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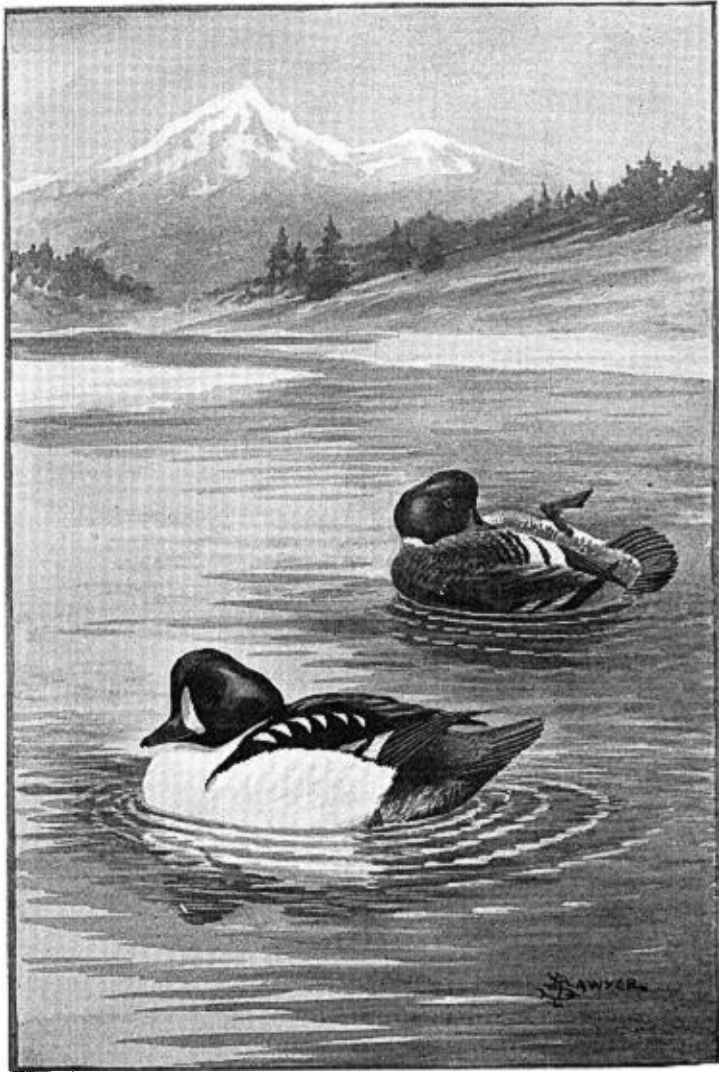
## THE COURTSHIP BEHAVIOR OF BARROW'S GOLDEN-EYE (*Glaucionetta islandica*)

BY EDMUND JOSEPH SAWYER

Probably for most readers of the WILSON BULLETIN a species like Barrow's Golden-eye has a certain plus-attraction. Comparatively few "arctic" species are found as nesting birds within the United States, south of Alaska. Among the ducks only the Pacific Harlequin seems to share a status closely similar to that of the Barrow's Golden-eye. There is an element of peculiar, human appeal in the mere idea of a bird that savors of the ice-fields and the midnight sun choosing, in considerable numbers and as if against the pull of instinct, to renounce the land of its primitive origin and adopt a homestead within our own boundaries. Yet that appeal is a mere hint of the real thrill that comes to one who first looks on a flock of these usually rare ducks competing for nuptial favors on some secluded little lake in a favored locality of our Rockies. "Barrow's Golden-eyes," you exclaim to your inner self — your bird-loving self, that is to say — and something (a kind of ornithological patriotism) insists that those resplendent drakes and coquettish hens are most ardently approving of these United States as a place altogether good enough to be used as a setting for their amours; nor is the thrill lessened when you reflect, as you do, that these amours will find their full fruition within short walking distance of the "Holy Ground" whereon you stand.

### PLACE AND PERIOD OF THESE STUDIES

This species is a permanent resident in Yellowstone Park. Before, during, and after the following observations I saw it in various waters — in the Gardiner River, particularly. For the most part, however, Ice Lake was the concentration point in the Mammoth region and I shall confine my remarks mainly to observations there made, especially because nothing new was seen elsewhere of their courtship behavior. Ice Lake (so-called from having at one time furnished ice for cold storage at Mammoth Hot Springs) is situated two and a half



BARROW'S GOLDEN-EYE  
Male, lower. Female, upper.

miles south of the park's northern entrance. Only half a mile north of the Wyoming boundary it lies within that narrow strip of southern Montana which is embraced by the park. Its elevation is approximately 6,000 feet. It is really a pond of only some four to six acres' extent; of irregular egg-shape, its extreme length may be four hundred yards, greatest width (near northern end) rather less than two hundred yards; it comes to an irregular blunt point at its southern end. It lies in a hidden pocket of sage-covered hills, but a thicket of aspens and alders extends down to the northwest shore. The eastern shore is low and marshy, affording nesting to a small colony of Thick-billed Redwings; while on the western side the land rises steeply and almost steadily to the very base of Mount Sepulcher's cliff-like eastern side, distant about a mile and a half. I visited this lake daily for



nearly a month in 1924 alone, spending from one to eight or more hours on each visit, probably averaging four or five hours; this included every hour of daylight. It was not found that time of day or state of weather had much to do with the actions of the birds.

Daily observations on Ice Lake began April 17 when, passing on horseback, I saw, as my notes record, "about one hundred and fifty Barrow's Golden-eyes, ten to thirty Mallards, probably also a few teal." It should be noted that those figures were the merest estimates from some distance on horseback. At that time the lake was frozen over except for a rim some twenty-five feet in width marking its shoreline. Most of the ducks were swimming in this open margin, but several were standing on the ice, a few Mallards walking on it. On the following day an observation blind was in operation and nearly all subsequent notes and sketches were made from this blind. The latter, a small tent, designed and made by myself for the purpose, was erected close to the water's edge and near an alder thicket on the west

shore and close to the mouth of one of the two small creeks which feed the lake on that side. Within fifteen minutes after I entered the blind on April 17 at six P. M., a pair had alighted almost directly in front and had very obligingly allowed me to witness the consummation of their marriage. But this soon proved no case of exceptional fortune, other pairs were equally obliging and, before many days, the affair, rather elaborate though it is, became an old story and my detailed notes were indeed profusely illustrated.

#### A SURPRISING SPECTACLE

It was astonishing to me to see all this wholesale mating going on long before nesting sites would be selected. A nesting box which I early erected in what seemed a suitable location beside one of the tributary creeks and in clear view from the lake, a hundred feet distant, was apparently never even inspected by the birds; before the next spring beavers had felled the aspen tree to which the box had been attached. One hundred and fifteen individuals were counted on April 24; there had been no distinct lessening in the number since systematic observations had begun on the 17th. Winter conditions still held in the nearest nesting haunts — small lakes less than a mile away; these lakes were still locked fast in thick ice and surrounded by deep snow. Yet, on that April 17, and perhaps much earlier, complete mating was already occurring on a broad scale, virtually every member of the flock seeming to indulge; this state of affairs continued daily for weeks. It was not until May 13 that I found a nest of fresh eggs; these I collected for the Yellowstone Park Museum, where they are now exhibited. About that date I abandoned my daily visits, although the visits continued to be frequent; there were still about seventeen birds on the lake.

My studies were continued each spring until 1927, inclusive; but practically no new data were secured after the first year; corroboration of former observations and additional sketches of attitudes previously noted were practically the only things gained. Hence, nothing of material importance will be lost, while confusion may be avoided, by confining my account, as I shall, rather strictly to the year 1924. Perhaps the advantageous position of my blind can be more clearly realized when I add that the golden-eyes often swam within a dozen feet of me and sometimes one could be seen diving and then busily feeding on the bottom in less than two feet of water close to shore.

#### RIVALRY

The nuptial behavior as I observed it may be divided in a natural, if general, way into two main periods. These are, first, rivalry; sec-

ond, actual mating of a given pair. Rivalry is a varied and rather complicated process and, when the entire flock or most of it is involved, as frequently occurs, the scene is one of great animation and excitement. It is then to all intents and appearances a busy marriage mart, complete with audible and frenzied bidding and the wild gesticulations of those fearful of being raised. Though each drake obviously has only his own poor self to offer one will nevertheless look in vain for the individual who makes this offer in any self-effacing manner. Competitors are many, time flies, supply is limited, females are most ravishing and in no procrastinating mood; every drake seems obsessed with all this.

On the drake's part, head bobbing and elaborate neck pumping and stretching are the most outstanding actions; these motions are grotesque and spectacular, as, for example, in the sudden upward thrust of the head. (See Figures 10-1, Plate 2). In many of his gestures the neck is extended to a surprising length. With neck stretched upward (as in Figures 6-9 of Plate 1) the bill may be opened and shut at one to three second intervals in repeated low quacks. I think this is more common during rivalry, but I have noted it when the drake seemed to be courting a certain female. A frequent act of the drake is the backward kick which sends a spurt of water backward and upward in the wake of the swimming bird (Fig. 2 on Plate 2). There is much quarreling among the drakes; hot pursuits on, above, and under water (see Figures 12-18, Plate 2).

The actions of the female during rivalry are chiefly various grotesque movements of the head and neck as she swims about. The extreme example is a snaky movement of the neck as the head is swept forwards and backwards, from extreme side to side of the bird, in a generally horizontal plane. (See Figures 19, 21-23, on Plate 2). What is properly a mating pose is illustrated in Figure 20, Plate 2. It is included here to indicate the fact that the females thus often manifest desire without relation to the mood or proximity of any male.

Rivalry, particularly in this flock aspect, does not seem to follow a regular and progressive plan as does the actual mating and its consummation. There may, however, be a standardized method of procedure throughout; but at least this could not be noted where so many competing birds were concerned and moving swiftly to and fro in a mixed flock. One of my field notes says (April 19): "Though a few birds can be seen courting at almost any time, a sort of courting bee seems to seize the flock at intervals averaging about one hour; then a dozen or more males will be seen throwing their heads high, kicking

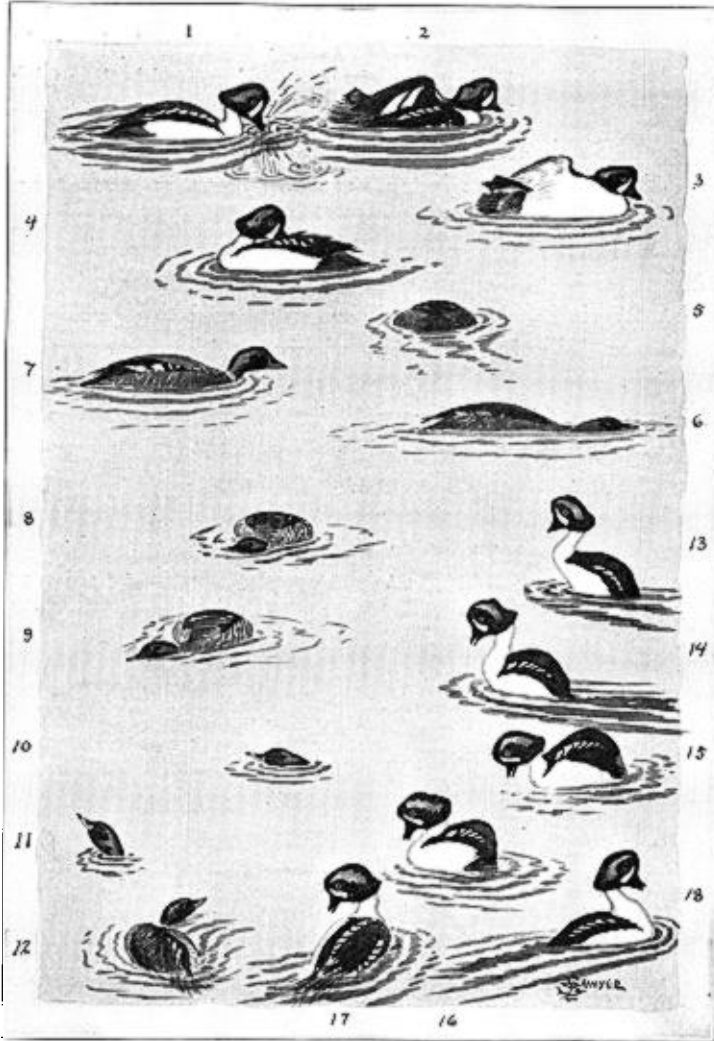


PLATE 2. BARROW'S GOLDEN-EYE. Attitudes during rivalry. The actions and attitudes do not appear to occur in any regular order or sequence, thus differing from those of final mating.

up the water, while many females are twisting their necks from side to side. But, at these times the sexes form a helter-skelter mixed flock, and no system or particular purpose is apparent. A female sometimes drives away another rival female, males drive away rival males." Yet there is some positive evidence that the rivalry and competitive courtship is in fact a rather general scramble in which the actions and postures do not occur in any given order, but, hit or miss, according to the chance impulse of the moment; though these impulses are doubtless to attract or impress and win favor, no given act — as, say, a bob of the head — can be predicted. Yet it is true that many times several males will perform the same act at once or nearly so; that looks like jealous competition in the case of that particular time and act. Similarly, the notes of the drakes tend to occur in chorus or nearly so, following intervals of comparative silence, as if in competition.

The strange thing to observe is that, after an hour or so of this frenzied rivalry and showing off, the game always appears to end about where it began, with quite negative results. If any successful wooing has been done, certainly one can not distinguish the proud and happy groom from the possible dejected swain who loved and lost; nor can the blushing bride be told from the despairing spinster. A pair might, it is true, separate from the main flock and consummate their mating during the general conference; or, again, here and there a couple may be seen *in coitu* when most of the flock is busily feeding immediately following their dispersal. Still it was never apparent that any of these "understandings" were definitely traceable to anything which could be seen accomplished at the flock gatherings. Nevertheless, I do not doubt that some extent or kind of selection occurs during the gatherings. I am probably merely pointing out the difficulty of actually noting the steps and manner of the process from beginning of competition to final mating act.

When the flock had, for the time being, more or less broken up one could often see the working of individual jealousies and rivalries and might note appearances of fidelity or inconstancy. The males seemed the more fickle, while for the most part they showed great respect for the females' privilege of choice. Males chase away males and females. Females chase away both sexes also. Just after the bathing which follows a mating completely enacted the female is especially given to repulsing intrusive males and females alike. One of my field notes reads, "Watched what appeared a pitched battle, breast to breast (two males); very loud splashing the only demonstra-



PLATE 3. BARROW'S GOLDEN-EYE. Attitudes during mating. From the top of the plate the attitudes are shown in general order of sequence, except that figures 8-12 and 13-18 are according to definite natural order.



tion apparent, the water flying and both birds rising about clear of the surface two or three times; it (the contest) lasted about twenty seconds, then each (contestant) joined a waiting female (some yards away) and all four indulged in much head bobbing." The males do a lot of twitching in the water with their bills—a general courting practice—but particularly for a minute or so before conclusively mating as described elsewhere.

#### MATING

There were usually a number of "inviting" females to be seen floating like half submerged logs on the pond, especially after the dispersed flock had had some little time for feeding. The appearance of the female in this position is remarkable and thoroughly characteristic of her mood. For many minutes at a time the bird looks like a rounded piece of driftwood as she lies half submerged for her entire length, including head, neck and bill. She sometimes emits a low clucking call in this attitude. Here may be mentioned a very striking thing which obtained among the birds in general; that is, the females, so far as one might judge by behavior, were decidedly more precocious than the males in their desire. With a given pair the female's period begins long in advance of the male's and continues unabated until the male's period, only two or three minutes in duration, is over. It was a common thing to see a half sunken duck float and drift invitingly about a drake for a quarter of an hour or more, while he showed not the slightest knowledge of her existence. Occasionally the immediate sequel was a sudden and furious transformation—from the ignored spouse spoiling for attention to the very personification of "a woman scorned;" she would dart with apparently murderous intent at the unresponsive drake, putting him to flight that looked not to the order of his going; yet, no sooner would he come to rest than she would be again at hand, floating invitingly—the all-loving spouse again—outdoing if possible her former abject appeal. Sooner or later—usually sooner than in instances like that above described—the drake complies.

The male sometimes assumes a pose similar to that of the half submerged female. This *may* be, in his case also, a specific advertisement of desire; but it seemed random, was not one of the definite series of mating acts. There is no attitude or act of the drake coinciding with that prolonged period of the female. Any interest he may feel at that time is certainly well disguised. It is only fair justice to the spectacle itself to record the strangeness of seeing him drifting or slowly swimming in the most every-day posture and manner imag-

inable while the female drifts, with the fine art of apparent chance, within near contact; often he swims slowly away to avoid her.

The first positive indication of his desire is apt to be a peculiar and animated twitching of the water with his bill (Fig. 1, Plate 3); then he is apt to stretch, turning on his side and extending the upper wing and leg—in this he is quite deliberate; pluming of the back feathers follows and looks like a gesture of ostentation. All this has taken but a minute or so (unless the water twitching has been more prolonged than usual); then the upright position (Fig. 13 in Plate 3) is assumed, which marks the beginning of the spurt to the female; the birds are usually within a yard of each other when the spurt begins. The next steps are illustrated in sequence (Plate 3, Figs. 14-17 for the male, 9-12 the correlated attitudes of the female). It should be understood that the plate shows an entirely arbitrary and unreal separation of the pair in the latter's three last stages of action.

Scarcely a minute is consumed in the entire specific act. While finally, *in coitu*, they begin to swim in a very small circle a note is repeated at regular intervals of about a second; I wrote it, "Gr-err'-er" or "cr-err'-er," and it seemed to come from the female, yet the latter point is in doubt. The middle syllable, high and accented, seems jerked forth. Another note (I thought from the drake) is a low cluck; these two notes were timed with each other so that one appeared an echo. As I reflect about it now, there seems a possibility that both calls came from the same individual. Having circled, as mentioned, two or three times around, the pair separates, each bird swimming away instantly from the spot; dabbling and vigorous bathing begins at a distance of some forty feet on the part of the female, rather farther in the case of the male. The male's appearance in this swimming away is noteworthy (Fig. 18 in Plate 3). He has an extremely self-conscious bearing; in the live bird the effect is enhanced to a ludicrous extent by the regular ticktock movement of the bill from side to side. The set pose, the straight course with uniform speed, the mechanical movement of the head—all give every appearance of an automaton, personifying egotism and wound up to run a set course.

In the matter of these mating operations I wish to emphasize their uniformity as regards sequence, time consumed, and the manner in which each step itself is performed. To me it was surprising that so many little mannerisms and actions apparently unessential and with no survival value had yet become thoroughly standardized and correlated with their respective stages in the performance. How, for example, can we explain the remarkable "proud" swim, so uniform in

every remarkable detail, of the male; this especially, since it follows complete consummation of the mating? May it indicate a period of distinctly significant breath-regaining or strength-regaining?

#### NOTES AND CALLS

A nasal twanging note or quack by the male accompanies attitudinizing during rivalry. It is that note which, possibly with others in the same category, often becomes a small babel as other drakes compete with it. There is also a low quack by the drake as he swims with head high and slightly forward (Fig. 8, Plate 2).

The female's "desire" note is a low cluck, fast and regularly repeated while with lowered head she drifts about the male (as in Plate 2, Fig. 20). The female's "gr-err'-er" or "cr-err'-er" call, more fully described under mating, is also uttered when she is simply *near* the drake; the last stage of mating is always accompanied by this note.

From a male and female together in flight above me I heard a repeated low short quack, slightly suggesting a Black Duck or a Mallard.

The drake often or usually gives a continued short quack in throwing the head back and while in the attitude which ensues (see Plate 2, Fig. 11). Quoting my field notes, "The usual note (apparently male, but possibly female or both) is a sort of quack with a decided nasal, metallic twang; sounds exactly like an amateur first trying a patent duck-call."

Both males and females did a good deal of what appeared to be, and may have been, sneezing.

If I may extend the period in question, I can add that a female, disturbed in her incubating, began a quacking when she had gotten clear of the nesting stub and was in flight to a nearby pond.

#### AN EXCEPTIONAL CASE

To the rivalry and mating actions as described above there remains to be added a unique and notable case. Obviously this is not to be considered as qualifying the standardized behavior of mature and normal birds; rather, it is an aside from the latter subject. On May 1 I noticed an individual that was strikingly "off color." As to explanation of the plumage, I will leave the point for others to determine who have access to the proper series of skins. Under other circumstances of time and place one's first thought would be of simply a seasonal or developmental phase of color; but, with every other member of the flock (as well as all individuals seen elsewhere at this time) in full breeding plumage, it struck me that this odd garb might indicate a case of sexual abnormality. That the bird shared the mat-

ing impulse was beyond question; it was equally evident from his technique that this impulse was not typical and normal—his action was always premature and invariably abortive. Many times I saw the bird attempt to consummate a mating, but in every instance the female spurned him and avoided contact, sometimes also chasing him in resentment of his ill-timed advances. There was a striking contrast between the orderly and standardized procedure of all the other drakes, with relation to their mates, and the unco-ordinated rushes of the off color individual; for the latter's charges would always begin at a distance of some dozen to twenty-five or thirty feet from the intended mate, instead of the customary yard or less; nor were they preceded by the dabbling, stretching and preening so characteristic in other drakes. On May 13 this bird was still on Ice Lake.



ICE LAKE. Looking north from the blind with several Barrow's Golden-eyes in the water.

My field notes describing the individual in question are as follows: "Head somewhat less crested than typical male, more crested than typical female; white on lores somewhat restricted, rest of head dark sepia with violet-purple gloss; sides and flanks like female, dark; breast, violet-gray; belly, white; upper parts, wings, tail, dark grayish or grayish-brown; feet dull flesh or dull orange, clouded with grayish; ring around neck white. Altogether, coloring and marking intermediate between typical male and female." Bear in mind that the description just given may be inexact in many details; but, for each part described, the *effect* produced by the live bird (for the specimen was not taken) was as stated, seen at close range.

## WILD LIFE ASSOCIATIONS

The golden-eye was merely one of the various wild life attractions on and about Ice Lake. Mallards were always present (usually several pairs), Green-winged Teals were usually represented by a few pairs or a small flock, now and then there were a few Widgeons and Shovellers; Pintails, in small numbers, were frequent visitors; occasionally there was a small flock of Ruddy Ducks. American Mergansers, never more than a very few at a time, would come in to try the fishing—successfully, too. A pair of Canada Geese occasionally would rise honking as I came close to the lake, to return and alight out near the middle soon after I had disappeared in the blind; they might then slowly swim ashore where the gander (presumably) would stand guard with watchful head raised high while the mate walked about, feeding. An Osprey, probably from the nest on famous misnamed "Eagle Nest Rock" a mile away, was a very frequent caller. A Kingfisher used one of my bough tent-supports for his lookout.

A few beavers, from a lodge two hundred feet from the blind, were in the daily habit of passing to and fro fifteen or twenty feet from me. Deer passed within sight of my peep-hole and once a lank coyote snooped by, skirting the opposite shore. Muskrats were abundant, instructive and entertaining. That is to list only some of the notables among those present.

Mountain Song Sparrows, Yellow Warblers, Western Robins and Mountain Bluebirds were nesting in the shore thickets or nearby pines. Within one hundred feet of the lake I collected for the Yellowstone Park Museum in due time one set each of eggs of Mallard, Thick-billed Red-winged Blackbird, and Mountain Song Sparrow. Cassin's Purple Finches were nesting a hundred yards from the east shore. Hence it will be understood that even an eight-hour day in the blind seemed all too short even though during the hasty lunch one's eyes could still look continuously from the peep-hole. There was never a dull or idle moment. If a lull occurred in the golden-eyes' affairs, there was always something, if no more than a muskrat or two, to be picked up by sweeping the shoreline with the glass; very often it was not necessary to look so far for the rats; they were fond of landing right in front of the blind and nosing about in the scant leavings from my lunch.

I think no allowance whatsoever need be made for any influence on the golden-eyes' behavior, as recorded in these notes, by the other more or less associated forms of wild life. The only species calling for remark in this connection are the various other ducks, the beavers

and the muskrats. As for the ducks, the other species simply did not mingle with the golden-eyes; each species kept by itself or, at times, mingled more or less casually with its more closely related species, as Mallards with the Teal and Shovelers. When the golden-eyes were spread about the lake all species were of course rather generally intermingled; still, in the matter of any inter-relations, the golden-eyes were simply "out of it"—a species apart; where the flock had drawn together in any of its "courting bees" other species never mingled or interfered. Beavers and muskrats were in a single category; either species could pass as if unnoticed unless the distance were less than fifteen or twenty feet; otherwise, the duck would swim rather deliberately out of the way a couple of yards or so. Even when the beaver or rat was coming swiftly and directly toward the duck, the latter seemed to regard the oncoming animal as little more than simply a small moving object with which impact was to be avoided.

YELLOWSTONE PARK, WYOMING.

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## SOME IMPRESSIONS OF THE COMMONER WINTER BIRDS OF SOUTHERN ARIZONA

BY MYRON H. AND JANE BISHOP SWENK

Southern Arizona has much to offer to the ornithologist and bird lover of the northern United States by way of a decided contrast in the character of its bird life. It was our privilege to spend the winter of 1926-27 (October 19 to April 27) in this interesting region; and we have since thought it might be interesting to others if we briefly described how two Nebraskans, familiar enough with the birds of the North, but making their initial acquaintance with the commoner winter birds of this Lower Sonoran or semi-tropical country, were impressed by them.

Our stay was at the historic and flourishing city of Tucson, which lies picturesquely in the approximate center of Pima County, on a level plateau of about 2,400 feet elevation that is thinly clothed with vegetation of the verdant desert type—i. e., various cacti, scrubby mesquite, creosote bushes, etc.—and is practically surrounded by imposing and eternally varyingly hued mountain ranges, some of which attain an elevation of 10,000 feet and support a Transition fauna. We found the weather during our stay to be generally very pleasantly bright and dry, except for a period of about three weeks in December when there seemed to us to be a good deal of cloudy and showery weather for a desert country. The days were nearly all warm, but the night