fourth or fifth day that they really look for food. Their initial pecking efforts are inaccurate. They do not appear to judge distances accurately nor do they readily consume such food as is picked up. By six days after hatching they recognize and peck normally at ants and small insects and worms. During the first few days the birds rested for long periods; their balance was imperfect and they wobbled when standing. Movement during this period tended to be in bursts rather than continuous. The young I kept for periods up to two weeks never did become tame although adults I had usually were fairly quiet after one week.

Malaus are difficult to observe in the field due to their secretive behavior and dull brown color, but I was able to watch a few adults in addition to those that I kept in captivity. Wild birds spend much of their time searching for food by scratching with their feet in the leaves and forest litter. Birds were not easily approached in the wild but if approached from downslope they tended to be less wary. When frightened they usually ran off rather than flying unless the intruder was very close or above them. A flushed bird commonly landed in a nearby tree and looked back at the source of disturbance. If no further danger was apparent after some minutes the bird would then return to the ground near its original location and carry on its activity. I rarely saw birds in flapping flight unless they had been frightened. They tend to move by walking, occasionally using their wings as an aid in climbing steep slopes. Going downslope they will sometimes glide without flapping.

Captive birds ate grated coconut supplemented daily with worms, ants, roaches, centipedes, and similar foods. The Malaus would not eat a species of yellow wasp common to the island. The captives on this artificial diet lost the bright yellow color of their legs. Captives vigorously defended their food from chickens on the outside of the cage. Twice in July 1969 I saw Malaus of unknown sex (presumed to be male) fighting. These scenes occurred on the big island in the lake where the population is quite dense. The fighting was characterized by wing beating, kicking, pecking, and shoving. In one case the combatants separated only after they had fallen into the lake. On emerging they went in opposite directions each emitting a call I had not previously associated with the Malau although I had heard it rather frequently. Malaus scratch their heads directly under the wing and after feeding commonly bill-wipe on sticks.

I would estimate that the present population is above two thousand adults and is close to the carrying capacity of the island.

Acknowledgment.—I thank G. A. Clark, Jr., for suggestions on the manuscript.—
DONALD G. WEIR, *2428 - 5th Street, Monroe, Wisconsin 53566, 13 September 1971.*

Black-bellied Plover incubation and hatching.—The Black-bellied Plover (*Squatarola squatarola*) has been little studied on its nesting ground in the Arctic. There has been some confusion about its usual incubation period, and so far as I am aware no one previously has watched the bird from a blind for any considerable time during incubation and hatching. Therefore, I am summarizing observations made in 1970 and 1971 mainly on two nests located in the interior of Bathurst Island, N.W.T., Canada.

The climate of Bathurst is high Arctic, and its shores remain in the grip of sea ice all summer. The terrain is rolling and mostly below 200 m in elevation. The pebble-strewn earth of the hilltops and slopes are nearly bare of vegetation, but the wettest of the lowlands often form sedge-moss flats that are almost completely covered with vegetation and look in the distance like a mowed meadow. The biological research camp of the National Museum of Canada where I worked overlooks an extensive meadow of this

kind. The plover nests I watched were here, about 14 km inland from the sea at lat 75° 44′ N, long 98° 25′ W.

All five of the Black-bellied Plover nests I examined were situated on ground that was nearly bare and at least slightly raised above the more richly vegetated flats nearby, where the adults did most of their feeding and where they took the young after hatching. In each instance the nest depression was shallow and floored with only a few wisps of lichens and leaves.

In 1970 I spent 23 hours observing a nest near the middle of the incubation period. The time was distributed over 5 days, 9–13 July, mostly in the afternoon hours. These young hatched 25–26 July.

Although other observers have noted males at the nest more often than females, I found this female on the eggs almost 60 percent of the time when I was watching. Each member of the pair had attentive periods as long as 3 hours, but each such period was broken briefly by alarms. Both adults sat closely except when frightened. The incubating bird always returned within 10 minutes after the disturbing factor went away. Arctic foxes (*Alopex lagopus*) passed within sight several times daily, particularly in 1971 when foxes were unusually abundant, and all three species of jaegers (*Stercorarius pomarinus, S. parasiticus,* and *S. longicaudus*) nested within 1 km and coursed frequently in the vicinity.

The male and female exchanged places on the nest quickly. In a typical interchange, the male approached on wing from a distance giving both loud single notes and the characteristic *pee-oo-wee* call of the species. The female flew directly from the nest to a point several hundred meters away and began feeding there. The male alighted 20 m from the nest and ran rapidly to the eggs. The nest was unattended less than a minute.

I watched another nest one and a half hours during incubation on 15 July and five and a half hours continuously during hatching in the afternoon of 18 July 1971. This set of four eggs was complete when found at 17:40, 22 June. One of these eggs was pipped at 00:45, 18 July, and the voice of the chick could be heard within. This first hatchling freed itself from the shell more than 12 hours later at about 13:15. The second chick hatched about 15:30; the third, about 22:00; and the fourth, between 00:15 and 04:45, 19 July. The time between the hatching of the first and last egg of the set was about 12 hours, and all of the young were out of the nest fifteen and a half hours after the hatching of the first. My frequent examinations of the nest may have accelerated their departure. When I visited the nest in the early morning after a four and a half hour absence, the youngest of the brood was covered by an adult on bare ground 10 m from the nest and the other three were more than 50 m away in the concealment of grass. Both parents ran about in agitation.

The incubation period of the fourth egg was at least 26 days, 6½ hours. In addition I had two other nests with incubation periods in excess of 25 days. From this information and other evidence to be given here, I have concluded the usual incubation period for the Black-bellied Plover is 26–27 days.

Parmelee et al. found it was "at least 27 days" (Birds of southeastern Victoria Island and adjacent small islands, Natl. Mus. Canada Bull., 222:220, 1967). Drury reported for two nests "at least 26 days" and "at least 27 days" but, noting shorter periods in earlier accounts, expressed concern that incubation might have been lengthened by his regular visits to the nests (Auk, 78:188, 1961). Brandt gave 23 days without details (Alaska bird trails, Bird Res. Found., Cleveland, p. 373, 1943), and Höhn reported 24 days in an inconclusive instance where only one egg hatched (Auk, 74:207, 1957). Two of the most comprehensive books available on shorebirds follow Brandt in giving 23 days, A. C. Bent

FIG. 1. Black-bellied Plover female carrying eggshell from nest after hatching.

(Life histories of North American shore birds, Pt. 2, U.S. Natl. Mus. Bull. 146, p. 159, 1929) and R. S. Palmer (Shorebirds of North America by Stout, G. D., P. Matthiessen, R. V. Clem, R. S. Palmer, Viking Press, New York, p. 163, 1967).

I am inclined to minimize the significance of human disturbance in these examples. My observations revealed that incubating Black-bellied Plovers are often frightened from the nest whether human beings visit them or not. The birds I watched left the nest many times a day when alarmed by the approach of jaegers and were sometimes off the nest many minutes when arctic foxes were near or caribou and muskoxen grazed nearby. They left the nest to chase Red Phalaropes (*Phalaropus fulicarius*) and White-rumped Sandpipers (*Erolia fuscicollis*) walking close at hand. Unlike some tundra nesters that sit tightly, the Black-bellied Plover often leaves when danger is 200 m or more away. In a species so skittish, frequent absence from the eggs with some cooling is probably normal.

The incubation period of the closely related Greater Golden Plover (*Pluvialis apricaria*) is 27–28 days (Witherby, H. F., Handbook of British birds, Vol. 4:366, 1940), and for the American Golden Plover (*Pluvialis dominica*) is about 26 days, 4 hours according to Parmelee et al. (op. cit.:85).

At the time of hatching, whichever adult was in attendance flew away with pieces of eggshell within minutes after a young bird broke free (Fig. 1). While the other young were hatching, the earlier hatchlings ventured as much as 20 cm out of the nest. The

young alternated sleep and vigorous activity within and outside the edges of the nest. Both parents sometimes twittered softly when approaching or covering the chicks.

I saw elaborate distraction displays from both male and female when I was near the nest during incubation and hatching. The birds moved on rapid feet, breast touching the ground, wings spread and drooping until the primaries brushed the earth, tail usually low but sometimes high and always showing much white, body trembling.

I would like to thank Stewart D. MacDonald and the Canadian National Museum for the opportunity to study on Bathurst Island, and David F. Parmelee and David J. T. Hussell for reading an earlier draft of this note.—HAROLD F. MAYFIELD, *Waterville, Ohio 43566, 22 May 1972.*

Ten years of Barn Owl prey data from a Colorado nest site.—Few reports on the food habits of Barn Owls (*Tyto alba*) are available from the Rocky Mountain region. Consequently, the ten years of prey data from a single site presented here should be of interest.

Barn Owls have used an abandoned gravel pit 3 miles southwest of Fort Collins, Larimer Co., Colorado, for nesting and roosting over a period of at least 17 years. Land surrounding the pit is largely short-grass prairie interspersed with some farmland, both dry and irrigated. Shrub covered hogbacks bordering the Front Range of the Rocky Mountains are located one-half mile west of the pit.

TABLE 1
TEN YEARS OF BARN OWL PREY FROM NORTHCENTRAL COLORADO

Prey	Per cent of prey numbers by year										
	1953*	1961	1962	1963	1964	1966	1967	1968	1969	1970	Total
MAMMALS											
Sorex spp.	–	–	1.7	1.0	–	–	–	–	–	–	12
Cryptotis parva	–	–	–	–	–	–	–	0.3	–	–	2
Sylvilagus spp.	1.1	–	0.2	–	0.3	–	–	0.8	2.2	1.9	31
Dipodomys ordii	0.2	–	0.2	0.5	–	–	0.4	–	–	–	5
Perognathus spp.	6.4	3.5	0.5	2.0	1.7	0.8	3.1	1.2	4.8	1.6	116
Reithrodontomys spp.	10.6	4.3	2.4	1.1	0.3	4.3	–	3.7	1.8	3.2	176
Peromyscus spp.	26.1	17.6	16.7	23.2	27.3	14.5	6.2	24.0	21.6	20.6	825
Neotoma spp.	0.1	–	0.2	–	–	–	–	–	–	–	2
Microtus pennsylvanicus	15.4	21.3	20.6	29.1	22.1	9.2	49.8	23.5	17.2	16.1	800
Microtus ochrogaster	28.4	52.5	47.9	36.1	35.7	51.6	40.1	43.3	48.4	54.2	1,565
Ondatra zibethicus	–	–	0.2	–	–	–	–	–	–	–	1
Rattus norvegicus	0.2	–	–	–	–	–	–	–	–	–	2
Mus musculus	3.5	–	3.1	4.0	–	7.7	0.4	2.3	1.5	1.1	94
Unidentified mammals	4.8	–	5.3	1.0	10.9	9.4	–	–	–	–	126
BIRDS											
Unidentified birds	3.2	0.7	1.0	2.0	1.7	2.5	–	0.9	2.8	1.3	69
Total numbers	1,018	141	582	203	293	116	227	600	273	373	3,826

* From Reed, ibid.