Some thirty thousand persons, it is estimated, viewed the fire, and a large number of them saw the birds, but probably very few appreciated the opportunity that was offered them of looking behind the dark curtain which so persistently shrouds one of nature's greatest mysteries, or realized that what they saw was, literally as well as figuratively, 'some light on night migration.'

NESTING OF THE GREAT BLUE HERON IN MONTANA.

BY E. S. CAMERON.

Plates IV and V.

SINCE living near the Yellowstone I have often wondered where the Great Blue Herons (*Ardea herodias*) nested which flew up and down the river, or stood motionless on the sandbars intercepting its brown flood. The different ferrymen, on being questioned, said the birds passed and repassed daily, but could supply no information as to their breeding haunts. Mr. A. C. Gifford of Fallon informed me that he recollected when there were twenty nests in some cottonwoods about two miles below his property, but was doubtful if herons bred there in recent years, and Mr. Dan Bowman had known of one nest on the Powder River in a cottonwood close to his ranch. These were my only records. Accordingly, on May 30 my wife and I rode to the grove indicated by Mr. Gifford and made a thorough investigation, which proved a task of some difficulty on account of the thick underbrush of wild roses, willows, and bulberry bushes, concealing regular pitfalls, through which a horse could scarcely force its way. Part of the wood was made into an island by a small branch of the river (called here a slough), and two pairs of Blue-winged Teal, evidently nesting, were seen,

YELLOWSTONE RIVER, MONTANA, JUST ABOVE THE GREAT BLUE HERON ISLAND.

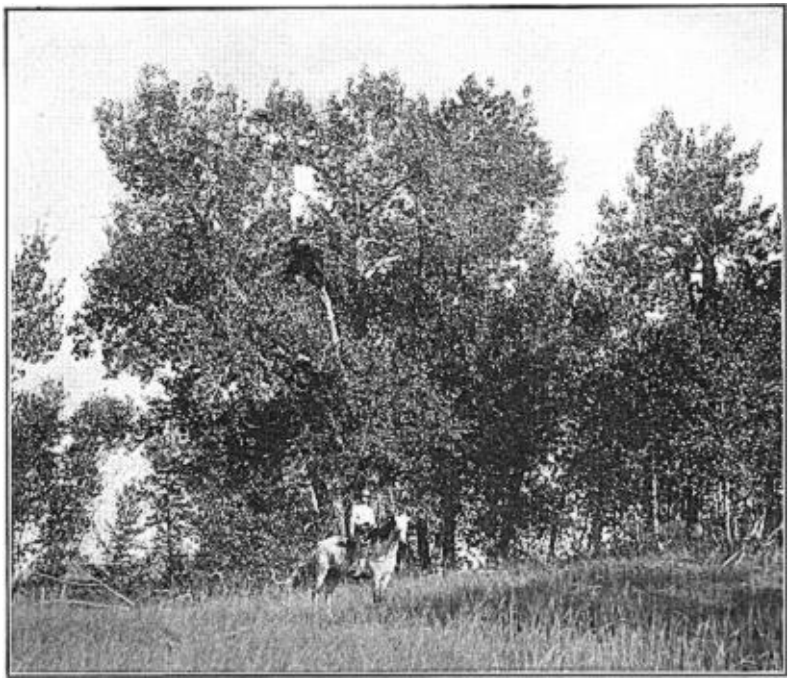

FIG. 1.— SITE OF GREAT BLUE HERONRY, YELLOWSTONE RIVER, MONTANA.
The nests are nearly concealed by the thick foliage.

FIG. 2.— YOUNG GREAT BLUE HERON, TWO MONTHS OLD.

but no trace was found of the heron colony. It was my conviction that, at the present time, herons nested on inaccessible islands in the Yellowstone and that the nests, accordingly, escaped observation, as boats are very scarce in this country.

Last year (1905) I was able to locate a heronry on an island of the Yellowstone about fifteen miles below my ranch, but, previous to the discovery, my friend Mr. J. H. Price had written sending particulars of another which he had visited on Powder River about thirty miles above the mouth. The latter, therefore, received attention first, and on June 29 an expedition was made there, when we found seven nests at the top of two tall pole-like cottonwoods, placed in the extremities of branches so thin that they would not bear the weight of even a small boy. Six of the nests were in a tree at the extreme edge of the river bank and three overhung the water in such a manner that any birds falling out would have been carried away on the swift current. The seventh nest was built at the summit of another tree, directly behind the first, in a dead branch, as also was one of the other nests. All were quite out of reach of the most expert climber except one which was nearest to the first fork of the tree containing six. At our approach nine old birds flew to a sandbar in the centre of the river, on which, later, they were observed to be fishing, but after their departure no sign of life was visible at the nests. A recently dead, full feathered nestling of large size which had been killed by a fall from above lay under the trees. We proceeded to pitch our tent in a glade of the cottonwoods, choosing a situation about a hundred yards off where unobstructed observations could be made on several nests through binoculars. It was found that the birds, both old and young, were extremely wary, so that until all talking and camp preparations ceased there was no sign from either. With such a small number of nests the peculiar odor of decaying fish from the heronry, although strong, was not very unpleasant. After a long period of silence the young herons, becoming hungry, stood quite erect, when it was seen that five nests contained four birds in each and the remaining two but three occupants. It is a likely supposition that all seven nests, at first, held four birds each, as the nestling picked up under the tree accounted for one, while another might easily have fallen into the river.

The young herons presented a remarkable sight, as in their eagerness to see the parents arrive they stretched their long necks to the fullest extent and with bills pointing straight up in the air looked from below like so many snakes. This extraordinary attitude is shown at the left hand branch in the photograph of the tree top (Plate V), but it was found impossible to obtain a near view because at the slightest unfamiliar sound the young herons crouched down as low as possible, maintaining complete silence. This, no doubt, accounted for none being seen upon our arrival, but it seemed strange that such large birds could hide so easily and, subsequently, their ability thus to conceal themselves appeared to me the most striking feature about them. That three or four young herons could make themselves invisible from below in quarters only large enough for one bird, as shown by the photographs, was little short of incredible, nevertheless, they managed to do so. On the first day of our arrival a thunderstorm cooled the air, but next morning, the remarkable effect which the hungry young herons produced was further increased by the rapid inflation and contraction of their gullets as they panted in the hot sun. They seemed to suffer as much as the young Golden Eagles (see Auk, Vol. XXII, p. 162), and, from their situation, being exposed to all vicissitudes of weather, it is certain that the parents shaded them during intense heat. When unalarmed they kept up a continuous soft croaking like frogs which, on the appearance of the parents, was changed to a vociferous quacking like the ducks in a farm-yard.

I was informed by Mrs. Murphy, who lived at a ranch near, that this heronry was established here for the first time and that three of the birds began to lay on April 23, when only three nests were completed. As the period of incubation is about 28 days some of the young herons were now five weeks old. We arrived at the heronry at 2 P. M. and the old birds could not summon sufficient courage to recommence feeding their young for four hours, during the latter part of which time my wife and I remained quiet in the tent. The herons flew from the river directly to the nests, but, too cautious to alight immediately, circled round and round above the trees uttering a harsh low croak recalling Canada Geese. Even after the fears of the majority had been allayed, several herons continued circling, passing frequently within gunshot of the tent,

which they regarded with such suspicion that a sentinel was perched on a high bough keeping watch on it each time that the nestlings were fed. From this time (6 P. M.) until 11 P. M. the parents catered to the wants of their offspring, and since out of a total of fourteen old birds only three or four came at one time, the operation was practically incessant. After dark the arrival of the parents was signalled by the quick transition from a temporary lull to the furious quacking above mentioned on the part of the young birds. The latter were fed on the small fish known as 'suckers' here, and are able to manage quite a large gullet-full, two of the fish which fell under the tree being seven inches long. Both parents alternately fed the nestlings, nor would it have been possible otherwise. Between the screaming, flapping, and struggling of the young to be fed, their rivalry for the first fish, and the efforts of the parent to satisfy them it seemed as though the frail bough must break under their united weight.

As is well known, herons feed their young by regurgitation and the end of the process has been thus graphically described: "The struggle between the young heron and the parent seems like a wrestling-match, the former standing up almost as high as the latter, the tree swaying to and fro, and both birds staggering upon the nest to such an extent that the mother is occasionally compelled to step off and stand on one of the branches to avoid falling. This struggle occurs when all the food has been given, and the mother is seeking to extricate her bill from that of her young." [1]

On this occasion the nestlings became so excited as to leave the nest altogether for the branch, and only saved themselves from a fall into the river below by the combined use of bill, feet, and wings. In a long-legged bird like a heron these arboreal gymnastics are very curious to witness, and are sometimes unsuccessful, as evidenced by the many bodies found beneath the trees in large colonies.

The only accessible nest in the colony of which I am now writing contained three large full feathered young belonging to the same brood as the unfortunate bird which had fallen under the tree. As it was impossible to make a photographic exposure of them *in*

[1] Water Birds of North America, by Baird, Brewer, and Ridgway, Vol. I, p. 19, 1884.

situ one was lowered to a broken cottonwood stump underneath the nesting tree. The bird, however, though it could stand so erect in the nest, refused to do so for even the fraction of a second outside, and as no amount of coaxing, nor our absence, had any effect in altering its intention, only a picture of the crouching pose could be obtained. The temporary removal of this young heron caused one of its companions to leave its own nest and climb much higher up to enter another. Several times it seemed likely to fall into the water but managed to regain its balance with violent flapping of wings. Later, when all was again quiet, the four real owners of this nest stood erect indignantly protesting at this outrage on their rights, and one bolder than the rest endeavoured to eject the intruder. The new-comer as valiantly resisted, and being of the same size a protracted and most extraordinary battle ensued which I witnessed through my binoculars. The birds would feint, and spar for a hold, until one was able to seize the other by the neck when, exerting all its strength, it endeavored to drag its antagonist over the side of the nest. Both in turn had the advantage and swayed backwards and forwards, while the three non-combatants crouched down in characteristic fashion, so that the battle was waged partly on their bodies and partly on the edge of the nest. The fight was continued until an old bird arrived with fish, when the five nestlings again stood erect, and, in the general scramble for food, the parent fed all without discrimination. As it became too dark for binoculars I saw no more that evening, but next morning the duel was renewed until the interloper became exhausted, and, being driven from the nest, scrambled down the branch to its rightful abode. As far as I could see, all the other young birds lived in perfect harmony.

The bill of young herons is a most formidable weapon, and in handling them much greater precaution is necessary than in the case of immature hawks or eagles; for they occasionably strike at the face and might easily cause the loss of an eye. The description of a young heron is as follows: — Age, 5 weeks; length from point of bill to end of claws, stretched out, 42 inches; wing, 12 inches; tarsus, $5\frac{3}{8}$; bill, $5\frac{3}{8}$; weight, 4 lbs. The prevailing color of the bird is slate gray, the feathers of the lesser wing-coverts and neck edged with chestnut, while the primaries and secondaries are

black. A number of feathers at the bend of the wing are white, broadly edged with bright chestnut. Below, the bird is mixed black and white with traces of chestnut. The chin is white and the crown black with only the commencement of a crest which is just beginning to grow. The tibiæ are pale chestnut; their bare portions pale green; the tarsus and feet slate gray. Upper mandible, black; lower, yellow. Irides, yellow.

This description would also serve for the bird at two months old, excepting that the occipital plumes are then well developed.

The island heronry in the Yellowstone was, of course, in a much more inaccessible and romantic situation which in the absence of a boat could only be reached on horseback when the river was low. Indeed, at certain times the densely wooded island was under water, this being the case when the herons first commenced building operations. The existence of the nests could only be suspected by watching the birds flying to them, for, though it was possible to make out two of the highest with extremely powerful binoculars, the heronry, on the whole, was well hidden by cottonwoods from ordinary observation. We visited this island on July 30, when the stream separating it from the north shore was narrow and only girth deep. During the June rise, a few weeks earlier, it would have been about 250 yards wide. For a short distance after landing it was necessary to force a way through willows as high as the rider's head, but otherwise there was little underbrush on the island, which extended to about a quarter of a mile each way, and was everywhere carpeted with a luxuriant growth of golden-rods, wild rye, and tall sand-grass. A few thickets of bulberry bushes could easily be avoided.

The heronry contained altogether eighteen nests, which were placed in the tallest trees on a sandbank sloping gradually to the main channel of the river, here about 300 yards wide. In two trees, containing altogether ten nests, several could be reached by climbing, the trunks in this case being so close together that the topmost branches intermingled. The distance from these nests to the ground was fifty measured feet. On our arrival numbers of the fully fledged young stood at their nests causing an effect which, when seen through the leafy screen, against an intensely blue sky, recalled the pictorial achievements on Japanese china. All, except two or three which scrambled back into the nests, flew away upon

our approach, but it was subsequently found that they returned here every evening to roost. Two dead, well feathered nestlings, eggshells, and some dried up fish lay under the trees. That night we rode to a ranch, about two miles off, for shelter, when the owner told us that herons had bred on the island for many years, repairing and adding to the old nests every spring. He said that formerly there were about fifty nests, but that, some years since, a man had cut logs on the island, thereby causing many birds to desert it. Beyond this, the herons had met with little or no disturbance, as scarcely anyone knew of the colony, which I could well believe. We also learned that the heronry mentioned by Mr. Gifford had been entirely deserted on account of tree-felling operations, shy birds like herons having been unable to endure such invasion of their sanctuary. As we sat on the veranda at dusk herons were seen flying low across the meadow to the heronry; we computed that both from here and the Powder River they sometimes go twenty miles from home in their search for food. Although the heron appears to fly so slowly it is in reality one of the swiftest of birds, and Sir John Sebright referring to the chase of the common Heron of Europe with Peregrines remarks:

"The falconers place themselves in the open country, down wind of the heronry, so that when the herons are intercepted on their return home, they are obliged to fly against the wind to gain their place of retreat. . . . When the heron flies down wind he is seldom taken, the Hawks are in great danger of being lost, and, as the flight is in a straight line, it affords but little sport."[1]

Of all birds a Peregrine is probably preëminent on the wing, the speed attained by it being incredible. My brother has seen both the Golden Eagle and the Peregrine (times out of number) hawking game in Argyllshire, and in his opinion the Eagle, though rapid, is visible comfortably to the eye, while the Peregrine passes like a streak of lightning. Furthermore the quarry pursued by the Eagle (a cock grouse), seemed to be travelling well within himself, like a hare pursued by a lurcher. The same quarry pursued by the Peregrine, on the other hand, goes "all out," and attains a blind velocity like a bullet — instance, a Blackcock which

[1] Observations on Hawking.

shot through a sheet of ¼ inch plate glass into Mr. Henry Evan's drawing room (in the island of Jura), left a clean round hole in the glass, and was picked up inside the room, a crumpled mass of blood and feathers.

To return to the heronry: half of the next day was spent here, but it was found that all the herons were, if anything, more shy than those on the Powder River, although we ascertained that three nests contained three full-feathered birds in each, which had not yet flown. One of these, placed at the extremity of a dead branch free from surrounding foliage, showed clear cut against the sky, and lent itself better to photography than any nest we had seen. Every effort was, therefore, made to obtain a picture of this nest with the young birds standing erect in it, which might even have been accomplished from the ground had they shown themselves a little more complacent. After focusing with an 8 by 10 camera and inserting the plate we retired for three hours in order to restore confidence to the herons if possible. Pleasant it was to lean against a fallen cottonwood by the softly murmuring river, and watch it ripple on the yellow sand where Spotted Sandpipers ran about industriously, or jerked their tails in company with their newly fledged young. The air was full of bird voices; in the trees overhead Arkansas Kingbirds chattered and fluttered, solicitous for the safety of their broods, although the young birds could now fly. Occasionally an excited heron wheeled above them, but I noticed that these audacious flycatchers refrained from attacking their long-legged island comrades. Here was indeed a great variety of bird life: we saw a Belted Kingfisher come to the island and a Bonaparte's Gull fly slowly past, both rare on the Yellowstone. At the expiration of the above-mentioned time we returned to the heronry, but the nestlings still persisted in their squatting attitude and the old birds kept away. When it was sought to make an exposure of the nest from the adjoining tree two of the nestlings flew clean away, but the third remained, and might pass in the resulting photographs for an adult heron incubating her eggs.

On September 24, Lance Irvine, foreman of the Crown W ranch, and T. Hughes Parry were returning from Macrae's ranch where they had been branding foals for Mr. J. H. Price. As they rode up Spring Creek, which empties into Fallon Creek, a flock of large

birds, flying very low, was observed to be approaching from behind. Under the impression that these were early arrivals of the Canada Geese the two men stopped to watch the flock, which then swung round and alighted in two divisions on the open plain. Upon riding close to them it was found that the birds were not geese but herons walking about on the prairie in two parties of eight and fifteen — making twenty-three in all. They were engaged in feeding; it was supposed upon grasshoppers. A high northeasterly wind accounted for the herons flying so low. The conclusions to be drawn are: (1) That this was a body of migrant herons on their first flight from the Yellowstone heronry, the place where they alighted being about fifty miles due south of this nesting site. (2) That herons from a particular heronry do not all go south at the same time; and that the young birds probably do not cover more than fifty miles on the first trip, as shown by the fact that the flock alighted (evidently for food and rest) despite the proximity of the horsemen. (3) That herons migrate by day, and not necessarily by night.

The nests of Great Blue Herons, in Montana, are made entirely of dead cottonwood sticks, without lining of any kind and white-washed by the excrement of the birds. Although at first bulky structures, they are so constantly knocked about by high winds and the trampling of the herons that very few retain their original proportions by the time that the young can fly at two months old. The dimensions of an average nest which I took were: diameter of greatest width across sticks, 3 feet 2 inches; diameter of cavity, 16 inches. As pointed out by Mr. Seebohm, the Great Blue Heron (*Ardea herodias*), and European Blue Heron (*Ardea cinerea*), build their nests by placing sticks around the centre so as to form arcs, differing thus from the Night Heron, and some other species, which arrange the sticks outwards from the centre so as to form radii. The European Blue Heron is very much like the American species in appearance and habits excepting that in the former the tibiæ and border of the wing are white while in the latter they are purplish-cinnamon or rufous.[1]

It would appear that Montana Herons are desirous of placing

[1] Water Birds of North America, by Baird, Brewer, and Ridgway, Vol. I, p. 5, 6.

their nests as near the water as possible which is not the case in Scotland. There are no less than three heronries near the residence of my brother in North Argyll where herons are exceedingly numerous and resident all the year round. He has had unusual opportunities for observing them and has sent me some most interesting notes. He says: "Our herons undoubtedly prefer to build in conifers, always choosing open situations, generally on high ground, and in associations varying from two or three nests to twenty or thirty together."

The second largest heronry within his knowledge "is in very old and very tall larches, high up on the face of a mountain which forms one side of a deep and luxuriantly wooded glen. Here the herons have selected the larch in preference to equally suitable pines at a lower elevation and nearer the mouth of the glen, but, possibly, the immediate proximity to the pines of a populous rookery may have had something to do with the choice. The larch, though deciduous in foliage, is the earliest tree to sprout in spring, and becomes handsomely feathered with green shoots before the herons are seriously occupied with family cares." Herons in Argyllshire pair very early in spring, and my brother has observed young birds hatched out on April 25. He has supplied me with the following account of another heronry in marked contrast to the haunt just described. "A heronry on my brother-in-law's estate in the Island of Jura occupies a deep cup in the bed of a mountain torrent, at the base of a high waterfall which has evidently in the course of ages hallowed out the cup. The nests are here placed on low, scrubby bushes of birch and goat willow, only a few feet from the ground, and easily accessible from the bed of the burn. The sides of the cup are so steep and deep that a person standing on the brink can look down upon the herons nesting below, and splendid observations could be taken but for the difficulty of suitable accommodation on the ground. Above the heronry, at no great distance, is a chain of lakes full of excellent trout, and round about are large herds of wild red deer — this romantic spot being in the heart of the Jura deer-forest."

Though I have never known it to be fired at with any kind of weapon the Great Blue Heron is an extremely shy bird and seems by some instinctive process thoroughly to gauge the killing range of

an ordinary scatter-gun. On the broken winding shores, however, which are characteristic of Montana rivers, often clothed with wood, or buttressed with badland rocks, there is little difficulty in approaching this solitary, meditative bird, who has no friend to warn him, and whose self-absorption at his lonely meal is so complete. He can be descried half-a-mile away and stalked warily from the rear, what time his eager gaze betokens the immediate proximity of some precious stream-borne prey.

It is from this cause, too, that private property is so great a protection to the herons on West Highland sea-lochs. The tourist collector can mark his quarry from the deck of his yacht, but he hesitates to land to achieve its destruction, and herons can rarely be shot from a boat.

THE CATALINA ISLAND QUAIL.

BY JOSEPH GRINNELL.

SIX specimens of quail from Santa Catalina Island, California, present characters constantly different from those of the series of mainland quail examined. While the degree of difference is not great, it requires no straining of the eyes to distinguish them. The differences seem to be significant of insular isolation under the peculiar set of factors which have resulted in differentiating many other species of animals and plants on the same island. It is convenient that the quail also be provided with a name, and I propose the following:

Lophortyx catalinensis new species.

SPECIFIC CHARACTERS.— Similar to *Lophortyx californicus vallicola*, but about 9 % larger throughout, and coloration somewhat darker; similar to *L. c. californicus*, but larger and much less deeply brownish dorsally.

TYPE.— ♂ adult; No. 6134 Coll. J. G.; Avalon, Santa Catalina Island, California; November 25, 1904; collected by J. Grinnell.