often signalized by making a target of harmless, non-game animals and birds until Colonel Goethals undertook to prevent such thoughtless destruction.

While there is little likelihood of any species living within the jungle becoming extinct, it would require but little effort to make the lake region a wonderful outdoor zoölogical garden that would

prove almost as interesting to visitors as the game refuges along the government railroad in British East Africa.

While breakfasting on the house-boat, a strange, uncouth sound came from the hills to the west, rising and falling in a torrent of guttural notes. It was the first greeting of the "black howler," the largest of the South American monkeys, whose uproarious conduct, whether in tribal conversation, in protestation against man or the weather, was a source of astonishment thereafter. My friend Fuertes, the bird artist and naturalist, whose mimicry of bird notes is quite equal to the fidelity of his brush, declares that the noise of the "howler" is by far the most striking sound in the American tropics, being "a deep, throaty, bass roar, with something of the quality of grunting pigs or of the barking bellow of a bull alligator or an ostrich. The noise was as loud as the full-throated roaring of lions, and its marvelous carrying power was frequently attested when we heard it from the far side of some great Andean valley."

It is a popular belief on the Isthmus that the "black howler" is an infallible weather prophet, and especially so in predicting a shower. So far as we could discover, it was only when the clouds blackened overhead and the first preliminary drops began to fall that this prognosticator considered it safe to commit himself in the forecast.

About 10 o'clock Mr. Anthony, carrying a gun, and his guide a pack of steel traps, left for the only open trail in the neighborhood, leading to an older plantation bordering the lake on the other side of the promontory, while I went in another direction, along a dry creek bottom, to select places for the flashlight and cameras, where the bait was to be the freshly skinned carcass of the trapped specimens, were they accommodating enough to serve this double purpose. And in passing it may be noted that the only natural foot-trails, and that during the dry season, are the creek bottoms, which are cleared of all underbrush and fallen trees by the torrential rains falling during eight months in the year. It is here, too, that many of the wild animals, large and small, seek easy routes of travel, as well as coming for the purpose of quenching their thirst at the small pools and pot-holes scooped out in the soft sandstone formation of all the creeks, while others come to prey upon those exposing themselves to attack.

On returning at noon the trapping party discovered a band of black howlers passing overhead, with a result described in the collector's notebook as follows: "I felt a pang of regret at silencing one of the 'howlers,' but as a specimen was needed I shot the foremost and heard him crash through the limbs to the ground. Pangs of a more effective source were experienced when my native boy and I attempted to retrieve the monkey, for he had fallen through a bee's nest the size of a bushel basket and we found the nest too late to avoid the consequences." Taking a lantern after dark the specimen, a fine large male, was recovered and brought to the house-boat (see page 189).

The following morning the traps only yielded a number of small rodents, while the runways, formerly used by larger game, showed scarcely a track—plain evidence that the heavy smoke from the clearing had driven them away. This compelled long and hard trips into the more distant forests, where trails had to be cut with a machete, foot by foot, resulting in a wonderful collection of ticks and red bugs and little game until the trails had been cleared for a day or two. But it was our experience here and elsewhere that the jungles of Panama are abundantly supplied with a great variety of wild life.

Observing about the house-boat several good-sized fish, a coarse line and a single rusty hook were put in service, with the result of soon landing a dozen averaging a pound or more. These resembled the black mullet and were fairly edible, proving, however, of greater service in baiting the traps and the flashlight machines. Whether they are land-locked fish from the sea, imprisoned on the closing of the locks, or coming from the numerous streams, they have certainly multiplied wonderfully, for we found them everywhere about the lake.

A smaller variety of fish was also no-

FLASHLIGHT PICTURE OF PACA (*Agouti paca virgata*)

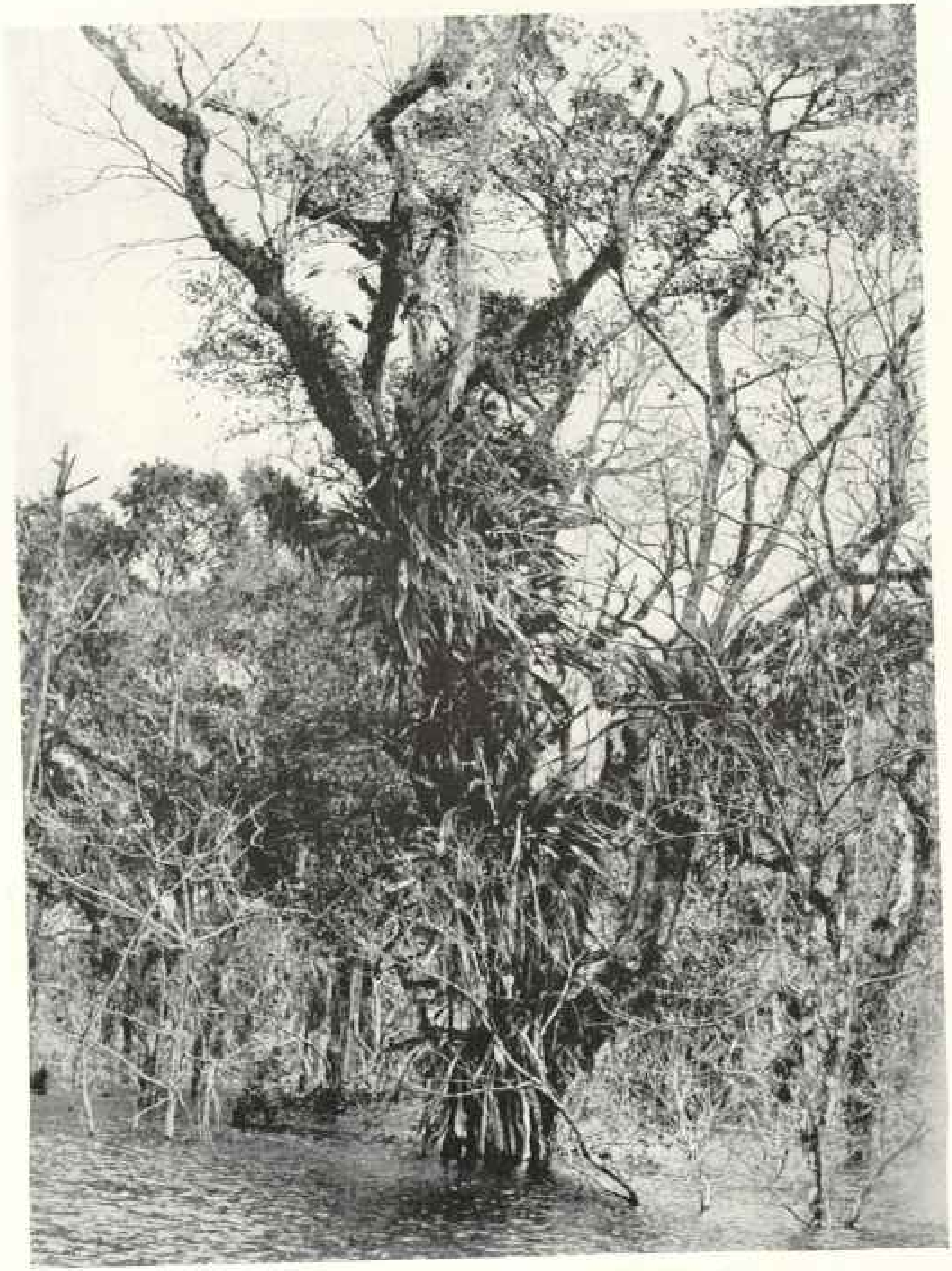
One of the largest of the existing rodents, the closely related capybara alone exceeding it in size. The paca is an animal of nocturnal habits, and therefore can be photographed only by means of flashlight apparatus set at night. Note in the animal's mouth the mango, which was used as bait. This is one of the game animals of the natives, who call it *conejo pintado*, or spotted "rabbit." Its eyes glow at night (see page 179).

ticed and they proved a great annoyance when bathing, as they had the habit of nipping a swimmer severely and could only be kept away by a vigorous commotion in the water. In its transient condition this lake should prove of scientific interest to the fish culturist, and presents a possibility of introducing many varieties of fish that would soon become of value commercially or to the visiting sportsmen.

It may be of interest to note that the southern range of the migratory wild fowl does not extend to Panama, for aside from two varieties of ducks—the blue-wing teal and the lesser scaup—no geese, brant, swans, or any of the other numerous varieties of ducks were seen by us or noted by careful resident observers, indicating that the Federal Migratory Bird Law, which has so effectively prohibited spring shooting in the States during the nesting flight, need only be supplemented by a treaty with Canada and Mexico in order to cover the extreme range of these valuable and rapidly vanishing birds. A pending treaty, protecting fish in international waters, involves the same Federal supervision.

TWO WAIFS OF GATUN LAKE

For centuries the valleys now occupied by Gatun Lake had been the home or feeding places of many wild animals, especially the tapir and deer. In the fall of 1911 the rising waters began driving the several species of deer from the bottom lands, where the thickets and more tender vegetation had afforded the best of shelter and of food. Some sought ridges and other near-by elevations, unaware that in a few months these refuges would become isolated as islands or wholly submerged by the rising lake.



ONE OF THE MANY THOUSANDS OF TREES FESTOONED WITH GROUPS OF BRILLIANT ORCHIDS DYING IN GATUN LAKE

About this time Captain Brown made a trip in his launch exploring the new avenues for motor-boats and in a territory where he had hunted for years afoot. In passing some matted drift composed of dead vegetation, which, under the pressure of the wind, had just passed out from a recently flooded island, he noticed lying fast asleep thereon a beautiful little fawn. It was but a few days old and the debris had been its cradle within the flooded timber.

Now separated forever from its mother, in the open lake, and destined to starve, drown, or become the prey of eagles or alligators, it was taken aboard and added to the captain's collection of native animals at Gatun. Raised by hand and under kind treatment, it reached maturity, becoming the favorite pet of the canal village (see page 173).

OUR HOUSE-BOAT ANCHORED OVER THE FLOODED VILLAGE OF ESCOBAL

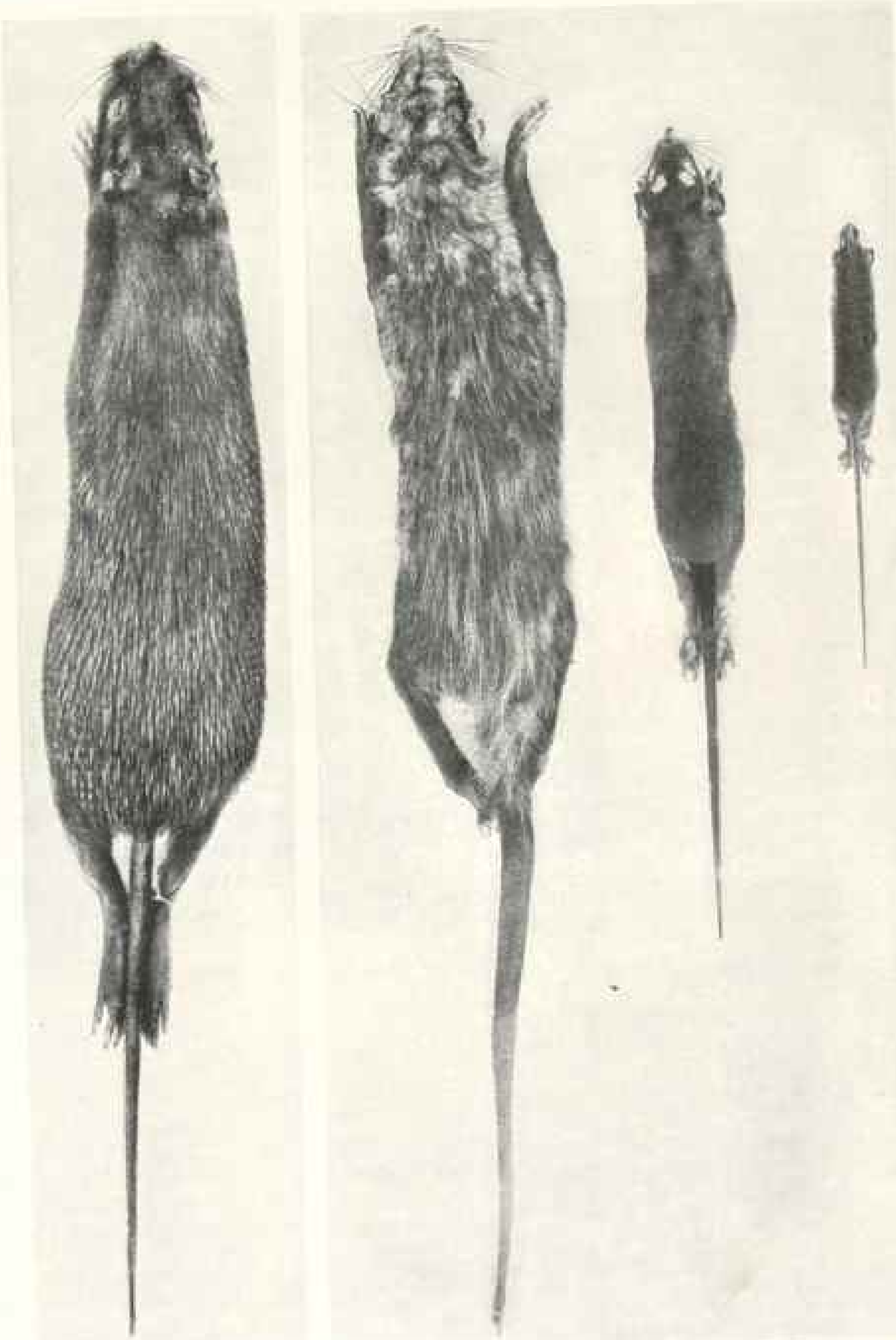
Note the floating islands near shore. These become of great size when permanently anchored by snags and dead trees.

A STARVING OWL MONKEY

A few months later, upon another expedition in the same region, a good lookout was kept for other marooned animals. Finally, in a large tree surrounded by water and a considerable distance from dry land, a round furry object was noticed in an upper crotch. As the launch approached, the ball unrolled into a small monkey-like creature, but with the bulging eyes of a lemur which Captain Brown felt sure was a rarely seen nocturnal species known as the owl monkey.

As this would prove a rare find, besides once more saving another animal in distress, the launch was tied to the tree and an effort made to slip a noose over its head by means of a boat-hook; but this proved unsuccessful. Then a ripe banana was placed invitingly on the bow, and Captain Brown retired to the stern to await results. In a very few minutes the little animal came down the tree, leaped on deck, and began eagerly devouring the fruit. It was evidently on the verge of starvation and permitted the rope to be cast off without showing any desire to seek its former retreat. An hour later the little monkey was placed in the same pen with the fawn and fed, when it sought a shelf on the rear porch, where it was concealed during the daytime by boxes and coils of rope.

True to its nature, it was never seen in the daytime, except when purposely disturbed, but after dark became continuously active (see page 175). On chilly nights it would seek the sleeping fawn



RATS AND OPOSSUMS CAUGHT ON GATUN LAKE

(A) Spiny rat; the quill-like hairs on back are probably used for defensive purposes. (B) Big gray opossum; this is the largest species found in Panama, variable in colors; the average number of young found with parent was seven. (C) Rat-tailed opossum, a medium-sized species. (D) Murine opossum, a very small species, the size of a ground squirrel.

A BROCKET DEER: RESCUED FROM A FLOATING ISLAND WHEN A FAWN (SEE P. 171)

and curl up on its back for warmth. My later introduction to this interesting animal is referred to again when testing its eyes under an artificial light to see whether they would shine.

SHOOTING A BOA-CONSTRICTOR

The dispersal or isolation of wild life had mostly occurred before our arrival. Some of the best specimens of the larger animals were obtained, through the assistance of hounds, on several of the islands where the deer and peccaries were still abundant, but more or less preyed upon by jaguars and ocelot. One afternoon when cruising through a forest of gaunt, dead trees, and where the water was fully 20 feet deep, we were surprised to see a large boa-constrictor sunning itself on a limb not much above the surface.

Regarding it as a good museum specimen, a rifle ball pierced the body just back of the head, and with a convulsive movement the snake hurled itself toward the bow of the launch, from which it unfortunately slid into the water, leaving only a crimson circle and a string of bubbles on its way to the bottom, where it could not be recovered. Whether it sought out a dead tree in the open water as the only available basking place in this deluged district or had found some form of prey unknown to us was hard to determine.

DIFFICULTIES OF NIGHT PHOTOGRAPHY IN THE TROPICS

While I had been previously successful in flashlight photography in southern climes like Mexico and the West Indies, this method in Panama proved difficult. Previous experiences had led me to expect frequent annoying visits from the omnivorous opossum, but here the country was alive with them after dark, ranging from the size of the northern species down to those no larger than a small squirrel (see page 187). No sooner was it dark than I could hear the reports from the scattered flashlight machines, with always a probability of their having been

FLASHLIGHT OF TWO NOCTURNAL RAILS THAT USED THE DRY CREEK BOTTOM WHERE THE FLASH WAS SET

Like the opossums, they fired it repeatedly, pulling on the string whether baited with fruit or meat

fired by a marsupial. In several instances the flash was sprung by a species of night rail, other times by large rats or flying bats (see page 176), and not infrequently by decaying vegetation dropping from the forest tops.

In the daytime the ever-present buzzard soon associated the green tin boxes covering the cameras with a near-by feast and it became necessary to set the flash just at dusk whenever meat bait was used (see page 177).

But worst of all was the extreme humidity, so that plates left exposed in the camera for more than two nights and developed at irregular periods became so mildewed as to be worthless.

A PANIC-STRICKEN JAGUAR

In one instance the flash fired by a jaguar, at a considerable distance from the house-boat, was visited too late to save the plate, and all I had for the effort was the sight of the clawed bank caused by the big animal as it sprang away in terror when the dazzling, booming flash greeted an effort to carry off the skinned body of an opossum, while the same result occurred in the case of a tapir passing along a runway to the water.

Moisture-absorbing chemicals in the camera would have overcome this, but none were at hand when most needed. Undoubtedly flashlight photography is the ideal way of getting pictures of the larger-sized South American animals, where, aside from their being almost wholly nocturnal, the dense brush prevents any possibility of daylight pictures unless such animals can be cornered or treed by the use of hounds.

That the jaguar occasionally hunts in the daytime was shown when Mr. Anthony, shortly after leaving the house-boat, had a big boar peccary nearly knock him over as he was standing scanning the tree-tops for a shot at a squirrel. He fired at it with small shot, rolling it over

dead a few feet away, at the instant his Indian guide, by his elbow, gave a cry of terror, when a big jaguar raised up and roared in his face—so intent had this beast been in following the peccary's trail. But it sprang away in a line with the guide, so a shot could not be safely fired.

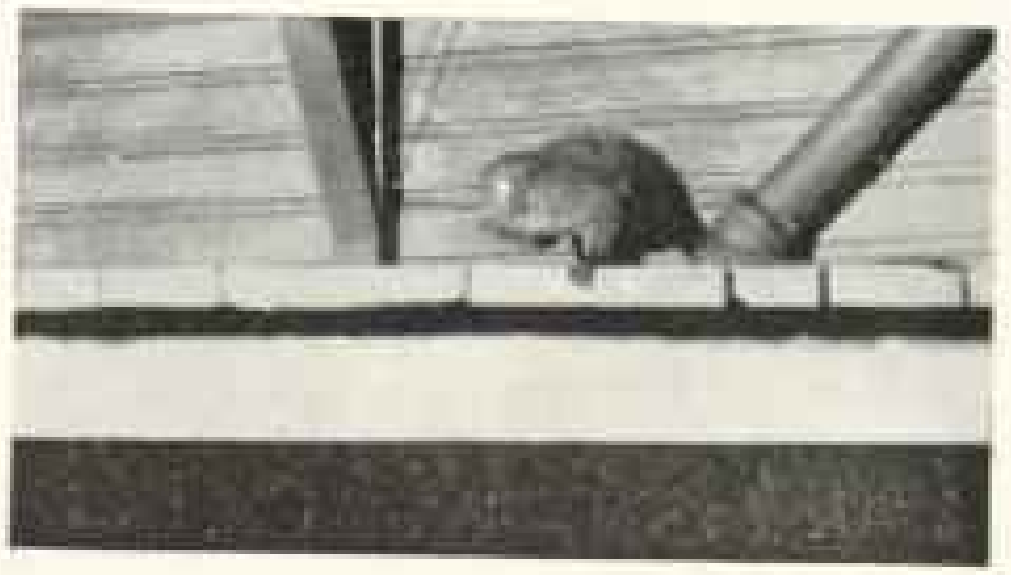
However, this adventure provided us with fresh meat and a good museum specimen (see page 178). That night Anderson, whose bed was on the floor between our cots, became restless, the usual indication that the daily supply of ticks had not been removed before retiring; but when he held up several objects and wanted to know if they were young turtles, his knowledge of entomology was enlarged on being told that they were a very large species of tick from the peccary he had skinned on the floor of the boat some hours before.

BAT CAVES

Many years ago large limestone caves were discovered near the upper Chagres and in these lived numerous bats, ranging in size from a small species to the huge so-called vampire, with a wing-spread exceeding two feet (see page 185). Formerly it was impossible to visit this vicinity other than by an uncertain trail through the ever-intruding jungle; but as the main stream and tributaries deepened with the back waters from the lake, the caves could be reached in a few hours by launch. Under the guidance of a former canal employee, an erstwhile trapper and market hunter, we made a trip on March 1.

After going up the broad, inundated valley of the Chagres some miles, we entered a branch called the Chilibrillo—narrow, deep, and tortuous, with no perceptible current. As the boat glided smoothly in the straight courses and swerved violently at numerous turns, the overhanging shrubbery and the flooded palm trees marking the bed of a stream formerly unnavigable for any kind of craft, we realized more fully how the new lake had opened up these canal-like avenues of travel into the very heart of the jungle (see page 183).

After a run of five or six miles a current became noticeable, and in a few minutes we came to a transverse ledge of rock with a slight flow of water rippling



FLASHLIGHT OF A NOCTURNAL MONKEY RESCUED FROM A FLOODED FOREST (SEE PAGE 171)

over it, indicating the end of the trip by boat. While walking up the nearly dry bed of the stream, it was plain that many animals had sought the higher ground as a refuge, for trails to the scattered pools came in all directions, bearing the fresh imprint of tapir, deer, peccary, agouti, and the occasional claw-marks of the jaguar and ocelot, while the frequent roaring of the black howler showed this big tenant of the tree-tops was also abundant. The grotesque toucans vied with the noisy parrots, while the calling of the parrakeets and the peculiar chorus-like calls of the chachalaca produced an impression that must ever be associated with jungle memories. Turning to the right and going up a creek bottom, we soon came in sight of the low entrance to the caves, encircled with ferns, vines, and flowering plants (see page 184).

Lighting the lantern and stooping low, we entered a corridor leading to a series of interconnecting rooms with high ceilings and dark and grimy walls, relieved here and there by light-colored stalactites, the tapering ends dripping with limestone waters. In the central room, both on the walls and ceiling, were great clusters of bats segregated by species and, as later examination showed, according to sex.

A ZEALOUS GUIDE

One big bunch, some 10 feet square and containing hundreds of small bats, was found on an end wall only 6 feet from the ground and particularly well situated for a flashlight picture. Our local guide, filled with the enthusiasm of the occasion, unbuckled his leather belt, and before his action was anticipated began lashing them, so that in a moment

A SPINY-HAIRED RAT FIRES THE FLASH

a surplus of specimens lay at his feet, while the rest took wing and in bewilderment circled about the lantern.

Our next effort was directed toward getting specimens of the larger bats, which hung from the highest domes, and could only be obtained by throwing missiles at them (see page 185). While picking up some loose pieces of rock for this purpose, we were startled by a quick flash and the reverberating report of a heavy rifle discharged by the guide in another misdirected effort to aid us. A few mangled and useless bodies fell, and then a black stream circled noiselessly overhead, creating a perceptible current of air as they passed continuously back and forth through the connecting caverns. Finally they attached themselves to the roof and a sufficient number were obtained for our purpose, and then a series of flashlight pictures were taken, several of which are shown on pages 184 and 185.

Upon the large detached rocks were dozens of big black beetles, either nocturnal in their habits or accustomed to feed on the vermin or excrement of the bats. A careful examination of these caves indicated that they did not belong to the group formerly discovered by visiting Americans, and as they contain a vast deposit of bat guano and are near water transportation this supply may become of considerable value as a fertilizer.

EYES THAT SHINE AT NIGHT

One of the most effective means in night hunting is the use of a lantern that will cause the eyes of wild animals to shine.

But what has appeared strange is the lack of any general understanding of this interesting phenomenon. In ancient and modern writings, scientific and otherwise, the glowing eyes of animals at night have been a matter of frequent comment, and often as not inaccurate or

misleading. Many have thought, and the impression still prevails, that this light is of a phosphorescent character, while others seem to think that the glow is inherent, so that the eyes of the animals possessing it will shine after dark or in an unlighted room at night regardless of any independent source of light.

Both of these views are, of course, wholly erroneous, since the illumination seen in such eyes is merely the reflection of rays generated beyond the animal and visible to the observer by reflex action. Two disks of tin, the size of a five-cent piece, fastened a few inches apart on the trunk of a tree will so reflect the light from a hunter's lantern as to deceive all but the most expert, and the writer has frequently used this method for detecting or misleading market hunters and others shooting at night in violation of law, for this destructive method is now prohibited in nearly all the States.

At the present time, however, "jacking," as it is usually called, has come into effective use in collecting scientific specimens or as an aid in the taking of flashlight pictures of wild life at night. Since most animals, big and little, are nocturnal, by using a light that will cause their eyes to glow it is now possible to get many specimens or photographs otherwise difficult to obtain and at the same time to use the night hours for this work, thus greatly increasing the opportunities and affording more favorable conditions for photography.

Originally, when hunting and later in night photography, the writer became familiar with many animals whose eyes glowed before a light as well as with those that did not have this peculiarity. For a long time it did not suggest any extended investigation, and beyond noting the different species, their actions under the light, and the variance in color reflection, nothing was done toward determining the portion of the eye that caused such reflection, whether it performed any function or was merely an arbitrary or useless attribute, without value or significance in the classification of different families and species of animals.

WHY ANIMALS CAN SEE AT NIGHT

In considering eye reflections, they should not be confused with the glistening surface so characteristic of all eyes, human or otherwise. The exterior light is mirrored on a posterior, lustrous layer of the retina, next to the choroid coat, called the *Tapetum lucidum*, and appears as a bright, luminous glow, which, in the case of many large animals, can be seen on a dark night, with a powerful lantern, 100 yards or more away. Such glowing orbs have usually the brightness and steadiness of a star or a ball of fire, and can generally be detected long before the body of the animal becomes visible under the approaching light.

BUZZARD FIRING FLASHLIGHT IN DAYTIME

The left wing became involved in string tied to bait and half of the pinion feathers were pulled out. These birds became such a nuisance that when meat bait was used the flash was not set until dusk.

While it is impossible to give here in detail the writer's investigations, they may be summarized by stating that the eyes of all the carnivorous or predacious animals glow, as is the case with their domestic descendants, the cat and dog. The same is true of practically all the hoofed or grazing animals and many other families, while on the other hand the two great orders—the Primates, including man, apes, monkeys, etc., and the Rodents—have few species that possess the *tapetum*. In addition to the mam-

A BOAR PECCARY, SHOT WHEN FLEEING BEFORE A JAGUAR: GATUN LAKE
(SEE PAGE 173)

nals, there are other vertebrates, including certain nocturnal birds, reptiles, and fish, that have brilliant eyes at night, as is the case with some of the invertebrates, such as spiders, beetles, and crabs.

Unquestionably the function of the *tapetum* is to give increased keenness to the night vision, for in no instance do strictly diurnal creatures have reflecting eyes, while practically all those of nocturnal habits possess this element of the eye.

On the Panama trip considerable study was given this subject, for there were missing links that only the tropics could supply. Up to this time I had not found a single member of the Primates that had reflecting eyes, for all tested were diurnal, like man. In several countries there are species of nocturnal monkeys, but I could never find one in the zoological collections, and therefore it was with great interest that I tested the eyes of the little owl monkey, whose rescue from a flooded forest is mentioned elsewhere.

Selecting a dark night and turning the lantern toward it as it sat on the upper edge of a porch, its eyes glistened like two brilliant diamonds.

Later, on taking a flashlight picture of

it, it became so wild on my approach as to prevent any further study; but as this particular monkey has not a prehensile tail and the eyes and general features resemble the lemur, a strictly nocturnal animal, it is probable that it represents a connecting link between the monkeys and the lemurs.

A HUNTER FOOLED

In the North I had found that the eyes of one species of night-hawk, belonging to the goatsucker family, would shine brightly under the light. While at Gatun I at once noticed that the night-hawks circling about the electric lights after insects had very brilliant eyes, and on one occasion, when Mr. Anthony was in the forest "headlighting" for specimens of the cat family, he saw a large pair of brilliant red eyes glowing from the top of a tree, and he fired with the expectation of getting an ocelot, or a similar animal. Instead of a heavy body crashing through the branches there was a slight swish, and in going under the tree he found that he had killed a large goatsucker, the biggest of the night-hawk family; and while he was disappointed, the result of the shot showed that all the members of these nocturnal birds possess a *tapetum*.

On other occasions we found that the larger species of the southern Rodents, like the agouti and paca, could be easily shined at night, and since the northern Rodents, with the exception of the rabbit (which at best can be doubtfully classified as such), do not have shining eyes, it is possible that this physical element may be used as a basis for creating a suborder of Rodents.

On the upper Chagres we found that there was one species of fish which apparently fed mostly at night, and under the light its eyes would glow with the same brilliant red possessed by the alligator, another night feeder. While the results in Panama enlarged the number of species having reflecting eyes, they confirmed more than ever the writer's position that the possession of the *tapetum* is directly associated with night vision; while the brilliancy of such reflection, it has been found, corresponds to the animal's need of such a faculty in defense or aggression.

NO PERIODICITY IN HABITS AS IN THE NORTH

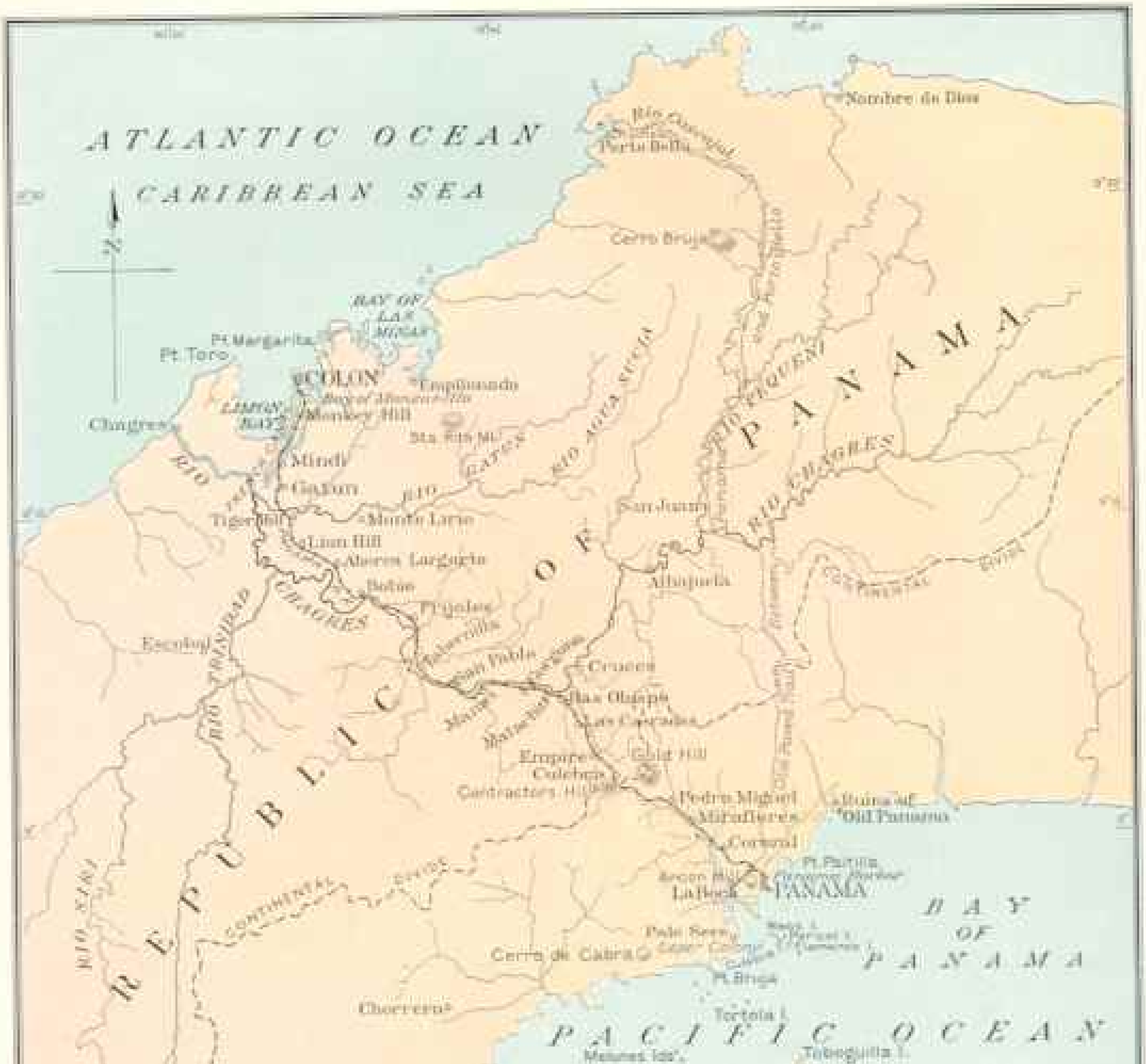
The animal I felt a particular interest in on this trip was the Central American whitetail, a relative of the Virginia deer. This species and its geographic representatives are found in all the lower Canadian provinces, in practically all our States and ranges southerly through Mexico, Central America to the Andes, and down into Brazil and Peru. The whitetails are now, as in the past, the most abundant and widely distributed of all the groups of our native deer, and as far as northern Mexico are represented by several closely related forms, beyond which they break into a number of distinct species.

The northerly mating season covers a period of about 30 days each fall; the bucks commence shedding their horns a month or so afterward, while the fawns are born in the late spring and within a corresponding period of 30 days. Such periodic and seasonable habits are undoubtedly caused and controlled by the rigorous winters and lack of nourishing food during the portion of the year when any newly born offspring would suffer or perish. Even in the Gulf States the mating and breeding seasons correspond closely with those of higher latitudes, due largely to the northern origin of the species—with the consequent inherited tendencies—and also because, even in the most southerly States, the colder winds affect many tender varieties of vegetation.

After passing the Mexican border, and especially from Vera Cruz south, there is a considerable enlargement of the breeding season, since necessity no longer controls the habits.

A VARIABLE BREEDING SEASON

On the Isthmus of Panama, with a mean annual temperature of 80 degrees, there is only an average difference of five degrees between the so-called summer and winter months, with the result that the rut, the shedding of the horns, and the birth of the young are very irregular. On the Isthmus the fawns are born dur-



MAP OF THE ISTHMUS OF PANAMA BEFORE THE ESTABLISHMENT OF THE CANAL ZONE

Showing former route of Panama Railroad, the various watercourses, and the valley basins later occupied by Gatun Lake, with the location of the larger native villages therein.

MAP OF THE CANAL ZONE AND SURROUNDING TERRITORY OF THE PANAMA REPUBLIC

Showing the relocated railroad, the canal route, Gatun Lake, covering 164 square miles, and the portion of same extending beyond the zone, with the watershed and tributary streams still under the exclusive jurisdiction of Panama. One-third of the lake and all the flooded valleys contain much standing timber, living and dead (see pages 187, 188, and 191).

ing a period of nine months, while a hornless buck may be found any month or again bearing antlers in various stages of growth.

And it is an interesting and undetermined question whether the prolonged breeding season does not result in many bucks carrying their horns much beyond the normal period in the North. If, as the writer believes, the horn growth of the male is purely a sexual manifestation, and incidentally providing a means to battle with the numerous rivals, and are shed in the North long before they can be of use against wolves and other predatory animals, then, with the Panama deer mating throughout most of the year, it may result in the carrying of the fully developed horns much longer than usual. With the tapir and many other large animals the prolonged breeding season was noticeable, but to a lesser extent among the birds.

UNITED STATES OWNERSHIP OF LAKE SITE NECESSARY

Conceding that Gatun Lake is the most essential factor in the canal system, it is evident that the entire basin and the surrounding shores should be under the exclusive sovereignty of the United States, while the main watersheds should also be under some form of supervision. A canal zone 10 miles wide may have seemed in the beginning a sufficiently large tract to be taken out of so small a republic as that of Panama, just as the constitutional restrictions on the size of the District of Columbia seemed reasonable at the time.

When it is finally appreciated that more than one-third of the superficial area of Gatun Lake and practically all the watersheds upon which the maintenance and the purity of the lake depend are within the sovereignty of another nation, seriously interfering with our control from a commercial, engineering, sanitary, and military standpoint, the present limitations appear unfortunate. While the consideration of this feature of Isthmian geography may not be germane to the original purposes of our exploration, yet no one can spend weeks traversing the proportionately large sheets of water lying beyond the zone without being impressed with the lack of governmental control.

Any enlargement of our territory under the existing treaty with Panama, which, fortunately, covers future readjustment of our holdings, should be undertaken at the earliest possible time, for with the springing up of many native villages about or near the shores of the lake, the costly preparation of land for agricultural purposes, the use of the waters as a convenient medium for travel and shipments, any interference therewith a few years from now will be at the expense of vested rights, making the condemnation more costly and, what is more to be feared, causing endless friction with the Panamanians, who will resent their dispossession after enjoying the many benefits of the inland waterways, regardless of how such occupation may interfere with the purposes for which the lake was created.

SETTLEMENT ENCOURAGED

Already both whites and natives are buying up or taking possession of large tracts of riparian lands just outside the boundary and along the now navigable valleys, in easy communication with all parts of the zone by boat or rail. Colonization schemes are in the bud and regarded with a somewhat favorable eye by our government, for we are told in official communications, in lectures, and by illustrated articles the wonderful future of the zone and adjacent lands for the enterprising agriculturists from the States.

On the Pacific slope, where there is no connection with or drainage into Gatun Lake, and again in the great forested tracts along the Atlantic coast, there are doubtless many opportunities for fruit-growers, stock-raisers, or lumbermen; but on all lands bordering or draining into the lake every effort should be made to prevent or restrict permanent settlements or any other occupation materially interfering with the control and protection of the lake waters.

Engineering Reasons.—The duty of watching and measuring the precipitation during periods of excessive rainfall

SCENE ON THE RIO CHILIBRILLO, UP WHICH TRIPS WERE MADE TO VISIT THE BAT CAVES

As palms never grow in water, something of the extent of the flooding of this region can be judged

on the watersheds is important, in order to properly safeguard any part of the lake basin subject to overflow or unusual pressure. Some miles up one of the valley estuaries is a ridge called "the Cana Saddle," forming a natural embankment between the impounded waters and the Caribbean Sea. So low is this rim, when the lake reaches the prescribed maximum of 87 feet, that a prolonged freshet might overflow the bank or a heavy, continuous pressure start a leakage, with the result, in either case, of the rushing waters cutting down or bursting through the embankment, reducing the lake level below the minimum required for navigation.

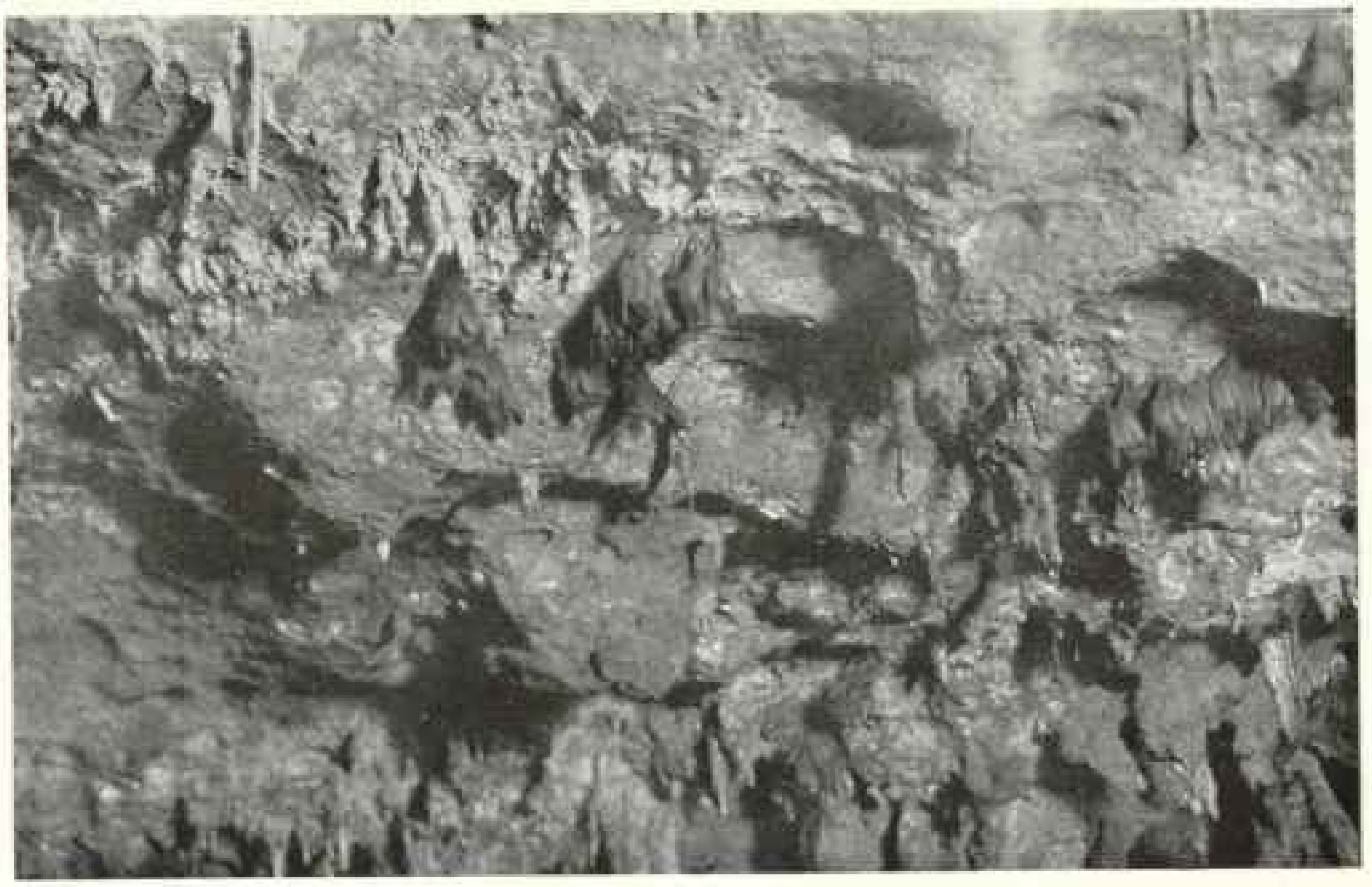
Were this break to occur just before the dry season, it might easily interrupt commerce for months, since the required depth could not be restored until well into the wet season. One or two other localities, also outside the zone, present somewhat similar features. Such an interruption would be a universal calamity in times of peace and probably more serious for us in times of war.

IS THE CANAL IMPREGNABLE?

Military Reasons.—Our refusal to accept the proposal of European nations for an unfortified or neutralized canal, followed by erecting the heaviest possible armament on the seaboard, becomes ludicrous if the operation of the canal can be suspended for months by the use of a stick of dynamite on a northern arm of the lake or through the destruction of the Pedro Miguel locks at the south by projectiles fired from the slopes of the Chagres River, since such easily concealed assaults would originate beyond our interior borders.

To protect the entrances of the canal by fortifications and war vessels, while

THE LOW ENTRANCE TO THE RAT CAVE ON THE CHILIBRILLO RIVER OPENS INTO A SERIES OF LONG CORRIDORS AND CHAMBERS MORE OR LESS INTERCOMMUNICATING

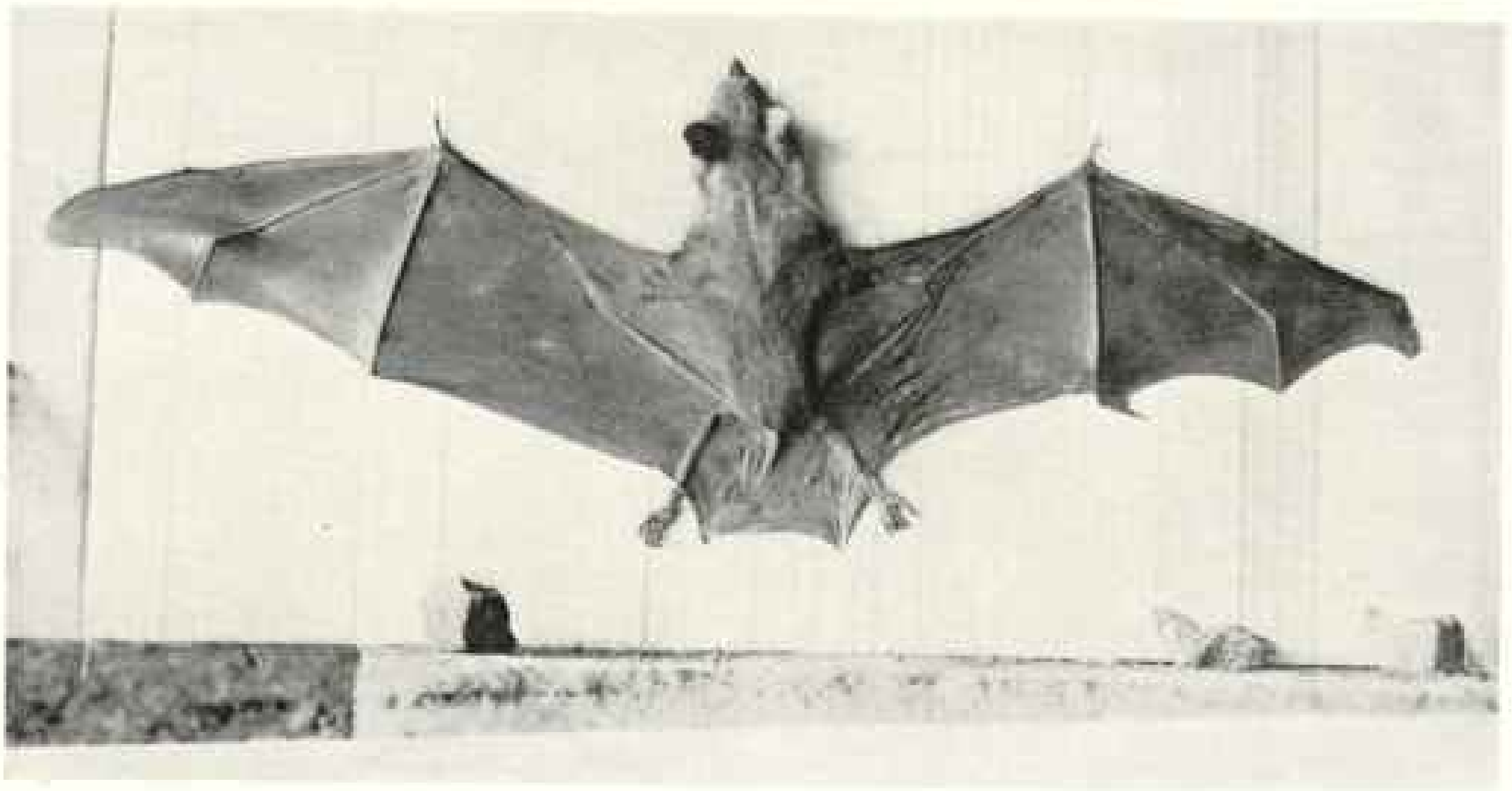


FLASHLIGHT OF A SMALL CLUSTER OF BATS BEFORE THEY WERE ALARMED

Clusters are ordinarily formed of a great number of individuals, probably several hundred in some instances. The variety shown is one of the largest of South American bats, one specimen secured having a wing expanse of 26 inches. The bats are strong and muscular and always ready to bite. The masses of bats bear a close resemblance in form to the stalactites with which the walls and domed ceilings are covered.

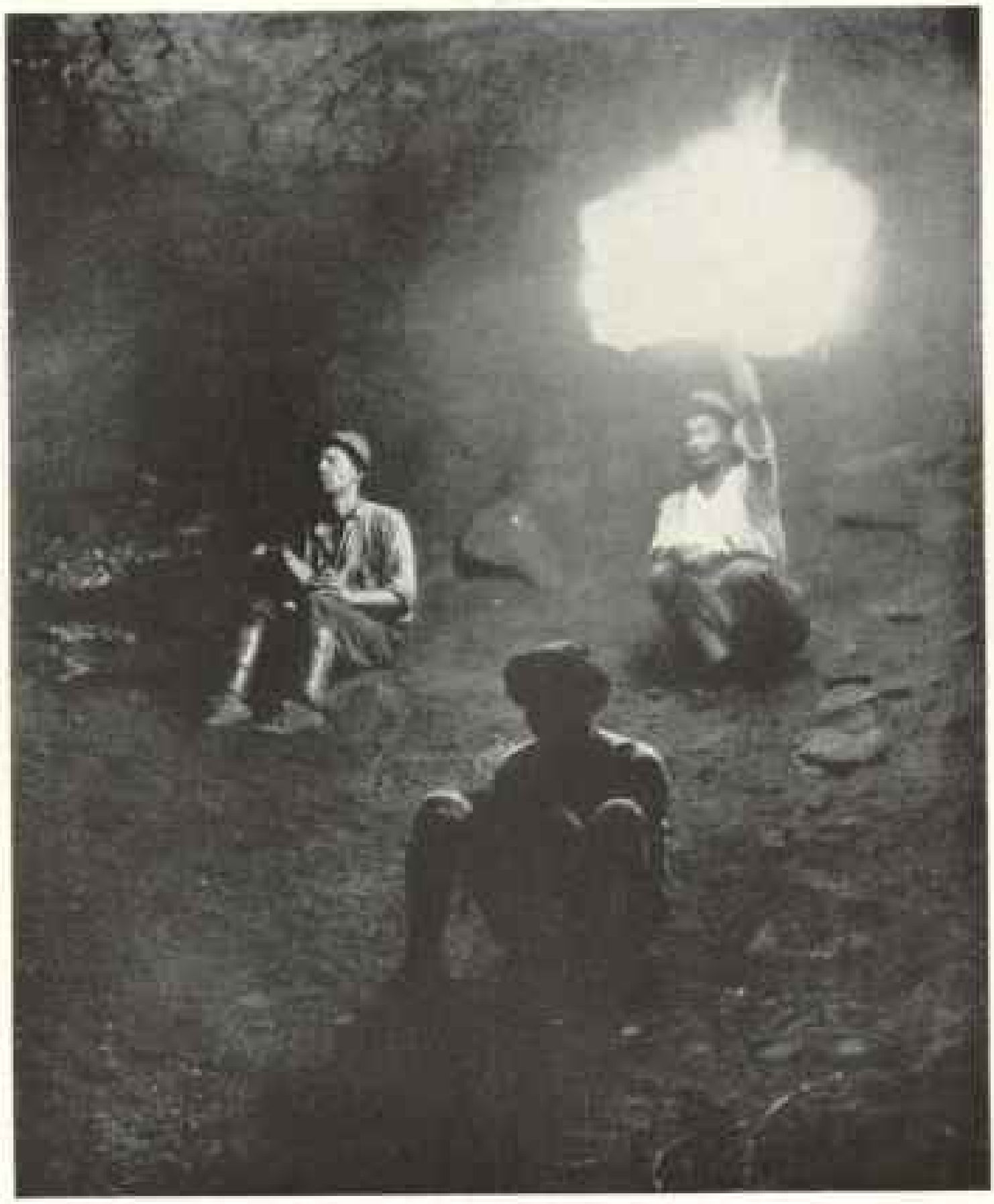
FLASHLIGHT PHOTOGRAPH OF SMALL BATS

They were isolated by species and sexes, each species confined to a particular grotto, where it was found in hundreds, and the bats of each mass all of the same sex



A FALSE OR SO-CALLED VAMPIRE BAT, WITH A WING-SPREAD OF 2 FEET 2 INCHES

Lives mostly on fruits. One of specimens from the bat caves



IN A BAT CAVE

Showing our method of photographing bats by flashlight. As the flashlight powder used is exceedingly explosive, the expression on the face of the operator is not to be wondered at

trusting to the supposedly enduring friendship of Panama or the inviolability of its neutrality by other nations, is much like locking the front and back doors while leaving those on the side invitingly open.

Although reference to military weakness is not always subject to a frank and full discussion, yet the perils suggested are apparent to the casual observer and beyond concealment. If this great reservoir can be broken and drained outside our possessions, the terminal locks left in easy range of guns beyond the border, or raiding boats concealed on lake waters beyond the zone, it will be entirely the result of not possessing territory essential to the military protection of the canal.

Sanitary Reasons.—It will be unnecessary to recall or describe the terrible loss of life suffered by the French in the effort to construct the canal or the proportionately greater loss in building the Panama Railroad many years preceding. All the conditions entering into such epidemics were understood by our sanitary authorities when the more active work was begun, and the methods and regulations prepared by Colonel Gorgas resulted in maintaining throughout the entire period of construction a lower mortality rate than in many of the States.

Having found that the principal scourges of the Isthmus—yellow fever and malaria—were spread by two indigenous forms of infected mosquitoes, efforts were directed toward destroying the breeding places of such in the neighborhood of construction towns or wherever workmen were exposed, by draining the swamps or spraying the stagnant waters with crude oil, while all dwellings

FLASHLIGHT PHOTOGRAPH OF ONE OF SEVERAL VARIETIES OF OPOSSUMS ENCOUNTERED IN THE CANAL ZONE

The particular opossum shown is the commonest species, and by reason of its abundance and its omnivorous appetite it proved a serious obstacle to flashlight photography. Probably 75 per cent of the flashes fired were sprung by opossums, who found and fired the camera shortly after dusk before better game was moving.

were carefully screened and inspected and the employees supplied gratuitously with quinine. By isolating, in conveniently located hospitals, all suspected or infected cases there was no possible chance for an epidemic to get a foothold.

LOSING SANITARY CONTROL

Now that most of the government towns about the lake have been dismantled or occupied only by a few permanent employees, it should be easier to insure proper health conditions along the canal route were it not for several changes which if ignored may cause a reversion to the old conditions or worse.

The change that has taken place since the lake filled up the lower Chagres Valley and extended far inland, flooding temporarily, and at places permanently, lowlands far beyond the zone, has already been mentioned. Taking the lake as a whole, and after the stagnation caused by decaying vegetation has ceased, it ought to be sufficiently pure for many domestic uses. Probably 90 per cent of the supply is the quickly delivered torrential rains, and the remainder, mostly during the dry season, is the contribution of small streams fed by the stored waters of the limestone formations; so its purity nearly equals that of distilled water.

With a depth in the main part surpassing that of Lake Erie, the surface roughened and aërated by daily winds and the rotting vegetation replaced by aquatic growths favorable to purification, there is no apparent reason why such water should not be piped, as now contemplated, to the cities of Panama and Colon or the neighboring towns, as well as becoming an important source of supply for the numerous ships en route between distant ports.

FLASHLIGHT OF A PIG-LIKE CREATURE: THE LONG, NAKED TAIL, HOWEVER, SHOWS IT TO BE A SPECIES OF PANAMA OPOSSUM

Therefore any infected drainage carrying typhoid, tuberculosis, and other water-borne diseases, productive of fevers or intestinal disorders, should be rigorously controlled. Yet this is impossible if scattered habitations and native villages occupy any considerable portion of the amphitheater of hills about the lake basin.

DANGEROUS TO SHIPPING

More serious, however, than the impairment of this great body of water for domestic uses will be the ever-increasing influx of mosquitoes, heretofore suppressed by the activity of the health authorities. The difference between draining or spraying local swamps and stagnant pools along an unfilled canal, with the easy enforcement of health regulations among the employees, and that of effectively controlling the inception and spread of mosquitoes in the more than 160 square miles of tepid waters, surrounded by ignorant and uncontrollable natives, is too apparent for argument.

While the deeper waters and those in which small fish have ready access may not be any great source of trouble, yet the myriad of swamps and pools, the thousands of water-holes in shore depressions or creek bottoms, will afford a breeding place, and the jungle a refuge, for an army of yellow fever and malarial mosquitoes. Imagine what will follow the relocation of native villages in the neighborhood of these shallow and sheltered waters.

Wherever we went about the shores mosquitoes were fairly abundant in the daytime and very numerous at dusk or thereafter. On the several occasions that we boarded a train in the evening at smaller stations adjacent to the lake we noticed the great abundance of mosquitoes, and especially that of the *anopheles* variety—the carrier of malaria.

These back-woods stations seem to be the gathering place in the evening of all the neighboring population, and as the cars are unscreened and the windows continuously open, it is easy to see how, in case an epidemic starts at such points, infected mosquitoes will be quickly and continuously conveyed to the large cities at either end of the route. Under such conditions, too, the slow passage of steamships by the swampy shores of the lake at all hours of the day and night will invite

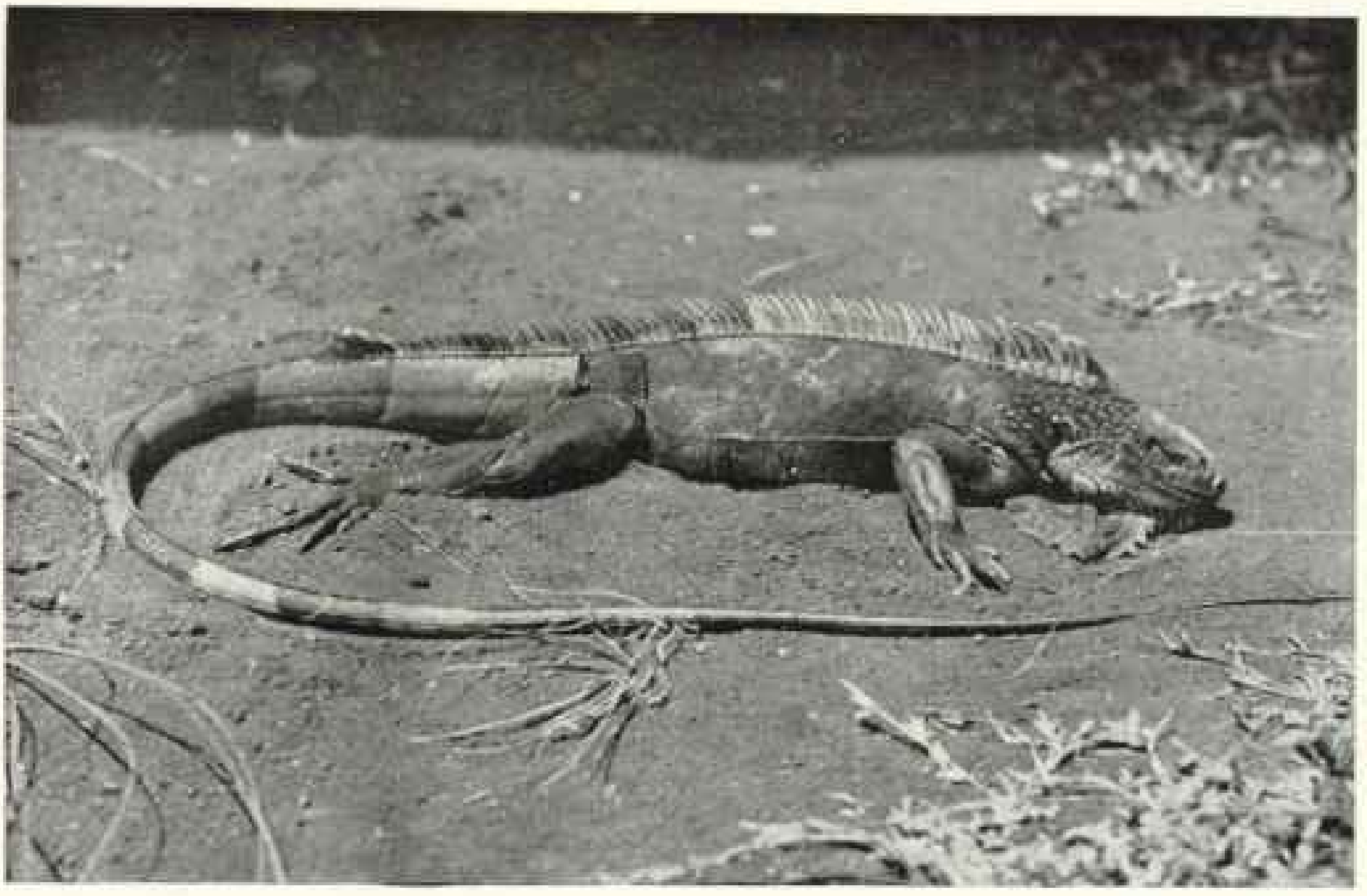
The black howler, the largest of the Panaman monkeys, is looked upon by the natives as a weather prophet, its loud, long, and reverberating howl being most frequently heard just preceding a heavy rain (see page 168).

MARMOSET MONKEY, WITH HAIR LIKE SILK, IN SHADES OF BROWN AND GRAY

A beautiful and attractive pet. There are five species of monkeys in the zone, from the black howler, the size of a small ape, down to the little squirrel monkey.

ANOTHER OPOSSUM FINDS THE BAIT

A CREEK BOTTOM ARBORED OVER WITH GIANT FERNS AND SWAYING VINES, WHERE THE FLASHLIGHT WAS FIRED BY A JAGUAR: CAMERA OUTFIT MARKED X



A GATUN LAKE IGUANA, THE GIANT LIZARD OF THE SOUTH, MUCH PRIZED BY NATIVES FOR FOOD

the contraction of such contagious diseases, threatening all the great ports of the world and resulting in a quarantine that might disrupt commercial intercourse for months.

A CASE IN POINT

Our experiences in this respect were suggestive. At no time in Gatun or other government towns were mosquitoes noticeable, since thickets had been cleared, the swamps drained or sprayed, and every precaution taken against the presence of insect life or their intrusion into dwellings. When the house-boat was anchored in the lagoons it was equally well protected against mosquitoes, besides we had little fear of fever when not near native villages.

But at the plantation on the Trocha were half a dozen laborers, and we were frequently bitten by malarial mosquitoes when coming through the clearing at dusk or when taking a refreshing bath off the boat after a hot day's work. All three of us developed malaria on or after leaving the Isthmus, and as we learned later that the white manager of the plantation had been taken to the Gatun Hospital, a week before our arrival, suffering from a severe case of fever, it seems quite certain that we were only an additional link in the chain of dissemination.

ENLARGE THE LAKE ZONE

In a communication recently received from a former canal commissioner, who was in charge at the time the Hay-Varilla Treaty was being negotiated, he wrote:

"What you say of the dangers arising from the lack of control by the United States to the lands adjoining the margin of Lake Gatun and outside the Canal Zone is not exaggerated. When the width of the zone was fixed at 10 miles, from ocean to ocean, the plans did not contemplate the construction of the dam at Gatun, but at Bohio, and the resulting lake would have been much smaller had that plan been carried out. The necessity has become greater as the area of the lake has become greater. . . .

"Until we have a lesson of experience in one or more elements of danger, I fear that opposition will develop more strength than can be overcome. So far as the

HERON FISHING AT HEAD-WATER STREAM: AS THE SHORES OF THE LAKE OPEN UP THEY WILL BE A FAVORITE RESORT FOR ALL WADING BIRDS

powers under the treaty are concerned, they are ample to enable us to acquire all the lands needed."

The treaty in question was proclaimed by President Roosevelt, February 26, 1904, and contained several broad stipulations altogether sufficient to meet present requirements. Article II, after granting, under definite boundaries, the 10-mile zone, further provides that the United States shall be granted "in perpetuity the use, occupation, and control of any other lands and waters outside of the zone, above described, which may be necessary and convenient for the construction, maintenance, operation, sanitation, and protection of the said canal."

TIME MUST BE FIXED

The acceptance of this privilege is not operative, of course, without proof that such enlargement is "necessary and convenient" in the use and protection of the canal. A demand, therefore, must be made for a compliance with this agreement. However liberal this offer, no independent nation can yield or another accept sovereignty over a territory without a proper definement of the ceded land, in order to determine the date of transfer and the permanent assumption of a jurisdiction thereover.

Eleven years have now elapsed since the treaty went into effect, and good faith as well as expediency suggests negotiations for determining the amount of land or adjacent waters needed to protect the United States in its use of the canal. While the treaty is silent as to additional compensation, such an omission should be disregarded and an appropriation made in proportion to the value of the additional grant.

All or a part of this sum might be used by Panama in the purchase of the boundary territory from Costa Rica, now under dispute, thereby restoring to Panama an area that would serve as an equivalent for the cession of the additional land, and at the same time bringing the three nations concerned into a mutual adjustment of their territorial rights.

THE RISING LAKE COVERED MANY NATIVE VILLAGES

Inhabitants in the remote valleys had no faith in the predicted rise and neglected to remove their property in time

A ZOÖLOGICAL AND BOTANICAL PARK

While the various so-called insular possessions of the United States present many strange forms of plant and animal life, most of these are beyond the current of our domestic intercourse and are little visited by travelers from other lands. Wonderful as are our national parks, they must be seen, if at all, by those diverted from the customary lines of travel.

The Canal Zone, however, is seen en route, and is the only Federal domain of surpassing interest that can be directly traversed by boat or rail and in which each citizen having a feeling of proprietorship should favor its permanent improvement and beautification. The terminal cities of the canal—Colon and Panama—will continue to be objects of interest; but how refreshing and entertaining is the trans-Isthmian trip, for here can be seen the tropic growths in all their luxuriance, and here ought to be visible every native variety of tree, shrub, and bloom, the wonderful bird life, the strange species of mammals and reptiles, and all that goes toward making a panoramic summary of tropical life.

The lake district, as the center of this great international park, would soon become the natural home of the deer, peccaries, tapirs, monkeys, alligators, crocodiles, and iguanas; a resort for every variety of fresh-water fish known to the southern continent; the place to colonize vast rookeries of heron and egrets, while protection against the gun would soon make the routes of travel resound with the noisy chatter of parrots and macaws, and myriads of bright-colored songsters would give added color to the orchid-laden trees.

A LESSON FOR OTHERS

What an example in wild-life conservation to our sister republics of the South! Such self-restraint in useless or wasteful destruction would soon bring to the car windows and to the edge of each hamlet a varied and interesting life now hidden to most eyes in the impenetrable jungles. The introduction of many beautiful and useful plants from South America could be supplemented by those from Africa and similar climes, and not out of line with such a display, as already suggested by Colonel Roosevelt, would be

HOUSE-BOAT TIED TO DEAD TREE MANY MILES FROM DRY LAND

The open space gave sunlight, cooling breezes, and freedom from insects, and the deep, clear water invited the morning and evening swim. Fish of several species were very numerous.

the naturalization of strange foreign animals like the hippopotamus, the waterbuck, and numerous other interesting or valuable animals suited to these surroundings.

Shooting, under a Federal license, of predaceous animals like the jaguar, puma, and ocelot could be permitted, while up the now navigable valleys leading into the Panaman wilderness hunting parties would enjoy a variety of sport with the minimum of discomfort or loss of time. Many of the wildest districts, unsurpassed in all of South America, can be reached from our northerly cities in less time than it now takes to visit the remoter portions of the Rocky Mountains or hunting resorts in upper Canada.

At a trifling cost a resident superintendent of zoölogy and botany could be maintained, with all the benefits following the scientific study of plant and animal life of our only continental possession in the Southern Hemisphere; and here would come the representatives from our great museums and other scientific organizations, were it possible for them to receive the coöperation of trained resident experts, thus avoiding the delay and wasted efforts such as were suffered by the present expedition, where half the time was occupied in outfitting and acquiring reliable information.

"This simple truth which all should know
I teach from *Campbell's* can—
A good soup makes the dinner go,
And dinner makes the man!"

You can't get away from this logic

A nourishing and appetizing first course like *Campbell's Tomato Soup* not only contributes rich food-value in itself but it makes you digest the whole dinner better. And in both these ways it increases the supply of good blood and nerve and muscle which make you what you are.

Serve this wholesome Campbell "kind" regularly at your home table and see for yourself what zest and enjoyment it adds to the entire meal, and how it benefits the health and condition of the whole family. Buy it by the dozen, and have it handy.

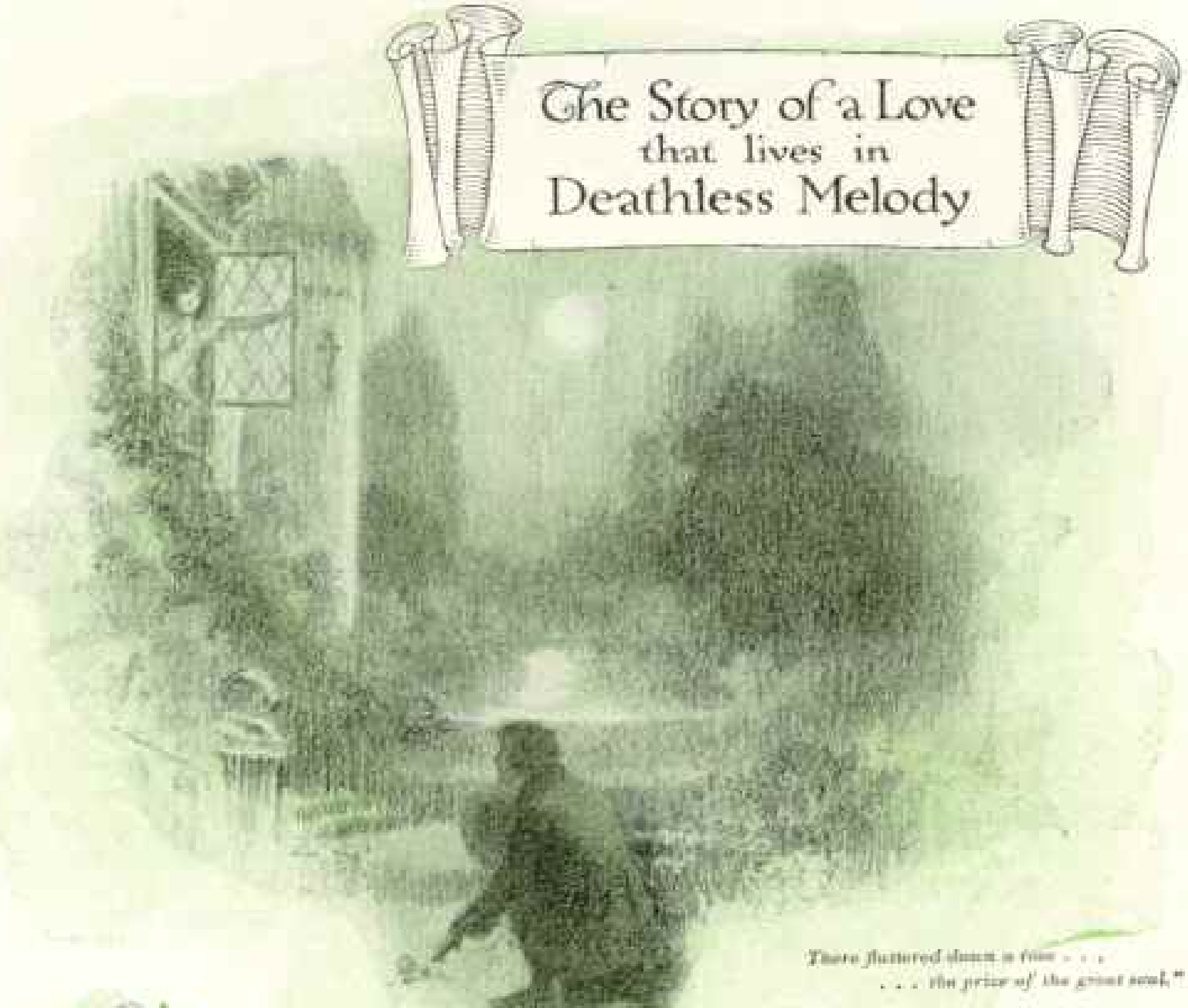
Your money back if not satisfied.

21 kinds **10c a can**

Campbell's Soups

LOOK FOR THE RED-AND-WHITE LABEL

The Story of a Love that lives in Deathless Melody



There flattered down in front . . .
. . . the price of the great work."

TOWARD the palace of the great Count Esterhazy a young musician walked rapidly, through fair Vienna's streets, one morning nearly a hundred years ago.

Little had he slept that night! And with the sun he was up—brushing away at his worn coat and inking the seams; trimming the edges of frayed cuffs, and all the while wondering if it were true—or only a dream—that he, the unknown Franz Schubert, was to have the nobleman's daughter for a pupil!

Still, his beloved master, old Michael Holzer, often had said he some day might be a famous teacher—and even more, and now—

Now he was standing in the splendid hall of the palace and to him the Count was saying, "This is my daughter, Caroline."

▼

. . . . She stood before him—that great Count's daughter—a child in years, in innocence. Her eyes—what mirrored purities they were! She looked and gently pitied as she looked. She smiled—and touched then such a spark of love that it will glow in song, in other centuries in a World grown old!

Ah! how he lived for but that lesson after that! The week was all too long a time to wait! How, when he guided her dainty hands about the keys, his own would tremble! How dumb were words that lay within his heart!

Did she understand that day she said, "Master, speak to me through the keys?"

His soul spoke then. His heart and life leaped forth as then he played. Could she know? Did she understand?

That evening came a note in her dear hand. "In three days we leave for Hungary to stay 'til Autumn," it said.

Ah, could he but find a way to give her the message in his heart his lips refused to utter!

▼

It was the night before she was to leave. The air was still and the moon rode in the high heaven. All the world lay in a shining veil.

Love had led the master's feet 'til he stood beneath her chamber, his head bared to the jeweled sky—in his eyes the purity of love

supreme. It was Spring—and Spring's spirit spoke through the silver silence of the night. Into his mind and heart and soul it crept—into a life made magic by its call.

Into a voice . . . . . .

"Nightingales for me implioring,
Sing in notes divine,
Ev'ry tone of sweet lamenting
Breathes a sigh of mine."

So Schubert sang his Serenade, in that, the velvet night of love.

So voiced he there, poor lover, the magic of his immortal plea.

Softly it ceased, he had come to the last measure—that final sigh of earth's most perfect music of love. Softly a curtain fluttered at her window. Gently she came—in white—then vanished. There fluttered down a rose—the prize, the poor white prize of the great soul whose voice had just sighed out *earth's greatest ecstacy of cadenced love!*

* * * * * *

This is the love-story of Schubert, the great genius. Thus, 'tis said, was born his song—the immortal "Serenade"—whose soul-satisfying loveliness has thrilled the hearts of all who since have heard it.

Are you one of those fortunate ones? Is Schubert's "Serenade" anything more than a name to you? Can you—in the sweet stillness of your home—lift and lighten your life and the lives of those you love with the sublime measures of this very melody and all the other melodies which have blossomed in the souls of the masters?

If music is still to you the "unavailable art," you have only yourself to blame. You are ignoring that great invention which has so wonderfully solved the problem of "music in the home"—which makes of everyone of us *past-master pianists in our own right.*

The Pianola—the most modern pianoforte—was made, that you and I and everyone might hear and know and *play* all music—might put into our home a pianoforte of truly miraculous power.

Nothing that the traditional piano is or does is lacking in the Pianola. It is itself a pianoforte of incomparable tone, of perfect action and beautiful appearance, which can be played by hand or practiced upon as any other, but which in addition can be played artistically by anyone, through the aid of Pianola music-rolls.

During the past few years all the leading Rulers of Europe have purchased Pianolas, the greatest educational institutions have installed them for demonstrating music, all the foremost musical authorities of the World have united in enthusiastic endorsement, and thousands upon thousands of music lovers, trained and otherwise, have placed them in their homes.

▼

We want you to know the Pianola. Perhaps you may never buy one, but we want you to spread its story, as you will when you have heard it. If you will write us, we will send you free the booklet "The Weight of Evidence," which in a simple and impressive way tells the full story and gives all information.

We will also give you the name of our nearest representative who exhibits and sells the genuine Pianola—for like all great successful inventions, the Pianola is very widely copied—that is, as closely as patent laws permit.

The genuine Pianola is made only by the Aeolian Company and only in the following models:

THE STEINWAY PIANOLA
THE STECK PIANOLA
THE STUYVESANT PIANOLA
THE WHEELOCK PIANOLA
THE STROUD PIANOLA
and
THE FAMOUS WEBER PIANOLA

Prices are $550 upwards.

Shipping charges added on the Pacific Coast. All models purchasable on moderate monthly payments from all representatives.

THE AEOLIAN COMPANY
AEOLIAN HALL NEW YORK

Makers of the Aeolian-Vocalion, "the phonograph that calls forth hidden beauties from your records," and largest Manufacturers of Musical Instruments in the World.

If a Giant Cut the Wires

Suppose all telephones were silent, and that for forty-eight hours you could not even call a telephone exchange anywhere in the Bell System to ask what the trouble was!

Imagine the confusion which would prevail—with personal visits and messengers substituted for direct, instant communication; with sidewalks, street cars and elevators jammed; with every old-fashioned means of communication pressed into service and all of them combined unable to carry the load.

The instant contact of merchant with customer, of physician with patient, of friend with friend, would be severed; the business man and the housewife would lose the minutes and hours the telephone saves them. The economic loss would be incalculable.

There would not be time enough to do the things we are accustomed to do, and social as well as business life would be paralyzed.

Such a condition is almost inconceivable. The Bell System has developed telephone service to the highest degree of usefulness and made it so reliable that its availability is never questioned. It has connected cities, towns and the remotest places from coast to coast, and has taught the people the advantages of nation-wide telephone facilities.

Plans are made, buildings built and businesses run with Bell Service taken for granted, and yet we have to imagine what it would mean to be entirely without telephones before the great value of this ever-present service can really be appreciated.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

AND ASSOCIATED COMPANIES

One Policy *One System* *Universal Service*


Not one, but SCORES of Experts—
So vast are the problems that must be solved in the quest of the better light for your home that no one man, no one mind alone, can ever cope successfully with the task. And so MAZDA Service has enlisted scores of experts in many fields of science, in its deep-delving research and study of the world's developments in lighting.
Already this many-minded effort has borne fruit in the MAZDA Lamps we know today, lamps that make a dollar's worth of electricity go many times as far as in the old-style carbon lamps. And as the search goes on, better and better lamps will come—but all with that Mark of MAZDA.
For as the Research Laboratories set the stamp of approval on each new development, it is at once transmitted to the Company's lamp works at Harrison and at Cleveland, and to certain other manufacturers who are entitled to receive this Service.
And your assurance that the lamps you buy are as good as science knows how to make them is the Mark of this Service—that word MAZDA—etched upon the bulb.
GENERAL ELECTRIC COMPANY
4623
MAZDA
"Not the name of a thing but the mark of a Service"

VOGUE

suggests:

that before you spend a penny on your new clothes, before you even plan your wardrobe, you consult its great Autumn and Winter Fashion numbers! Beginning with the

FORECAST OF AUTUMN FASHIONS*

and continuing for six months (twelve numbers—see list below) you will receive the most complete presentation of styles ever offered American women. During the very period when these numbers appear you will be selecting your Fall and Winter wardrobe and paying hundreds of dollars for the suits, gowns, etc., you select.

The gown you buy and never wear is the really expensive gown! Gloves, boots, hats, that miss being exactly what you want, are the ones that cost more than you can afford!

$2 Invested in Vogue will save you $200

Why take chances again this year when by simply sending in the coupon, and at your convenience paying $2—a tiny fraction of the loss on a single ill-chosen hat or gown—you can insure the correctness of your whole wardrobe?

Vogue is a beautifully illustrated magazine: the acknowledged authority on what is worn by well-dressed American women. Here are your twelve numbers (and one extra):

Forecast of Autumn Fashions,* Sept. 1
The earliest and most authentic forecast of Winter mode

Autumn Millinery Sept. 15
Shows exactly the Paris styles to be worn during the Fall

The Paris Openings Oct. 1
The Fall exhibitions of the leading dressmakers of Paris weeks ahead of other magazines. Superbly illustrated

Autumn Patterns Oct. 15
Working models for your entire Winter wardrobe

Winter Fashions Nov. 1
Showing the mode in Winter culmination—charming models smart couturiers evolve for their private clientele

Vanities Number Nov. 15
Those graceful little touches that make the smart woman smart, where to get them and how to use them

Christmas Gifts Dec. 1
Vogue's solution of the Christmas gift problem. A new idea

Christmas Number Dec. 15
More gifts and practical ideas for holiday entertaining

Lingerie Number Jan. 1
Fine Linen for personal use and for the household

Motor and Southern Jan. 15
The new fashions in motor cars and the new wardrobe for the southern season!

Forecast of Spring Fashions Feb. 1
Earliest authentic news of Spring styles. Fully illustrated

Spring Millinery Feb. 15
Hats, bonnets, and toques from the famous milliners of Paris

Spring Patterns Mar. 1
Working Models for your Spring and Summer wardrobe

"Nine out of ten women copy what the tenth does; the tenth is a reader of VOGUE."

*OUR SPECIAL OFFER

THE Forecast of Autumn Fashions Number is already on the news-stands. If you enclose the $2 with the coupon below, we will send you with our compliments this earliest and most authentic forecast of the Winter mode, making thirteen numbers instead of twelve.

Or, if more convenient, send coupon without money. Your subscription will then start with the Millinery Number, and continue through the next eleven numbers.

VOGUE, 443 Fourth Avenue, New York City
Send me twelve numbers of Vogue, beginning with the Millinery Number, and I will remit $2 on receipt of bill, Oct. 1st. (OR) I enclose $2 herewith and shall expect thirteen numbers of Vogue, beginning with the Forecast of Autumn Fashions Number.

Name (Please write name plainly)
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Build Fireproof Floors of Kahn Pressed Steel and Hy-Rib

THE old-style inflammable wood joist must go. It is being fast replaced in stores, schools, apartment houses, residences, etc., by Kahn Pressed Steel Beams. These make possible fireproof floors at a low cost—easy to build, vermin-proof, rot-proof, light as wood, and permanent.

No forms are required nor special equipment, but only the use of Hy-Rib above and below. Such a construction never shrinks, causing ceilings to crack and plaster to drop. Satisfactory in every way.

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THEY make lawns attractive 365 days in the year. In Winter, when one misses the fleeting flowers of previous months and the verdure of leaf-dropping trees and shrubbery, Evergreens brighten a place and provide a wholesome enjoyment out-of-doors.

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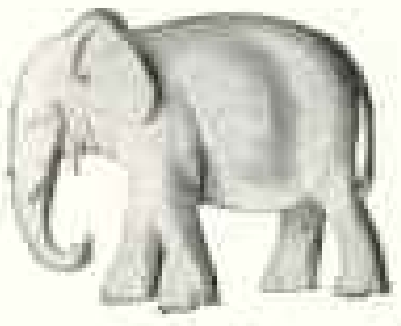

IVORY

This little ivory elephant is a mascot; also the "Grand Old Party" emblem, always popular and now more glorious than ever. A work of art, beautifully carved. A cabinet ornament or charm for good luck. Sent postpaid, delivery guaranteed, for one dollar.

F. W. KALDENBERG'S SONS
Artisans in Amber, Ivory, Meerschaum, Briar, Pearl

Correspondence solicited. Send for Catalog

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Lantern Slides from Photographs in National Geographic Magazine

SO MANY REQUESTS are being constantly received regarding lantern slides from the copyright photographs in the GEOGRAPHIC that arrangements have been completed to supply them to members of the Society. Slides are not kept in stock, each order being made up as received, and will be delivered within two weeks after receipt of order, unless otherwise advised.

The copyright notice must appear on each slide. The purchase of lantern slides does not carry with it the authority to publish the pictures and they cannot be used for advertising purposes.

Slides cannot be sent upon approval and a remittance must accompany each order. The slides will be carefully packed and sent by express collect. Prices in the United States (standard size), black and white, 75 cents each; colored, $1.50. Address,

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WASHINGTON, D. C.

Resinol Soap

keeps the complexion healthy and beautiful

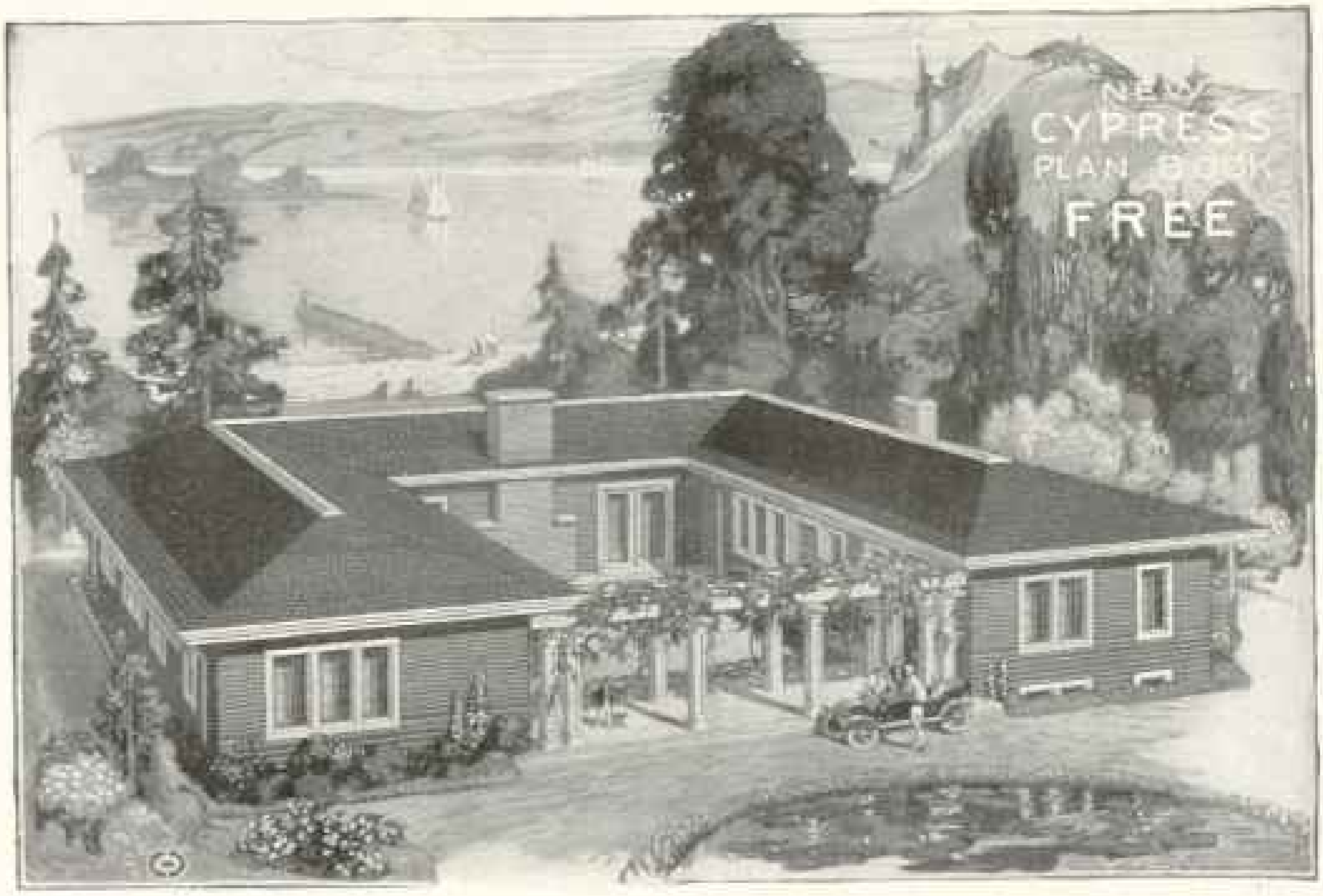
Many an otherwise attractive woman is a social failure because of a poor complexion. If *your* skin is not naturally fresh, smooth, and glowing; if it has suffered from summer sun and dust, or from an unwise use of cosmetics, Resinol Soap will clear it—or greatly help to do so—in a normal, healthy way. It is so easy, too:

Just bathe your face for several minutes with Resinol Soap and hot water, working the creamy lather into the skin gently with the finger-tips. Then wash off with more Resinol Soap and warm water, finishing with a dash of clear, cold water to close the pores.

Do this *regularly* once or twice a day, and you will be astonished how quickly the healing, antiseptic Resinol balsams soothe and cleanse the pores, remove pimples and blackheads, and leave the complexion clear, fresh, and velvety.

When the skin is in a very neglected condition, spread on just a little Resinol Ointment for ten or fifteen minutes before using Resinol Soap. Resinol Soap is sold by all druggists.

For a trial size cake, write to Dept. 22-C, Resinol, Baltimore, Md.



A Masterly Patio Plan

The idealization of bungalow designing must include a patio, or ample open court. You know (or can learn from Vol. 5 of the famous Cypress Pocket Library) that technically a "bungalow" must be all on one floor; a two-story "bungalow" is a "cottage," correctly speaking. Only a true bungalow can avert stair-climbing. Sufficient room often, then, requires more ground area—and the patio solves the problem. Think of waking in a chamber whose *opposite* windows all look upon foliage and fountains.

CYPRESS, "the wood eternal," is the pre-eminent bungalow wood because "Cypress lasts practically forever"—DEFIES ROT INFLUENCES which destroy most other woods—does not warp, shrink, or swell like most wood—takes paint and stain perfectly but does not need either. (See U. S. Gov't Rept.—reprinted verbatim in "Vol. 1," Cypress Pocket Library.)

The Brand-New Cypress Bungalow Book

Vol. 41 of the Cypress Pocket Library (entirely new) contains SKETCHES, DETAILED WORKING DRAWINGS (on sheet 24 x 36 inches) and FULL SPECIFICATIONS for erecting the beautiful and ample patio bungalow pictured above. Study the plan. *SPECIALLY DESIGNED* for us by the well-known architects, Messrs. Lowe & Bollenbacher, Chicago. WRITE TODAY for Vol. 41.

NOTE—These plans are in no way similar to those in Vols. 6, 8, 18, 29, 32 or 34—they are NEW.

When planning a Pergola, Manalon, Bungalow, pasture-fence or sleeping porch, remember—"With *CYPRESS* you *BUILD BUT ONCE.*"

Let our "ALL-ROUND HELP'S DEPARTMENT" help YOU. Our entire resources are at your service with Reliable Counsel.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

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INSIST ON CYPRESS AT YOUR LOCAL LUMBER DEALER'S IF HE HASN'T IT, *LET US KNOW IMMEDIATELY.*

IN form, Nabisco Sugar Wafers are slender, oblong wafers of appetizing golden hue.

In design, most artistic and pleasing. In flavor they are incomparable.

NABISCO

Sugar Wafers

have been called "fairy sandwiches"—a title justly deserved. They contain between their delicate wafer covers a most enchanting sweetened-cream filling. In ten-cent tins and twenty-five-cent tins.

FESTINO—A dessert sweet in the form of an almond. Hidden under its fragile shell is a sweetened-cream filling.

NATIONAL BISCUIT COMPANY

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CAMERAS & FILM

NEAT, flat and so compact that it can be easily slipped into coat, vest or hip pocket, the Ansco Vest-Pocket is the smallest and lightest camera made which takes a picture 2¼ x 3¼ inches. Uses a *standard* six-exposure film-cartridge, obtainable all over the world. Needs no adjustment for different distances. Price $7.50. For perfect results use the combination of Ansco Camera; Ansco Film, the court-decreed *original* film; and Cyko, the prize-winning paper. See your Ansco dealer. Catalog from him or us, free upon request.

Write us for specimen picture taken with model you contemplate buying.

Millions of dollars were recently awarded in a suit for infringement upon Ansco patent rights, establishing Ansco Film legally as the original film.

The Sign of the Ansco Dealer

ANSCO COMPANY BINGHAMTON NEW YORK

"Mention the Geographic—It identifies you."

Beautiful Geographic Photogravures

THERE is always room for beautiful pictures in the home, and Geographic photogravures are distinctive and unique.

These charming photogravures, which cannot be purchased elsewhere, are admired wherever they are seen.

Copies of any of these photogravures, artistically framed with specially selected molding, can be forwarded, carefully boxed, anywhere in the country.

DOE AND TWIN FAWNS—Photograph by George Shiras, 3rd. Sepia Photogravure, 8½ x 12 in.

THE MAJESTY OF THE MATTERHORN—17 x 22 Inches. Printed on Heavy Artist-Proof Board

A RUMANIAN PEASANT GIRL
Photogravure, 9½ x 11½ inches

HOUSE OF THE RICH MAN—JERUSALEM
10 x 14 Inches, in colors

Geographic Panoramas

THESE panoramas are published as supplements to the NATIONAL GEOGRAPHIC MAGAZINE, not merely because they are beautiful scenes, but by reason of the fact that they are both educational *and* artistic. They were selected from thousands of others to convey the most comprehensive pictures of wonderful and characteristic corners of the earth—the great Sahara, the matchless Matterhorn, the Panama Canal, the wonders of Mt. Robson, in the Canadian Rockies, and the Lure of the Frozen Desert.

These pictures can be obtained nowhere else, and will be forwarded unframed or framed, as desired. Arrangements have been made to supply a limited number artistically framed, with molding specially selected to obtain perfect harmony with the subject. The best French glass is used, they are most carefully packed, and a high quality of work guaranteed.

THE HOUR OF PRAYER IN THE SAHARA DESERT—Photogravure, 7 x 18 inches

THE LOST CITY OF THE INCAS—9 x 22 inches. Photogravure

This city, probably built by the Incas 2,000 years ago, was discovered in 1911 by Professor Hiram Bingham and uncovered and excavated under his direction the following year, under the auspices of the National Geographic Society and Yale University. Its beauty of situation and the mystery of its past make it one of the most interesting groups of ancient buildings in the world. Size, 65½ x 18 inches. Photogravure on heavy artist proof board.

CUT ON THIS LINE

DEPARTMENT H, NATIONAL GEOGRAPHIC MAGAZINE, WASHINGTON, D. C.

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The manufacturer who brands his goods and advertises them nationally is so sure of their quality that he is willing to stand the full force of possible complaints.

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Their whole tendency is to raise qualities and standardize them, while reducing prices and stabilizing them.

NATIONAL GEOGRAPHIC MAGAZINE
MEMBER OF THE QUOIN CLUB
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The ONLY GRAND PRIZE

in the Motor Vehicle Section of the Panama-Pacific International Exposition *and the*

FIRST MEDAL OF HONOR

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THIS supreme award was based upon: Quality of material and workmanship—skill and ingenuity displayed in invention, construction and application—magnitude of the business represented and length of time engaged in that business.

It is a broad tribute to Packard superiority and the qualities of permanent success that are back of the PACKARD "TWIN-SIX," the twelve-cylinder car that has set a new measure of automobile performance, design and value.

PACKARD MOTOR CAR COMPANY, DETROIT

Ask the man who owns one

How is your light?

Do your eyes tire easily when working, reading or studying in artificial light? Do you have to shade them? Do you "squint" or concentrate to see well? Have you eye-headaches?

Then your light is wrong

Have you bright electric lights that make your eyes blink, or flickering bare gas lights that irritate your eyes?

Then your light is wrong

Alba Installation — Alameda, Cal.

Why tolerate the wrong light when good light is so easy to get? It usually requires only a few simple changes.

Alba Lighting Equipment

Alba softens bright irritating light so that the eye can use it comfortably and distributes or concentrates the light where you need it most. Alba makes the light do its best, with very little absorption. You get more light for the same money. You can get complete Alba Lighting Equipment, consisting of fixtures and glassware. If you have fixtures installed, you can probably get Alba globes, shades and bowls suitable for those same fixtures.

Reg U S Pat Off

Free Facts about Good Light

The pamphlets below tell the facts about Good Light and are free. If you will tell us your particular needs we will suggest, without charging you, how to get the best light for *your* purposes.

Macbeth-Evans Glass Company Pittsburgh

Sales and Showrooms also in New York, Chicago, Philadelphia, St Louis, Boston, Cincinnati Cleveland, Dallas, San Francisco Macbeth-Evans Glass Co Ltd Toronto

TEAR OFF—CHECK SUBJECT—SIGN AND MAIL

Macbeth-Evans Glass Co., Pittsburgh: Send article on Good Light for subject checked and Portfolio of Individual Lighting Suggestions for my needs to name and address signed below: V-8-15

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Three Men

disagreed as to the best form of Shaving Soap. One preferred the stick, another the powder and the third, the cream. So each man bought the form he preferred and all secured the same shaving comfort and satisfaction for they all bought

Williams'

as wise men usually do.