where I remained for a short time before returning to Washington. Two hundred and thirty-seven birds were collected during this trip and also numerous specimens in other branches of natural history. The field seasons 1877-78 were spent in the eastern portions of Nevada, California, and Oregon, and the routes travelled amounted practically to a continuous, though decidedly tortuous, line from Carson to the Dalles.

THE WHEELER SURVEY TERMINATED

My connection with the Wheeler Survey terminated in 1879, its work having been merged into that of the recently formed (March 3, 1879) United States Geological Survey, under Clarence King as first Director. The question of my future thus arising, I imparted to Prof. Baird my strong desire to join the National Museum staff as Assistant Curator of Ornithology, Robert Ridgway being then, as now, Curator. This he decided was impracticable owing to the low state of the funds of the Institution and to the prominence already given to the department of ornithology. He offered me, however, a position on the staff as Curator of Herpetology. As I was less interested in this branch of science, to which I already had paid some attention, than in others, I declined the offer and finally accepted the invitation of Major Powell to attach myself to the Bureau of Ethnology, then being organized, with the understanding that if the new field proved to be congenial I should make it my life work. Major Powell accepted the Directorship of the Geological Survey, Clarence King having resigned.

Thereupon for some years to come my ornithological studies ceased, the administrative and other duties that soon devolved upon me in my new position proving an ample tax upon my time, strength and such abilities as I possessed. I may add that it was Major Powell's opinion that a biologic training was a prerequisite to a successful career in anthropology, and this opinion he held to the last.

(To be continued)

IMPORTANCE OF THE BLIND IN BIRD PHOTOGRAPHY

By FRANK N. IRVING

WITH SIX PHOTOS

AS THE photography of birds usually presents a difficult problem to the beginner the suggestions set forth in the following paragraphs may prove helpful to those workers who desire to undertake something worth while in this field. Although I have been a student of ornithology for many years and have pictured and collected the nests and eggs of many species, it is but recently that I have taken up photography of the birds themselves, and I am prepared to state that there is a peculiar fascination attending this sort of work which should afford a great deal of genuine pleasure to all lovers of nature. It requires a certain amount of skill and patience to produce a series of really excellent bird photographs; but the proper course of procedure, coupled with the usual persistence of a bird hunter, will soon remove most of the obstacles.

The most satisfactory method of procuring bird "portraits" is to construct a blind such as will afford the necessary concealment of the photographer and his camera equipment. Much has been written on the subject, and blinds of various styles employed, all no doubt with a certain degree of success. The "string pull" and other similar methods of photographing birds from a distance can but result in a great deal of wasted energy and material, with an occasional good picture a matter of chance. For truly satisfactory work the blind is an essential feature and may be of any one of several designs; and it should be sufficiently large to comfortably house the operator and his camera. The pattern used in making the pictures reproduced herewith is original and has proven a remarkable success in every detail. A more complete description than here given will be furnished gratis upon request.

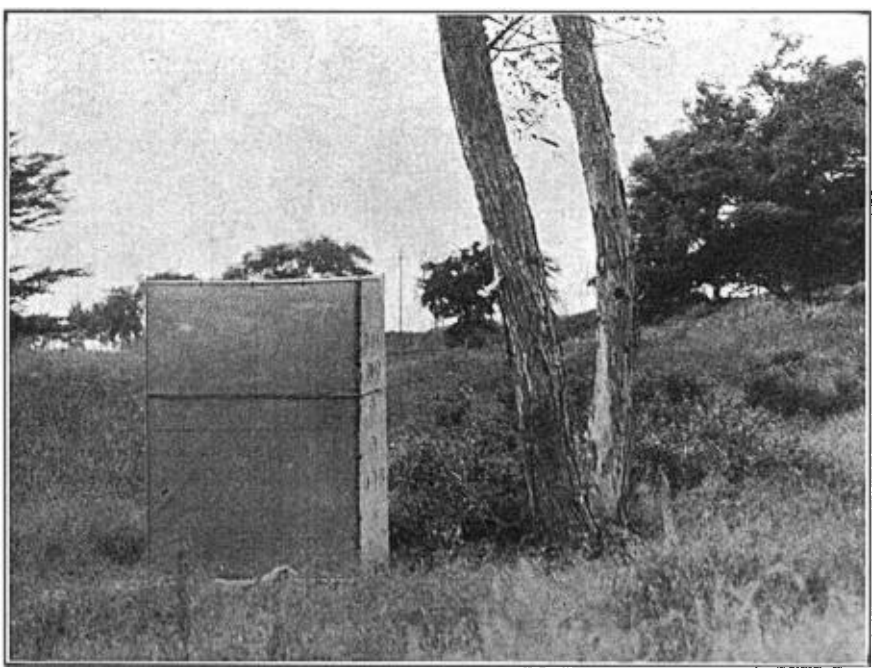

Fig. 1. ILLUSTRATES STRUCTURE AND POSITION OF BLIND USED IN SECURING THE PICTURES WHICH FOLLOW. ENTRANCE TO FLICKER'S NEST SHOWS IN RIGHT-HAND TREE TRUNK.

My blind is 2½ feet wide, 4 feet long, 6 feet high and covered with aeroplane cloth, a drab-colored, waterproof material which when rolled into a compact bundle can be easily carried on the shoulder. The cost of the entire outfit was something less than seven dollars, and several hours each evening for about a week were required to complete it, although I worked along a more elaborate scale than was necessary, with a view of having a blind which would last indefinitely. Nevertheless I feel well repaid for my efforts.

A special knowledge of the habits of birds is really of no great importance at the outset; much useful data will be gained by observation when the work is in progress which could not be acquired in any other manner. It is well to know the names of those species which are destined to become the subject of one's ef-

forts, however, and to select the larger species of such colors as will photograph well on the ordinary plate, thereby securing a much larger image in nearly correct monotone than could be realized of most small birds such as have markings of red, yellow or blue, and, not of least importance, the advantageous speed qualities of the fast plates.

The style of camera is an important feature, and one of the best adapted to this work is the 4x5 or, if preferred, the 5x7 size, with sufficient bellows extension to accommodate a lens of not less than 12 inch focal length. If the expense

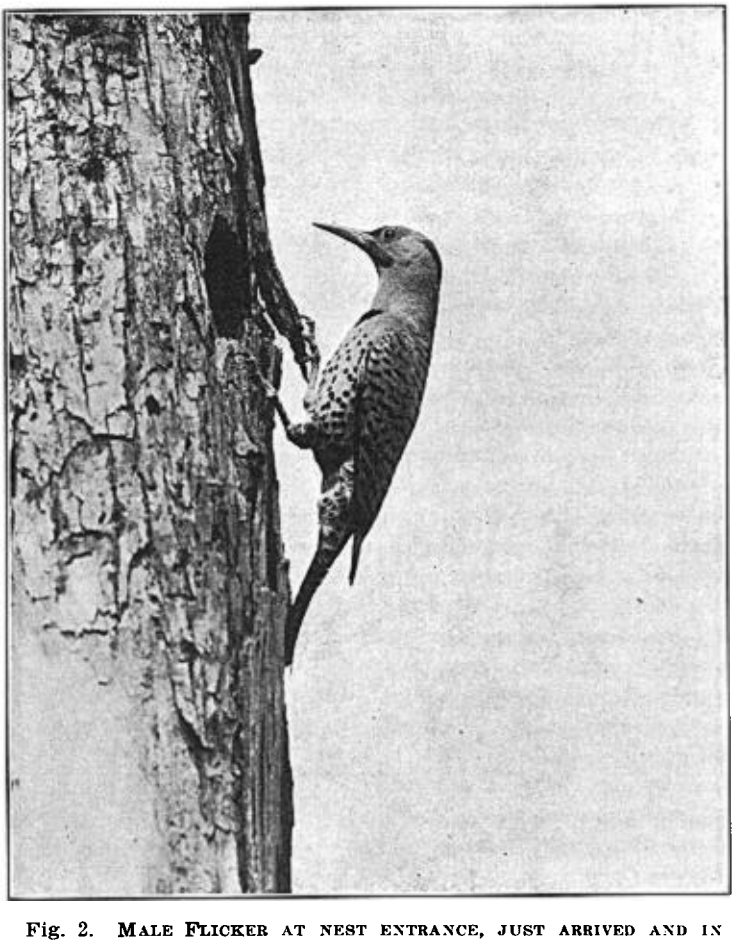

Fig. 2. MALE FLICKER AT NEST ENTRANCE, JUST ARRIVED AND IN FEEDING POSITION.

is not prohibitive, by all means select a reflecting model. I have but one camera outfit of this kind, which I find entirely adequate, regardless of the contention that several are necessary. This is the Naturalist's Graflex, fitted with the no. 19 Zeiss Protar lens, a luxury it is true, but there is a distinct pleasure in knowing that it will produce results under conditions when no other camera of ordinary type seems effective. A tripod is desirable as it will eliminate the necessity of holding the camera and will insure a rigid front against the opening in the blind; otherwise the lens would appear a moving object and alarm the subject.

In anticipation of a beginning in bird photography, the question arose as to the correct exposure for average light conditions, and although I purchased two exposure meters of different makes, and searched through all available material on the subject, I failed to obtain the desired information. I learned by experiment however, that between the hours of ten and three o'clock, in bright sunlight, with a lens working at an aperture of f. 6.3, 1/350th of a second exposure will give satisfactory results and afford a good working basis which may be modified to suit individual preference.

Such birds as the flicker, wood thrush, cedar waxwing, brown thrasher, robin, mourning dove, cuckoo, king rail, clapper rail, mockingbird and many other well known, common species, usually construct their nests at low elevations, and during the nesting period are easily approached. They present desirable subjects and will be found practically fearless when the young are yet but a few days old, permitting work from the blind at close range with little evidence of concern.

One spring morning I walked through a pasture in search of anything feathered suitable to photograph and had the good fortune to locate a family of Flickers (*Colaptes auratus*), situated in a hollow six feet from the ground. This hollow, or cavity, was excavated in an old willow. Returning the following day with the paraphernalia I pitched the blind five feet distant, set up the camera on the tripod, adjusted the focus and shutter, care being taken to "sky" the entire area covered by the ground glass, and, everything ready, awaited the return of the parent birds.

Fig. 3. MALE FLICKER SHOWING EXTREME TIMIDITY, READY TO SPRING OFF AT A MOMENT'S NOTICE.

A few moments later, while congratulating myself upon having selected a beautiful day, with a bright sun directly at right angles to the cavity, which faced the north, thereby permitting a well lighted "broadside" view of the subject, one of the adults returned and perched on top of the tree, some thirty feet up. This proved to be the female and I could hear the scratching of her claws on the bark as she began a gradual descent. The young were on the alert and upon the first intimation of the parent's return, set up a peculiar hissing sound, characteristic of the family Picidae. A few moments passed and the parent settled into a feeding position with head opposite the entrance; I glanced at my watch to find that it was 11:08 and pressed the release, making the first

exposure just eighteen minutes after entering the blind. Quickly changing plates I made another exposure, both with the diaphragm at f.11 and the curtain set at 1/90th second.

The young are fed by regurgitation and I now proceeded to watch this interesting performance through a corner of one of the photographic windows. What a remarkable sight it was to view the actions of the adult, all unconscious of my presence, at a distance of but five feet. The young, being of considerable size, scrambled up to the entrance, and several with heads protruding received the food which was pumped into their throats by this curious method possessed by numerous species of birds. During the course of regurgitation there was an extremely rapid motion of the head and wings, an action upon which this function undoubtedly depends.

Fig. 4. AN ATTEMPT WAS MADE TO CATCH THE MALE IN THE ACT OF FEEDING, WITH THE CAMERA SET AT HIGH SPEED; BUT HE CEASED OPERATIONS JUST AS THE RELEASE WAS PRESSED.

The female paid but little heed to the blind, but was rather alarmed at the "eye" of the camera, appearing nervous and watching it constantly while feeding the young, which process she accomplished in feverish haste and quickly departed. At 11:15 the male appeared, "drooping down" gradually from aloft, on the opposite side of the tree, peering cautiously around at the obstruction and watching the "eye" nervously; but he did not venture to feed, and flew off shortly after. This occurred again with the male at 11:45.

At 11:48 the female returned, flying direct to the cavity and exhibiting less fear than heretofore, permitting several exposures while feeding was in progress; after this she entered the cavity for the purpose of cleaning the nest, and, at the moment she reappeared with a large portion of excreta in her bill, I made another exposure in this position.

At 12:10 the male returned to reconnoiter, flew away and was back ten minutes later, appearing anxious to feed the nestlings but in a highly nervous state and evidently suspicious to a degree. It was not until the following day that I obtained a picture of the male, when, but a few minutes after I entered the blind, he arrived, alighted on top of the tree and at once commenced a downward scramble, peering cautiously to right and left, calling softly and frequently tapping the bark. Presently I could see his tail, which came into the screen first; a few more seconds and the bird appeared opposite the entrance, afford-

ing opportunity for two exposures. Now I was due for a surprise, in that the male, so timid and cautious, came direct to the entrance and having apparently dispelled all fear, began to regurgitate, a comical sight as he gulped until his neck had swelled as though inflated; then with bill full to the overflowing point he quickly fed the young (from the outside of the cavity) and assumed a "spring off" position, all of which actions were caught with the camera, as I secured five exposures before he departed. The birds are not disturbed at the

Fig. 5. THE FEMALE FLICKER, PREPARATORY TO FEEDING; DISTANCE FROM CAMERA TO NEST ENTRANCE, FIVE FEET.

Fig. 6. FEMALE FLICKER AFTER CLEANING NEST AND ABOUT TO DEPART WITH EXCRETA IN HER BILL; THIS MATERIAL IS ALWAYS CARRIED TO A CONSIDERABLE DISTANCE FROM THE NEST SITE.

sound of the release or shutter mechanism, the lens being the real object of their anxiety.

At no time was there any visible food substance in the bill of a parent bird, although it would begin regurgitation immediately when opposite the entrance, feeding two or three of the young which may have climbed to the opening, and then would enter the nest to feed the other members of the family. The food

consists chiefly of ants, which are fed to the young in the form of a paste. Many thousands of ants must be consumed by the family in a single day.

It is truly a wonderful experience, not devoid of little thrills and excitements, to watch and picture such handsome birds in the course of their parental routine, almost at arms length; and the beautiful enlargements on the walls in my home serve to recall the many pleasant hours which I have spent in field photography.

Kansas City, Missouri, September 21, 1919.

THE RUSTY SONG SPARROW IN BERKELEY, AND THE RETURN OF WINTER BIRDS

By AMELIA S. ALLEN

ON March 29, 1919, a Yakutat Fox Sparrow (*Passerella iliaca meruloides*), one of half a dozen Fox Sparrows which come regularly to my window for food, was accidentally caught in the house. I took the opportunity, before setting it free, to band the bird, as I wished to get some evidence as to the identity of the individuals which come from year to year to this particular feeding-table. This banded bird remained several weeks after he had been marked, but emigrated, about April 21, with the rest of his kind, no doubt to Alaska to spend the summer months. In the fall, returning Fox Sparrows were noted as early as September 25, but it was not till November 3 that the banded Fox Sparrow was seen.

This is the first instance in which I have been able to prove, what I have long suspected to be a fact, that a migratory bird has returned to a favorite niche after its long journey to and from its summer home. The behavior of the group of birds which feed at my table has been very convincing to the daily observer, but an actual tag brings the matter quite up to certainty. These half dozen Fox Sparrows are practically alike, presenting no marks to differentiate male from female, old from young. No doubt part of the number each year are birds of the year, but now I am sure of at least one adult that has been here before.

Among the Golden-crowned Sparrows a few are definitely in juvenal plumage. These, during the early part of the season, are quite nervous when they come to the table, raising the crown feathers and stretching the neck and legs, alert in every muscle. This attitude contrasts strongly with the squat position of the birds in adult plumage which settle down to a comfortable at-homeness which argues very favorably for their having been here before.

It was, however, the case of the Rusty Song Sparrow (*Melospiza melodia rufina*) which made me feel most firmly convinced that the same birds were returning year after year. I first made the acquaintance of the Rusty Song Sparrow on January 5, 1915. It was easy to see that the newcomer was not a Santa Cruz Song Sparrow, for he was perceptibly larger and at a little distance seemed to be colored a uniform reddish brown except for a light line over the eye. Closer scrutiny revealed the fact that the reddish brown of the back was streaked with a darker shade and that the breast was buffy, densely spotted with brown. These