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EIDER DUCKS OF KENT'S ISLAND

BY ALFRED O. GROSS

Plates 11-13

KENT'S is an outpost island which guards the mouth of the Bay of Fundy, a body of water between Nova Scotia and New Brunswick, Canada, famous for its extreme tides and treacherous tide rips. One will scan the maps in vain to find the name Kent's but it is a member of a group represented on the marine charts as Three Islands, located about six miles southeastward of Grand Manan, New Brunswick. The island takes its name from that of the original owner, John Kent, who years ago eked out a living from his small farm and the varied products of the sea which surrounded his little island kingdom. Times have changed since John Kent's day and for years the island has been uninhabited, leaving Nature to follow its own course. The isolation of Kent's Island makes it the favorite breeding place of thousands of seabirds and among the notable array of species which make it their home is the finest of our sea ducks, the American Eider. It was Mr. Allan Moses, veteran naturalist of North Head, Grand Manan, who first brought the attention of ornithologists to this bird paradise. He interested Mr. John Sterling Rockefeller of New York City who purchased the island in 1930 as a bird sanctuary primarily for the Eider Ducks. In 1935, Mr. Rockefeller generously gave the island to Bowdoin College with the conditions that a warden be employed to protect the bird life and that the island be maintained as a sanctuary and a scientific station for students of Bowdoin College and other institutions wishing to avail themselves of the unusual opportunities afforded there for study and research. Before the island was purchased by Mr. Rockefeller, the eiders as well as other seabirds suffered persecution at the hands of poachers and especially by egg hunters who ventured there at the height of the nesting season for gull and eider eggs, highly prized as food. The frequent robbing of the nests often extending late in the season threatened the early extermination of these splendid



NESTS OF TWO EIDERS, A HERRING GULL, AND LEACH'S PETREL



EIDER NESTING BENEATH A FALLEN SPRUCE.

sea ducks from the region. Since Kent's Island has been made a sanctuary with Mr. Ernest Joy as resident naturalist and warden, the eiders have more than doubled their summer-resident population.

During the winter months great rafts of Eider Ducks, sometimes comprising thousands of individuals, frequent the waters off the southern end of Kent's Island but the birds at this season of the year, for the greater part, are the Northern Eider, *Somateria mollissima borealis*. During severe storms when the sea is churned into mountainous waves the birds are forced to come ashore. One can readily imagine the striking and resplendent scene that flocks of these beautiful sea ducks present to anyone fortunate enough to see them. With the coming of calm weather the eiders, like the Fundy fishermen, again put out to sea for the serious business of fishing. By the end of March these winter residents leave on their migration to nesting grounds along the Labrador coast and northward to the islands of the Arctic.

The American Eider, *Somateria m. mollissima*, many of which winter along the New England coast, is the form represented at Kent's Island during the nesting season. These birds arrive in April after their northern cousins have left the Bay of Fundy. In 1937, the first American Eiders, according to Mr. Joy, arrived on April 7 which is approximately the date when the first arrivals have been noted in previous years. The birds spend the month of April on the rich feeding grounds about the islands. The winter birds ordinarily feed well off at sea whereas the American Eiders come to the shoal grounds where such favorite food as crustaceans, sea-urchins and mollusks abound in inexhaustible quantities. Not only are the shoal grounds about Kent's Island a good provider for diving ducks but the extensive areas laid bare by the excessive tide (twenty-two feet at Kent's Island) provide ideal feeding facilities for the thousands of shore-birds which stop there as a way station on their migration.

Mating.—In 1937, the first mating activity of the eiders was observed on April 26 and thereafter was a frequent occurrence. All of the performances observed at Kent's Island have taken place in the water. The following account of the courtship is based on observations of a group of birds seen off the eastern shore of the island on May 10, 1932. "The female swam away from a flock of about forty-five birds and maneuvered to the lee side where the water was comparatively smooth. She floated with her head outstretched on the surface of the water and in that position drifted along giving an appearance not unlike that of a wounded bird. Meanwhile the members of the main flock continued their diving and feeding in the usual way. As the female drifted, the male bird circled about her, frequently standing upright, flapping his wings and ardently uttering a series of deep cooing calls. This part of the courtship lasted about four minutes after

which the male came close to the female, grasping the back of her head as he mounted on her back. During the procedure the female sank beneath the surface. The copulation was of short duration and after its completion the two birds again joined the flock."

That the eider is polygamous is substantiated by an observation made by Mr. Joy on May 12, 1937. He saw a male bird copulate with three females in the course of thirty minutes. My own observations of several years at Kent's Island indicate that the number of females is greatly in excess of the number of adult males. It is therefore obvious that the number of males is by no means an accurate index to the number of nests in the vicinity.

Nesting.—When I visited the island on May 9, 1932, nesting had just started, for only three nests could be found; one of them contained three eggs and each of the two others had but one egg each. The first nest with an egg found by Mr. Joy in 1937 was on May 4. From this time on the number of nests increases rapidly until the height of the nesting season in June. A census taken during that month revealed more than three hundred nests containing eggs. In June 1932, there were only 178 occupied nests which clearly indicates that the birds are increasing in numbers under the protection given them by the Station through its efficient warden.

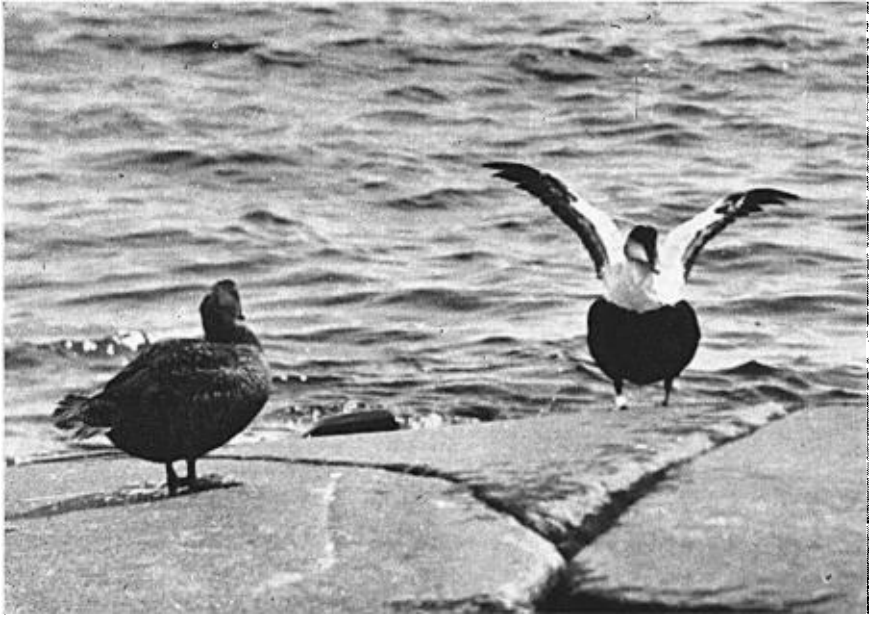
The female selects the nesting site, builds the nest, incubates the eggs and cares for the young without any assistance on the part of the male. After the courtship season, the male deserts his mate or mates and never approaches the nesting site. The males may linger offshore and at times, usually at high tides, come on the rocks along the water to preen their feathers and bask in the sun. They are generally accompanied by non-breeding females and immature males. During the month of June many males in a transitional stage of plumage are seen. By the time the incubation of the last eggs is well under way most of the males have deserted the proximity of the island and retreated to more secluded spots to undergo the ordeal of the post-nuptial moult and take on the so-called eclipse plumage.

In the case of many of the nests observed at Kent's Island the female makes a shallow excavation in the soft peaty soil at the site chosen. In this cavity devoid of all nesting material the first egg may be laid but more often grasses, bits of turf and débris are added. The nesting eider seems to take no precaution to conceal the first eggs but, as the set is completed and especially after incubation begins, she carefully covers the eggs with nesting material, chiefly down. Along the coast of Labrador I have noted that down is present in the nest at the time the first eggs are deposited and is amply sufficient to cover them completely, but it is doubtful if this difference in nesting behavior is correlated with a colder climate. If the nest is robbed

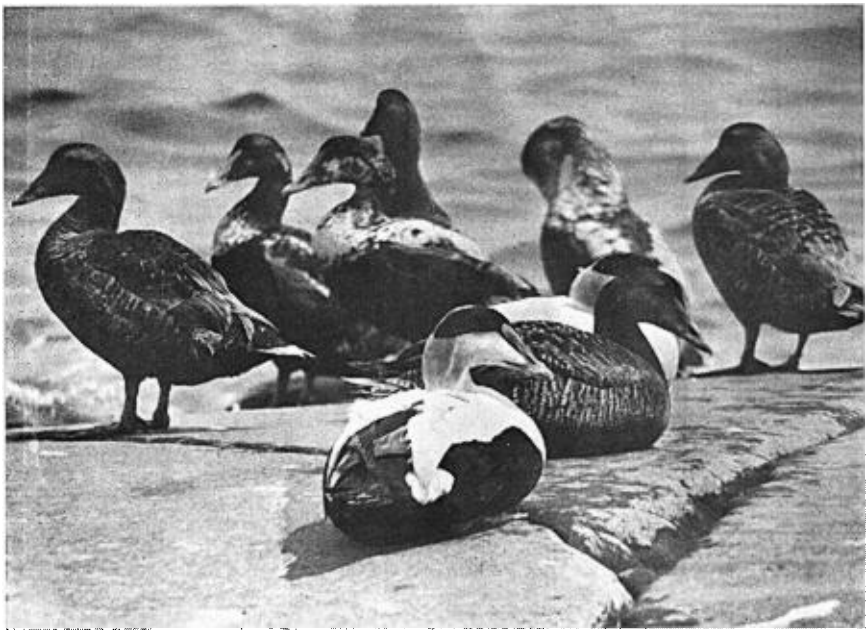
of its down, as is frequently done along the Labrador coast and especially in Iceland where the eider down is an important financial consideration to the natives, it is replaced at least in part by the nesting bird. The primary purpose of the down is to conceal the eggs and to serve as a protection for them.

In a mixed bird community such as exists on Kent's Island, the nearby presence of great numbers of different species of birds has had its influence on the details of the eider's nesting behavior. Most of the central and northern portions of the island are covered by a dense growth of tall white spruce, whereas the southern end is free of trees but there are areas with standing dead trees where the ground is generously strewn with trunks and branches. (The spruces, presumably, have been killed by the depositions of the thousands of gulls which inhabit that part of the island.) With increasing numbers the eiders are leaving the open situations which are thickly populated by the gulls and are choosing nesting sites among the spruces of the northern end. In recent years it has not been unusual to find eiders nesting in the seclusion of woods so thick that little light filters to the forest floor through the thick canopy of foliage. At the southern end of the island the majority of the nests are among the tangled masses of fallen dead spruces which also give the female eider a certain degree of privacy. As is generally true with ground-nesting birds there is considerable individual variation in the types of nesting sites. About twenty-five nests are to be found each year in the rank growth of grasses and iris which abounds in the lower swampy portions of the island and again a few are in very exposed places, entirely devoid of vegetation, among the huge boulders near the sea-wall.

Although many of the eiders on Kent's Island seem to avoid the society of other birds by retreating to the depths of the spruce woods, there are others which nest and live peacefully in intimate association with other species. At the southern end of the island in the center of the great gull colony I noted three gulls nesting within a few yards of an occupied eider's nest and in another case an eider nested within four feet of a gull's nest. In the latter case both the gull and the eider were successful in taking off their young unmolested. In June 1932, I found Eider Duck eggs in three nests of the Herring Gull. Two eggs of the eider and two eggs of the gull were in the first nest and one eider's egg was in each of the other nests containing two and three gull eggs respectively. In these three cases the eggs were incubated by the gulls. In the first nest the eiders hatched first. The gull accepted the ducklings and deserted her own eggs to care for them. I was unable to follow up the fate of these young eiders; at least they were not with the adult gull on the following day. Either they perished or it is conceivable that they joined some family of their own kind. In the other



FEMALE EIDER WITH TAIL SPREAD; MALE LEAVING THE WATER



PART OF A GROUP OF AMERICAN EIDERS

two nests the gull's eggs hatched first and the eider's eggs were deserted. The embryos of the eider's eggs were about two weeks old indicating that the incubation of the gull's eggs was under way when the eiders deposited their eggs. Several cases came to my attention in which it was evident that the eider had appropriated a newly built Herring Gull's nest to which she added the usual quantity of down.

The female eider is not a passive creature as we might be led to believe but may exhibit unusual aggressiveness toward her neighbors as is illustrated by the following incident. On June 20, 1932, when observing the behavior of an eider from a blind placed eight feet away from her nest, I saw an eider attack an unsuspecting gull which was standing in her territory as she approached the nest. The gull was badly worsted and made a hurried retreat causing a great commotion among the members of the populous gull colony. The pompous eider then pounced on an innocent gull who was peacefully incubating her eggs about twelve feet away from the nest of the irate eider. The eider deliberately grasped the gull by the neck, violently pulled the surprised bird aside and took possession of the nest. She sat on the gull's eggs for a few minutes and then seeming to be satisfied at being mistress of the situation walked triumphantly to her own nest. The gulls though vastly superior in numbers have apparently learned to respect the eiders. I never saw a gull attack an eider in the manner described above although gulls are guilty of cowardly attacking the downy young when the latter are not protected by the adult eider. The Black-backed Gull, of which there are a dozen pairs breeding on Kent's Island, is a frequent marauder of the young eiders whenever the latter chance into their territory.

The nest of the eider is usually round and fairly uniform in size as shown by the measurements of eight typical nests selected at random. The outside diameter is the limit of nesting material, the inside diameter is the distance across the nesting bowl occupied by the bird and the chief mass of down. The depth is the distance from a straight edge placed across the top of the nest to the bottom of the bowl.

Outside diameter	Inside diameter	Depth
240 mm.	215 mm.	70 mm.
280	235	65
240	210	60
230	212	60
240	230	80
210 x 230	160	60
340	240	85

Eggs.—The prevailing color of a large series of eggs examined at Kent's Island was light vetiver green according to Ridgway's 'Nomenclature of

Colors,' but the shade of green varied in extreme cases from tea green and water green to vetiver green. The eggs are free of markings except for nest stains and calcareous deposits.

The number of eggs in sets known to be complete varied from two to seven. The average number in one hundred nests of complete sets was 4.4 eggs per nest. Nests containing sets of five eggs are common but a nest containing more than five is unusual. Of the hundreds of nests examined on Kent's Island over a course of five years, only two containing six eggs and three containing seven each have come to my attention.

The following numbers of sets of eider's eggs found in nests on islands in Penobscot Bay, Maine, on June 7, 1933, are of interest for comparison and also indicate the state of nesting activities on that date.

Name of Island	Number of nests	Number of eggs
Grass Ledge	2	1
	16	2
	24	3
	26	4
	3	5
	1	6
	1	4 young
Sheep Island	21	empty nests
	1	2
	2	3
	3	4
	2	5
	1	6
	Oak Island	3
6		2
8		3
8		4
4		5
1		5 young

The average number of eggs per set in the above nests is only 3.2 but it is probable that a considerable number of those sets containing one or two eggs were not complete, which accounts for the lower average of the Penobscot Bay nests. The average number of eggs per set in about 150 nests on islands along the Labrador coast was 4.5, practically the same as the Kent's Island average. The largest sets found on the Labrador coast contained seven eggs. One nest containing nine eggs was undoubtedly the product of two females. The weights and measurements of the eggs of ten sets found on Kent's Island during June 1932 and 1933 are as follows,:

Date	Long diameter	Short diameter	Weight
June 17, 1932.	79 mm.	56 mm.	125.4 grams
	77	55	117.5
	78	55	114.9
	75	53	105.5
	80	57	121.2
June 17, 1932.	80	55	109.6
	77	53	94.2
	82	55	112.2
	79	56	106.6
	79	58	116.1
June 17, 1932.	81	56	106.1
	78	54	105.4
	81	53	105.5
	79	52	96.2
	79	54	102.0
June 17, 1932.	81	52	106.1
	77	52	101.0
	83	52	108.9
	77	54	107.7
	81	52	107.8
June 20, 1932.	81	55	111.5
	81	56	120.4
	82	55	120.0
June 20, 1932.	81	56	119.1
	78	55	110.7
	79	55	112.2
	80	56	111.9
June 28, 1932.	74	52	94.5
	75	52	99.5
	75	51	101.9
	73	52	101.1
	76	50	99.6
June 26, 1933.	79	54	120.0
	80	53	117.5
	75	52	110.2
	82	53	119.1
June 26, 1933.	75	53	95.5
	74	52	108.1
	80	50	105.3
	80	52	104.2
	79	52	98.7
June 26, 1933.	82	52	115.1
	79	54	118.2
	79	51	104.6
	77	51	115.3

The number of eggs per set laid by a particular female in successive nesting seasons was determined in the case of three banded individuals. These results seem to indicate that a larger number of eggs may be laid as the birds become older, but further observations are needed to substantiate any generalization. The birds came to the same nesting sites on three successive years.

	1930	1931	1932
Female 1	4	5	7
Female 2	3	5	5
Female 3	4	4	5

There is a considerable decrease in the weight of the eggs as incubation proceeds. The weighings of two sets of eggs are shown in the following tables.

SET NO. 1		SET NO. 2	
<i>First Weighing</i>	<i>Second Weighing</i>	<i>First Weighing</i>	<i>Second Weighing</i>
June 17, 1932	June 28, 1932	June 28, 1932	July 5, 1932
125.4 grams	118.6 grams	94.5 grams	90.2 grams
117.5	110.2	99.5	95.9
114.9	107.3	101.9	98.3
105.5	99.2	101.1	97.5
121.2	114.0	99.6	95.2
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Average 116.9	109.8	Average 99.32	95.42

In the first set the average loss of weight for each egg was 7.1 grams for the eleven days or 0.64 grams per egg each day. In the second set the average loss for each egg was 3.9 grams for seven days or 0.56 grams per day. In another set the average loss of weight was 0.61 grams. The total loss in weight during the entire incubation period is approximately fourteen per cent of the weight of the eggs.

Incubation.—The incubation period of the American Eider according to the following observations is twenty-eight days. On June 6, 1932, a nest containing three eggs was found in a rank growth of iris along the western shore of the island about fifteen yards from the high-tide mark. The fourth egg was laid the next day and apparently incubation started. On June 8, the fifth and final egg of the set was deposited. Little down was added to the nest until incubation was under way. On June 17, a burlap blind was built within six feet of the nest in order to facilitate photography and the making of detailed observations. Experience had shown that a blind placed near a nest before incubation started usually resulted in the desertion of the nest. After a week the instinct to incubate the eggs becomes so strongly developed that the bird seems less disturbed by a strange structure erected

near her nest. After the blind was in place for a few days, it was possible to enter and leave by a rear entrance without flushing the bird. Furthermore she paid no attention to the noises of the camera shutter and other disturbances by the operator inside the blind. In other words it was thus possible to secure natural poses for photography and to study her normal behavior at very close range.

The female incubated the eggs and at no time did the male make his appearance in the vicinity. The female usually left the nest to feed during the morning hours following daybreak. Before leaving she invariably covered the eggs completely. Under normal conditions she did not fly from the nest but walked by a circuitous route along a path through the iris and tall grass to the shore. There mounting a boulder or some other good vantage point she flew to the feeding grounds at sea. At times when there was no surf she did not fly but swam to join in breakfasting with other members of the eider colony. The length of her absence from the nest varied with the circumstances but generally it was for a period of at least two or three hours. It became evident that the thick layer of eider down served not only to conceal the eggs from view but functioned by preventing the chilling of the eggs. As the embryos near the end of development, they produce sufficient heat within themselves and the part then played by the down in retaining the high incubating temperature is of less importance.

In returning, the female flew toward the nesting site with a loud whirr of her wings. Usually she circled two or three times before alighting in the vegetation about twenty-five to thirty yards from the nest. At this point she would pose with her head uplifted as she carefully surveyed the surroundings. If conditions appeared satisfactory she scooted through the grass with her head lowered and well out of view, at least to the observer in the blind. She generally stopped several times on her way to the nest to repeat the careful inspection. Finally when in sight of the nest she seemed to lose all sense of fear and approached without hesitation. She shoved the down aside with her beak, settled on the nest and carefully adjusted her feathers so that the eggs came in direct contact with her warm body. She shifted her position several times and rearranged the down and other nesting material until every part of her household was in accordance with her meticulous standards. She then settled down to the monotonous duty of incubation in an apparent state of comfort and relaxation. She remained motionless for long periods of time; her sombre brown markings harmonized so perfectly with her surroundings that she virtually disappeared from view. In this respect the female offers a striking contrast to the gaudy, conspicuous plumage of her wary mate who seldom even dared to approach the shores of the nesting island. The eggs were turned several times during the course of the day. She did this by thrusting her head through the thick mass of her

breast feathers in such a way that the eggs were shifted or turned without even exposing them to view.

Whenever there was an unusual disturbance, such as an outburst of loud calls by the gulls, the nesting eider would elevate her head to see what it was all about. When the cries of the gulls subsided she again snuggled closely to her nest and assumed her usual complacent posture.

Hatching.—On July 3, the eggs were intact. On the afternoon of July 4, four of the eggs were slightly cracked but at this time the fifth egg showed no signs of hatching. The next morning the fifth egg was pipped and the others were correspondingly advanced. Faint but clear peeps could be heard from the embryos. When I approached the nest at 8 a.m. the female, instead of sneaking through the iris as heretofore, flew directly from the nest with a tremendous *whir* of her wings and as she cleared the grasses and iris uttered a loud quacking call. Just as she took off she extruded a mass of semi-liquid dung all over the half-hatched eggs. I have noticed this happen in the case of other nesting eiders and I am inclined to believe that it is not accidental but intentional on the part of the bird. The unexpected noise accompanied by the spray of filth might well serve to confuse and to discourage certain enemies from molesting the eggs.

The female was much more cautious in returning to the nest than on previous days. In fact she made no attempt to return until 11.30 a.m., three hours and a half after she was flushed. This was not unexpected for at this stage of hatching, the eider often leaves the eggs for long periods of time. The young have sufficient heat within themselves and do not require the incubating mother to keep them warm. Hatching evidently proceeds satisfactorily without the aid of the adult for the period she is away.

When the female finally returned she exhibited a peculiar behavior. After alighting about twenty yards from the nest, she violently jumped up from the thick iris growth and squawked loudly with the evident purpose of attracting the attention of any possible concealed enemy away from her young. She repeated this curious procedure so many times that at first I was led to believe she was being molested by some creature in the vegetation that I could not see from the blind, but this proved not to be the case. After deciding that the coast was clear she walked toward the nest but exercised extreme caution. At every few steps she elevated her head and carefully surveyed the surroundings. When within three feet of the nest she heard the peeps of a young that had hatched during her absence. This lent her courage, she lost all fear, took no further precautions and went directly to the nest to brood the youngster and the four eggs in process of hatching. Whenever the young peeped, she responded with pacifying guttural *gawk,-gawk,-gawk* notes. She worked the eggs frequently with her bill as if to assist the hatching process. She was extremely excited over the

important event transpiring in her household as evidenced in various ways, such as the thrusting of her head up suddenly and gazing intently on the least provocation. Even an ordinary call of a gull near her nesting site was enough to excite her. However, I found no difficulty in photographing the bird at this time for neither the sound of the graflex shutter nor my voice disturbed her. It was evident that she was not in the least suspicious of the blind nor of any of the noises originating there.

The second young hatched at 2 p.m., and the third emerged at five o'clock, twenty-eight days after incubation started on June 8. The two remaining eggs had large openings through which the tips of the bills and portions of the head could be seen. The first young was completely dry and fluffy. It spent much of its time poking its head through the feathers of the brooding bird. It peeped frequently and was answered by the pacifying calls of the mother. These notes were not loud and I doubt if they could have been heard by an observer stationed more than twenty-five feet from the nest. At times when the precocious youngster attempted to wander from the confines of the nest it was an occasion for disapproval and discipline on the part of the mother. I left at six o'clock and by exercising care succeeded in getting out of the rear of the blind without disturbing the bird.

When I arrived at the nest early the next morning the adult was not to be seen. The last two of the five young had hatched during the night but one of them, presumably the last to emerge, was weak and very much bedraggled. The older young were alert and active. They also had the instinct of fear for whenever a gull would fly over the nest and especially if it called, the youngsters would dive into the depths of the downy feather bed. The female returned to the nest at ten o'clock using extreme care and employing much the same tactics she had displayed the previous day. After adjusting herself on the nest, much to my surprise, she brooded the young only a few minutes before walking away along the well-trodden path, calling vigorously as she went. Four of the young readily responded but the one last to hatch was too weak to go. When about three feet from the nest the mother halted until the young reached her, rewarding their efforts by brooding them a moment. After repeating this procedure several times, the family reached the shore and without the least hesitancy the downy armada launched into the cold waters of the Bay of Fundy. The deserted orphan in the nest was placed in my hat with some down and taken back to camp. After being kept in a box near a stove it gained its strength and was soon running about camp as lively as those that had left the nest a few hours before. The next day the duckling fed freely on bits of snails and clams provided for it. The warden carried it about in his pocket and when at the shore allowed it to forage among the seaweeds. It discovered that the little crustaceans commonly known as "sand fleas" were good for food. By

uncovering sheaves of rock-weed hundreds of these leaping creatures kept it busy dashing first this way then that in futile effort to get every one in sight. In the course of a few minutes the little fellow's crop was bulging and so heavy that it was forced to sit down to rest from sheer exhaustion. This little eider was kept at camp for about a week before it was released to join with a brood where it was readily accepted by the foster mother.

Description of the young.—The following description of a day-old chick was made with the aid of Ridgway's 'Nomenclature of Colors.' Crown, chaetura black; remainder of upper parts, fuscous to fuscous black; the down tips, hair brown; a band above the eye drab gray extending about one centimeter back of the eye where it shades into the chaetura black of the crown and nape; in front, the band of drab gray is separated by the naked posterior extensions of the upper mandible; sides of head below eye hair brown shading to smoke gray on the throat; upper breast light hair brown; lower breast and belly pale smoke gray; mandibles dark neutral gray; extensions of mandible into crown, black; mandibles tipped with drab; egg-tooth chalky white (the egg-tooth quickly disappears and by the time chick is two days old is worn off); iris, olive-brown; legs, toes, webs and nails black.

Measurements of two young one day old made at Kent's Island, June 20, 1932 (weights in grams, measurements in millimeters):—

	<i>Number 1</i>	<i>Number 2</i>
Weight.....	73.5 grams	77.0 grams
Length.....	188 mm.	195 mm.
Extent.....	145	146
Wing including down.....	35	34
Manus.....	19	22
Bill length.....	17	17
Bill width.....	11	11
Bill depth.....	9	9
Front edge of eye to tip of bill.....	27	27
Front edge of nostril to tip of bill.....	10	10
Angle of gape to tip of bill.....	21	21
Tarsus and third toe.....	61	63
Third toe.....	33	33
Tarsus.....	28	30
Foot (first toe to third toe).....	55	53
First toe.....	12	12
First toe-nail.....	5	4
Second toe.....	25	24
Second toe-nail.....	4.5	5
Third toe.....	33	34
Third toe-nail.....	5	5.5
Fourth toe.....	34	32
Fourth toe-nail.....	4.5	5



NEST OF AMERICAN EIDER WITH SEVEN EGGS



SEVEN YOUNG EIDERS LESS THAN A DAY OLD

The length of the down covering the different parts of the day-old eider varies considerably. The following measurements represent the average length of the down in the three regions indicated: down of the back, 72 mm.; down of the breast, 12 mm.; that of the crown the shortest, measuring only about 10 mm. in length.

After the nesting season the females remain in the vicinity of Kent's Island with their broods of young. It is usual for two or more females to combine their families evidently for the purpose of protection against a common enemy. During the latter part of July and August one may see groups of eiders made up of as many as twelve to fifteen families, the young varying from downy stages recently out of the nests to others several weeks old. The individual family more or less loses its identity and a female seems to show a maternal interest in any eider young whether they are members of her own or those of some other family.

The young are very adept in imitating their elders in the matter of obtaining food. They are expert divers from the start and even in the early stages of their development obtain food by diving for it. The groups frequently come ashore at high tide especially when the sea is comparatively quiet, but they never go inland any great distance from the water. They clamber to the top of flat ledges or large boulders and there preen their feathers and bask in the sunshine. Sometimes the birds will follow an incoming tide in order to feed on the numerous small crustaceans that live among the great masses of rock-weeds. While an occasional male may make his appearance at the island at this season, he never exhibits any interest in the young. The females have the sole responsibility not only of incubating the eggs but also of rearing the young.

The eiders remain at the island until about the middle of October. In the autumn of 1936, there was a flock of about two hundred and fifty eiders along the shores of Kent's Island on October 12 and 13. On October 14 only three eiders could be found in a careful survey of the entire coastline. Mr. Joy had practically the same experience in 1935 when the remaining summer population of eiders left in a body on October 15. They evidently migrate *en masse* and probably cling together as a group on the winter feeding grounds farther to the south. The winter population of Kent's Island arrives in the latter part of October and by the middle of November is represented by thousands of individuals. At this time they are to be seen in great rafts off the southern end of the island. The winter birds killed by local gunners have proved to be the Northern Eider. Their food is made up largely of sea-urchins, small crustaceans, snails and other mollusks. Entire sea-urchins and mollusks with shells intact were found in some of the stomachs. None of the stomachs examined contained either vegetable food or fish.

Although we are very much interested in the large winter population of eiders, we are chiefly concerned with the nesting colony present during the summer. It is gratifying that the eiders are prospering and that the number of birds nesting on the island has greatly increased since the establishment of the Bowdoin Scientific Station.

EXPLANATION OF PLATES

PLATE 11

UPPER FIGURE.—Two nests of the American Eider and one of the Herring Gull, within a radius of about eight feet. The eider at the left is incubating four eggs and the gull at the right three eggs. The three eggs in the eider's nest toward the foreground are hidden from view by down and nesting material used to cover them. In the background beneath the fallen spruces are the openings to five nests of Leach's Petrel. Kent's Island, June 21, 1932.

LOWER FIGURE.—An American Eider on its nest beneath the fallen trunk of a dead spruce tree. Kent's Island, June 21, 1932.

PLATE 12

UPPER FIGURE.—A male American Eider flapping its wings just after leaving the cold water. An adult female with tail spread in a peculiar fashion stands at the left. Kent's Island, June 17, 1932.

LOWER FIGURE.—Part of a large group of American Eiders on a wave-washed rocky ledge along the eastern shore of Kent's Island, at high tide. In this group are two adult males, three males in transitional plumage and four adult females, the last presumably not breeding birds. June 17, 1932.

PLATE 13

UPPER FIGURE.—Nest and seven eggs of the American Eider at Kent's Island. One egg is in process of hatching, four others are pipped. Taken at 8 a. m., June 20, 1932.

LOWER FIGURE.—The same nest at 3.30 p. m., the following day. An hour later the mother led the whole family to the shore and all plunged into the cold water of the Bay of Fundy.

Bowdoin College
Brunswick, Maine