

THE VERTEBRATES OF THE CAYUGA LAKE BASIN, N. Y.

(From the Department of Neurology and Vertebrate Zoölogy,
Cornell University.)

WITH FOUR MAPS.

BY HUGH D. REED AND ALBERT H. WRIGHT.

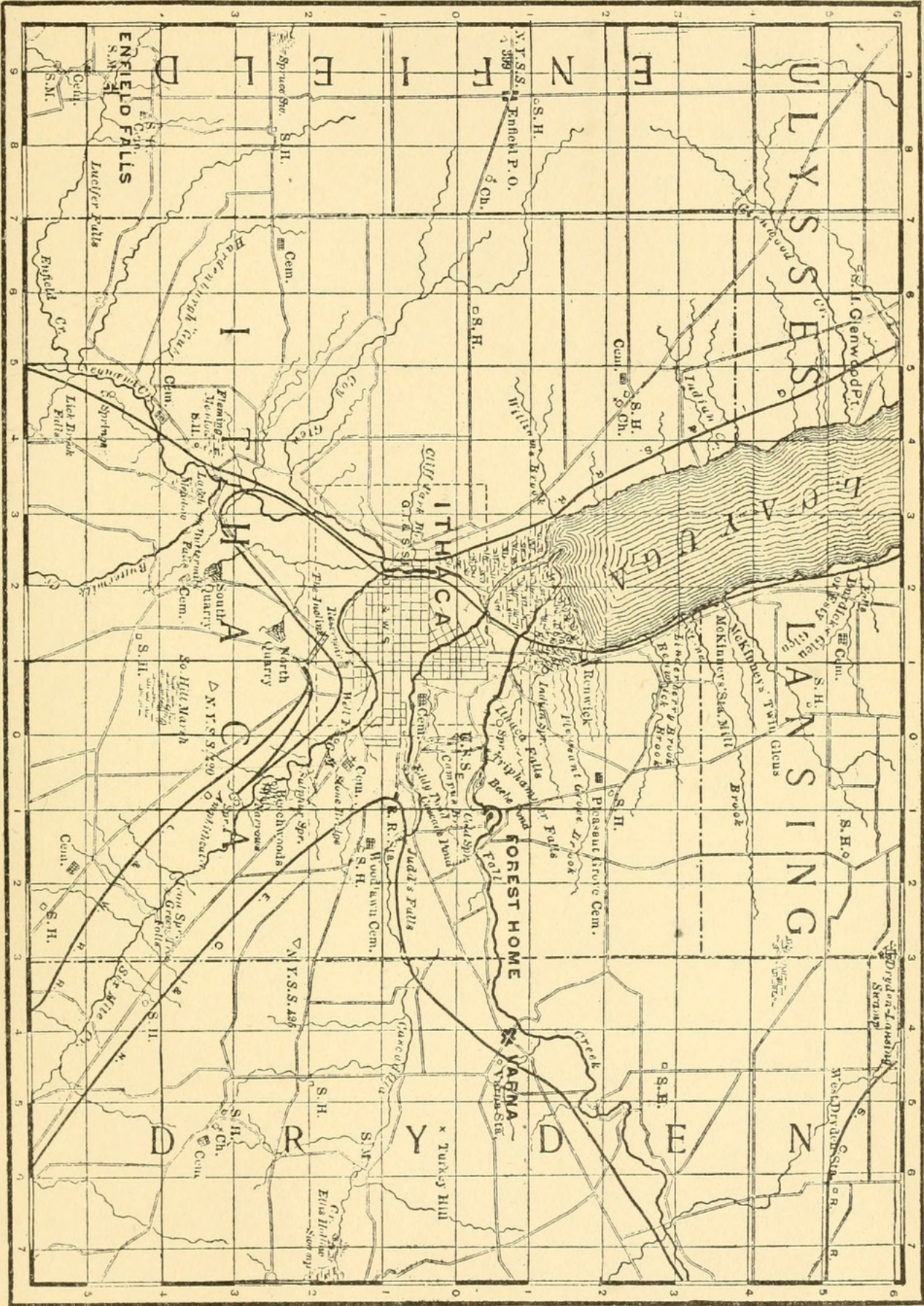
(*Read October 1, 1909.*)

INTRODUCTION.

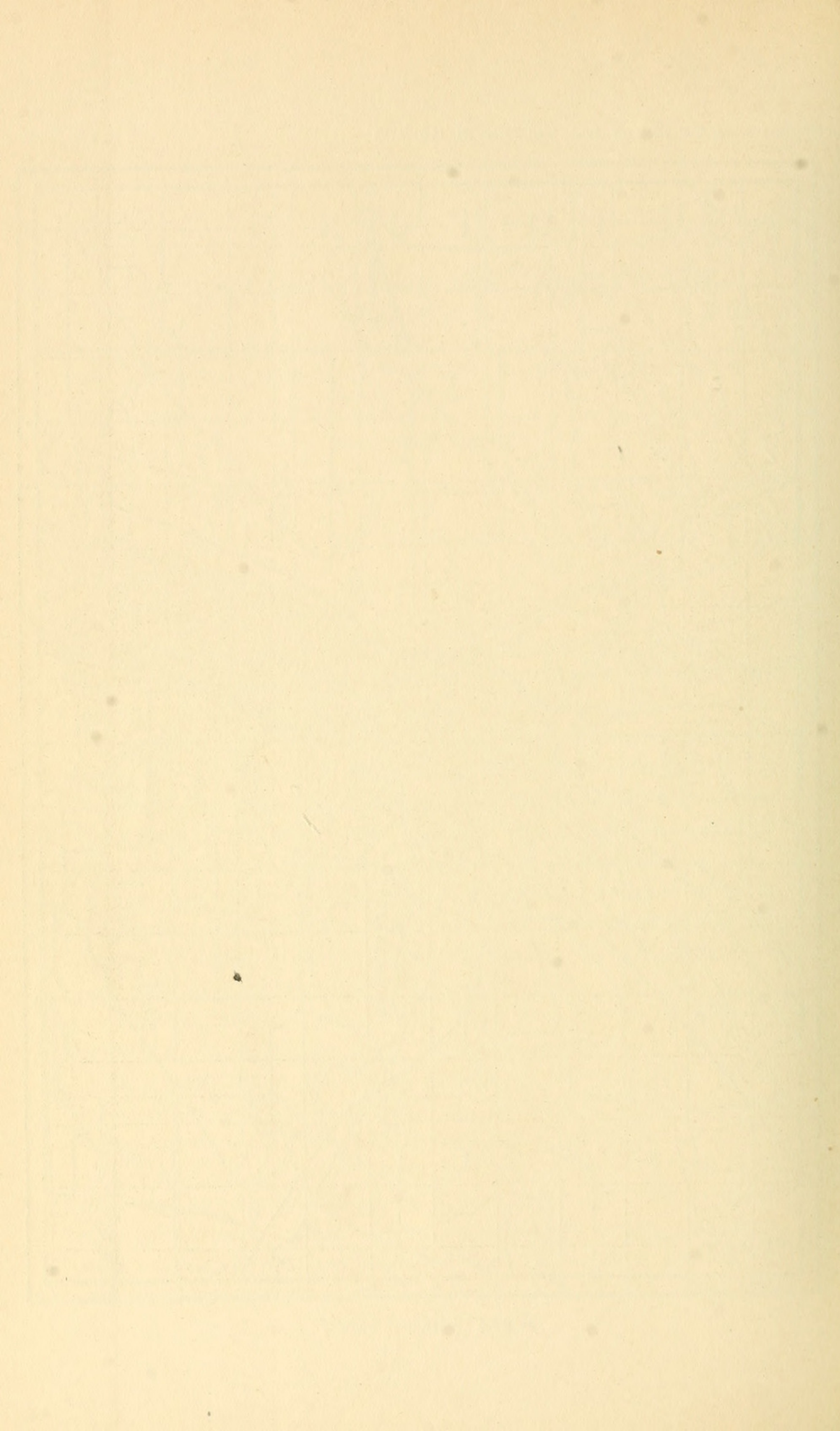
This paper is based mainly upon the records made by members of this department since the opening of the university in 1868; our personal observations have extended over the last twelve years. For valuable notes, helpful criticism and material assistance we are indebted to Professors B. G. Wilder, T. L. Hankinson and E. H. Eaton and to Messrs. G. S. Miller, Jr., L. A. Fuertes, A. A. Allen, G. C. Embury and John Vann. Many others have aided in various ways and acknowledgments are made in the proper places.

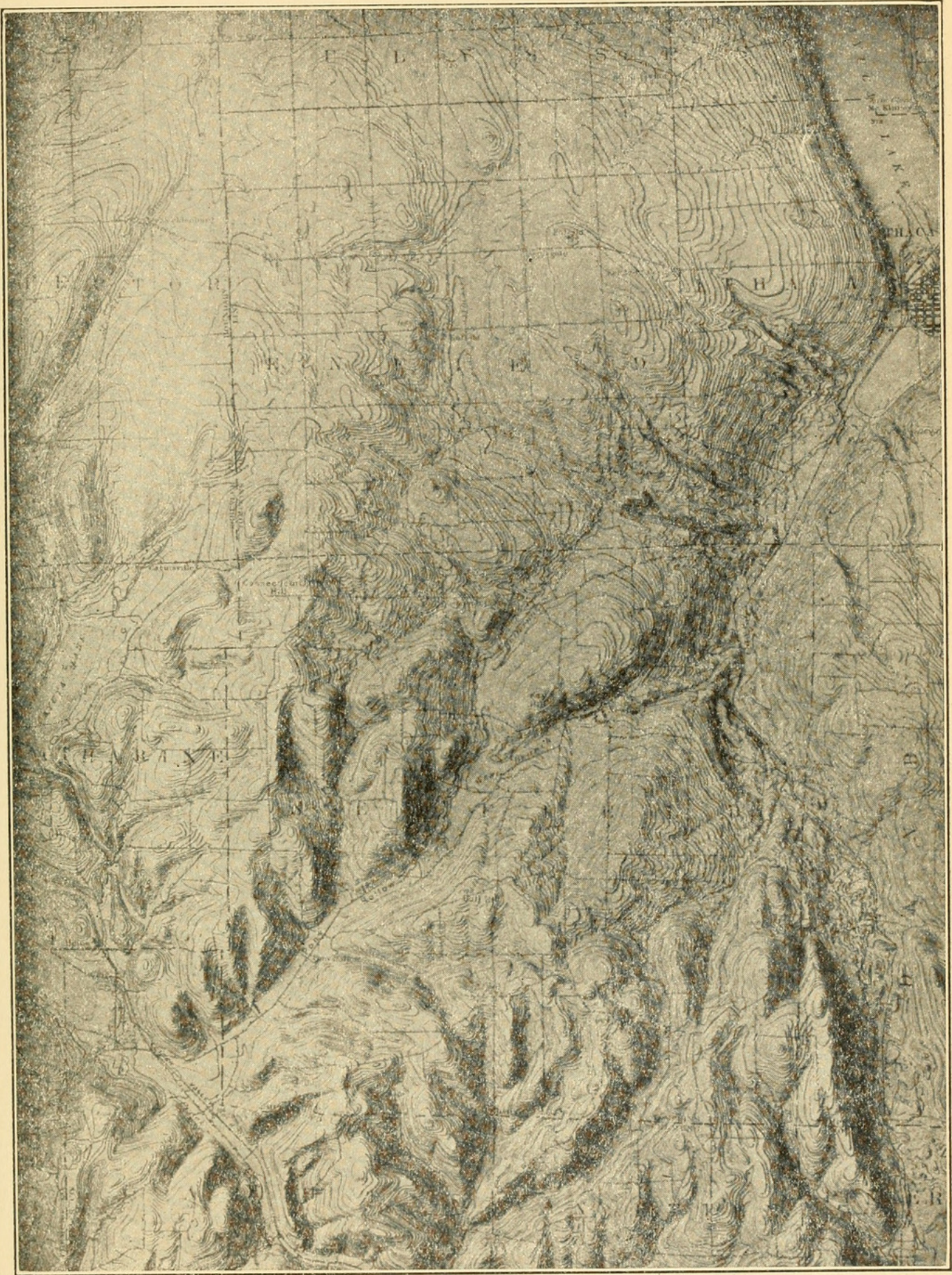
The paper includes all the vertebrates known by us to occur in this basin. Each record is based upon specimens taken within our limits. In cases of doubt as to identification the specimens have been submitted to specialists in the group.

The only previous publications which deal specifically with the vertebrates of this region are: "Fishes of Cayuga Lake," by B. G. Wilder, published in the *Weekly Ithacan* for June 25, 1875, "Notes on the Fishes of Cayuga Lake Basin," by Seth E. Meek, published in the *Annals of the New York Academy of Sciences*, Vol. IV., 1899, and "The Lake and Brook Lampreys of New York, Especially those of Seneca and Cayuga Lakes," by S. H. Gage, in the "Wilder Quarter-Century Book," 1893. There are numerous other publications which contain notes upon the vertebrates of this basin, particularly the birds and reptiles, to which reference will be made elsewhere.

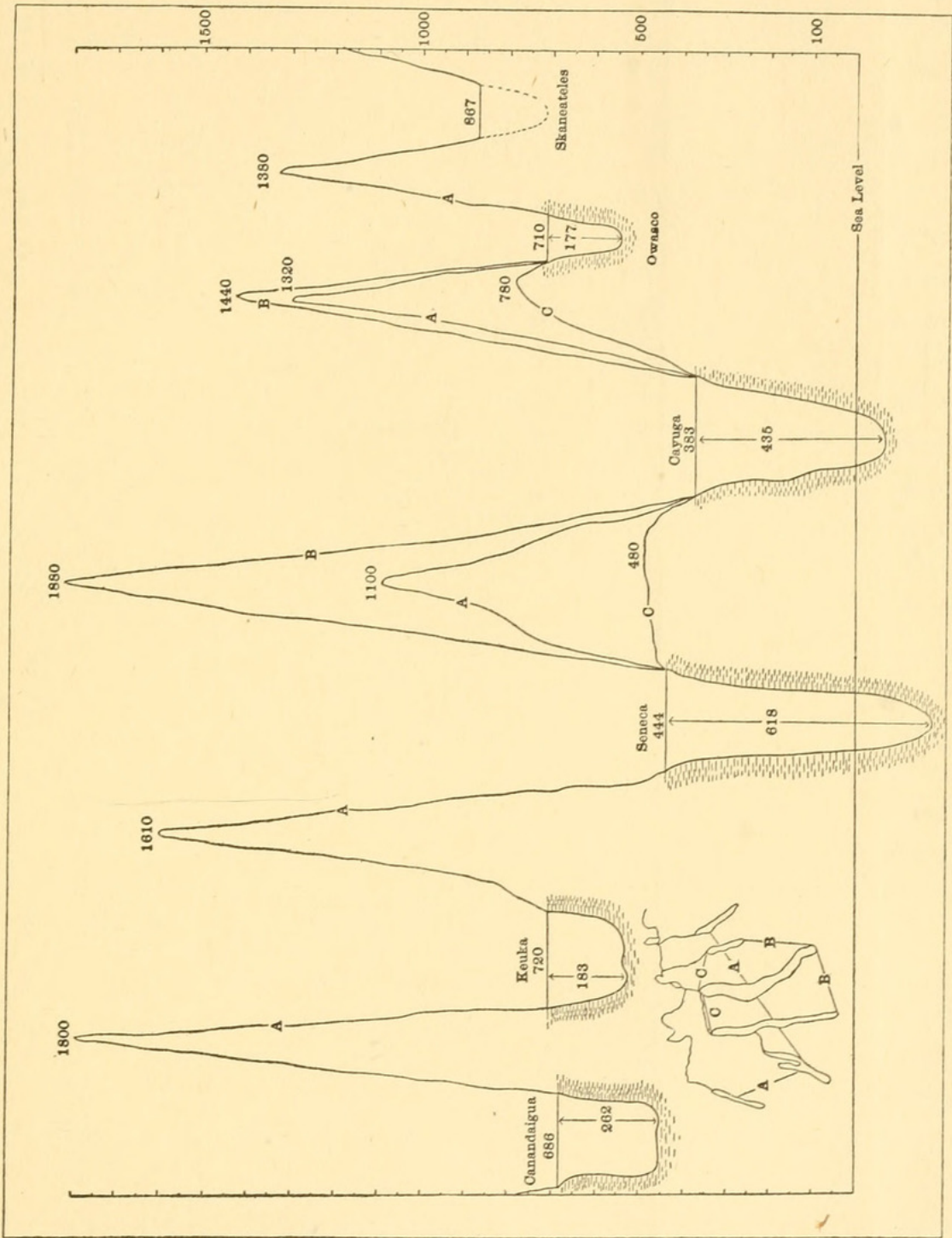


Map of Ithaca and Vicinity.

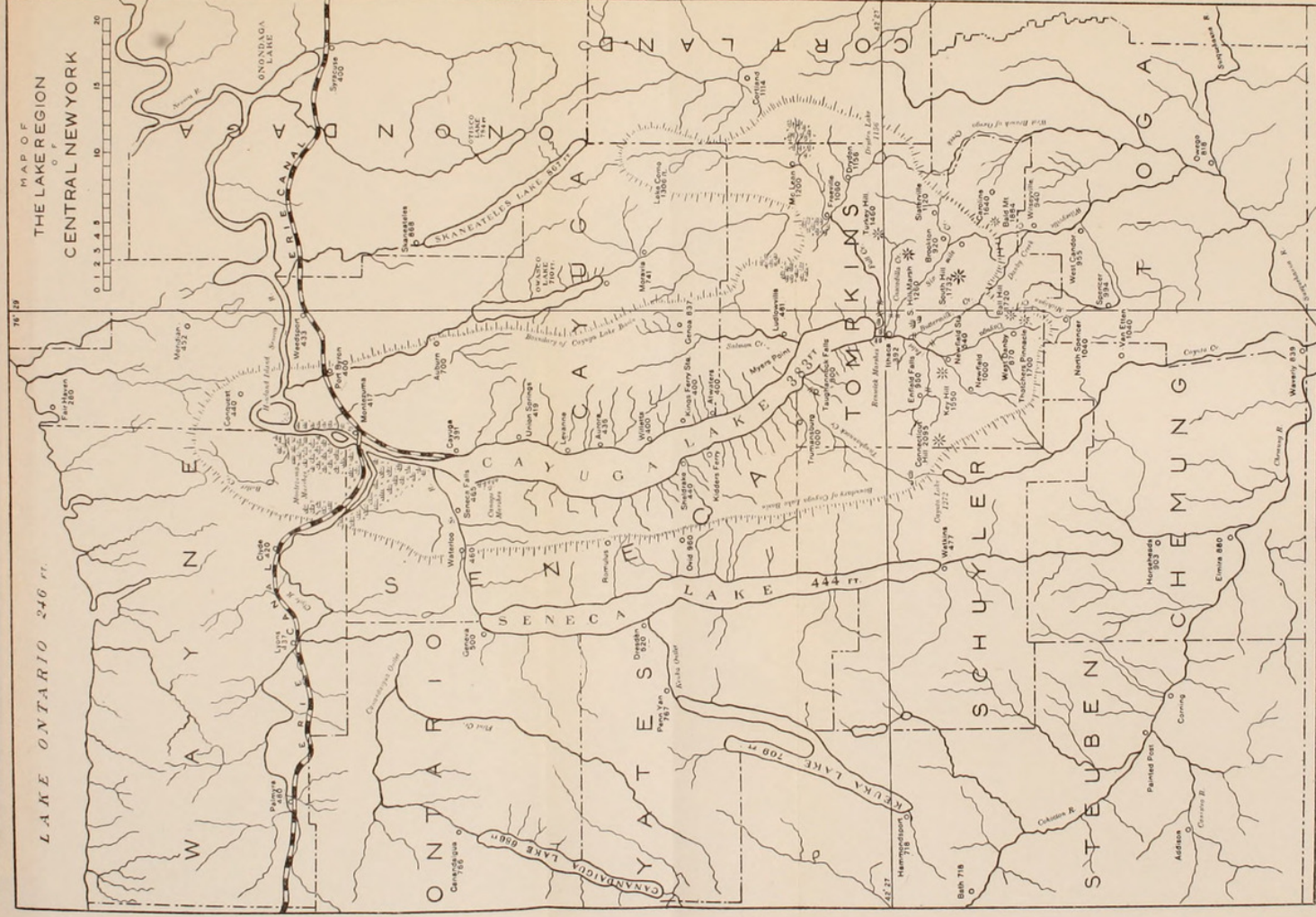




Relief Map of the Ithaca Quadrangle.



Cross-section of the Finger Lake Region.



The Maps.—The map of the Ithaca region (Pl. XVII) is from Dudley's "The Cayuga Flora." It shows this region in more detail than the general map. A small portion of the southern end of the basin is shown in a photograph (Pl. XVIII) of a relief map made by William Stranahan from the U. S. Geological Survey sheets. It gives a very accurate idea of the gorges and general surface carving in the southern portion of the basin. It is through the courtesy of Mr. Stranahan and the authorities of the Cornell University Library that we are able to reproduce it here. Plate XIX represents a cross-section of the finger-lake region, showing the comparative depths and altitudes of lake levels and the altitude of intervening land. The lakes are represented in section at their deepest points, the land as indicated by the lines *A*, *B*, *C* on the figure in the lower left-hand corner of the plate. The distance between the lakes is not proportional to the elevation. Plate XX is a map of the lake region of central New York based primarily upon the map published by Professor Dudley in his flora of the basin. It has been modified in many particulars in order to adapt it to the needs of the present paper. The modifications are based largely upon the maps of the U. S. Geological Survey and in a minor degree upon personal observations. The number accompanying the name of a town or hill indicates its altitude above sea level. The altitudes are taken from bench marks so far as they are given. In other cases the altitude given is that of the contour which passes through the center of a town or indicates the top of a hill.

The Lake Basin.—Cayuga is the largest of a series of approximately parallel lakes in central New York which extend in a north and south direction. They are long and narrow, virtually deep river valleys, and consequently have been very appropriately designated the "Finger Lakes." The basin as delimited in this paper (Pl. XX) comprises about 1,600 square miles. Throughout the greater part of this area only the actual catchment basin has been included, but, in the northern portion, the limits as we have set them are, to a certain degree, arbitrary. It includes a portion of the Clyde and Seneca rivers and the large Montezuma marshes which cover an area of 45 square miles.

The greatest length of the basin is about 65 miles, extending

from the source of Butler Creek southward to the source of the Cayuga inlet near North Spencer. The width gradually increases from 12 miles at Montezuma to Taughannock Falls, where it suddenly broadens to about 30 miles because of a finger-like extension along the course of Fall Creek.

The length of the lake is usually estimated at thirty-eight miles, its breadth from one and a half to three miles. In appearance, therefore, it resembles a great river; indeed it is said to occupy a part of a preglacial river channel of which the Neguaena¹ valley was the continuation. The height of the lake above mean tide is 383² feet, the greatest depth found by numerous soundings of the Cornell University Engineering Department was 435 feet at a point directly off Kidder's Ferry. In the section between Myers Point and Sheldrake Point it is in many places over 400 feet deep. On account of its depth its waters are comparatively cold far into the summer, and rarely become so chilled in winter as to admit of the formation of ice over the deeper sections. From one half to two thirds of the middle section usually remains open, but in the winter of 1884-5 the lake was frozen over before the middle of February and the ice did not break up till the first week in April. There is a tradition that this occurs about once in twenty years (Dudley).³

Data collected from various sources show that this tradition has some foundation in fact. Since the beginning of white settlements in this basin, soon after the Revolutionary War, the lake has frozen over seven times and the intervals have been, with one exception, from eighteen to twenty years. During the winter of 1836, ice covered the lake throughout its extent but was apparently very thin, for in an article under the caption "Cayuga"⁴ written in 1846 the writer observed that this condition lasted for a day or two only. Prior to 1836, the lake had been frozen twice but nothing is known concerning the dates further than that the intervals were about twenty years—probably about 1816 and 1796. During March and April, 1856, ice ten inches thick closed the entire lake. At many points teams were driven across. The *Ithaca Weekly Journal* of March 12, 1856, contains the following note:

Cayuga Lake is frozen over completely from one extreme to the other. The like has not been known for over twenty years (1836):

¹ Now called the Inlet valley.

² The average level as given by the U. S. Geological Survey is 381 feet.

³ Dudley, William R., "The Cayuga Flora, Part I.: A Catalogue of the Phænogamia Growing without Cultivation in the Cayuga Lake Basin," *Bulletin of the Cornell University* (Science), Vol. II., 1886, Andrus and Church. Ithaca, N. Y.

⁴ *Ithaca Daily Chronicle*, Dec. 22, 1846, Vol. I., no. 140.

During the last half of February and the first of March, 1875, ice thirteen inches thick covered the entire lake. On February 15, 1884, the lake again froze over completely and remained so until April 4. Since this date Cayuga has frozen from end to end but once and then during February, 1904. In certain places the ice was 22 inches thick. The shallow water at either end of the lake is frozen over usually by the middle of December and remains in this condition until the middle of March or the first of April.

Dudley further observes:

The temperature of the lake unquestionably influences the development of vegetation in its immediate vicinity. Plants on its shores are usually a week later in the spring than in the neighboring ravines and the warm valley about Ithaca, and a week earlier than on the distant hills; and during the first half of November, the blue flowers of *Aster laevis* and the white plumes of *Aster sagittifolius* still remain in considerable abundance, while they have long ago matured and faded near Ithaca.

Proceeding southward from the gently sloping shores near Cayuga Bridge the banks become gradually bolder, until in the vicinity of Levanna the first cliffs appear on the eastern shore. Between Willets and Kings Ferry these reach their culmination in the "High Cliffs"; but stretches of lofty, precipitous, or more or less broken declivities occur on both shores until within a few miles of the southern extremity. At intervals, especially near the mouth of some stream, are low, half-sandy points which yield many rare plants. Near Ithaca, and about two miles from the lake, the great valley forks, the main portion continuing to the right of South Hill, a preglacial valley of erosion extending southwardly to Waverly in the Susquehanna Valley. The other portion on the left of South Hill is similar to the first and forms the present Six Mile Creek and White Church Valleys, and opens into the Susquehanna at Owego. These deep valleys penetrate and cut through the great dividing ridge between the St. Lawrence or Great Lake hydrographic system to which our streams and smaller lakes are tributary, and the Susquehanna system, and are parallel to similar valleys east and west of us. The headwaters of the streams occupying them, *i. e.*, the summits between the two systems are usually very near the crossing of the dividing ridge. (Dudley.)

Hydrographic Areas.—A glance at a hydrographic map of the state will reveal the existence of seven river systems, only two of which lie within the province of this paper, namely: the Oswego, of which the Finger Lakes are a part, and the Susquehanna. The latter has in New York a catchment area of 6,267 square miles and comes into very close relation with the Oswego system through the numerous inlets of the Finger Lakes where the origins of many

of the streams of each system are very close, in a few instances with actual water connection.

The close relation existing between the Finger Lakes and the Susquehanna system is most marked in the tributaries of Cayuga Lake. Sixmile and Wilseyville creeks arise about three miles apart with a considerable elevation intervening, but within the upper three miles of their respective courses, they approach within three fifths of a mile of each other at precisely the same level with no high land between. Buttermilk creek arises one fourth of a mile from Michigan creek and three tenths of a mile from Danby Creek, all at an elevation of 1,100 feet. Taughannock Creek arises in the same marsh with a tributary of Cayuta Lake at an elevation of 1,300 feet. The inlet of Cayuga Lake arises one and one half miles from Spencer Creek at the same elevation and in the same stretch of marshy area. The west branch of the Inlet at its source is one fifth of a mile from Cantor creek in Pony Hollow. Sixmile Creek and the west branch of the Owego Creek rise in the same marsh at an altitude of 1,280 feet. The west branch of the Owego Creek also comes into close relation with Fall Creek through the tributaries of Dryden Lake.

These examples serve to show not only the possibility of recent connections but in the case of several streams of the two systems an actual connection at the present time. The sources of Sixmile and Wilseyville creeks are so close that they are connected for limited periods during flood times. Professor R. S. Tarr has expressed to us the belief that before the region was settled and the dense virgin forests cleared away, many of the streams of the Cayuga and Susquehanna systems, with present close relations, were actually connected in the heavily wooded swamps.

The outlet of the Finger Lakes is the Seneca River, which constitutes the principal component of the Oswego system. The stream itself is about fifty miles long and according to the U. S. Geological Survey has a drop of only twenty feet which accounts for its sluggish, meandering and marshy course. It receives the drainage of a little more than three thousand square miles of territory.

The following is a table of the elevations, and area of water and of catchment basins of the Finger Lakes taken from Rafter:⁵

Lake,	Elevation in Feet.	Area of Water in Square Miles.	Area of Catchment Basin in Square Miles.
Canandaigua	686	18.6	175
Keuka	720	20.3	187
Seneca	444	66.0	707
Cayuga	381	66.8	1593
Owasco	710	12.4	208
Skaneateles	867	12.8	73
Otisco	784	3.0	34

Thus it appears that Cayuga has a slightly greater water area,⁶ a decidedly greater catchment basin and a lower level (Pl. XIX) than any of the other Finger Lakes. The catchment basin is larger than the combined basins of the other six lakes. The usual fluctuation between high and low water in Cayuga is not great. Upon this point Rafter observes (p. 112):

According to figures given in the Eleventh Annual Report of the State Board of Health of New York it appears that the maximum fluctuation of Cayuga Lake for a long series of years has been 7.56 feet, although this large fluctuation may be possibly partly due to work done by the state in cutting out the channel of the Seneca River for the purpose of draining the Montezuma marsh. Ordinarily, the fluctuation of Cayuga Lake does not exceed between 2 and 3 feet. From March 4, 1887, to December 2 of that year, the lake fell 2.93 feet. By way of illustrating how these great natural reservoirs tend to prevent floods, it may be mentioned that the configuration of Cayuga outlet with relation to Clyde River is such that frequently, when there are heavy rainfalls in the catchment area of the Clyde River, Cayuga Lake being at the same time at a low level, the entire flood flow of Clyde River is discharged into Cayuga Lake without affecting Seneca River below the mouth of the Clyde River at all. It is undoubtedly due to this fact that fall floods on Oswego River are almost entirely unknown.

The evaporation of the Oswego River catchment area is exceedingly large—about 28 inches—whence it results that the run-off from a mean annual rainfall of from 36 to 37 inches does not exceed about 9 or 10 inches.

During the winter of 1908-9 the lake level fell 1.25 feet below the mean level (383 feet), the lowest it had been for twenty years.

⁵ Rafter, George W., "Hydrology of the State of New York," Bull. 85 of the New York State Museum, 1905, p. 216.

⁶ Much greater if the forty-five square miles of the Montezuma marshes are included.

The principal tributaries of Cayuga Lake are: Cayuga Inlet, Six-mile Creek, Cascadilla Creek, with a combined catchment area of 173 square miles, Salmon Creek, with a catchment area of 90 square miles, and Taughannock Creek, with a catchment area of 60 square miles. In their upper courses all these streams follow broad and gently sloping preglacial valleys without waterfalls. All, however, except the inlet, have cut a mile or more of post-glacial channel just before entering the lake valley. Here the channels are narrow and deep and the descent sudden, forming the gorges and waterfalls so characteristic of the tributaries of Seneca and Cayuga lakes. The fall of these streams in the last two miles (more or less) is between four and five hundred feet. What is said here of the principal tributaries applies to most of the streams entering Cayuga lake. In this connection Professor Dudley wrote:

There remains but one other feature to mention in this general review. Nothing in the physical aspect of this region strikes the stranger as more characteristic than the so-called gorges or ravines found in the first great bench above the lake and valleys, wherever a creek or even a brook descends to the lower level. The true gorges are probably, without exception, of recent or post-glacial origin; the walls are frequently of perpendicular or overhanging rock from fifty to two hundred feet or even much higher, as in Taughannock and Enfield ravines. Within these great chasms are usually falls or cascades, some of them exceedingly beautiful and of considerable height.

The Life Zones.—The Cayuga Lake basin is, in the main, typically Transitional, although in certain localities there is a trace of the Upper Austral and Canadian. All of the nine species of mammals, which, Miller⁷ observes, "will serve to identify any part of the Transition zone in New York," are found within the basin. These forms are:

Southeastern red squirrel,	<i>Sciurus hudsonicus loquax.</i>
Southern flying squirrel,	<i>Sciuropterus volans volans.</i>
Northern pine mouse,	<i>Microtus pinetorum scalopsoides.</i>
Naked-tailed mole,	<i>Scalops aquaticus.</i>
Hairy-tailed mole,	<i>Parascalops breweri.</i>
Northeastern chipmunk,	<i>Tamias striatus lysteri.</i>
Bonaparte's weasel,	<i>Putorius cicognani.</i>
Big brown bat,	<i>Vespertilio fuscus.</i>

⁷ Miller, Gerrit S., Jr., "Preliminary List of New York Mammals," Bull. of the New York State Museum, Vol. VI., No. 29, 1899.

Of the eastern birds which find their northern breeding limit in the Transition zone, nineteen out of the twenty-two mentioned by Miller breed in this basin. They are:

Bob-white,	<i>Colinus virginianus</i> .
Ruffed grouse,	<i>Bonasa umbellus umbellus</i> .
Mourning dove,	<i>Zenaidura macroura carolinensis</i> .
Yellow-billed cuckoo,	<i>Coccyzus americanus</i> .
Whip-poor-will,	<i>Antrostomus vociferus</i> .
Least flycatcher,	<i>Empidonax minimus</i> .
Baltimore oriole,	<i>Icterus galbula</i> .
Towhee,	<i>Pipilo erythrophthalmus</i> .
Grasshopper sparrow,	<i>Ammodramus savannarum australis</i> .
Indigo bunting,	<i>Passerina cyanea</i> .
Rough-winged swallow,	<i>Stelgidopteryx serripennis</i> .
Northern loggerhead shrike,	<i>Lanius ludovicianus migrans</i> .
Yellow warbler,	<i>Dendroica æstiva</i> .
Parula warbler,	<i>Compsothlypis americana usneæ</i> ,
Long-billed marsh wren,	<i>Telmatodytes palustris</i> .
Catbird,	<i>Dumetella carolinensis</i> .
Brown thrasher,	<i>Toxostoma rufum</i> .
Wood thrush,	<i>Hylocichla mustelina</i> .
Blue bird,	<i>Sialia sialis</i> .

Of the ten eastern birds which find the southern limit of their breeding range in the Transition zone of New York, six breed in this basin:

Pied-billed grebe,	<i>Tachybaptus podiceps</i> .
Purple finch,	<i>Carpodacus purpureus</i> .
Nashville warbler,	<i>Vermivora rubricapilla</i> .
Chestnut-sided warbler,	<i>Dendroica pensylvanica</i> .
Chickadee,	<i>Penthestes atricapillus</i> .
Veery,	<i>Hylocichla fuscescens</i> .

In the higher hills and in the upper parts of the gorges at the south end of the basin there is an unmistakable tinge of the Cana-

dian zone. In these localities are found five of the ten Canadian mammals characteristic of this zone in New York. They are:

Canadian white-footed mouse,	<i>Peromyscus maniculatus gracilis</i> .
Common red-backed mouse,	<i>Evotomys gapperi gapperi</i> .
Woodland jumping-mouse,	<i>Napæozapus insignis</i> .
Northeastern mink,	<i>Putorius vison vison</i> .
Smoky shrew,	<i>Sorex fumeus</i> .

Of the sixteen more characteristic Canadian birds breeding in New York, the Blackburnian and Magnolia warblers breed upon these hills. Associated with this assemblage of Canadian forms are others which, while not characteristically Canadian, may be considered northern forms. Such are:

Slate-colored junco,	<i>Junco hyemalis</i> .
Nashville warbler,	<i>Vermivora rubricapilla</i> .
Black-throated blue warbler,	<i>Dendroica cærulescens</i> .
Black-throated green warbler,	<i>Dendroica virens</i> .
Water-thrush,	<i>Seiurus noveboracensis</i> .
Canadian warbler,	<i>Wilsonia canadensis</i> .
Winter wren,	<i>Nannus hiemalis</i> .
Hermit thrush,	<i>Hylocichla guttata pallasii</i> .

In about the same degree in which a trace of the Canadian zone is found in the higher portions of the basin there is a trace of the Upper Austral in the lowlands about the head and outlet of the lake. In these places are found such of the characteristic birds of the Upper Austral zone as breed in New York, viz.,

Louisiana water-thrush,	<i>Seiurus motacilla</i> .
Yellow-breasted chat,	<i>Icteria virens</i> .
Hooded warbler,	<i>Wilsonia citrina</i> .
Carolina wren,	<i>Thryothorus ludovicianus</i> .
Tufted titmouse,	<i>Bæolophus bicolor</i> (one specimen).

In the same localities with the above are found species which reach their northern breeding limit in the Transition zone in New York having a wider breeding range to the southward, viz.:

Barn owl,	<i>Aluco pratincola</i> .
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Red-bellied woodpecker,	<i>Centurus carolinus.</i>
Rough-winged swallow,	<i>Stelgidopteryx serripennis.</i>
Orchard oriole,	<i>Icterus spurius.</i>

A few Lower Austral forms, as the glossy ibis, the egret and the turkey vulture, have been taken in Montezuma marshes during the summer season. In the lowlands about the head of the lake, particularly the Renwick marshes, there remain throughout the winter a number of transients and summer residents. They are:

Kingfisher,	<i>Ceryle alcyon.</i>
Flicker,	<i>Colaptes auritus luteus.</i>
Meadow lark,	<i>Sturnella magna.</i>
Song sparrow,	<i>Melospiza melodia.</i>
Swamp sparrow,	<i>Melospiza georgiana.</i>
Winter wren,	<i>Nannus hiemalis.</i>
Long-billed marsh wren,	<i>Telmatodytes palustris.</i>
Robin,	<i>Planesticus migratoria.</i>

The localities where the more southern birds are found breeding and where a few summer residents pass the winter are the alluvial flood plains which constitute the "sheltered spots" of the basin. According to Dudley a few very rare plants belong to these levels, among them the more southern species.

Meteorology.—The basins of Canandaigua, Keuka, Seneca and Cayuga lakes constitute a meteorological subdivision of the state termed the Central Lake region. On the north this subdivision meets the Ontario region. Lakes Owasco and Skaneateles are considered as within the meteorological subdivision known as the Eastern Plateau which lies to the east and southeast of the central lakes. The Seneca lake basin, except for a small portion of its northern extremity, lies wholly within the Central Lake region while that of Cayuga is not only continuous with the Ontario region in its northern extremity but its southeastern portion projects for a considerable distance into the Eastern Plateau.

The normal annual temperature of the Central Lake region differs only slightly from that of the Ontario and to the extent of about three degrees only from the Eastern Plateau. The normal temperature for each of the three regions computed from the nor-

mal annual temperatures for eleven years, 1891–1901, is: Ontario 47.5°, Central Lakes 48.3°, Eastern Plateau 45.9°. Thus it appears that the Central Lake region is .8° warmer than the Ontario and 2.4° warmer than the Eastern Plateau.

The extent to which the lake modifies the climate of the basin, if any, is still to be determined. Dr. W. D. Wilson, of Geneva, in comparing the influence of the lakes upon Ithaca and Geneva,⁸ states that the northerly winds in winter are warmed by their passage up the lake valley, which they follow more or less closely, and cause the temperature in the vicinity of Ithaca during this season to stand 3.3 degrees higher than it otherwise would. According to E. C. Turner the observations made at Ithaca prior to 1897 substantiate Dr. Wilson's views and moreover indicate that they apply to the whole of the central lake region.

The normal monthly temperature for Ithaca compiled from data collected from 1875 to 1905 follows:

January.....	24.1	July.....	70.6
February.....	25.1	August.....	68.2
March.....	31.9	September.....	60.6
April.....	44.2	October.....	49.5
May.....	57.0	November.....	37.6
June.....	66.2	December.....	28.4

The sum of daily heat units above 32 degrees is 14,317, compiled from a table of normal daily temperature for 33 years and the average normal daily temperature of the six hottest weeks is 70.4 degrees. According to Turner, from 1879 to 1893 the average date of the latest freezing temperature was May 6, the extremes being April 9 and May 29. The average date of the first freezing temperature in the fall was October 10, the earliest being September 26, while in one year 32 degrees was not reached until October 31. A table of the latest spring and earliest fall killing frosts from 1900 to 1907 at three stations in the basin follows:

Ithaca.	Romulus.	Auburn.
1900. May 7–Oct. 20	May 10–Oct. 20	May 6–Oct. 16
1901. April 12–Oct. 28	Oct. 18	April 12–Oct. 6

⁸ See Turner, E. T., Eighth Annual Report of the New York Weather Bureau, Assembly Documents, Vol. 25, 1897, p. 440.

	Ithaca.	Romulus.	Auburn.
1902.	May 10-Oct. 10	May 15-Oct. 15	May 14-Oct. 10
1903.	May 2-Oct. 25	May 2-Oct. 25	May 2-Oct. 24
1904.	May 12-Oct. 7	April 22-Sept. 22	April 22-Sept. 22
1905.	May 2-Oct. 26	May 3-Oct. 26	May 2-Oct. 23
1906.	May 21-Oct. 1	May 21-Oct. 8	May 21-Oct. 8
1907.	May 12-Oct. 21	May 21-Oct. 9	May 21-Oct. 9

The average precipitation for the Central Lake region is slightly less than that for either the Great Lake or Eastern Plateau. The mean annual precipitation for these regions compiled from precipitation data for the years 1891 to 1902 is: Great Lakes 35.65 inches, Eastern Plateau 40.8 inches, Central Lakes 34.46 inches. The normal monthly precipitation at Ithaca compiled from the last twenty-nine years follows:

January.....	2.16 in.	July.....	3.75 in.
February.....	1.87 in.	August.....	3.24 in.
March.....	2.44 in.	September.....	2.83 in.
April.....	2.29 in.	October.....	3.17 in.
May.....	3.43 in.	November.....	2.58 in.
June.....	3.88 in.	December.....	2.64 in.

From 1900 to 1907 there have been from 150 to 185 rainy days each year. For the same period the annual snowfall (unmelted) has varied from 46.4 to 75.8 inches, the average being 63.6. One of the striking features of the region about Ithaca is the small percentage of clear days, as the following table will show:

	Cloudy.	Partly Cloudy.	Clear.	Percentage of Clear Days.
1900	174	109	82	22.4
1901	171	126	68	18.6
1902	149	151	65	17.8
1903	195	98	72	19.7
1904	180	115	71	19.4
1905	148	126	91	24.9
1906	164	92	109	29.8
1907	163	140	62	16.9

Based upon average hours of sunshine from 1900 to 1903 R. G. Allen derived 49 per cent. as an annual mean of sunshine, or a monthly mean of 189 hours of sunshine.

The average of mean relative humidities at Ithaca from 1900 to

1907 is 77 per cent., based upon readings taken at 8 A.M. The range for these years being from 73 to 80 per cent.

The total movement of wind in miles varies from 62,556 to 79,172. The maximum velocity ranges from 36 to 54 miles per hour in the period from November to March. The prevailing direction of the wind for the past eight years has been northwest. Besides the general winds there are local currents or night winds particularly in the southern portion of the basin. Concerning these Dr. W. M. Wilson⁹ writes:

The night wind commonly sets in two or three hours after sunset, first as a light breeze, but gradually increasing in strength until a velocity of about eight miles per hour is reached. This current has its origin on the hillsides at the southern end of the lake and flows northward down the channels of the two principal streams which form the inlet, converging into the main depression at the head of the lake. The flow of the current as it moves northward over the level surface of the lake is augmented by the cool currents which join the main stream through the numerous gorges and water courses entering the valley from either side. Along the western shore at the southern end of the lake, where the densely wooded slopes cool the air near the surface, the flow of the cool breeze down the water courses towards the lake often continues throughout the day. The night breeze is usually stronger, but the day breeze as it comes from the depths of the woods is delightfully refreshing.

The meteorological conditions of the Cayuga basin and more particularly those about Ithaca are thus commented upon by Garriott:¹⁰

In spring, summer and autumn precipitation is preceded twelve to forty-eight hours by southeast winds and falling barometer, and the barometer generally falls to 29.90, or below, in spring and summer, and to 29.95, or below, in autumn before precipitation begins. In winter southerly winds precede precipitation, but the winds shift more quickly and the signs of precipitation are not so well defined as in other seasons; precipitation begins in this season with a falling barometer and when the barometer has fallen to 30 or below. On account of the position of this station on the hillside and above the lake, diurnal winds are noticeable, especially during the warm months. When not influenced by passing storms these winds come as a gentle east to southeast breeze by night and by day a northwest wind having a velocity of two or three times greater than the day breeze. When, instead of shifting to the

⁹ Wilson, W. M., "New York Section of the Climatological Service of the Weather Bureau in coöperation with Cornell University," August, 1906, p. 59.

¹⁰ Garriott, Edward B., "Weather Folk-lore and Local Weather Signs," U. S. Department of Agriculture, Bull. 294 of the Weather Bureau, p. 93.

northwest in the early morning, the wind continues from the southeast and begins to increase in force, the approach of a storm is indicated. While rain begins most frequently with falling barometer, the heaviest rainfall often comes, especially in the warmer months, after the turn of the barometer from falling to rising.

Richard's registering hygrometer shows that in spring and summer the humidity sometimes decreases before rain, but rapidly increases after rain begins; in spring rain begins with relative humidity from 50 to 98 per cent., and in summer it may be as low as 50 per cent. one hour before rain begins. In autumn the effect of day and night seems greater than the influence of passing storms, and rain will begin with relative humidity as low as 50 per cent. one hour before rain. In winter there is usually an increase in humidity from one half to four hours before rain, and dry snow will begin with relative humidity as low as 40 per cent.

Cirrus clouds are reliable indications of precipitation in all seasons, but are liable to be obscured by lower clouds of local formation in the colder portion of the year. These clouds appear moving from the west in the spring and winter, from the northwest in summer, and from the southwest in autumn, twenty-four to thirty-six hours before precipitation begins. Special characteristics of clouds have not been noted except in connection with cirrus clouds.

Frost is likely to damage fruit or other crops in May and September. Heavy frost is generally preceded by high barometer, low temperature and humidity, very high wind and clear weather.

The Fishes of the Basin.—The fish fauna of the basin comprises 65 species distributed among 21 families, as follows:

Petromyzonidæ	2 species.	Umbridæ	1 species.
Acipenseridæ	1 "	Esocidæ	2 "
Lepisosteidæ	1 "	Pœciliidæ	1 "
Amiidæ	1 "	Gasterosteidæ	1 "
Siluridæ	5 "	Percopsidæ	1 "
Catostomidæ	4 "	Atherinidæ	1 "
Cyprinidæ	19 "	Centrarchidæ	7 "
Anguillidæ	1 "	Percidæ	7 "
Clupeidæ	1 "	Serranidæ	1 "
Salmonidæ	5 "	Cottidæ	2 "
	Gadidæ		1 species.

As yet too little is known of the fish fauna of the finger lakes to draw any definite conclusions concerning the general distribution of species or the relation of these faunas to others. Lake Cayuga and Seneca River have water connection with Lake Erie and the Hudson River through the Erie Canal; with Lake Ontario both through river and canal (Oswego); with the Susquehanna system through several

of the southern tributaries at certain periods of the year. It is possible, therefore, that these lakes may receive species from all three sources. Of the 65 species found in the basin 19 are common to the Ontario and Susquehanna basins although frequently varying in abundance. A table follows:

	Susquehanna.	Cayuga.	Ontario,
<i>Exoglossum maxillingua</i> ,	very common,	common,	uncommon.
<i>Semotilus bullaris</i> ,	very common,	rare,	uncommon.
<i>Erimyzon sucetta oblongus</i> ,	very common,	uncommon,	uncommon.
<i>Esox reticulatus</i> ,	common,	common,	rare.
<i>Catostomus nigricans</i> ,	very common,	rare,	common.
<i>Hybopsis kentuckiensis</i> ,	common,	rare,	common.
<i>Chrosomus erythrogaster</i> ,	common,	rare,	uncommon.
<i>Percina caprodes zebra</i> ,	common,	rare,	common.
<i>Lota maculosa</i> ,	rare,	uncommon,	common.

Several of the basses are common to all three basins but the introduction of these species from one place to another renders them of no comparative value.

Twenty-one species are common to the Cayuga and Ontario basins. Two species, *Cottus gracilis* and *Notropis procne*, are common to the Cayuga and Susquehanna basins. There are in the Cayuga basin four species which do not occur in either the Ontario or Susquehanna. One of these is the smelt, *Argyrosomus osmeriformis*, confined to the interior lakes of New York. The others, *Notropis umbratilis*, *Notropis anogenus* and *Lepomis cyanellus*, are most common in the northern portion of the basin and doubtless found their way hither through the Erie Canal from Lake Erie.

It appears that the fish fauna of the Cayuga basin bears the stamp of Lake Ontario with just a trace of the Susquehanna and Erie basins. There is a possibility that species which seem to have found their way here from the Erie and Susquehanna basins were introduced along with game fishes or from bait pails. Observations made in Monroe Co., New York, by A. H. Wright¹¹ indicate that fishes find their way eastward through the Erie Canal.

Amphibia.—One of the characteristic features of our vertebrate fauna is the relative abundance of amphibian species and individuals, particularly in the southern portion of the basin. In this respect the

¹¹ Wright, A. H., MS., "The Fishes of Monroe Co., New York."

basin is similar to the mountains of Pennsylvania. The seventeen species are distributed among the following families:

Proteidæ	1 species.	Pleurodelidæ	1 species.
Ambystomidæ	1 "	Bufonidæ	1 "
Plethodontidæ	5 "	Hylidæ	2 "
Desmognathidæ	1 "	Ranidæ	5 "

Reptilia.—Twenty species of reptiles are known within our limits. The lizards are represented by a single specimen of the Ground Lizard, *Leiolopisma laterale*, found just northeast of Caroline on the divide between Sixmile Creek and a branch of the Susquehanna. Twelve species of snakes are known, three of which are now very rare. The rattlesnake so far as we know is met with only occasionally in the region about McLean, while the blacksnake and pilot snake are confined to the extreme southern portion of the basin near Newfield and Danby.

There are seven species of turtles, representing four families as follows:

Trionychidæ	1 species.	Kinosternidæ	1 species.
Chelydridæ	1 "	Emydidæ	4 "

Only three of the seven species, the snapping turtle (*Chelydra serpentina*), Agassiz's painted turtle (*Chrysemys marginata*), and the wood tortoise (*Clemmys insculpta*) are found distributed throughout the basin. The other four are confined to the extreme northern portion. The musk turtle (*Terrapene odorata*), a species fairly widely distributed east of the Mississippi, was first found in this basin in the fall of 1908 and proved to be common in the Seneca River near the Erie Canal. The Soft-shelled turtle (*Aspionectes spinifer*), a species of more northern and western distribution, is very rare at the south end of the basin but found fairly common about Montezuma. The Speckled tortoise (*Clemmys guttata*) is widely distributed in central and eastern United States but in this region is confined to the vicinity of the Junius Ponds north and west of Waterloo. Muhlenberg's turtle (*Clemmys muhlenbergii*), a species limited in its range to eastern Pennsylvania, New Jersey and the Hudson Valley, is the only more eastern form found here aside from those of wide distribution.

Birds.—The birds that have been recorded for this region comprise 257 species distributed among 51 families as follows:

Colymbidæ	3 species.	Strigidæ	8 species.
Gaviidæ	2 "	Cuculidæ	2 "
Alcidæ	1 "	Alcedinidæ	1 "
Laridæ	9 "	Picidæ	7 "
Procellariidæ	1 "	Caprimulgidæ	2 "
Phalacrocoracidæ	2 "	Micropodidæ	1 "
Pelecanidæ	1 "	Trochilidæ	1 "
Anatidæ	33 "	Tyrannidæ	8 "
Ibididæ	1 "	Alaudidæ	2 "
Ardeidæ	6 "	Corvidæ	3 "
Gruidæ	1 "	Icteridæ	8 "
Rallidæ	6 "	Fringillidæ	31 "
Phalaropodidæ	3 "	Tanagridæ	1 "
Recurvirostridæ	1 "	Hirundinidæ	6 "
Scolopacidæ	20 "	Bombycillidæ	1 "
Charadriidæ	4 "	Laniidæ	2 "
Aphrizidæ	1 "	Vireonidæ	5 "
Odontophoridæ	1 "	Mniotiltidæ	31 "
Tetraonidæ	1 "	Motacillidæ	1 "
Columbidæ	2 "	Mimidæ	2 "
Cathartidæ	1 "	Troglodytidæ	5 "
Buteonidæ	9 "	Certhiidæ	1 "
Falconidæ	3 "	Sittidæ	2 "
Pandionidæ	1 "	Paridæ	2 "
Aluconidæ	1 "	Sylviidæ	2 "
Turdidæ		9 species.	

The following tables show the seasonal status of each species that has been found in the lake basin.

PERMANENT RESIDENTS.

Bob-white,	Hairy woodpecker,
Ruffed grouse,	Downy woodpecker,
Red-tailed hawk,	Red-headed woodpecker,
Red-shouldered hawk,	Prairie horned lark,
Barn owl,	Blue jay,
Long-eared owl,	Crow,
Short-eared owl,	Goldfinch,
Barred owl,	Song sparrow,
Screech owl,	White-bellied nuthatch,
Great horned owl,	Chickadee.

TRANSIENT VISITANTS.

Holboell's grebe (sometimes in winter),	Solitary sandpiper,
Horned grebe (sometimes in winter),	Black-bellied plover,
Common loon (sometimes in winter),	Semipalmated plover,
Bonaparte's gull,	Broad-winged hawk (found breeding in 1890),
Common tern,	Duck hawk,
Red-breasted merganser (a few regularly in winter),	Pigeon hawk,
Mallard (a few regularly in winter),	Osprey,
Gadwall,	Yellow-bellied flycatcher,
Baldpate,	Alder flycatcher (breeds locally),
Green-winged teal,	Rusty blackbird,
Blue-winged teal,	Nelson's sparrow,
Shoveller,	Acadian sharp-tailed sparrow,
Pintail,	White-crowned sparrow,
Lesser scaup duck (sometimes in winter),	White-throated sparrow,
Ring-necked duck,	Junco (uncommon in winter; breeds locally),
Buffle-head (sometimes in winter),	Lincoln's sparrow,
Ruddy duck (sometimes in winter),	Fox sparrow,
Great blue heron,	Northern loggerhead shrike,
Black-crowned night heron,	Blue-headed vireo (found breeding in 1893),
Knot,	Black and white warbler (breeds locally),
Pectoral sandpiper,	Nashville warbler (breeds locally),
Least sandpiper,	Tennessee warbler,
Red-backed sandpiper,	Parula warbler (breeds locally),
Semipalmated sandpiper,	Cape May warbler,
Sanderling,	Black-throated blue warbler (breeds locally),
Greater yellow-legs,	Myrtle warbler,
Yellow-legs,	Magnolia warbler (breeds locally),
	Cerulean warbler (breeds on Howland Island),

Bay-breasted warbler,	Hooded warbler (breeds locally),
Black-poll warbler,	Wilson's warbler,
Blackburnian warbler (breeds locally),	Canadian warbler (breeds locally),
Black-throated green warbler (breeds locally),	Titlark,
Pine warbler (breeds locally),	Red-breasted nuthatch (sometimes in winter),
Palm warbler,	Golden-crowned kinglet (sometimes in winter),
Water-thrush (breeds locally),	Ruby-crowned kinglet,
Connecticut warbler (fall only),	Gray-cheeked thrush,
Mourning warbler (breeds locally),	Olive-backed thrush (found breeding in 1890),
Yellow-breasted chat (breeds locally),	Hermit thrush (breeds locally).

SUMMER RESIDENTS.

Black duck (a few found regularly in winter),	Bald eagle,
Wood duck,	Sparrow hawk,
Bittern,	Yellow-billed cuckoo,
Least bittern,	Black-billed cuckoo,
Green heron,	Belted kingfisher (sometimes in winter),
King rail,	Yellow-bellied sapsucker (not common at this season),
Virginia rail,	Flicker (sometimes in winter),
Sora,	Whip-poor-will,
Florida gallinule,	Nighthawk,
Coot,	Chimney swift,
Woodcock,	Ruby-throated hummingbird,
Wilson's snipe (not common at this season),	Kingbird,
Spotted sandpiper,	Phoebe,
Killdeer,	Wood pewee,
Mourning dove,	Least flycatcher,
Marsh hawk,	Bobolink,
Sharp-shinned hawk,	Cowbird,
Cooper's hawk,	Red-winged blackbird (a few in winter),

Meadow lark (a few in winter),	Rough-winged swallow,
Baltimore oriole,	Cedar waxwing (irregularly in
Bronzed grackle,	winter),
Purple finch,	Red-eyed vireo,
Vesper sparrow,	Warbling vireo,
Savannah sparrow,	Yellow-throated vireo,
Grasshopper sparrow,	Chestnut-sided warbler,
Chipping sparrow,	Oven-bird,
Field sparrow,	Louisiana water-thrush,
Swamp sparrow (sometimes in	Maryland yellow-throat,
winter),	Redstart,
Towhee,	Catbird,
Rose-breasted grosbeak,	Brown thrasher (uncommon at
Indigo bunting,	this season),
Scarlet tanager,	House wren,
Purple martin,	Long-billed marsh wren,
Cliff swallow,	Wood thrush,
Barn swallow,	Veery,
Tree swallow,	Robin (a few regularly in winter),
Bank swallow,	Bluebird.

WINTER RESIDENTS.

Herring gull,	Rough-legged hawk,
Merganser,	Pine grosbeak,
Redhead,	Red crossbill,
Canvasback,	White-winged crossbill,
Greater scaup duck,	Redpoll,
Golden eye,	Pine siskin,
Old-squaw,	Snow bunting,
Scoter,	Tree sparrow,
White-winged scoter,	Northern shrike,
Surf scoter,	Winter wren (found breeding in
Canada goose (more common as	1878),
a transient),	Brown creeper.

OF RARE OCCURRENCE.

Red-throated loon (winter),	Hudsonian curlew (transient),
Brunnich's murre (winter),	Golden plover (transient),
Kittiwake (winter),	Turnstone (transient),
Iceland gull (winter),	Turkey vulture (summer),
Ring-billed gull (transient),	Goshawk (winter),
Fork-tailed gull (winter),	Saw-whet owl (winter),
Least tern (transient),	Snowy owl (winter),
Common cormorant (transient),	Hawk owl (winter),
Double-crested cormorant (transient),	Arctic three-toed woodpecker (winter),
White pelican (transient),	Red-bellied woodpecker (summer),
Barrow's golden-eye (winter),	Olive-sided flycatcher (transient),
King eider (winter),	Orchard oriole (summer),
Greater snow goose (winter),	Lapland longspur (winter),
Brant (winter),	Leconte's sparrow (transient),
Whistling swan (transient),	Dickcissel (summer),
Glossy ibis (summer),	Philadelphia vireo (transient),
Egret (summer),	Worm-eating warbler (transient),
Whooping crane (transient),	Golden-winged warbler (summer),
Yellow rail (transient),	Tufted titmouse (summer),
Red phalarope (transient),	Orange-crowned warbler (transient),
Northern phalarope (transient),	Yellow palm warbler (transient),
Wilson's phalarope (transient),	Carolina wren (summer),
Dowitcher (transient),	Short-billed marsh wren (transient),
Stilt sandpiper (transient),	Wheatear (fall),
White-rumped sandpiper (transient),	Avocet (fall).
Hudsonian godwit (transient),	
Willet (transient),	
Long-billed curlew (transient),	

ACCIDENTAL VISITANTS.

Black-capped petrel,	Evening grosbeak,
Blue goose,	European green-winged teal.

CATALOGUE OF SPECIES.

A. Class CYCLOSTOMATA.

I. Order HYPEROARTIA.

1. Family PETROMYZONIDÆ. The Lampreys.

1. *Petromyzon marinus unicolor* (De Kay). Lake lamprey.

Abundant in the lake, where they are very destructive to the larger fishes because of their parasitic habits.¹² They are found in great numbers in the lake inlet during the spawning season, which occurs between May 25 and the middle of June. There is, however, considerable variation in this respect according to the season. In 1900 the crest of the spawning season occurred during the last days of May. In 1902 active spawning continued until June 7, while in 1903 spawning was over entirely by June 1. Larvæ of various sizes are found at all seasons buried in the mud and sand bars below the spawning grounds. Transformation occurs from the last of August to the middle of October. The latest record of transforming individuals is that of three specimens taken October 16, 1907. In one of these transformation was just beginning. Judging from the different sizes of larvæ found at a given season the larval period is of about four years duration.

2. *Lampetra wilderi* Jordan and Evermann. Brook lamprey.

Common in the inlet, where they may be found in abundance during the spawning season, which occurs during the middle of May beginning, according to Professor Gage's observations, about the eighth of the month and lasting until about the twentieth. The maximum period averages near the middle of the month. This species is not parasitic at any stage in its life-history. It probably takes no food in the adult stage.

¹² See Gage, S. H., *op. cit.*; also Surface, H. A., "Removal of Lampreys from the Interior Waters of New York," Report of the New York Fisheries, Forest and Game Commission, 1898, pp. 191-243.

B. Class PISCES.**II. Order CHONDROSTEI.****2. Family ACIPENSERIDÆ. The Sturgeons.****3. *Acipenser rubicundus* Le Sueur. Lake sturgeon.**

Rare.

A large specimen of this species, now in the collection of Cornell University, is reported as being from Cayuga Lake. Mr. Seth Green informs me that sturgeons have occasionally been taken in Cayuga Lake; but, so far as he knows, they have never been found in any other of the small lakes of central New York. I copy the following letter of recent date from Mr. H. V. Kipp, of Montezuma, N. Y.: "There have not been any sturgeons taken from Cayuga Lake since 1880, but quite a number before that date, and the largest known weighed 35 pounds." (Meek.)

On June 4, 1905, a specimen four feet long and weighing forty-two pounds was taken at Sheldrake by Dr. L. A. Gould and on December 3, 1908, a specimen (C. U. 5130) weighing fifty pounds was caught in the Seneca and Cayuga canal near Montezuma by William Ferrei and George Wildner. These are the only records of the sturgeon since Meek's list was published.

III. Order LEPIDOSTEI.**3. Family LEPISOSTEIDÆ. The Gars.****4. *Lepisosteus osseus* (Linnaeus). Long-nosed gar.**

Rare. "Occasionally taken from the north end of the lake. Not as numerous as they used to be" (Meek). There are in the Cornell University Museum seven specimens taken at the south end of the lake as follows:

June 17, 1877, in the lower course of Fall Creek.

June 13, 1894, from shallow water at the head of the lake.

June 8, 1896, in Fall creek about one half of a mile from the mouth.

March 26, 1899, from the lake near Ithaca.

April 17, 1899, from the lake near Ithaca.

May 28, 1900, from shallow water at the head of the lake.

August 12, 1908, from the lake near Ithaca. Most of the specimens taken here are small, still showing the dark lateral band.

IV. Order HALECOMORPHI.

4. Family AMIIDÆ. The Bowfins.

5. *Amiatus calva* (Linnaeus). Bowfin.

Abundant. Meek recorded this species as "seldom taken near Ithaca" and "not common at the north end of the lake." During recent years the bowfin has increased so rapidly in numbers that it has become a serious pest. In shallow water during the month of August hundreds may be seen in rowing a quarter of a mile. Foster Parker, of Union Springs, reports that he has repeatedly seen them capture and swallow the young of marsh birds.

V. Order NEMATOGNATHI.

5. Family SILURIDÆ. The Catfishes.

6. *Ictalurus punctatus* (Rafinesque). Spotted catfish.

Rare. Only two specimens have been recorded; one eleven inches long was taken on hook and line near the mouth of the inlet by Mrs. R. J. Ashdown July 10, 1902; the other, ten inches long, was taken in the same locality August 25, 1908.

7. *Ameiurus natalis* (Le Sueur). Yellow cat.

There is one specimen (No. 888) in the collection of Cornell University taken from the lake September 27, 1877. This is probably the specimen referred to in Meek's list: "I have seen but one specimen of this species from the lake. It was taken a few years ago."

8. *Ameiurus vulgaris* (Thompson). Long-jawed cat.

The collection of Cornell University contains two specimens of this species taken from the lake; one November 7, 1885, the other February 16, 1886.

9. *Ameiurus nebulosus* (Le Sueur). Common bullhead.

Abundant in the lake and all of its tributaries. In the larger streams it is found above the falls.

10. *Schilbeodes gyrinus* (Mitchill). Tadpole cat.

Common throughout the lake along muddy shores and in the streams, below falls, over a muddy bottom.

VI. Order PLECTOSPONDYLI.

6. Family CATOSTOMIDÆ. The Suckers.

11. **Catostomus commersonii** (Lacépède). Common white sucker.
Abundant throughout the basin both above and below falls.

12. **Catostomus nigricans** Le Sueur. Hog sucker.

There is a specimen in the U. S. National Museum from Cayuga lake. Mr. Richard Rathbun writes: "The specimen is among the Museum's earliest collections and is not accompanied by complete data."

13. **Erimyzon sucetta oblongus** (Mitchill). Chub sucker.

This species occurs throughout the lake although much more abundant at the north end.

14. **Moxostoma aureolum** (Le Sueur). Red horse.

Common at the north end of the lake and taken occasionally at the south end. Meek recorded this species as *M. macrolepidotum*. Specimens recently taken and the specimen in the collection of Cornell University are all clearly *aureolum*.

7. Family CYPRINIDÆ. The Minnows.

15. **Chrosomus erythrogaster** (Rafinesque). Red-bellied dace.

One specimen taken July 13, 1901, by T. L. Hankinson near Ithaca in a cold brook which is tributary to Fall Creek.

16. **Pimephales notatus** (Rafinesque). Blunt-nosed minnow.

Abundant at both ends of the lake and in the sluggish portions of the streams below the falls.

17. **Semotilus bullaris** (Rafinesque). Fall fish.

Two specimens have been recorded. One taken from the lake, January 24, 1891, and another from Beaver Brook near McLean May 21, 1902.

18. **Semotilus atromaculatus** (Mitchill). Creek chub.

Found throughout the basin as the most common minnow. In the streams above falls it is the most common fish.

19. **Abramis crysoleucas** (Mitchill). Roach.

Common in all sluggish waters over a muddy bottom. It has not been found above falls.

20. **Notropis anogenus** Forbes. Black-chinned minnow.

"Quite common in the canal near Montezuma" (Meek). It has been taken several times in fairly large numbers at the mouth of Fall Creek and in the lower course of Sixmile Creek.

21. **Notropis cayuga** Meek. Cayuga minnow.

Common in the lake and the lower course of tributaries. It has not been found above falls.

22. **Notropis heterodon** (Cope). Varying-toothed minnow.

Common in the south end of the lake and the lower courses of streams where the water is sluggish. It appears to be uncommon at the north end of the lake. The only record we have for that region is twenty specimens taken in the Canoga marshes, June 24, 1901. In 1885 J. H. Comstock and S. E. Meek took several specimens from Beaver Creek near McLean. This is the only record of its occurrence above the falls.

23. **Notropis blennius** (Girard). Straw-colored minnow.

Found only at the north end of the basin in sluggish water.

24. **Notropis procne** (Cope). Swallow-tailed minnow.

Not common. It has been taken several times in the lower courses of Sixmile and Renwick creeks.

25. **Notropis hudsonius** (De Witt Clinton). Spot-tailed minnow.

This species was found for the first time in this basin on April 25, 1908. It was taken in large numbers with a minnow seine in a slough at the Needham Biological Station in the Renwick marsh.

26. **Notropis whipplii** (Girard). Silverfin.

Common in the lower courses of all the streams at the south end of the basin. In the fall of 1903 several specimens were taken from Eddy pond in Cascadilla Creek above a series of falls which aggregate about 400 feet. This is the only place where the species has been found above falls. Its presence here is probably to be accounted for by the following: Mr. Wilbur Genung during the summer of 1903 stocked a mill pond, situated at the source of Cascadilla Creek, with fishes taken from an ice pond on the lowlands near Ithaca where this species is common. Specimens of this were undoubtedly among other species taken and later, when the dam

went out during a flood, found their way to Eddy pond between which and the site of the dam there are no falls.

27. **Notropis cornutus** (Mitchill). Red fin.

Abundant throughout the basin.

28. **Notropis atherinoides** Rafinesque. Rosy minnow.

Rare. Meek took one specimen in Sixmile Creek and a few at Montezuma. Two specimens were taken near the mouth of Fall Creek November 23, 1906, and another at the Needham Biological Station April 25, 1908.

29. **Notropis umbratilis lythrurus** Jordan. Blood-tailed minnow.

Meek records one specimen taken from a small stream near the Montezuma dry dock.

30. **Rhinichthys atronasus** (Mitchill). Black-nosed dace.

Common in the southern portion of the basin and as far north as Ludlowville. At present there is no evidence of its occurrence at the north end of the lake. It is found both above and below falls.

31. **Hybopsis kentuckiensis** (Rafinesque). Horny head.

The only record we have of this species is that of Meek: "A few specimens taken from Montezuma only."

32. **Exoglossum maxillingua** (Le Sueur). Cut-lip minnow.

Common. Found in all streams below falls in clear water.

33. **Cyprinus carpio** Linnaeus. Carp (introduced).

Abundant in the lake and in a few of the streams. This species was first noticed in the lake about 1889. Four or five years prior to this date three different persons had constructed ponds and stocked them with carp. One was at Newfield in a tributary to the inlet, a second was in a small tributary to Fall Creek six or seven miles from the lake and a third was at Ludlowville in a tributary of Salmon Creek. In 1888 all three of these ponds gave way during a heavy flood and in the following year carp began to be in evidence in the lake and have increased rapidly to the present time.

VII. Order APODES.

8. Family ANGUILLIDÆ. The True Eels.

34. *Anguilla chrysypa* Rafinesque. Common eel.

Common in the lake and the larger streams and ponds. The largest specimen taken in the basin of which we have any record is one caught in the lake May 29, 1893, which measured three feet in length. One caught off Kidder's Ferry a few years ago is said to have measured five feet.

VII. Order ISOSPONDYLI.

9. Family CLUPEIDÆ. The Herrings.

35. *Pomolobus pseudoharengus* (Wilson). Alewife, saw-belly.

One of the most abundant fishes in the lake where it has been known since 1872. In the spring from the first of May to the middle of August they die in great numbers and are washed ashore. During the summer of 1907 dead individuals were much more abundant than in the three preceding years.

Many persons in the region of Cayuga lake attribute the presence of the alewife here to its introduction by Seth Green who, according to Dr. H. M. Smith,¹³ disclaimed any responsibility for their presence in Lake Ontario, but we have been unable to find any statement concerning Cayuga Lake. Dr. T. H. Bean¹⁴ is of the opinion that they have come hither of their own accord, for he writes:

As to their presence in Seneca and Cayuga lakes, New York, we have ground for believing that they have, of their own accord, penetrated thus far into the interior of New York State. Mr. Fred Mather writes that he has seen alewives go up the canal locks at West Troy and Professor H. L. Smith, of Geneva, who first noticed them in the neighborhood of Seneca Lake in June, 1868, states that the canal was opened at about that time and thinks that they might come into the New York lakes from the Chesapeake or Delaware Bays through Elmira and Painted Post.

¹³ Smith, H. M., "Report on the Fisheries of Lake Ontario," Bull. U. S. Fish Com., 1892, p. 188.

¹⁴ Bean, T. H., "The Fisheries and Fishery Industries of the United States," Section I., Natural History of Aquatic Animals, Washington, 1884, p. 590. "Fishes of New York," Bull. 60, New York State Museum, p. 200.

Mr. John Diltz, of Ithaca, for many years a fisherman, and Mr. E. C. Stillwell, now of Ithaca but formerly a ferryman at Kidder's both state that the alewife was introduced about 1872. Mr. John Vann tells us that they were introduced purposely as food for the lake trout.

10. Family SALMONIDÆ. The Salmon and Trouts.

Coregonus clupeiformis (Mitchill). Common whitefish.

"I have seen no specimens of this species from the lake of which it is however undoubtedly an inhabitant" (Meek). Various reports have been received of whitefish taken from the lake but we have never seen one that was of this species. Mr. John Vann states that all of the so-called whitefish brought to his notice have proved to be ciscoes. We do not believe that it is found here, the fact that it has been introduced notwithstanding.

36. **Argyrosomus osmeriformis** (H. M. Smith). New York smelt

Still taken in fairly large numbers but not as common as formerly. Old fishermen tell us that it has never been abundant since the introduction of the alewife. Prior to that time, according to their statements, it was very abundant.

37. **Salmo fario** Linnæus. Brown trout (introduced).

This species of trout is found in considerable numbers in the lake inlet, Enfield, Sixmile and Taughannock creeks. During the last season a very large specimen was caught in the reservoir in Sixmile Creek.

38. **Salmo irideus** Gibbons. Rainbow trout (introduced).

Fairly common in the lake inlet and its tributaries. Mr. Vann has seen individuals make their way up over the low falls in Enfield Creek.

39. **Cristivomer namaycush** (Walbaum). Lake trout.

Common in the deeper portions of the lake. They have apparently increased in numbers within the past few years. Mr. Vann has observed that they follow the alewives into shallow water in the spring. During the late spring and summer months many individuals, dead from lamprey wounds, are picked up from the surface of the lake. Occasionally one is found not quite dead and with the lamprey still clinging.

40. **Salvelinus fontinalis** (Mitchill). Brook trout.

Common in suitable streams throughout the lake basin. During the summer of 1908 many of the younger individuals perished because of the long draught which dried many of the smaller streams.

IX. Order HAPLOMI.

11. Family UMBRIDÆ. The Mud Minnows.

41. **Umbra limi** (Kirtland). Mud minnow.

This species has never been taken at the south end of the lake. Meek took it in small numbers at Montezuma and Cayuga.

12. Family ESOCIDÆ. The Pikes.

42. **Esox reticulatus** (Le Sueur). Eastern pickerel.

Common throughout the basin. Many individuals from this region approach very closely the characteristics of *Esox vermiculatus*.

43. **Esox lucius** Linnæus. Northern pike.

Common throughout the basin.

13. Family PÆCILIIDÆ. The Killifishes.

44. **Fundulus diaphanus** (Le Sueur). Gray-back.

Abundant in the lake, marshes, flood lands and the lower courses of the streams.

X. Order HEMIBRANCHII.

14. Family GASTEROSTEIDÆ. The Sticklebacks.

45. **Eucalia inconstans** (Kirtland). Brook stickleback.

Common in standing water and pools both on the flats and uplands above falls.

XI. Order ACANTHOPTERI.

15. Family PERCOPSIDÆ. The Trout Perches.

46. **Percopsis guttatus** Agassiz. Trout Perch.

Common. Found in the south end of the lake and the lower courses of the streams. At the breeding season, which occurs during the first two weeks in May, they are abundant in the shallow sloughs of the marshes.

16. Family ATHERINIDÆ. The Silversides.

47. **Labidesthes sicculus** (Cope). Brook silverside.

"Not found near Ithaca. Several specimens taken from a small stream which empties into the canal a few rods south of Montezuma" (Meek). It is now found to be common at the south end of the lake over a muddy bottom along shore and in the lower courses of streams.

17. Family CENTRARCHIDÆ. The Sunfishes.

48. **Pomoxis sparoides** (Lacépède). Calico bass.

Common at the south end of the lake. During the late summer and early fall of 1906 the young of the species was abundant in the lower course of Fall Creek and its tributaries.

49. **Ambloplites rupestris** (Rafinesque). Rock bass.

Common. The young are abundant in the lower courses of all streams throughout the basin. It is not found above falls except in Eddy pond in Cascadilla Creek where its presence is probably to be explained in the same way as *Notropis whipplii*.

50. **Apomotis cyanellus** (Rafinesque). Green sunfish.

No specimens of this species have been recorded from the lake basin in recent years and never from the south end. Meek found a few near Montezuma.

51. **Lepomis pallidus** (Mitchill). Bluegill.

Meek found it in small numbers at Montezuma. None have been recorded from other localities in the basin.

52. **Eupomotis gibbosus** (Linnæus). Pumpkin seed.

Abundant throughout the basin. It spawns during the whole of June and first part of July.

53. **Micropterus dolomieu** Lacépède. Small-mouthed black bass.

Common. Meek recorded this species as not found by him at the south end of the lake where it is now common. During late summer and early fall the young are found abundantly in the lower courses of the streams tributary to the lake. By the last of August the young vary between four and five centimeters in length and by December have attained a length of from six to seven centimeters.

54. **Micropterus salmoides** (Lacépède). Large-mouthed black bass.

Common in the lake. Young of this species are found in summer and fall along with those of the former species. Specimens obtained in the streams in December average between seven and eight centimeters in length.

18. Family PERCIDÆ. The Perches.

55. **Stizostedion vitreum** (Mitchill). Wall-eyed pike.

Found in the lake but not common.

56. **Stizostedion canadense** (Smith) Sauger.

Found in the lake in about the same abundance as the preceding species.

57. **Perca flavescens** (Mitchill). Yellow perch.

Abundant throughout the basin. It spawns during the first of April.

58. **Percina caprodes zebra** (Agassiz). Manitou darter.

Rare. Two specimens have been recorded in this basin; one May 27, 1907, in Fall Creek near the mouth and one July 18, 1907, in the inlet about four miles from the lake.

59. **Boleosoma nigrum** (Rafinesque). Johnny darter.

One specimen taken in Renwick brook on the flats April 21, 1900, by T. L. Hankinson and C. O. Houghton.

60. **Boleosoma nigrum olmstedii** (Storer). Tessellated darter.

Common in the lake and tributaries below falls.

61. **Etheostoma flabellare** Rafinesque. Fan-tailed darter.

Common. Found in localities along with the preceding species.

19. Family SERRANIDÆ. The Sea Basses.

62. **Roccus chrysops** (Rafinesque). White bass.

Two specimens of this species have been taken from the lake basin; one from the inlet April 18, 1877, and one April 15, 1896.

20. Family COTTIDÆ. The Sculpins.

63. **Cottus ictalops** (Rafinesque). Blob.

Common at both ends of the lake in cold water. The eggs are

deposited in masses attached to the under side of stones where they are guarded by one of the parents.¹⁵

64. **Cottus gracilis** (Heckel). Miller's thumb.
Not common but found throughout the basin.

21. Family GADIDÆ. The Cods.

65. **Lota maculosa** (Le Sueur). Burbot.
Not common. Found only in deep water.

C. Class AMPHIBIA.

XII. Order PROTEIDA.

22. Family PROTEIDÆ. The Mud Puppies.

66. **Necturus maculosus** Rafinesque. Mud puppy.
Abundant in the lake and the lower courses of the inflowing streams. They have been taken in the inlet three miles from the lake.

XIII. Order URODELA.

23. Family AMBYSTOMIDÆ.

67. **Ambystoma punctatum** (Linnæus). Spotted salamander.
Common throughout the basin. Depending upon the season, egg-laying begins the last of March or the first of April immediately after emerging from hibernation. The earliest date March 13, 1903. Transformation of the larva begins the last of July or about four months after the eggs are laid. From this time to the middle of September transforming individuals may be found.

24. Family PLETHODONTIDÆ.

68. **Hemidactylium scutatum** Tschudi. Four-toed salamander.
Not common. The first specimens recorded were obtained near Ithaca in the valley of Sixmile Creek by H. W. Norris in April 1889. No other specimens were found in this basin until October 22, 1905, when twenty-one specimens were found on Larch Hill, two miles south of Ithaca on the east side of the inlet valley. They were all found under stones or about the bases of stumps in the open.

¹⁵ Gage, S. H., "Notes on the Cayuga Lake Stargazer," *The Cornell Review*, November, 1876, p. 91.

69. **Plethodon erythronotus** (Green). Red-backed salamander, gray salamander.

Common. Found usually in dry places under stones or any object which will furnish cover. They appear from hibernation the last of March or the first of April. The earliest date upon which they have been recorded in the spring is March 17, 1903. The latest date on which they have been observed in the fall is November 1, 1903. The eggs are deposited during June and July, under logs, loose bark or in decaying wood, in bunches of from seven to twelve. Each egg is attached by a slender cord to a common focus and the whole cluster is attended by the female. The young transform immediately after hatching. There is every possible gradation between the red-backed and gray forms.¹⁶ During the summer of 1908 a pure red individual was found at Chautauqua, N. Y.

70. **Plethodon glutinosus** (Green). Slimy salamander.

Common but limited to certain localities. Found usually in moist humus, manure piles, damp moss banks and decaying vegetation. Its breeding habits are not known.

71. **Gyrinophilus porphyriticus** (Green). Purple salamander.

Common. Found in all cold springs and streams flowing through gorges or ravines. They remain in the larval stage for a period of two years, at least. The only record of transformation which we have obtained is a specimen 11.5 cm. long found March 14, 1903, in which the larval characteristics have almost entirely disappeared. A female taken May 12, 1906, with mature eggs in the ovaries and what appeared to be a larva not long after hatching taken from a cold brook June 29, 1901, are the only clues we have to the breeding habits.

72. **Spelerpes bislineatus** (Green). Two-lined salamander.

Common in and about cold swift brooks. The breeding habits have not been observed in this locality.

¹⁶ Reed, H. D., "A Note on the Coloration of *Plethodon cinereus*," *Am. Nat.*, Vol. 42, 1908.

25. Family DESMOGNATHIDÆ.

73. *Desmognathus fusca* (Rafinesque). Dusky salamander.

One of the most abundant salamanders in the lake basin. It is found under most any sort of object which will furnish cover in wet and marshy places along the cooler streams. The maximum period of egg-laying is July. The eggs are laid in clusters joined by a slight cord to a common focus but not attached to extraneous objects as in the case of *Plethodon erythronotus*. The female attends the eggs and is found usually with the body partly encircling them. The larvæ transform from September to December, when they are from 18 to 20 millimeters long.

26. Family PLEURODELIDÆ.

74. *Diemictylus viridescens* Rafinesque. Vermilion-spotted newt.

The most abundant salamander found in the lake basin. The adult is found in every pool, pond, ditch and stretch of standing water. Individuals in the red land stage are common on the woods under dead leaves and decaying bark and wood. The eggs are deposited singly upon the leaves of aquatic plants from April to June. Larvæ begin to transform to the red land stage in August, continuing until September. Some individuals pass the winter in the larval stage. After two and one half or three years the red land form assumes a viridescent coloration and becomes permanently aquatic.¹⁷

XIX. Order SALIENTIA.

27. Family BUFONIDÆ. The Toads.

75. *Bufo americanus* Le Conte. American toad.

Abundant. The average date of emergence from hibernation is April 15. The earliest recorded date is March 19, 1903. They proceed immediately to the water where the eggs are deposited. The maximum period of egg-laying is between April 20 and May 30, although stragglers continue to spawn until July. The larval period lasts for about sixty days, the tadpoles beginning to transform about the last of June. The latest fall record for this species is October 20, 1906.

¹⁷ See Gage, S. H., "Life-history of the Vermilion-spotted Newt," *Am. Nat.*, 1891, p. 1084.

28. Family *HYLIDÆ*. The Tree Frogs.76. *Hyla versicolor* Le Conte. Common tree toad.

Abundant. It appears from hibernation the last of April or very first of May. The eggs are laid the first of June in bunches of from four to twenty-five, which float at the surface either attached to vegetation or free. Transformation begins the first of August making the larval period of from fifty to sixty days duration. The latest fall record for this species is October 25, 1905.

77. *Hyla pickeringii* (Holbrook). Peeper.

Abundant. It emerges from hibernation the last of March. The height of the egg-laying season is April although individuals are found depositing their eggs as early as the last of March. The eggs are attached singly to vegetation beneath the surface of the water. Sometimes they are found in bunches of from four to twelve. Transformation begins the middle of July at the end of a larval period of from 90 to 100 days duration. The latest fall record is October 30, 1901.

29. Family *RANIDÆ*. The Frogs.78. *Rana pipiens* Schreber. Leopard frog.

The most abundant anuran throughout the basin. They come out from hibernation the last of March or the first of April. The eggs are seldom deposited before April 10 from which date active spawning continues for about four weeks. The tadpoles begin to transform the middle of July, about 100 days after the eggs are laid. The latest fall record is November 18, 1906.

79. *Rana palustris* Le Conte. Pickerel frog.

Common. The average date of its appearance in the spring is April 13. In some seasons it has been found to emerge the last of March. The eggs are deposited in bunches attached to submerged twigs and grasses. As a rule egg-laying does not begin until the last of April. They may be distinguished from the eggs of other frogs of this region by their decided yellow color. The tadpoles transform the last of July, about 90 days after the eggs are deposited. The latest fall record for the species is November 1, 1902.

80. ***Rana clamata*** Daudin. Green frog.

Common. It appears from hibernation the middle of April. The eggs are not laid until the first of June, through this month, July and a part of August. The eggs are deposited in a frothy film which floats at the surface of the water. The larval period is of about thirteen months duration transformation beginning the middle of the July of the following year in which the eggs are laid. The latest fall record is November 1, 1902.

81. ***Rana catesbeiana*** Shaw. Bull frog.

Common. This is the last one of the frogs to emerge from hibernation, never appearing before the middle of May. The eggs are laid the last of June and the first of July in an irregular sheet or film attached to sticks or twigs near the surface of the water. The larval stage lasts for a period of two years, the tadpoles transforming in July and August of the second year following hatching.

82. ***Rana sylvatica*** Le Conte. Wood frog.

Common. It appears in the spring, the last of March or the first of April. Egg-laying begins almost immediately. The young transform the last of June about 90 days after the eggs are laid. The latest fall record is November 1, 1906.

D. Class REPTILIA.

XX. Order OPHIDIA.

30. Family COLUBRIDÆ. The Harmless Snakes.

83. ***Diadophis punctatus*** (Linnaeus). Ring-necked snake.

Common. The earliest date upon which it has been observed in the spring is April 19, 1900. The latest fall date is October 16, 1905.

84. ***Liopeltis vernalis*** (Harlan). Smooth green snake.

Not common. De Kay, however, records it as common at the north end of the lake in the marshes. The latest fall record is October 20, 1906.

85. ***Bascanion constrictor*** (Linnaeus). Black snake.

Formerly common. Now confined to the region about Newfield and Danby in the southern portion of the basin.

86. **Coluber obsoletus obsoletus** Say. Racer.

Rare. Only four specimens recorded for the basin. Two of these were taken June 14, 1883, one during the summer of 1889 and the fourth, a specimen five feet long, was captured alive at Newfield in August, 1899.

87. **Lampropeltis doliatus triangulus** (Boie). Milk snake.

Common throughout the basin.

88. **Lampropeltis doliatus collaris** (Cope).

One specimen taken June 16, 1903. So far as we know this is the first record of this variety for the state. The specimen agrees with Cope's figure and description and with a specimen of *collaris* taken at Danville, Ill.

89. **Natrix sipedon** (Linnæus). Water snake.

Abundant throughout the basin, especially in the marshes where on clear days they are found coiled on stools of dead sedges.

90. **Storeria occipitomaculata** (Storer). Red-bellied snake.

Common throughout the basin under logs, pieces of bark and dead leaves along hillsides and dry places. In the fall they are seen in the open upon lawns, roads and walks. The earliest spring record is March 18, 1903. The latest fall record is October 21, 1906.

91. **Thamnophis saurita** (Linnæus). Ribbon snake.

Common, especially in the lowlands and moist meadows. The earliest spring record is March 19, 1905. The latest they have been seen in the fall is October 30, 1901.

92. **Thamnophis sirtalis sirtalis** (Linnæus). Striped garter snake.

This is the most abundant snake in the basin. They appear in the spring about the first of April and are abroad until the last of October.

31. Family CROTALIDÆ. The Pit Vipers.

93. **Crotalus horridus** Linnæus. Common rattlesnake.

Formerly abundant. They are still met with about McLean.

XXI. Order LACERTILIA.

32. Family SCINCIDÆ. The Skinks.

94. **Leiolopisma laterale** (Say). Ground lizard.

One specimen (No. 3550) taken at Caroline April 23, 1892, by W. J. Terry and L. A. Fuertes.

XXII. Order TESTUDINATA.

33. Family TRIONYCHIDÆ. The Soft-shelled Turtles.

95. **Aspionectes spinifer** (Le Sueur). Common soft-shelled turtle.

Common at the north end of the lake. A few specimens have been taken at the south end.

34. Family CHELYDRIDÆ. The Snapping Turtles.

96. **Chelydra serpentina** (Linnæus). Snapping turtle.

Common. Found in all marshy places. The earliest spring record is April 13, 1906. The eggs hatch the first of October. On October 3, 1883, twenty-four specimens were found that had just hatched. A few were still in the nest but the larger number were in line moving towards water.

35. Family KINOSTERNIDÆ. The Musk Turtles.

97. **Terrapene odorata** (Latreille). Musk turtle.

Common in the Seneca river and marshes about Montezuma where it was first found by A. A. Allen and J. T. Lloyd, September 24, 1908.

36. Family EMYDIDÆ. The Pond Turtles.

98. **Chrysemys marginata** (Agassiz). Agassiz' painted turtle.

Abundant throughout the basin. On January 25, 1906, a single individual was observed swimming under the ice on a pond near Ithaca. The same day 150 were taken by fishermen at the head of the lake. This early emergence from hibernation was due to the extremely mild winter up to that date and the unusually warm week of January 25. On the same date this species was observed along the southern shore of Lake Ontario.

99. **Clemmys muhlenbergii** (Schoepff). Muhlenberg's tortoise.

For the present this species must be considered rare. Thus far only three specimens have been taken; one on June 15, 1877, near Ithaca, and two at Junius, May 26, 1906. The specimen taken near Ithaca was kept alive for a time and on July 20 deposited eggs in the sand of the terrarium.

100. **Clemmys insculpta** (Le Conte). Wood tortoise.

Common throughout the basin in wooded regions along water courses.

101. **Clemmys guttata** (Schneider). Spotted turtle.

The only records of this species are from Junius in the extreme northwestern portion of the basin where it is common.

E. Class AVES.

XXIII. Order PYGOPODES. The Diving Birds.

37. Family COLYMBIDÆ. The Grebes.

102 (2).¹⁸ **Colymbus holboelli** (Reinhardt). Holboell's grebe.

Not an uncommon transient during April and November. A few are found regularly in winter. The latest spring record for this species in the basin is May 25, 1907. They are seldom taken at the south end of the lake.

103 (3). **Colymbus auritus** Linnæus. Horned grebe.

Common transient from April 1 to May 10 and occasionally taken in winter. In the spring they become common about the middle of April and all have disappeared by May 10. They appear in the fall the first of October, gradually increasing in numbers until November throughout which they are common.

104 (6). **Tachybaptus podiceps** (Linnæus). Pied-billed grebe.

A common transient and an uncommon but regular summer resident in the marshes at the north end of the lake. In the spring they appear April 1 and are common throughout the month. In the fall they become common the first of October and continue so until November 1. The latest fall record is a young female taken Novem-

¹⁸ The number of the species in "Check-list of the American Ornithologists' Union."

ber 15, 1897. In a collection of birds made at Ithaca about fifty years ago are several immature specimens ranging in size from just hatched to birds two-thirds grown. In the spring of 1909 a nest was found in the Renwick marshes.

38. Family GAVIIDÆ. The Loons.

105 (7). **Gavia immer** (Brünnich). Common loon.

Common transient. They appear in the spring from April 14 to May 20, being the most common the very last of April. On April 28, 1908, Mr. L. A. Fuertes reported a flock of 50 off the mouth of Taughannock Creek. All of our fall records of this species occur between October 29 and November 29. Audubon mentions this species as breeding on Cayuga Lake in 1824.

106 (11). **Gavia stellata** (Pontoppidan). Red-throated loon.

Rare. There is a specimen of a male in the collection of Cornell University taken on Cayuga Lake at Ithaca, November 4, 1875, by Dr. M. J. Roberts. Another specimen was taken at Sheldrake a few years ago by Jacob Cram. It was identified by L. A. Fuertes, who states that it was probably killed in November, 1889.

39. Family ALCIDÆ. The Auks.

107 (31). **Uria lomvia** (Linnæus). Brünnich's murre.

Occasionally seen in recent years. The first record for Cayuga Lake was a specimen reported in 1854 by William Hopkins of Auburn.¹⁹ On December 14, 1895, a specimen was shot and is now in the possession of H. G. Wilson, of Ithaca. On December 16 of the same year two more specimens were killed. According to our records they did not appear again until the fall of 1899 when in November a female was obtained. Eaton²⁰ mentions them as on "Cayuga Lake, winter of 1899." The next record was a specimen taken at Ithaca December 19, 1901 by T. L. Hankinson. Since that date we have no knowledge of this species on the lake.

¹⁹ Hopkins, William, *Proc. Boston Soc. Nat. Hist.*, Vol. V., p. 13, July, 1854.

²⁰ Eaton, E. H., "Birds of Western New York," *Proc. Rochester Acad. Sci.*, Vol. IV., pp. 1-164.

XXIV. Order LONGIPENNES. The Long-winged Swimmers.

40. Family LARIDÆ. The Gulls and Terns.

108 (40). **Rissa tridactyla** (Linnæus). Kittiwake.

A specimen was reported by William Hopkins in 1854.

109 (43). **Larus leucopterus** Faber. Iceland gull.

A specimen was taken on Cayuga Lake by L. A. Fuertes during the winter of 1896-7 and another was brought in by a fisherman March 17, 1897.

110 (51). **Larus argentatus** Pontoppidan. Herring gull.

Common winter resident. It is abundant during the spring and fall. They appear in the fall the first of September and leave in the spring about May 25 the latest record being June 2, 1906.

111 (54). **Larus delawarensis** Ord. Ring-billed gull.

Foster Parker, of Cayuga, has a specimen taken on the lake a few years ago.

112 (60). **Larus philadelphia** (Ord). Bonaparte's gull.

Transient. Common in spring, rare in fall. It is found in the spring from April 20 to May 25 and is usually common during that period. On June 14, 1908, a flock of eleven individuals was reported at the south end of the lake and on July 24 of the same year L. A. Fuertes reported a single individual from Cayuga at the north end of the lake. In the fall this species is found occasionally in October and November.

113 (62). **Xema sabinei** (Sabine). Fork-tailed gull.

One specimen taken at the north end of the lake about 1887 by Foster Parker. It is now in the collection of E. H. Eaton.

114 (70). **Sterna hirundo** Linnæus. Common tern.

Regular, though not common, transient through May and the first of June. Mr. L. A. Fuertes reports a specimen the latter part of April 1898 and two adults near the mouth of Fall Creek at Ithaca, July 6, 1908. The only fall record of this species is a single individual reported by L. A. Fuertes the last of August, 1907.

115 (74). **Sterna antillarum** (Lesson). Least tern.

Mr. F. R. Rathbun²¹ recorded two specimens taken on Cayuga Lake.

116 (77). **Hydrochelidon nigra surinamensis** (Gmelin). Black tern.

Not an uncommon spring migrant during the last half of April and the first of May. Foster Parker has found them nesting on old musk rat houses in the Cayuga marshes. L. A. Fuertes took a specimen August 28, 1900, at Ithaca, and reported three others seen at the same time.

XXV. Order TUBINARES. The Tube-nosed Swimmers.

41. Family PROCELLARIIDÆ. Shearwaters and Petrels.

117 (98). **Æstrelata hasitata** (Kuhl). Black-capped petrel.

There was a specimen in the collection of L. S. Foster, number 759, taken in Cayuga Co., early in September, 1893.

XXVI. Order STEGANOPODES. The Totipalmate Birds.

42. Family PHALACROCORACIDÆ. The Cormorants.

118 (119). **Phalacrocorax carbo** (Linnæus). Common cormorant.

A specimen was reported by William Hopkins as taken by him at Auburn.

119 (120). **Phalacrocorax auritus** (Lesson). Double-crested cormorant.

Rare. An adult male was taken November 16, 1875, by Dr. J. M. Roberts. A second specimen was taken September 29, 1905, at Aurora, N. Y., and is now in the collection of Wells College. An immature specimen was obtained at Ithaca, August 2, 1906, by L. A. Fuertes.

43. Family PELECANIDÆ. The Pelicans.

120 (125). **Pelecanus erythrorhynchos** Gmelin. White pelican.

There are two records of this species for Cayuga Lake. A specimen was obtained by Mr. Cave in 1876, concerning which Mr. J. W. Beal²² writes as follows:

²¹ Rathbun, Frank R., "A Revised List of the Birds of Central New York," p. 41, Auburn, N. Y.

²² Beal, J. W., *American Naturalist*, Vol. I. (1867), p. 323.

Sometime during the spring of 1864, near a marsh on Cayuga Lake, two large birds were seen for several weeks, but one of them left a few days before the other was killed. None of the hunters had ever seen anything of the kind about here before. It proved to be a specimen of the white or rough-billed pelican (*Pelecanus erythrorhynchus* Gmelin), in good condition, and its wings measured fully eight feet from tip to tip.

In the late summer about 1888 Foster Parker killed a specimen which is now in the New York State Museum.

XXVII. Order ANSERES. Lamellirostral Swimmers.

44. Family ANATIDÆ. The Ducks and Geese.

121 (129). *Mergus americanus* Cassin. Merganser.

Common winter resident from the middle of October to the last of April. The latest spring record is April 27, 1907, upon which date they were still common.

122 (130). *Mergus serrator* Linnæus. Red-breasted merganser.

Common transient and found in small numbers during the winter. It is not common after April 25 and the latest date upon which they have been recorded in the spring is May 25, 1907.

123 (131). *Lophodytes cucullatus* (Linnæus). Hooded merganser.

Common transient from the last of March to the last of April. Foster Parker reports it as breeding occasionally in the Montezuma marshes. In the fall individuals are common from the middle of October to the middle of November.

124 (132). *Anas platyrhynchos* Linnæus. Mallard.

Common transient during March and April and again in October. It is sometimes found in winter and Foster Parker reports it as breeding in the marshes at the north end of the lake. They first appear in the fall about the middle of September and remain as late as the last of November but are most common in October.

125 (133). *Anas rubripes tristis* Brewster. Black duck.

Common transient and regular but not common in winter. It breeds regularly and in fair numbers in the Canoga and Montezuma marshes.

126 (135). **Chaulelasmus streperus** (Linnæus). Gadwall.

Common transient the latter part of March and the entire month of April. They appear in the fall the last of September and remain until the very last of October. The latest fall record is a male killed November 20 at Cayuga. This species is not common at the south end of the lake.

127 (136). **Mareca penelope** (Linnæus). European Widgeon.

Mr. F. S. Wright of Auburn has a specimen killed on Cayuga lake in the spring of 1881. It is an adult male in full plumage. Foster Parker reports that several have been killed at Cayuga.

128 (137). **Mareca americana** (Gmelin). Baldpate.

Common transient from March 23 to April 26, the bounding dates of our records. In the fall they appear during the last week of September and remain until the first of November. The latest date upon which they have been recorded in any numbers is October 22, 1905.

129 (138). **Nettion crecca** (Linnæus). European teal.

Accidental. A male was shot by Will Canfield at Cayuga, April 10, 1902. The specimen was identified by E. H. Eaton.

130 (139). **Nettion carolinensis** (Gmelin). Green-winged teal.

Common transient during April and October. Arrivals are to be noted the last of September but it is most common during October. This species is very rarely found in winter.

131 (140). **Querquedula discors** (Linnæus). Blue-winged teal.

Common transient during April and in the fall during the last half of September and throughout October. It formerly bred in fairly large numbers in the marshes at the north end of the lake.

132 (142). **Spatula clypeata** (Linnæus). Shoveller.

Common transient. It is not often found at the south end of the lake.

133 (143). **Dafla acuta** (Linnæus). Pintail.

Transient during the last of March and the first of April and in the fall during October and the first half of November.

- 134 (144). **Aix sponsa** (Linnæus). Wood duck.

Summer resident but not as common as formerly. It still breeds in small numbers at Cayuga. During the summer of 1907 a pair nested in the woods of the Renwick marshes at Ithaca.

- 135 (146). **Marila americana** (Eyton). Red head.

Common transient and regularly present in winter. In the spring it is common from the middle of March throughout April. In the fall it is found during October and November.

- 136 (147). **Marila vallisneria** (Wilson). Canvas-back.

Common transient and a regular winter visitant in smaller numbers from the middle of November to the last of March.

- 137 (148). **Marila marila** (Linnæus). American scaup duck.

Winter resident from the first of October to the very last of April. It is more common during migration.

- 138 (149). **Marila affinis** (Eyton). Lesser scaup duck.

Common transient. A few are occasionally found in winter. They arrive in the fall the first of October and remain until the middle of November. In the spring they are to be found from April 1 to June 24, the latest date.

- 139 (150). **Marila collaris** (Donovon). Ring-necked duck.

Usually a rare transient. Foster Parker reports it as common during the spring of 1905 at the north end of the lake.

- 140 (151). **Clangula clangula americana** (Bonaparte). Golden-eye.

Common winter resident from November 1 to April 1.

- 141 (152). **Clangula islandica** (Gmelin). Barrow's golden-eye.

Rare. One specimen, an adult female, taken at Cayuga by L. A. Fuertes, December 20, 1906. (Coll. of L. A. F., no. 1523.)

- 142 (153). **Charitonetta albeola** (Linnæus). Buffle-head.

Common transient. It appears in the spring from the middle of April to the last of May. In the fall arrivals from the north appear usually the second week in October and remain until the last of November.

- 143 (154). **Harelda hyemalis** (Linnæus). Old-squaw.

Common transient and not uncommon in winter. They arrive the middle of October and remain until the first of May.

144 (162). **Somateria spectabilis** (Linnæus). King eider.

"A mounted specimen of an adult male, taken on Cayuga lake, is now in the barroom of the Cornell House at Trumansburg, N. Y." (L. A. Fuertes). On November 3, 1908, at Cayuga four individuals, three females and an immature, were shot from a flock of twenty.

145 (163). **Oidemia americana** Swainson. Scoter.

Common transient and uncommon winter resident. The earliest fall record is a specimen shot October 13, 1885.

146 (165). **Oidemia deglandi** Bonaparte. White-winged scoter.

Common winter resident from October 3 to May 1.

147 (166). **Oidemia perspicillata** (Linnæus). Surf scoter.

Uncommon. We have no spring records of this species. The earliest date upon which it has been recorded in the fall is that of a specimen shot by L. A. Fuertes, October 13, 1906.

148 (167). **Erismatura jamaicensis** (Gmelin). Ruddy duck.

Common transient in the fall from October 1 to November 1. It is occasionally taken in the spring but much less common at this season.

149 (169a). **Chen hyperborea nivalis** (Forster). Greater snow goose.

Two young were killed near Ithaca during the last of March, 1876.²³

150 (169.1). **Chen cærulescens** (Linnæus). Blue goose.

Two specimens, male and female, were killed a few years ago on Cayuga Lake by Foster Parker. They are now in the New York State Museum.

151 (172). **Branta canadensis** (Linnæus). Canada goose.

Common transient and an occasional winter resident. They are common in the spring from March 10 to May 7. In the fall this species begins to arrive from the north about October 1 and is present until December 1. The latest record of what appeared to be migrating flocks is December 9, 1907.

²³ *Forest and Stream*, Vol. 7, p. 283.

152 (173a). **Branta bernicla glaucogastra** (Brehm). Brant.

Rare. No specimens of this species have been recorded from the lake basin in recent years. Foster Parker has in his possession a specimen shot on Cayuga Lake a few years ago. From the Auburn List²⁴ we quote the following:

One shot on Cayuga Lake, N. Y., near the railroad bridge by Mr. Charlie Traverse. The same was identified by Mr. Greene Smith.—Horace Silsby, in *Auburn Daily Bulletin* of December, 1877. An adult male received from Cayuga Lake, November 26, 1878, which was also shot near the railroad bridge by Mr. David Copeman.

153 (180). **Olor columbianus** (Ord). Whistling swan.

Rare. Two specimens were shot by Foster Parker a few years ago and another is recorded by Fowler, Wright and Rathbun²⁵ from the Seneca River. On March 16, 1908, a flock of 118 individuals was reported from the north end of the lake. According to Father Raffeix swan were common on the lake in the days of the Jesuits for he writes:²⁶ "It [Cayuga] abounds in swan and geese all winter."

XXVIII. Order HERODIONES. The Heron-like Birds.

45. Family IBIDIDÆ. The Ibises.

154 (186). **Plegadis autumnalis** (Hasselquist). Glossy ibis.

William Hopkins recorded a specimen from Cayuga Lake in 1854. There are two specimens in the possession of Foster Parker taken on the Seneca River in 1902. F. S. Wright shot one specimen and saw three others on Howland Island in May, 1902. On May 27, 1907, two males and two females were shot at Cayuga by Foster Parker.

46. Family ARDEIDÆ. The Herons.

155 (190). **Botaurus lentiginosus** (Montagu). Bittern.

Common summer resident. It nests in every marsh of any size throughout the basin. The average date of spring arrival is April 15, the earliest, March 28, 1908. Nesting begins the middle of May

²⁴ "A Revised List of Birds of Central New York," collected and prepared for publication by Frank R. Rathbun, Auburn, N. Y.

²⁵ *Ornithologist and Oölogist*, Vol. 7, p. 133.

²⁶ Father Raffeix, "Relations for the Year 1671-72," Quebec edition, p. 22.

and continues for the rest of the month. Young in the nest are found from the first to the middle of June. They depart for the south the first of November.

156 (191). ***Ixobrychus exilis*** (Gmelin). Least bittern.

Common summer resident. The average date of spring arrival is May 15, the earliest May 9, 1908. The active period of nesting extends from May 20 to June 10. Young are found in the nest from about June 8 to June 25. We have no records of this species in the fall later than September 10.

157 (194). ***Ardea herodias*** Linnæus. Great blue heron.

Common spring and fall transient and summer resident at Meridian, N. Y., at the north end of the basin. The average date of spring arrival is March 28, the earliest, March 18, 1890. In the fall they appear at the south end of the basin the last of July, the earliest record being a specimen taken July 18, 1889, by L. A. Fuertes. We have no records indicating that this species remains after November 1.

158 (196). ***Herodias egretta*** (Gmelin). Egret.

This species was recorded in 1854 by William Hopkins. Foster Parker has in his collection a specimen shot at Cayuga but without record or recollection of date.

159 (201). ***Butorides virescens*** (Linnæus). Green heron.

Common summer resident. The average date of spring arrival is May 2, the earliest, April 18, 1906. Nesting begins about May 10 and continues until the middle of July. On July 11, 1906, four nests were found, one containing four eggs and the others, young birds which left the nest upon approach. This species leaves in the fall about the last of September, the latest record being October 2, 1902.

160 (202). ***Nycticorax nycticorax nævius*** (Boddaert). Black-crowned night heron.

Never common but a regular spring and fall migrant. In the former season our records extend from May 11 to June 2, in the latter from July 14 to October 29.

XXIX. Order PALUDICOLÆ. The Cranes and Rails.

47. Family GRUIDÆ. The Cranes.

161 (204). **Grus americana** (Linnæus). Whooping crane.

"Several years ago a specimen was killed on Cayuga Lake—Frank A. Ward" (Eaton, 1901).

48. Family RALLIDÆ. The Rails.

162 (208). **Rallus elegans** Audubon. King rail.

Not an uncommon summer resident in the marshes at the north end of the basin. There is but one record of this species at the south end of the lake, an adult male shot November 29, 1901.

163 (212). **Rallus virginianus** Linnæus. Virginia rail.

Common summer resident in all the marshes throughout the basin. The average date of spring arrival is May 1, the earliest, April 24, 1904. They nest the last half of May and throughout June. The earliest date for nest is May 18, 1905. The latest date upon which nest and eggs have been found is July 9, 1906. They are abundant throughout September and the first half of October. All have usually departed by November 1.

164 (214). **Porzana carolina** (Linnæus). Sora.

Common summer resident throughout the basin. The average date of spring arrival is May 1, the earliest, April 14, 1908. About the middle of October this species becomes exceedingly abundant and usually all have left by the last of the month. The nesting period is the same as for the preceding species.

165 (215). **Coturnicops noveboracensis** (Gmelin). Yellow rail.

Mr. F. S. Wright, of Auburn, reports that two or three have been taken at the north end of the lake. One of them was a male shot at Meridian, N. Y., in 1897.

166 (219). **Gallinula galeata** (Lichtenstein). Florida gallinule.

Fairly common summer resident in the marshes at the north end of the lake where it arrives the last of April. Ralph and Bagg²⁷

²⁷ Ralph, William L., and Bagg, Egbert, "Annotated List of the Birds of Oneida County, N. Y., and Its Immediate Vicinity," *Trans. of the Oneida Historical Society*, Vol. III., p. 101, 1886.

recorded this species as very common in the marshes of Seneca River where they bred in great numbers. In recent years it has not been recorded near Ithaca. E. H. Eaton informs us that C. J. Pennock saw a female with young in the Renwick marshes in July, 1879. Cornell University has recently come into the possession of a collection of birds made near Ithaca in 1850. Among the skins is one of an adult male and one of a young individual in first plumage.

167 (221). **Fulica americana** Gmelin. Coot.

Common transient the last of April and the first of May and an occasional summer resident in the marshes at both ends of the lake. On May 25, 1907, a nest containing five eggs was found in the west marsh at Ithaca. On June 1 it contained ten eggs and on June 9, when it was last visited, the number was the same. During October this species is very common and departs usually by the last of the month.

XXX. Order LIMICOLÆ. The Shore Birds.

49. Family PHALAROPODIDÆ. The Phalaropes.

168 (222). **Phalaropus fulicarius** (Linnæus). Red phalarope.

Rare transient visitant. William Hopkins reported a specimen in 1854. In the collection of Cornell University there is a specimen of a male killed on Cayuga Lake October 18, 1885, by E. H. Sargent.

169 (223). **Lobipes lobatus** (Linnæus). Northern phalarope.

In the collection of E. H. Eaton are two specimens, male and female, taken at Montezuma in 1895. In the collection of Cornell University is a specimen taken at Ithaca in 1850.

170 (224). **Steganopus tricolor** (Vieillot). Wilson's phalarope.

One specimen, a young individual, was obtained by L. A. Fuertes at Ithaca in the fall of 1892.

49a. Family RECURVIROSTRIDÆ. The Avocets and Stilts.

170a (225). **Recurvirostra americana** Gmelin. Avocet.

One specimen (C. U. 5219) was taken at Renwick, September 16, 1909, by Mr. A. A. Allen.

50. Family SCOLOPACIDÆ. The Snipe.

171 (228). **Philohela minor** (Gmelin). Woodcock.

Summer resident in moist areas throughout the basin. They arrive in the spring the last of March and leave in the fall during the first two weeks of November. The woodcock is slowly increasing in numbers about Ithaca. Mr. John Vann tells us that in the fall of 1908 all the individuals of several localities succeeded in migrating without any loss from shooting. He attributes the increase partly to the growth of cover in the uplands where they are found during the fall.

172 (230). **Gallinago delicata** (Ord). Wilson's snipe.

Common transient between April 12 and May 20. In 1908 one was recorded on April 3. They are most abundant during the latter part of April. Our autumn records fall between September 22 and November 18. The downy young were found at Meridian, N. Y., by E. G. Taber and F. S. Wright states that it is a rare breeder in the marshes at Cayuga.

173 (231). **Macrorhamphus griseus** (Gmelin). Dowitcher.

There is a specimen in the collection of Foster Parker taken on Cayuga lake but without other data. From August 18 to 26, 1908 Foster Parker shot one and saw five others.

174 (233). **Micropalama himantopus** (Bonaparte). Stilt sandpiper.

Foster Parker shot a specimen at Cayuga October 10, 1907, in a flock of red-backed sandpipers. August 25, 1908, E. H. Eaton took a specimen at Cayuga and two more on September 20. On September 28, 1908, A. A. Allen and J. T. Lloyd shot a specimen at the north end of the lake.

175 (234). **Tringa canutus** Linnæus. Knot.

Two specimens were shot at Cayuga by Foster Parker, August 30, 1908. Mr. E. H. Eaton and Mr. L. A. Fuertes report them as frequently seen at Cayuga in the fall. It is altogether probable that this species is not an uncommon transient.

176 (239). **Pisobia maculata** (Vieillot). Pectoral sandpiper.

Common transient at the north end of the lake but rare at the south end. L. A. Fuertes has taken one specimen at Ithaca on each

of the following dates: During the fall of 1892, August 13, 1899, and October 12, 1890.

177 (240). **Pisobia fuscicollis** (Vieillot). White-rumped sandpiper.

One specimen taken at Montezuma October 12, 1906, by L. A. Fuertes.

178 (242). **Pisobia minutilla** (Vieillot). Least sandpiper.

Common transient. Most common in spring from May 7 to 27. The latest fall record is October 12, 1906. Regarding the time of first appearance in the fall we have no data.

179 (243a). **Pelidna alpina sakhalina** (Vieillot). Red-backed sandpiper.

Common transient being most abundant in the fall during October.

180 (246). **Ereunetes pusillus** (Linnæus). Semipalmated sandpiper

Common transient. In the spring they are found all through May. In the fall they appear August 20 and leave November 1. They are most common during the first half of October.

181 (248). **Calidris leucophæa** (Pallas). Sanderling.

Specimens are frequently taken at both ends of the lake. It appears to be a fairly common transient in both spring and fall.

182 (251). **Limosa hæmastica** (Linnæus). Hudsonian godwit.

"A rare spring and autumn migrant" (Auburn List). A specimen was taken at Ithaca about November 5, 1878, by C. J. Pennock and mounted by R. B. Hough.

183 (254). **Totanus melanoleucus** (Gmelin). Greater yellow-legs.

Transient. Fairly common from April 30 to May 20. It is common in the fall during October.

184 (255). **Totanus flavipes** (Gmelin). Yellow-legs.

Common transient from May 10 to June 1, the earliest spring date being April 28, 1908. It is common in the fall during October. The latest fall date is November 10, 1900.

185 (256). **Helodromas solitarius** (Wilson). Solitary sandpiper.

Common transient from April 28 to May 20 and July 14 to Sep-

tember 20. The average date of spring arrival is May 1, the earliest date being April 28, 1905.

186 (258). **Catoptrophorus semipalmatus** (Gmelin). Willet.

"A regular migrant. Three secured in the fall of 1876" (Auburn List, p. 33). This species has not been recorded in recent years.

187 (261). **Bartramia longicauda** (Bechstein). Upland plover.

The only record of this species which we have is a pair found breeding by Foster Parker during the summer of 1907. In the Auburn List (p. 33) it is spoken of as not an uncommon summer resident.

188 (263). **Actitis macularia** (Linnæus). Spotted sandpiper.

Common summer resident. The average date of spring arrival is April 24, the earliest, April 20, 1906. The active nesting period is from May 20 to June 15. L. A. Fuertes reports that he has found nests with eggs as late as July 26 (1900).

189 (264). **Numenius americanus** Bechstein. Long-billed curlew.

"A regular but somewhat rare migrant" ("Auburn List," p. 23). Not recorded in recent years.

190 (265). **Numenius hudsonicus** Latham. Hudsonian curlew.

"Occurs irregularly during the migration. One specimen preserved in the collection of the Phoenix Sportsman's Club at Seneca Falls, N. Y. ("Auburn List," p. 34). There is a specimen (C. U. 1158), in the collection of Cornell University taken at Union Springs in 1882.

51. Family CHARADRIIDÆ. The Plovers.

191 (270). **Squatarola squatarola** (Linnæus). Black-bellied plover.

Regular transient in the fall and occasionally in spring. On October 14, 1899, L. A. Fuertes shot a specimen at Ithaca which constitutes the only record for the south end of the basin. Mr. A. A. Allen and Mr. J. T. Lloyd reported it common at the north end of the lake on September 26, 1908. Our fall records all occur between September 20 and October 30.

192 (272). **Charadrius dominicus** Müller. Golden plover.

The only record of this species is a specimen taken by E. H. Eaton and L. A. Fuertes at Cayuga, October 29, 1907.

- 193 (273). **Oxyechus vociferus** (Linnæus). Killdeer.

Common transient and not uncommon summer resident from March 12 to November 15. It is most abundant in the fall.

- 194 (274). **Ægialitis semipalmata** Bonaparte. Semipalmated plover.

Transient. Uncommon in the spring, fairly common in the fall from August 15 to September 30.

52. Family APHRIZIDÆ. The Turnstones.

- 195 (283a). **Arenaria interpres morinella** (Linnæus). Turnstone.

Mr. L. A. Fuertes took a specimen at Ithaca June 3, 1906 and Foster Parker reports several taken at Cayuga.

XXXI. Order GALLINÆ. The Gallinaceous Birds.

52a. Family ODONTOPHORIDÆ. The Quail.

- 196 (289). **Colinus virginianus** (Linnæus). Bob-white.

Common permanent resident. It is very scarce all along the eastern part of the basin.

53. Family TETRAONIDÆ. The Grouse.

- 197 (300). **Bonasa umbellus** (Linnæus). Ruffed grouse.

Common permanent resident. All of our nesting records fall between April 20 and May 15.

XXXII. Order COLUMBÆ. The Doves.

54. Family COLUMBIDÆ. The Pigeons.

- 198 (315). **Ectopistes migratorius** (Linnæus). Wild pigeon.

Formerly abundant. None have been recorded here since 1892 when "A few were seen in Ithaca—L. A. F." (Eaton, p. 32).

- 199 (316). **Zenaidura macroura carolinensis** (Linnæus). Mourning dove.

Common summer resident. The average date of spring arrival is April 1, the earliest, March 8, 1890. Nest building has been found to begin as early as April 15 and eggs have been found until June

18. In the Renwick marshes they nest in colonies varying from three or four to a dozen pairs. The nests are frequently only a few feet apart, built upon stumps, brush piles, logs and heaps of debris.

XXXIII. Order RAPTORES. The Birds of Prey.

55. Family CATHARTIDÆ. The American vultures.

200 (325). *Cathartes aura septentrionalis* (Wied). Turkey vulture.

Mr. C. J. Hampton saw eight individuals hovering above a rank woodchuck on July 1, 1900, at Cosad, N. Y. One specimen was shot. On June 20, 1908, Mr. J. T. Lloyd reported one from the Renwick flats at Ithaca.

56. Family BUTEONIDÆ. The Hawks and Eagles.

201 (331). *Circus hudsonius* (Linnæus). Marsh hawk.

Common summer resident. The average date of spring arrival is March 27, the earliest being March 25, 1906. They remain in Autumn until the last of October, the latest fall record being October 28, 1908. The only nesting records of this species which we have are: a nest and eggs found May 27, 1904, and a nest with five young found June 29, 1906.

202 (332). *Accipiter velox* (Wilson). Sharp-shinned hawk.

Common summer resident and occasionally taken in winter. It is common from the last of March until the first of November. The only breeding record is a nest of young which took wing on July 16, 1906.

203 (333). *Accipiter cooperi* (Bonaparte). Cooper's hawk.

Common summer resident, more abundant in the fall. The average date of spring arrival is March 25, the earliest, March 17, 1907. They remain in the fall until November 1.

204 (334). *Astur atricapillus* (Wilson). Goshawk.

Uncommon winter visitant. A specimen was taken near West Candor, November 26, 1907, by C. S. Gridley. Mr. Fuertes reports that he sees one or more every winter. It is recorded in the Auburn List as an "uncommon winter visitor."

- 205 (337). **Buteo borealis** (Gmelin). Red-tailed hawk.

Common resident species.

- 206 (339). **Buteo lineatus** (Gmelin). Red-shouldered hawk.

Common resident species and more common in winter than the preceding species. The earliest nesting date recorded is April 26, 1905.

- 207 (343). **Buteo platypterus** (Vieillot). Broad-winged hawk.

Uncommon summer resident. The earliest spring record, March 16, 1906.

- 208 (347a). **Archibuteo lagopus sancti-johannis** (Gmelin). Rough-legged hawk.

Regular but not common winter visitant from Jan. 1 to April 1.

- 209 (352). **Haliaeetus leucocephalus** (Linnæus). Bald eagle.

Not common permanent resident. It is more frequently seen in the spring and fall. It bred formerly near Crowbar point and still breeds in the vicinity of Union Springs.

56a. Family FALCONIDÆ. The Falcons.

- 210 (356). **Falco peregrinus anatum** (Bonaparte). Duck hawk.

Rare transient during spring and fall.

- 211 (357). **Falco columbarius** Linnæus. Pigeon hawk.

Uncommon transient.

- 212 (360). **Falco sparverius** Linnæus. Sparrow hawk.

Common summer resident from March 15 to November 15 and occasionally taken in winter.

56b. Family PANDIONIDÆ. The Fish Hawks.

- 213 (364). **Pandion haliaëtus carolinensis** (Gmelin). Osprey.

Common transient during May and October. Several are seen every year during the summer months but we have no evidence that they nest within the basin. The average date of spring arrival is April 12, the earliest, April 5, 1901, 1902 and 1906. Migrants begin to arrive in the fall about September 20. They are common from the last of September to the middle of October. The latest fall record is a female killed October 25, 1899.

57. Family ALUCONIDÆ. The Barn Owls.

214 (365). **Aluco pratincola** (Bonaparte). Barn owl.

The barn owl has been recorded within the basin at various intervals since 1880 at which time Foster Parker reports one taken at Cayuga. On December 13, 1885, one was taken at Auburn by F. J. Stupp. Another was taken by L. O. Asbury September 23, 1900, at Sennett and on December 1, 1904, a specimen was shot near South Danby. Mr. Samuel Tisdell, of Ithaca, has in his possession a mounted specimen taken near Ithaca in the fall of 1907. He states that during the fall of that year three others taken near Ithaca were brought to his shop to be mounted. On June 6, 1908, A. A. Allen and J. T. Lloyd saw one in the Renwick Marshes. November 27, 1908, one was killed in Michigan Hollow in the extreme southern portion of the basin. There is little doubt that this species is increasing in the lake basin.

58. Family STRIGIDÆ. The Owls.

215 (366). **Asio wilsonianus** (Lesson). Long-eared owl.

Common permanent resident. The only breeding record which we have is a nest containing eggs found April 9, 1905.

216 (367). **Asio flammeus** (Pontoppidan). Short-eared owl.

A resident species. Common in summer at the north end of the basin, uncommon in the southern portion.

217 (368). **Stryx varia** Barton. Barred owl.

Uncommon resident.

218 (372). **Cryptoglaux acadicus** (Gmelin). Saw-whet owl.

Rare. "Adult male taken July 18, 1878. Two specimens received, taken in Cayuga Co., April 14, 1877, and November, 1878" ("Auburn List," p. 27). A female was taken at Sennett January 25, 1904, by Charles Lyon and one was taken at Ithaca January 16, 1908, by A. A. Allen and J. T. Lloyd.

219 (373). **Otus asio** (Linnæus). Screech owl.

Abundant permanent resident.

220 (375). **Bubo virginianus** (Gmelin). Great horned owl.

Uncommon permanent resident.

221 (376). **Nyctea nyctea** (Linnæus). Snowy owl.

Irregular winter visitant. In the collection of Cornell University are three specimens from this basin taken as follows: winter of 1878 at Aurora, December 12, 1890, at Covert, February 22, 1902 at Newfield.

222 (377a). **Surnia ulula caparoch** (Müller). Hawk owl.

The only record of this species is a male taken by L. O. Ashbury at Conquest, November 23, 1902. Two birds were seen and one captured.

XXXIV. Order COCCYGES. The Cuckoo-like Birds.

59. Family CUCULIDÆ. The Cuckoos.

223 (387). **Coccyzus americanus** (Linnæus). Yellow-billed cuckoo.

Common summer resident. The average date of spring arrival is May 10, the earliest, May 6, 1905.

224 (388). **Coccyzus erythrophthalmus** (Wilson). Black-billed Cuckoo.

Common summer resident. The average date of spring arrival is May 9, the earliest, April 24, 1904.

60. Family ALCEDINIDÆ. The Kingfishers.

225 (390). **Ceryle alcyon** (Linnæus). Belted kingfisher.

Common summer resident. On December 23, 1874, a female was taken at Ithaca and on January 15, 1905, one individual was seen near an open stream in the Renwick wood at Ithaca. The average date of spring arrival is April 4, the earliest, March 17, 1907. It is common in the fall until the middle of October. By the 25th of this month all have usually disappeared.

XXXV. Order PICI. The Woodpeckers.

61. Family PICIDÆ. The Woodpeckers.

226 (393). **Dryobates villosus** (Linnæus). Hairy woodpecker.

Common resident species.

227 (394c). **Dryobates pubescens medianus** (Swainson). Downy woodpecker.

Common permanent resident. The active season of nesting is from May 10 to June 15. The earliest record of nesting is May 6, 1904. Our earliest record of young on the wing is June 9, 1904.

228 (400). **Picoides articus** (Swainson). Arctic three-toed woodpecker.

An occasional winter visitant. Specimens were taken at Ithaca during the winter of 1895-6 and on November 1, 1901, by L. A. Fuertes. A female was taken October 19, 1901, at Sennett by L. O. Ashbury.

229 (402). **Sphyrapicus varius** (Linnæus). Yellow-bellied sapsucker.

Common transient and "reported as breeding in Cayuga, Yates and Oneida Counties" (Eaton). The average date of spring arrival is April 10, the earliest, March 30, 1908. They become common the last of April and the first of May. The latest date upon which individuals have been seen at Ithaca is May 26, 1900. Usually all have left by May 15. They appear in the fall from September 20 to November 1. The latest fall record is one seen November 27, 1908.

230 (406). **Melanerpes erythrocephalus** (Linnæus). Red-headed woodpecker.

Rare in winter but becomes common about May 5. The only nesting records which we have are eggs found June 13, 1903, and May 16, 1907.

231 (409). **Centurus carolinus** (Linnæus). Red-bellied woodpecker.

Rare. There are in the collection of Cornell University three specimens taken near Ithaca. One in 1850, another in 1858 and a third taken by L. A. Fuertes in November, 1894. Mr. G. C. Embury took a female in a small swamp just north of Auburn, March 4, 1898.

232 (412a). **Colaptes auratus luteus** Bangs. Northern flicker.

Common summer resident and occasionally present in winter.

Migrants begin to arrive the last of March from which time it is common until October 20. Frequently many are seen as late as the first of December.

XXXVI. Order MACROCHIRES. The Goatsuckers, Swifts and Hummingbirds.

62. Family CAPRIMULGIDÆ. The Goatsuckers.

233 (417). **Antrostomus vociferus** (Wilson). Whip-poor-will.

Common summer resident in the basin from May 1 to September 1. In the region about Ithaca it is very uncommon. The latest that it has been observed in the fall is October 7, 1907. The earliest spring record is April 29, 1906.

234 (420). **Chordeiles virginianus** (Gmelin). Nighthawk.

Common summer resident. The average date of spring arrival is May 19, the earliest, May 15, 1906.

63. Family MICROPODIDÆ. The Swifts.

235 (423). **Chaetura pelagica** (Linnæus). Chimney swift.

Abundant summer resident. The average date of spring arrival is April 23, the earliest, April 19, 1889. Nests with eggs are found from May 20 to July 5. Usually all have departed in the fall by October 1.

64. Family TROCHILIDÆ. The Hummingbirds.

236 (428). **Archilochus colubris** (Linnæus). Ruby-throated hummingbird.

Common summer resident from May 10, the average date of spring arrival, to September 10. Nesting dates all fall between May 23 and July 21. The crest of the nesting season is between June 15 and 30.

XXXVII. Order PASSERES. The Perching Birds.

65. Family TYRANNIDÆ. The Flycatchers.

237 (444). **Tyrannus tyrannus** (Linnæus). Kingbird.

Common summer resident. The average date of spring arrival is May 6, the earliest, May 3, 1902. They nest the very last of May and during June.

238 (452). **Myiarchus crinitus** (Linnæus). Crested flycatcher.

Common summer resident. The average date of spring arrival is May 4, the earliest, May 1, 1900. Nesting begins the last of May and lasts through June.

239 (456). **Sayornis phoebe** (Latham). Phoebe.

Abundant summer resident along the streams and lake shores. The average date of spring arrival is March 20, the earliest, March 9, 1899. During the first half of October they depart for the south, latest record being October 19, 1902. Nesting begins April 20 and continues through May and June. The earliest nesting record is April 13, 1901. The latest date for eggs is a nest found June 21, 1900.

240 (459). **Nuttallornis borealis** (Swainson). Olive-sided flycatcher.

Rare. A specimen was taken in Fall creek gorge by L. A. Fuertes May 11, 1905. G. C. Embury took a male at the north end of the lake May 30, 1898.

241 (461). **Myiochanes virens** (Linnæus). Wood pewee.

Abundant summer resident. The average date of spring arrival is May 13, the earliest, May 1, 1900. They nest throughout the month of June.

242 (463). **Empidonax flaviventris** Baird. Yellow-bellied flycatcher.

The definite records are three specimens, two males and one female taken at Ithaca by R. B. Hough on May 29, 1882, and several taken in the vicinity of Waterloo and reported by E. H. Eaton. A few are reported *seen* each year between May 15 and June 10.

243 (466a). **Empidonax traillii alnorum** Brewster. Alder flycatcher.

Uncommon transient and rare summer resident. The average date of spring arrival is May 14, the earliest, May 4, 1905. The yellow-bellied and the alder are the last flycatchers to arrive in the spring, the latter loitering along into June. In 1906 it was found until June 9 in the willow and alder thickets along the west side of the Renwick marshes. L. A. Fuertes reports it as breeding at Cay-

uta, N. Y., just outside the Cayuga basin on the southwest. A. A. Allen and J. T. Lloyd found a nest containing two eggs on June 16, 1908, at Ithaca.

244 (467). **Empidonax minimus** Baird. Least flycatcher.

Abundant summer resident. The average date of spring arrival is May 4, the earliest, May 1, 1906. Abundant everywhere except the denser wooded areas.

66. Family ALAUDIDÆ. The Larks.

245 (474). **Otocoris alpestris** (Linnæus). Shore lark.

It is reported by Mr. Fuertes that the shore lark was formerly common in this basin. It is now replaced by the prairie horned lark. A few are, however, still found in winter. Mr. G. C. Embury took two specimens at Auburn.

246 (474b). **Otocoris alpestris praticola** Henshaw. Prairie horned lark.

Permanent resident although not common during December and January. They become common about the first of February. This species is the first of our Passerine birds to nest. On April 7, 1904, a nest was found at Trumansburg which contained one egg and two young. Dating back fourteen days, which, according to Bendire is the period of incubation, the eggs must have been laid not far from March 20 to 23. On April 20, 1902, there was taken at Ithaca a young individual which had just left the nest. On April 6, 1906, young just beginning to fly were seen. In 1907 Mr. A. A. Allen found on April 3 a nest containing eggs and on April 4 another nest in which the eggs hatched April 10. The young of this nest were killed by a very heavy snow storm a few days later.

67. Family CORVIDÆ. The Crows and Jays.

247 (477). **Cyanocitta cristata** (Linnæus). Blue jay.

Common permanent resident. It is now rarely seen in the vicinity of Ithaca except for a short period during the spring and fall. It has not been known to nest in this immediate vicinity since 1889 when a pair built in a small grove of oaks on the Cornell Campus.

In all other portions of the basin they are fairly common. At Enfield on May 5, 1907, A. A. Allen found a nest containing five eggs.

248 (486a). **Corvus corax principalis** Ridgway. Northern raven.

"Formerly not uncommon at the north end of the basin. The last reported was one, seen by Foster Parker in 1880, pursued by a number of crows." (Eaton).

249 (488). **Corvus brachyrhynchos** C. L. Brehm. Crow.

Common permanent resident. Nests containing eggs are most commonly found from April 10 to 20. In 1903 a nest containing eggs was found on April 3. The latest record of nest and eggs is May 16, 1900.

68. Family ICTERIDÆ. The Blackbirds and Orioles.

250 (494). **Dolichonyx oryzivorus** (Linnæus). Bobolink.

Common summer resident. The average date of spring arrival is May 4, the earliest, April 30, 1900. By July 10 they are gathered in large flocks in the marshes where they remain through August and the first of September, at about the middle of which they depart for the south.

251 (495). **Molothrus ater** (Boddaert). Cowbird.

Abundant summer resident. The average date of spring arrival is March 28, the earliest, March 14, 1899. Eggs are found from May 5 to June 15. The maximum period of egg-laying is the last half of May. The phoebe, the vireos, redstart and yellow warbler are the most common victims of the cowbird's parasitic habits.

252 (498). **Agelaius phœniceus** (Linnæus). Red-winged blackbird.

Common summer resident and found regularly in small numbers in the marshes during winter. Migration begins about March 10. The earliest record is a large flock of males in full song, seen February 22, 1902. The earliest record of nesting is May 12, 1906. The most active breeding period is from the middle of May to the first of June. Young are on the wing by June 5. During the first two weeks of July this species collects in large flocks in the marshes where they remain until the last of November. Flocks containing hundreds are seen migrating all through November. So far as they have been observed at Ithaca they follow the inlet valley towards the south.

253 (501). **Sturnella magna** (Linnæus). Meadow lark.

Common summer resident and found regularly in small numbers in winter. The average date of the spring arrivals is March 17, the earliest, March 4, 1906. They remain common until the last of October.

254 (506). **Icterus spurius** (Linnæus). Orchard oriole.

Rare. On May 30, 1898, G. C. Embury took a male at Cayuga. On May 27, 1899, Burdett Wright found a pair nesting at Montezuma. A male was taken at Ithaca, May 3, 1890, by L. A. Fuertes, who saw a pair at Ithaca, June 7, 1902. A male in song was found May 18, 1908, in the Inlet valley just south of Ithaca and in the same locality A. A. Allen and J. T. Lloyd found a nest which contained four eggs and one young.

255 (507). **Icterus galbula** (Linnæus). Baltimore oriole.

Common summer resident. The average date of spring arrival is May 3, the earliest, April 30, 1900 and 1905. They nest from May 10 to June 1.

256 (509). **Euphagus carolinus** (Müller). Rusty blackbird.

Common transient. It arrives usually the last days of March. The earliest date is March 18, 1901. It is common from April 15 to 30 but small flocks are seen until May 15.

257 (511b). **Quiscalus quiscula aeneus** (Ridgway). Bronzed grackle.

Common summer resident and occasionally found in winter. The average date of spring arrival is March 14, the earliest, March 4, 1906. Nesting begins the last half of April and continues throughout May. By May 25 large numbers of young are on the wing; during the first week in June this species begins to collect in flocks and resort to common roosts.

69. Family FRINGILLIDÆ. The Sparrows.

258 (514). **Hesperiphona vespertina** (W. Cooper). Evening grosbeak.

Accidental visitant. During the winter of 1890 when it was so common in New England it appeared here in fairly large numbers

from January 22, when first seen, to March 28. They were not seen again until April 11, 1904, when L. A. Fuertes shot a pair on the Cornell Campus. On December 8, 1906, Mrs. A. T. Kerr reported one which she saw on Cornell Heights.

259 (515). **Pinicola enucleator leucura** (Müller). Pine grosbeak.

An irregular winter and spring visitant but never common. In 1890 it was reported by L. A. Fuertes on January 23. Since that date it has been recorded as follows: 1904 on January 7, April 26 and 29 and May 5. In 1905, April 20. In 1906, March 5.

260 (517). **Carpodacus purpureus** (Gmelin). Purple finch.

Common summer resident from March 22 to November 10. It is occasionally seen in winter. It nests during May and June. The latest date of nest and eggs is June 21, 1905.

261. **Passer domesticus** (Linnæus). English sparrow.

Abundant.

262 (521). **Loxia curvirostra minor** (Brehm). Red crossbill.

An irregular visitant. Although commonly seen during March and April they are frequently present during late spring and summer. In 1889 L. A. Fuertes reported them on June 16. In 1900 T. L. Hankinson saw a flock of 30 individuals on May 30 and again on July 15. On August 7 of this year another flock was seen. In 1906 a flock of ten were seen on the Cornell Campus from June 21 to 24. In 1907 they were first seen on May 27 and continued common until June 24. In 1908 they were seen daily from June 10 to 16.

263 (522). **Loxia leucoptera** Gmelin. White-winged crossbill.

Rare winter visitant. During the winter of 1907 this species was more common in the basin than in any year since records have been kept. Specimens were frequently taken and seen from January 5 to the first of March. The last specimen recorded that year was one killed at Taughannock Falls, March 4. November 15, 1882, a female was taken at Ithaca. L. A. Fuertes took a specimen at Ithaca, February 8, 1906.

264 (528). **Acanthis linaria** (Linnæus). Redpoll.

An irregular winter visitant but usually common when present. There are no records of their occurrence before January in any year.

There is a specimen of a female in the collection of Cornell University taken at Ithaca in January, 1876, showing that they were present that winter but no notes to indicate whether or not they were common. On January 10, 1879, a male was killed by R. B. Hough. They were reported by E. H. Eaton as common that winter in Cayuga Co. In 1904 they were common all through January, February and March on the twenty-ninth of which L. A. Fuertes shot a specimen from a large flock. In 1907 they were common from January 13 to March 24. In 1909 the first individuals appeared January 5 and were common everywhere in the southern portion of the basin until February 1.

265 (529). **Astragalinus tristis** (Linnæus). Goldfinch.

Permanent resident although more or less irregular in winter. They become common in the spring from the tenth to the fifteenth of April. The breeding plumage begins to show about April 20 and is complete about the middle of May at which time the males are in full song. Nests and eggs are commonly found during July.

266 (533). **Spinus pinus** (Wilson). Pine siskin.

An uncommon winter and a common spring visitant from the last of April to the middle of May. The latest spring record is May 30, 1907. The earliest winter record is a specimen taken January 20, 1890.

267 (534). **Plectrophenax nivalis** (Linnæus). Snow bunting.

Common winter resident being most common from January to March. In the fall they arrive the last week in October and remain until the middle of March. The latest date is March 26, 1890.

268 (536). **Calcarius lapponicus** (Linnæus). Lapland longspur.

Rare. Mr. Fred Allen took a specimen near Auburn during the winter of 1876 and Mr. Charles Lyon took a male near Auburn, March 3, 1899.

269 (540). **Poœcetes gramineus** (Gmelin). Vesper sparrow.

Common summer resident. The average date of spring arrival is March 28, the earliest, March 23, 1903. The active breeding period is May and June. The earliest record of nest and eggs is April 25, 1900, the latest, July 23, 1900. This species remains in the fall until the last of October. The latest fall record is November 27, 1908.

- 270 (542a). *Passerculus sandwichensis savanna* (Wilson). Savannah sparrow.

Common summer resident. The average date of spring arrival is April 6, the earliest, March 23, 1905. About July 25 this species begins to collect in flocks which become numerous the first of October. All have left usually by the middle of the month.

- 271 (546). *Ammodramus savannarum australis* Maynard. Grasshopper sparrow.

Common summer resident. The average date of spring arrival is May 2, the earliest, April 26, 1905.

- 272 (548). *Passerherbulus lecontei* (Audubon). Leconte's sparrow.

One specimen was shot in the Renwick marshes by L. A. Fuertes, October 11, 1897.

- 273 (549.1). *Passerherbulus nelsoni* (Allen). Nelson's sparrow.

The numerous specimens taken since 1900 justify the conclusion that this species is a common visitant during the fall migration from the middle of September to the first of October. They have always been found in the rushes close to the water where they skulk and run in a fashion very suggestive of a mouse. When flushed they rise for a moment and disappear again much as a wren.

- 274 (549.1a). *Passerherbulus nelsoni subvirgatus* (Dwight). Acadian sharp-tailed sparrow.

Uncommon but regular fall visitant. It arrives the very last of September or first of October, about a week later than the Nelson's sparrow and remains for a period of from 12 to 15 days. Neither this nor the preceding species has ever been taken in the spring. The definite records are skins, which are now in the collection of L. A. Fuertes and that of Cornell University, taken between September 26 and October 12.

- 275 (554). *Zonotrichia leucophrys* (Forster). White-crowned sparrow.

Common transient. The average date of spring arrival is May 4, the earliest, May 2, 1907. It remains until May 20 becoming common from the tenth to the fifteenth of the month. It is common in the fall during the very last of September and the first half of Octo-

ber. The latest record is October 28, 1908. A single individual was seen in the marshes at Ithaca, February 24, 1906.

276 (558). **Zonotrichia albicollis** (Gmelin). White-throated sparrow.

Common transient. The average date of spring arrival is April 17, the earliest, April 13, 1903. They become common the last week of April and remain until May 20. The latest record is May 23, 1908. In the fall they appear about September 20 and are common throughout October. The latest record for the fall is November 4, 1908.

277 (559). **Spizella monticola** (Gmelin). Tree sparrow.

Common winter resident. They arrive October 1 and remain common until April 25. A few stragglers have been noted after this date. In 1889 L. A. Fuertes saw several on May 8. In 1904 a few were seen on May 2 and in 1906 the latest date was April 30.

278 (560). **Spizella passerina** (Bechstein). Chipping sparrow.

Common summer resident. The average date of spring arrival is April 2, the earliest March 27, 1907. The maximum nesting period is from May 15 to June 30. They remain in the fall until the last week in October. The latest record is November 1, 1902.

279 (563). **Spizella pusilla** (Wilson). Field sparrow.

Common summer resident. The average date of spring arrival is March 30, the earliest, March 25, 1907. The nesting period extends from May 15 to June 5. They remain in the fall until the very last of October.

280 (567). **Junco hyemalis** (Linnæus). Slate-colored junco.

A common transient, uncommon winter resident and a rare summer resident. They become common in the fall the last week in September and are abundant during October. In the spring the first influx from the south occurs the last week in March. They remain abundant throughout April. The first of May there is a decided reduction in numbers and by May 10 the migration ceases. On June 21, 1878, F. H. King²⁸ found two individuals in the Enfield gorge. In 1907, each day from July 21 to 25, two individuals were

²⁸ Bull. Nutt. Orn. Club, Vol. III., p. 195.

seen in the same locality. A. A. Allen and J. T. Lloyd found two adults and three young just leaving the nest, June 19, 1908, at the source of Cascadilla Creek.

281 (581). **Melospiza melodia** (Wilson). Song sparrow.

Common summer resident and not uncommon in the marshes during winter. Migrants from the south begin to arrive about March 10. For the remainder of the month this species is abundant. The nesting season extends from May 1 to July 22. A few nests have been found the last of April.

282 (583). **Melospiza lincolni** (Audubon). Lincoln's sparrow.

An uncommon but regular transient. It arrives the very last of April, the twenty-seventh being the earliest date. It is met with occasionally until May 15. It appears in the fall the last of September or first of October.

283 (584). **Melospiza georgiana** (Latham). Swamp sparrow.

Common summer resident. It is occasionally taken in the marshes in winter. The average date of spring arrival is April 12, the earliest, March 29, 1904. During the second week in October there is a decided reduction in numbers and all have left before the last of the month.

284 (585). **Passerella iliaca** (Merrem). Fox sparrow.

Common transient. The average date of spring arrival is April 15, the earliest, March 17, 1908. They are very rarely found after April 15, the latest being May 8, 1908. In the fall they appear the first week in October and are found until the first week in November. The latest date is November 15, 1908.

285 (587). **Pipilo erythrophthalmus** (Linnæus). Towhee.

Common transient and an uncommon but regular summer resident. The average date of spring arrival is April 23, the earliest, April 18, 1905. It is found nesting in a few localities, at the south end of the basin, from May 25 through the larger part of June. Young on the wing have been seen June 19. They remain in the fall until October 20.

286 (595). **Zamelodia ludoviciana** (Linnæus). Rose-breasted grosbeak.

Common summer resident. The average date of spring arrival is May 6, the earliest, April 30, 1900. Eggs have been found from May 16 to June 9. They remain in the fall until the last of September. The latest date is October 1, 1908.

287 (598). **Passerina cyanea** (Linnæus). Indigo bunting.

Common summer resident. The average date of spring arrival is May 14, the earliest, May 6, 1902. Eggs have been found from June 7 to July 15. Usually the middle of September marks the limit of their stay in this basin although a few have been seen after that date. October 1, 1908, is the latest date.

288 (604). **Spiza americana** (Gmelin). Dickcissel.

This species nested in the town of Jamaica, Seneca Co., in 1875. One of the specimens taken at that time is now in the collection of E. H. Eaton.

70. Family TANAGRIDÆ. The Tanagers.

289 (608). **Piranga erythromelas** Vieillot. Scarlet tanager.

Common summer resident. The average date of spring arrival is May 8, the earliest, May 6, 1906. Nesting begins the last week in May and continues through the first half of June. A few nests with eggs have been found in the latter part of June and one as late as July 9 (1906). This species has steadily increased in numbers since 1899. It remains in the fall until the middle of September, the 21st of this month constituting the latest record.

71. Family HIRUNDINIDÆ. The Swallows.

290 (611). **Progne subis** (Linnæus). Purple martin.

Rare although formerly very common. Two were seen at Ithaca April 26 and 27, 1905. One was seen at Taughannock Falls, June 3, 1906. It is still found in small numbers in the northern portion of the basin.

291 (612). **Petrochelidon lunifrons** (Say). Cliff swallow.

Formerly a common summer resident but rapidly decreasing in numbers. The average date of spring arrival is April 25, the ear-

liest, April 20, 1900 and 1905. It nests through June and departs the very last of August.

292 (613). **Hirundo erythrogaster** Boddaert. Barn swallow.

Common summer resident. The average date of spring arrival is April 19, the earliest, April 13, 1905. This species along with individuals of the preceding begin to collect in large flocks in the marshes about July 15. The latest fall record is September 26, 1908.

293 (614). **Iridoprocne bicolor** (Vieillot). Tree swallow.

Common summer resident and abundant during migration. The average date of spring arrival is April 2, the earliest, March 23, 1907. Nests with eggs have been found from May 8 to June 15. It becomes abundant the last of September, suddenly disappearing about October 15. In 1906 large flocks were common until October 13. In 1907 numerous flocks were seen until October 12.

294 (616). **Riparia riparia** (Linnæus). Bank swallow.

Common summer resident. The average date of spring arrival is April 25, the earliest, April 14, 1906. Nesting begins May 10 and lasts until June 15. The nests are found usually in gravelly or sandy banks. The larger proportion of individuals leave during the first week in September. Our latest record is September 26, 1908.

295 (617). **Stelgidopteryx serripennis** (Audubon). Rough-winged swallow.

Common summer resident. The average date of spring arrival is April 26, the earliest, April 22, 1906. Nests and eggs have been found from May 10 to June 10. This species is not so partial to sand and gravel banks as the preceding. They are often found nesting in shale banks along the lake shore, in the crevices of rocks in the gorges and in banks of loose earth. Frequently we find them nesting in isolated pairs and always the colonies are smaller than those of the Bank Swallow. As a rule all have left by September 10. The latest date is a specimen taken September 26, 1908.

72. Family BOMBYCILLIDÆ. The Waxwings.

296 (619). **Bombycilla cedrorum** Vieillot. Cedar waxwing.

Common summer resident and frequently seen in small flocks

during winter. They are more or less irregular at all seasons except mid-summer. Nests with eggs have been found from June 15 to August 8.

73. Family LANIIDÆ. The Shrikes.

297 (621). **Lanius borealis** Vieillot. Northern shrike.

Occasional winter visitant, most often seen in January and February. The earliest record of this species in the fall is November 8, 1875, and November 25, 1908. The latest spring record is February 24, 1905.

298 (622*e*). **Lanius ludovicianus migrans** W. Palmer. Northern loggerhead shrike.

An uncommon but regular spring migrant. The average date of arrival is March 24, the earliest, March 17, 1907. The latest date upon which it has been seen is May 24, 1904. "A nest with six eggs was found at Ithaca in May, 1877, by A. R. Ingersoll" (C. J. Pen-nock).

74. Family VIREONIDÆ. The Vireos.

299 (624). **Vireosylva olivacea** (Linnæus). Red-eyed vireo.

Common summer resident. The average date of spring arrival is May 5, the earliest, April 30, 1906. The nesting season extends from May 30 to July 1. It remains in the fall until the last week in September.

300 (626). **Vireosylva philadelphica** Cassin. Philadelphia vireo.

Rare. Three specimens have been taken within the basin as follows: a male May 16, 1906, and a female September 21, 1907, both in the collection of L. A. Fuertes, and a specimen, taken October 1, 1908, in the collection of Cornell University.

301 (627). **Vireosylva gilva** (Vieillot). Warbling vireo.

Common summer resident. The average date of arrival in spring is May 2, the earliest, April 27, 1908. Nests with eggs are found from May 12 to June 10. It departs in the fall about the middle of September. An individual seen on September 19, 1908, is the latest record.

302 (628). **Lanivireo flavifrons** (Vieillot). Yellow-throated vireo.

Common summer resident. The average date of spring arrival

is May 3, the earliest, April 30, 1905 and 1906. Nesting begins May 20 and lasts until June 15. This species is seldom seen after the first week in September. L. A. Fuertes shot a specimen September 26, 1889.

303 (629). **Lanivireo solitarius** (Wilson). Blue-headed vireo.

Common transient and a rare summer resident. The average date of arrival is May 4, the earliest, April 25, 1906. It is not common after May 15 but a few have been seen between this date and May 28. In 1893 L. A. Fuertes found a pair breeding in the Cascadilla Woods near Ithaca. In the fall it is found throughout September. The latest fall date is October 6, 1907.

75. Family MNIOTILTIDÆ. The Wood Warblers.

304 (635). **Mniotilta varia** (Linnæus). Black and white warbler.

Common transient and occasionally found breeding. The average date of spring arrival is April 30, the earliest, April 26, 1905. The bulk of migrants have passed by May 18. On June 13, 1902, T. L. Hankinson found a nest containing five young at North Spencer, about a mile outside the lake basin on the south. June 19, 1908 A. A. Allen found young just taking wing near the source of Cascadilla Creek. L. A. Fuertes reports it as breeding on Snyder Hill. Migrants are common in the fall from July 13 to September 1.

304a (639). **Helmitheros vermivorus** (Gmelin). Worm-eating warbler.

The only record of this species in the basin is an adult male taken by A. A. Allen, May 6, 1909, at Ithaca.

305 (642). **Vermivora chrysoptera** (Linnæus). Golden-winged warbler.

Mr. F. S. Wright, of Auburn, has taken specimens at the north end of the basin as follows: June 6, 1883, an adult male on Howland Island; May 13, 1898, an adult male at Sennett, N. Y.; May 25, 1901, an adult male on Howland Island; May 5, 1902, an adult male on Howland Island. Two other specimens have been taken in that vicinity but we do not have the data.

306 (645). **Vermivora rubricapilla** (Wilson). Nashville warbler.

Common transient. A few breed on South Hill near Ithaca. The average date of spring arrival is May 3, the earliest April 28, 1908. The migration is over by May 20. On May 27, 1905, a nest with five eggs was found on South Hill and on June 6, 1906, in the same locality a nest containing five young. The latest fall date is September 19, 1908, when it was still common.

307 (646). **Vermivora celata** (Say). Orange-crowned warbler.

Rare. An adult male was taken May 17, 1900, near Auburn by Charles Lyon. On October 6, 1907, a specimen was taken at Ithaca by L. A. Fuertes. There are two specimens in the collection of Cornell University taken at Ithaca, one October 6, 1907, the other, October 12 of the same year. On May 11, 1909, Mr. A. A. Allen killed an adult male at Ithaca and on May 12 saw four more.

308 (647). **Vermivora peregrina** (Wilson). Tennessee warbler.

Common transient. The average date of spring arrival is May 15, the earliest, May 10, 1908. It is not found after May 30.

309 (648a). **Compsothlypis americana usneæ** Brewster. Northern parula warbler.

Common transient. The average date of arrival in spring is May 6, the earliest, April 30, 1905. It has been found breeding on the Cornell University Campus and on South Hill. The latest fall date is October 1, 1900.

310 (650). **Dendroica tigrina** (Gmelin). Cape May warbler.

Common transient. The average date of arrival in spring is May 13, the earliest, May 10, 1899. The migration of this species lasts for a few days only. None have been noted later than May 20 but very frequently are common up to this date.

311 (652). **Dendroica æstiva** (Gmelin). Yellow warbler.

Common summer resident. The average date of spring arrival is April 28, the earliest, April 25, 1908. It nests from May 13 to June 1. The latest date on which it has been noted in the fall is September 21.

312 (654). **Dendroica caerulescens** (Gmelin). Black-throated blue warbler.

Common transient. It breeds regularly in small numbers on South and Snyder hills. The average date of spring arrival is May 3, the earliest, April 29, 1905. Nesting continues through June and the first half of July. The latest record in this connection is a nest, found on August 11, which the young were just leaving. This species is found in the fall until the middle of October.

313 (655). **Dendroica coronata** (Linnæus). Myrtle warbler.

Common transient. The average date of arrival in spring is April 22, the earliest, April 14, 1904. The migration of this species ceases usually about May 15. After this date only a straggler is seen. The latest record is May 21, 1904. The fall migration begins the middle of September, becoming common about the first of October. From the middle of this month they gradually diminish in numbers finally disappearing about October 20. The latest fall record is October 28, 1908.

314 (657). **Dendroica magnolia** (Wilson). Magnolia warbler.

Common transient. A few breed regularly in the southern portion of the basin. The average date of spring arrival is May 6, the earliest, April 27, 1902. Migrants remain in the basin as late as May 30. On July 8, 1906, A. A. Allen found, on South Hill, a nest containing eggs. The young left this nest on July 14. In the vicinity of South Hill this species has been seen on the following dates: 1905, June 4; 1906, June 7, July 30, August 1; 1907, July 22, two immature birds. On May 30, 1909, a nest containing two eggs was found on the hills near Michigan Hollow in the southern portion of the basin.

315 (658). **Dendroica caerulea** (Wilson). Cerulean warbler.

Uncommon but regular transient. It breeds on Howland Island at the north end of the lake. The average date of spring arrival is May 10, the earliest, May 2, 1902.

316 (659). **Dendroica pennsylvanica** (Linnæus). Chestnut-sided warbler.

Common transient and not uncommon summer resident. The average date of arrival is May 18, the earliest, May 3, 1905. Nests

with eggs have been found on South Hill from May 25 to June 20. On July 8, 1906, a nest of young were just taking wing. The latest fall record is September 19, 1908.

317 (660). *Dendroica castanea* (Wilson). Bay-breasted warbler.

Common transient. The average date of arrival is May 11, the earliest, May 7, 1905. The bulk of migrants have passed before May 25. The latest record is May 30, 1907. "I have found it breeding in the immediate vicinity of Cayuga Lake" (Audubon).²⁹

318 (661). *Dendroica striata* (Forster). Black-poll warbler.

Common transient. The average date of spring arrival is May 16, the earliest, May 10, 1905. It is common from its arrival to May 30. A few are seen always during the first week of June, the latest record being June 9, 1907. In the fall it is present from September 10 to October 20 and is most common from September 25 to October 10.

319 (662). *Dendroica fusca* (P. L. S. Müller). Blackburnian warbler.

Common transient and regular but uncommon summer resident. The average date of arrival is May 4, the earliest, April 30, 1908, and May 1, 1900, 1905 and 1906. The migration ceases about May 20. On June 13, 1900, L. A. Fuertes first found them breeding on Snyder Hill. Since that date they have been found to breed regularly there and on South Hill.

320 (667). *Dendroica virens* (Gmelin). Black-throated green warbler.

Abundant transient and common summer resident. The average date of arrival is May 2, the earliest, April 25, 1908. Eggs have been found from June 5 to July 8. It is abundant all through September and disappears the first week in October. The latest date is October 7.

321 (671). *Dendroica vigorsii* (Audubon). Pine warbler.

Common transient and common locally during the summer. The average date of arrival is April 14, the earliest, April 2, 1905. No nests of this species have been found but it is common in growths of pine during May, June, July and a part of August.

²⁹ "Ornithological Biography," Vol. I., p. 447, 1831.

322 (672). **Dendroica palmarum** (Gmelin). Palm warbler.

Not a common but a regular transient. The average date of arrival is May 2, the earliest, April 27, 1908. The latest record for spring is May 21, 1908.

323 (672a). **Dendroica palmarum hypochrysea** Ridgway. Yellow palm warbler.

One specimen, taken October 25, 1908, at Danby.

324 (674). **Seiurus aurocapillus** (Linnæus). Oven-bird.

Common summer resident. The average date of arrival is May 3, the earliest, April 27, 1908. Nests with eggs are found from May 25 to June 20. The bulk of individuals have left for the south by September 15. The latest fall date is October 1, 1908.

325 (675). **Seiurus noveboracensis** (Gmelin). Water-thrush.

Common transient and breeds in small numbers. The average date of spring arrival is April 30, the earliest, April 27, 1908. They cease to be common about May 5. They breed in small numbers at the base of West Hill and in a small marsh on East Hill near Ithaca. In the fall they become common the first week in August and remain until October 1.

326 (676). **Seiurus motacilla** (Vieillot). Louisiana water-thrush.

Common summer resident. The average date of spring arrival is April 16, the earliest, April 14, 1906. Nests with eggs are found from May 7 to June 3. On June 13, 1906, L. A. Fuertes found four young just leaving the nest.

327 (678). **Oporornis agilis** (Wilson). Connecticut warbler.

Common transient in the fall from September 7 to 30. Not present in the spring.

328 (679). **Oporornis philadelphia** (Wilson). Mourning warbler.

Common transient and frequently found during summer. The average date of arrival is May 10, the earliest, May 4, 1905. No nests of this species have been found but males in full song are seen every year in the woods of Renwick marsh through May, June and July. On June 30, 1908, immature birds were seen in the Renwick woods.

329 (681). **Geothlypis trichas** (Linnæus). Maryland yellow-throat.

Common summer resident. The average date of arrival is May 4, the earliest, April 30, 1905. Nests with eggs are found from May 25 to June 20. It ceases to be common in the fall about the first of October. The latest date is October 10.

330 (683). **Icteria virens** (Linnæus). Yellow-breasted chat.

Fairly common summer resident. The average date of arrival is May 12, the earliest, May 4, 1905. Nest-building begins about May 25. Eggs are found throughout June. On June 26, 1902, L. A. Fuertes found a pair just beginning to build. Formerly this species was rare in the region about the south end of the lake but has increased greatly during the past eight years.

331 (684). **Wilsonia citrina** (Boddaert). Hooded warbler.

Rare transient and summer resident at the north end of the lake. It is found between May 8 and 20, but appears to be more common from the tenth to the fifteenth of the month. Mr. G. C. Embury reports a nest with young which he found near Auburn and Mr. F. S. Wright reports one found four miles east of Auburn.

332 (685). **Wilsonia pusilla** (Wilson). Wilson's warbler.

Common transient. The average date of arrival is May 11, the earliest, May 10, 1900. It is common from its arrival until the twentieth of the month. A few are sometimes seen after this date. The latest date is one seen June 7, 1908.

333 (686). **Wilsonia canadensis** (Linnæus). Canadian warbler.

Common transient. It breeds in small numbers on the hills in the southern portion of the basin. The average date of arrival is May 8, the earliest, May 5, 1905. They continue common from their arrival until May 30. They have been found breeding on South Hill and Ellis Hollow from June 7 to 19. On the latter date a nest of five young were found.

334 (687). **Setophaga ruticilla** (Linnæus). Redstart.

Common summer resident. The average date of arrival is May 3, the earliest, April 29, 1905 and 1906. They nest from May 10 to June 15. A few are found nesting later than this date. On July 11, 1906, a nest was found which contained eggs. This species

departs the first of September. The latest date is September 10, 1890.

76. Family MOTACILLIDÆ. The Wagtails.

335 (697). **Anthus rubescens** (Tunstall). Titlark.

Common transient from April 7 to May 15 and from September 20 to October 20.

77. Family MIMIDÆ. The Thrashers and Mockingbirds.

336 (704). **Dumetella carolinensis** (Linnæus). Catbird.

Common summer resident. The average date of arrival is May 5, the earliest, April 27, 1908. Breeding occurs through the last half of May and whole of June. The majority of individuals have left in the fall by September 30 but a few are seen always during the first days of October. The latest date is October 8, 1908.

337 (705). **Toxostoma rufum** (Linnæus). Brown thrasher.

Common transient and an uncommon summer resident. The average date of arrival is May 1, the earliest, April 27, 1908. The migration lasts for about two weeks, ceasing as a rule about May 15. A few breed regularly on South and Snyder Hills. The latest fall date is October 6, 1900.

78. Family TROGLODYTIDÆ. The Wrens.

338 (718). **Thryothorus ludovicianus** (Latham). Carolina wren.

Rare summer resident. On March 22, 1890, L. A. Fuertes found a pair on the west shore of the lake about four miles north of Ithaca where they bred that summer. It was not seen again until June 12, 1903, when a pair was found in Cascadilla gorge on the Cornell campus where they remained until observations ceased about the middle of August.

339 (721). **Troglodytes ædon** Vieillot. House wren.

Common summer resident. The average date of arrival is April 30, the earliest, April 26, 1905 and 1906. Eggs are found from May 25 to July 10. They are much reduced in numbers by the middle of September and all have left by the last of the month. In the southern portion of the basin, this species has increased seventy-five percent in the last 10 years.



Reed, Hugh D and Wright, Albert Hazen. 1909. "The Vertebrates of the Cayuga Lake Basin, N. Y." *Proceedings of the American Philosophical Society held at Philadelphia for promoting useful knowledge* 48(193), 370–459.

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