the impressions made upon open-minded observers who have no axe to grind, and who have no reason to take sides on the question, one way or another. They have been written in a friendly spirit, and we hope they will be received in the same way.

TEN YEARS OF OBSERVATION ON THE MIGRATION OF ANATIDÆ AT WENHAM LAKE, MASSACHUSETTS.

BY J. C. PHILLIPS.

WENHAM LAKE is 20 miles northeast of Boston in the town of Beverly and Wenham. It is one and one third miles in length, and is divided into an upper and a lower basin. The lower basin is larger and very much deeper, averaging across its middle portion over fifty feet, with several deeper spots. The upper basin is somewhat shallow with one very long cove, attractive to the surface feeders. The pond is situated in a thickly settled region. Along the eastern shore is a brightly lighted main road — Main Street. At the south end are two large pumping stations, with tall chimneys and numerous cottages. At the southeast corner and at the north end are ice-houses. The whole western shore is wild, mostly high land with white oak forest. In the fall the pumping operations often lower the level of the lake ten or twelve feet.

The pond weeds common to the lake, very kindly identified for me by Mr. W. L. McAtee of the U. S. Biological Survey, are quillwort (*Isoëtes echinospora*, var. *braunii*); pondweed (*Potamogeton lucens* and *P. perfoliatus*), the "red head grass" of Currituck Sound; *Naias flexilis*; *Sagittaria teres*; wild celery (*Vallisneria spirilis*). This sheet of water is therefore well supplied with foods attractive to ducks.

The following list of Anatidæ represents ten consecutive years of gunning and of careful records at a point on the western shore of the lake.

At present it is likely that future records of this sort will not be kept, so that it seems worth while, in view of the paucity of similar data, to give a complete list of all the species taken during this period, with brief notes about each; such estimates are of interest at least for purposes of future comparison.

I shall also give the percentage of each species as it figures in the totals for the ten years, and in the cases of the more uncommon varieties, the actual dates and numbers.

Before beginning, it may be well to sum up the actual result of each year in numbers, and also to give the yearly number of fowl seen from the stand, an actual record of which has been faithfully kept. In the table, "total fowl" means all fowl seen from the stand during the season in question. "Fowl flying" refers to those birds passing over which did not light, while "fowl in pond" are the birds which alighted.

Year	Total fowl	Fowl flying	Fowl in pond	Fowl shot	Records begun	Records ended	No. species taken
1900	984	581	403	163	Sept. 15	Nov. 20	13
1901	1149	619	520	327	" 20	Dec. 2	18
1902	591	291	300	182	" 15	" 9	19
1903	845	315	530	308	" 15	Nov. 26	19
1904	1476	860	616	345	" 5	" 10	20
1905	607	215	392	232	" 13	" 14	15
1906	248	54	194	51	Oct. 1	" 6	7
1907	292	78	215	104	Sept. 15	" 11	12
1908	368	89	279	177	" 20	" 11	16
1909	651	359	292	165	" 23	" 23	15
Totals Period 1900–1904:	5045	2666	2369	1325	364 (total days observation in first 5 years)		
Period 1905–1909:	2166	795	1372	729	269 (total days observation in second 5 years)		

The chief points to be noted in the above table is the extraordinary diminution of "total fowl" observed in comparing the last

with the first five year period — 2166 as against 5045. It is true that we have 25 per cent less days of actual observation in the last period, but a glance will show that this paucity covers dates mostly outside the high tide of migration, the month of October and early November furnishing of course by far the most of the duck records, while by late November the migration of all save a few Black Ducks, Sheldrakes, Whistlers, Buffle-heads, and Green-winged Teal, is over. Geese do not figure very largely in these totals, as in a previous paper I have noted that the coastal flight is well to the eastward of Wenham Lake.

I do not believe for a moment that there is an actual diminution of fowl nearly as great as these figures suggest. The periods considered are much too short for actual comparisons of this sort. I know for instance that we have to consider the periods 1900–04, which an examination of the records of several clubs at Currituck, N. C., show to have been one of great abundance, for the surface feeding ducks at least. The season 1909–10 stands out above all others for one club which has kept a record since 1888–89. Fluctuations in numbers may last for one or several years.

Other factors, such as the increase of boating, and the placing of a great number of electric lights about Wenham Lake, have undoubtedly tended during the last five years to discourage fowl; but in spite of all this I cannot but feel that there has been an actual decrease of the migration wave for this locality, perhaps amounting to 20 or 25 per cent.

Some of the individual records given below are embodied in Townsend's 'Birds of Essex County.'

MALLARD (*Anas platyrhynchos*). The total number taken for the entire period is 33. Not many more are noted. The Mallard occurs in little scattered flights which extend over two or three days, during which nearly all the gunning points get one or two. They have never occurred in September, and usually not before October 12 or 15. During the years 1900, 1905, 1906, 1907 and 1908 none were noted at all.

BLACK DUCK (*Anas rubripes* Brewster). Occurs occasionally in considerable numbers during the latter part of September, but for the last five years there have been very few noted. On years when Black Ducks are numerous there is always a good showing

in September. If a September flight occurs, it is sure to arrive any time after September 18 with the first cool frosty night, especially if preceded by a northwest wind.

This September flight we have always found preceded and accompanied by a marked migration of Osprey (*Pandion haliaëtus carolinensis*). These early birds are tame and easily decoyed. Mr. Brewster in 'The Auk' for July, 1909, noted that my records showed typical red-legged individuals occurring early only three times: September 29, 1904, October 3, 1907, and October 9, 1906. After October 20 they are common.

None of the regular local Black Ducks have ever used Wenham Lake, though undoubtedly if there was no boating, birds from Essex and Ipswich would use this sheet of water for a drinking and resting spot. Occasionally late in the fall and sometimes on heavy northeast storms, accompanied by high tides, a flock or two of "bay ducks" will come over from the salt water. These local ducks are extremely wary, and if shot, smell strongly of their salt-marsh foods.

The largest flock of Black Ducks which has visited the lake in the last ten years is 25. Flocks of over ten or twelve are rare. They arrive usually from a northeast or southeast direction, and alight far from shore in broad water.

Black Ducks represent over 33 per cent of the entire results for the ten year period. This is the duck *par excellence* of a thickly settled and shot-out country, for if given any chance at all, it will hold its own. The introduction of motor boats and night herring torching on the numerous creeks of the Ipswich marshes has sadly cut down the winter residents in Essex County. The main local breeding ground is the valley of the Ipswich River and its tributary brooks, where the building of cottages and the increase in canoes ever tends towards forcing the birds into a more restricted area. Careful spring protection, however, holds out hope that they may hold their own. In early August, 1908, while on a house-boat in Plum Isle River I had the opportunity to see 150 Black Ducks coming each evening to an artificial fresh water pond of some 75 acres in extent. This, however, was an unusual sight, even for this, a favorable spot.

GADWALL (*Chaulelasmus streperus*). This duck, exceedingly

rare in eastern Massachusetts, has occurred only once, October 26, 1904, when a single female was secured. Dr. Townsend, in 'The Birds of Essex County,' mentions several more taken during the same season.

BALDPATE (*Mareca americana*). The Widgeon is not at all an uncommon bird. There are numerous dates for September in the Wenham Lake records. They are often seen as single birds or in pairs, and once or twice in little flocks. Nineteen is the largest number in one year for the stand, and they have occurred every season except one. Fifty-six individuals have been taken. These Widgeon have usually decoyed readily, and seem to delight in climbing up on the beach, where they run about on good terms with the live decoys. They are, of course, all in immature plumage.

WIDGEON (*Mareca penelope*). While looking at the axillary feathers of various birds in the Museum of Comparative Zoölogy, Mr. Outram Bangs recently pointed out to me a new way of distinguishing at a glance, regardless of sex or plumage, between *M. americana* and *M. penelope*. This has enabled me to identify four Widgeon skins as belonging to *M. penelope* out of six skins from Wenham Lake, as follows: An immature male and a female taken Nov. 15, 1904, and two females (from the collection of Dr. C. W. Townsend) dated Oct. 17, 1903. All four of these skins have reddish heads. The 1903 birds are remembered to have been saved on account of their appearance, but the other two were probably set aside at random.

The characters referred to above are as follows: *M. americana*, axillaries practically pure white, except for a very fine dusky pattern at extreme tips or a slight dusky line along the main shaft in some cases. *M. penelope*, axillaries markedly dusky and finely patterned, especially on the inner webs. The outer webs may be almost entirely white, giving an appearance of white axillaries, until the feathers are spread apart.

This distinction has thus far been found to hold good through the entire series of Widgeon skins in the collection of Mr. William Brewster and the Museum of Comparative Zoölogy, comprising about fifty specimens of *M. americana* and about twenty-five of *M. penelope*.

The findings suggest the fact that *M. penelope* is far from an

uncommon bird and may turn out to be relatively more common among birds of the coastal migration route. Owing to the imperfect plumage of early fall Widgeon, it is not surprising that *M. penelope* has been overlooked, especially in Massachusetts.

GREEN-WINGED TEAL (*Nettion carolinense*). Has only occurred four times in the ten years, nine individuals being taken. The dates were in late November and December.

BLUE-WINGED TEAL (*Querquedula discors*). This duck is represented by only 13 individuals, this paucity being due to the fact that its migration is commonly in the second week in September, lasting but three or four days, and following rather strictly along the coast. During the great teal flight of 1904 I saw a flock of about 50 on Wenham Lake on the evening of September 13, as noted in Townsend's 'Birds of Essex County'; and on the same day another flock passing. September 15, 16, 22, and 27, 1904, flocks of teal were noted; but these are the only flocks appearing in the records.

The Blue-wing, quite curiously, is often associated singly with one or two Black Ducks. They quack lustily on hearing the decoys, and seem anxious to come to shore.

SHOVELER (*Spatula clypeata*). Represented by two specimens only, October 8, 1901, and November 6, 1903.

PINTAIL DUCK (*Dafila acuta*). This duck, which, with several other species goes in Massachusetts by the name of Gray Duck, is always seen in very poor plumage, and is confused with Widgeon, Gadwall, and Mallards. Our records show but 22 individuals and a few others observed. The flight is early. There are no November records for Wenham, but at Oldham, south of Boston in the town of Pembroke, Mass., I have one for November 21, 1909.

WOOD DUCK (*Aix sponsa*). Scarce migrant, but not uncommon locally. There are a few about the lake from early April to late October. These are birds which breed near by. They pay no attention whatever to the decoys. They often frequent a small mud-hole near the eastern shore of the lake. The largest flock of apparent migrants was eight, on October 3, 1903.

REDHEAD (*Marila americana*). The Redhead usually puts in a sudden appearance, often mixed with Lesser Scaup Ducks, occasionally single, but mostly in small flocks. They break out of the

sky with a roar of wings. On the pond they are, in the presence of live decoys at least, very restless, continually making short unexpected flights, only to return to the same spot. During the best year, 29 were secured, and another year 22. They have occurred eight out of the ten years, and 82 specimens have been taken. They are of course rare here as compared with ponds on the south shore of Martha's Vineyard.

CANVAS-BACK (*Marila vallisineria*). This species has occurred as follows: one on November 13, 1902; 5 on November 4, 1905, and two on November 3, 1909. One other individual was identified through a glass, but this completes the list. It was a curious coincidence that on the morning of November 4, 1905, three Canvas-backs came to the decoys before it was light, and at 2:30 P. M. of the same day a pair was taken.

SCAUP (*Marila marila* and *M. affinis*). These two species have been bunched in the records, so that it is not possible to separate them. During the last three seasons, however, and in 1904, count has been kept, and places the Greater Scaup at about 20 per cent of the number for the two combined species. The Scaups represent 13 per cent of the entire bag for the ten years. The Lesser appears at times in flocks of 12 to 25, while the large Scaup are often single, or three or four together. Nearly every flock of Redheads has had at least one or two Scaup among them. Scaup appear scattered along in the records late into November, and my earliest for the lake is September 18, 1904 (*M. marila*). The next earliest is October 4, 1900 (species not stated). Their appearance between the 8th and 12th of October is regular enough to be depended upon, and only once are they recorded as late as October 18.

RING-NECKED DUCK (*Marila collaris*). It is possible that some of these may have passed as common Scaups, as I did not see all the birds as they were taken. I am sure, however, that only a few could have got by in this way. The records show three specimens: one each on October 9 and 26, 1907, and one on October 13, 1908.

GOLDEN-EYE (*Clangula clangula americana*). A very common bird in the pond late in November, and always tending to become local at that time of the year, moving back and forth to the salt-water with the regularity of clock-work, but never, so far as I am

aware, spending the night on fresh water. Some fifteen years ago I shot several Whistlers about September 26 or 28,— the date was lost; but for the ten years the earliest appearance is October 8, 1904. The number taken, 5 per cent of the total fowl, does not at all represent the true abundance of this bird, as its natural shyness and absolute disdain for live decoys make it one of the most difficult birds to take from the shore. In the spring it is the first fowl to cheer the desolate surface of the lake, gathering in little flocks before the ice is out, and tracking regularly to salt water for several weeks.

BUFFLE-HEAD (*Charitonetta albeola*). A common late arrival at the pond in small flocks of three to six, and often with Ruddy Ducks. The earliest arrival is October 9, 1900; the latest arrival, November 4, 1904. From the 19th to the 25th of October is the ordinary date of appearance. Forty-seven individuals have been taken, which number does not represent their relative abundance, as they were not always shot on account of their small size and inferior flesh.

OLD-SQUAW (*Harelda hyemalis*). A rare duck in the ponds of Massachusetts, and represented here by only four individuals. Several others are noted as being seen. Occurred alone each time. The earliest is October 20, 1902.

NORTHERN EIDER (*Somateria mollissima borealis*). Has never occurred to my knowledge in the ponds of eastern Massachusetts except once at Furnace Pond, Pembroke, November 9, 1909. Three were shot, one of which is in my collection.

SCOTERS (*Oidemia americana, O. perspicillata,* and *O. deglandi*). Of these three ducks, the White-winged Scoter is by far the most common in the pond, and represents about 4 per cent of the total score. Large flocks of Scoters in migration are rarely seen at Wenham. Such a flight was only once noted, October 9, 1900, in a heavy northeast storm. Our point of observation is too far west to see many of these fowl.

RUDDY DUCK (*Erismatura jamaicensis*). The Ruddy Duck represents 15 per cent of the total number of fowl taken. From year to year there is a great variation in the number of these birds seen. In 1905, 114 were taken, and 70 others recorded, while in 1907 only one was taken, and two others noted. The earliest date is September 30, 1904.

CANADA GOOSE (*Branta canadensis*). As I have noted in a previous paper (Auk, July, 1910), geese are much less common here than at Chebacco Lake on Cape Ann, or rather at the base of it. There is a fly-way across the north end of Wenham Lake between Dodge's and Burnham's Hills, where far more geese pass than at the blind, from which point this fly-way cannot be seen. One hundred and eighteen geese figure in the totals. On a number of years, as will be seen by the table, the camp was closed too early to take advantage of the geese.

CORMORANT (*Phalacrocorax carbo*). Occasionally these birds have dropped into the lake, when, after a few dives, they usually go out of their own accord. Seven specimens have been taken, and a few others noted on the pond. Flocks in migration are common.

AMERICAN MERGANSER (*Mergus americanus*). A moderately common visitor to the lake after November 1. Twenty-three specimens have been taken, but among these only two fine males. On December 7, 1902, I have a record of the weights of these two males; 3 lbs. 15 oz. and 3 lbs. 7 oz. It is probable that the migration of the males is much later than that of the females.

RED-BREASTED MERGANSER (*Mergus serrator*). About as common as the American Merganser, 29 having been taken. Adult males very rarely seen, as in the foregoing species. Neither of these birds take kindly to live decoys, and approach the shore only in rather deep water.

HOODED MERGANSER (*Lophodytes cucullatus*). This bird has occurred in nine of the ten years, and is by far the commonest merganser seen about the pond. Adult males are again exceedingly rare. Out of 44 birds taken, I have only one really fine male in my collection, while I can recall only one or two others nearly approaching adult plumage. The fine male was taken on November 2, 1908. Unlike the preceding two species, this "wood sheldrake" is glad to associate with live decoys, and usually swims quickly among them if he alights near by. Of late years we have allowed them to go unmolested.

HOLBŒLL'S GREBE (*Colymbus holbœlli*). Represented by three specimens only, taken Oct. 27, 1903, Oct. 24, 1904, and Nov. 13, 1902.

HORNED GREBE (*Colymbus auritus* Linn.). Not very common. On October 1, 1904, a flock of 26 came into the lake, and six specimens were taken. A few others have been seen, but they have not always been separated from the Pied-billed Grebe in the records.

PIED-BILLED GREBE (*Podilymbus podiceps*). Seen quite commonly about the pond any time after the first of September. Has an innate love for the live decoys, among which it dives, striking terror into their hearts. By the end of October the grebes are rare.

LOON (*Gavia imber*). Very common in migration, but rather rare in the pond. If the gunner watches his decoys closely, he will often catch them cocking their heads, and if he looks directly into the zenith he may often see very high-flying fowl, more than likely loons. Large numbers of fowl which are so high as not to be visible except when directly overhead must escape observation. Only three loons are noted as having been shot, but many others were left unmolested. They evince a good deal of curiosity about the live decoys, and like to swim about just out of gun range.

RED-THROATED LOON (*Gavia stellata*). Rare in the pond. The only specimen in my collection is a female marked Wenham Lake, October, 1906. This bird has probably been once or twice included in the records under loons.

COOT (*Fulica americana*). Very common, but usually appearing alone. By nature rather sociable, this bird likes to come in amongst the decoys, or to sit on the beach near by. It is not uncommon at the time the camp is opened, and the latest date is Nov. 19, 1904.

Chebacco Lake.

This pond is situated four miles east and a little north of Wenham Lake. It is a long, narrow, and rather shallow pond of irregular shape, one and one fourth miles in length. It is therefore nearer the sea, and at the base of Cape Ann.

In looking over the gunning notes for a stand on the east shore of this pond from the year 1894 to 1909, there are several interesting facts worth noting.

The chief difference between this lake and Wenham is the comparative rarity of deep-water ducks — Redheads, Scaups, Ruddy

Ducks, and Whistlers; while a great many more Black Ducks and geese are seen in migration.

For instance, during the ten year period which we are considering at Wenham, I find Ruddy Ducks mentioned only on three years: one was taken in 1906; 2 in 1908, and five in 1909.

Redheads: 2 in 1904, 9 in 1909.

Whistlers are seldom seen or taken.

The proportion of Black Ducks to the total bag is larger than at Wenham. Spoonbills are noted on four occasions, five birds having been taken.

The terms Widgeon and Gray Ducks are used a great deal, but as these names are applied to a variety of species, it is not safe to lay too much stress upon them.

Geese are seen in some numbers at Chebacco Lake, perhaps three times as many as at Wenham.

Brant have come to the pond on two occasions, November 9, 1905, and November 26, 1900. They have been noted in flight several times.

In order to try and get a clear idea regarding the part of the country whence the Wenham flight ducks have come, a collection of stomachs was made in 1909, representing 11 species by 66 specimens.

These were very kindly analyzed by Mr. McAtee and his report is freely quoted below. Referring to the entire collection Mr. McAttee says: "One remarkable fact about them is that of the entire lot of 66, 22 were empty or nearly so. This is an unusual proportion of empty stomachs.... However, many of the birds must have had access to good feeding, as shown by the presence of wild celery, *Vallisneria spiralis*, in 12, and several of the stomachs were well filled.... The percentage of mineral matter for the whole number of stomachs is 35.6, rather high, showing that on the average the birds were not full fed. Most of them had access to good fresh-water feeding grounds, the Black Duck, Widgeon, Mallard, Ruddy, Goldeneye, and Canvasback getting buds and rootstocks of wild celery....Most individuals of the above mentioned species, and of both Scaups and Blue-winged Teal and Merganser had secured their food in fresh water. The Geese, however, one containing eel-grass and 8 an alga like the sea lettuce, *Ulva*, came

from the coast. The presence of marine mollusks in the stomachs of two Black Ducks, 2 Lesser Scaup and one Greater Scaup shows where these birds had been feeding before visiting Wenham Lake."

Mr. McAtee adds that he could make nothing out as to the point of origin of these birds from their stomach contents, but thinks that it is evident that they have come from a considerable distance without stopping long to feed. The analyses in detail are as follows:

"The contents of the Black Ducks' stomachs (29 in all, 4 empty) was 88.4 per cent. vegetable, the principal items being seeds of bur-reed (*Spanganium*), pondweed (*Potamogeton*), bulrush (*Scirpus*), eel-grass (*Zostera*) and mermaid weed (*Proserpinaca*), and buds, rootstocks, etc., of wild celery. The animal matter, amounting to 11.6 percent., included, in the order of importance, snails, ants, chironomid larvæ, bivalves, crustacea, and insects. The percentage of mineral matter of the gross contents was 36.5.

"The Geese had eaten vegetation entirely, including grass, eel grass, and algæ. Six of the 9 gizzards were nearly empty, and the mineral matter was 68.33 per cent of the gross contents.

"The Widgeons were entirely vegetarian also, consuming pond weed, wild celery, water-lily seeds (*Brasenia*), bur-reed, and smartweed seeds (*Polygonum hydropiper*). Mineral matter, 65 per cent.

"Three of the 5 Greater Scaup stomachs were empty; the others held animal and vegetable matter in equal proportions, the items being bur-reed, pondweed, and bivalves (*Gemma gemma*). Three of the four Lesser Scaups were almost without food, the objects secured being seeds of bur reed, bayberry, and saw-grass (*Cladium effusum*), and snails (*Lunatia heros*), and ants.

"The three Mallards had full stomachs. Ninety-seven per cent of the food was vegetable, including seeds of bayberry, saw-grass bulrush, mermaid weed, and pondweed, seeds and plants of *Naias flexilis*, and buds, roots, etc., of wild celery. Their animal food included a dragonfly nymph, chironomid and caddis larvæ, crustacea, and snails.

"Six of the 10 Ruddy Duck stomachs were empty or nearly so. The food was 40 per cent vegetable and 60 per cent animal; gravel, etc., 50 per cent. Seeds of bur-reed, pondweed, bulrush,

and *Naias* and buds, etc., of wild celery are the plant items, and chironomid and hydrophilid larvæ the animal substances.

"Four other species of ducks are represented by single stomachs. The Goldeneye contained seeds of pondweed, water-lily, bayberry, and bur-reed, buds and roots of wild cleery, and bits of water boatmen, and dragonfly nymphs. Animal matter 6 per cent; vegetable, 94; mineral 40 of the gross contents.

"The Canvasback had eaten seeds of bur-reed and wild celery buds. Vegetable matter, 100 per cent; mineral 60. The Hooded Merganser contained dragonfly nymphs and caddis larvæ. Animal matter, 100 per cent; mineral 20. The Blue-winged Teal had many young snails, various insects, and seeds of bur-reed, pondweed, smartweed, and various sedges and grasses. Animal matter, 88 per cent; vegetable, 12 per cent; mineral, 8 per cent."

THE BIRDS OF KERRVILLE, TEXAS, AND VICINITY.

BY HOWARD LACEY.

THE following list contains the observations I have made at my ranch where I have lived since 1882. Being always in the woods and fields, I have had a good chance to get acquainted with the natural history of the county. The ranch is seven miles southwest of Kerrville, in Kerr County, and about fifty-five miles northwest of San Antonio. It consists for the most part of rough hills and still rougher hollows and cañons, lying at an elevation of about 1800 feet, between the Guadaloupe River and its tributary Turtle Creek. It is well watered by small springs, but there is no considerable body of water nearer than the river.

The timber near Kerrville is mostly pecan, live-oak, hackberry and walnut in the valleys, with some fine cypress along the main river; on the hills occur cedar (*Juniperus*), shin-oak and Spanish oak. In the eastern and northwestern parts of the county there is a good deal of mesquite and the same sort of chaparral as occurs