

A REMARKABLE FLIGHT OF PINE GROSBEAKS
(*PINICOLA ENUCLEATOR*).

BY WILLIAM BREWSTER.

TOWARD the end of November, 1892, Pine Grosbeaks appeared in eastern Massachusetts for the first time in three years. My earliest date is November 21, when I heard a bird in Concord, Mass. Soon after a flock was met with in Ipswich, and by the first week in December the birds had been reported in large numbers from Belmont, Wellesley Hills, Fitchburg and other towns.

On the 21st of December, twenty-seven Grosbeaks, the first I had seen in Cambridge, visited a red cedar behind our house, and spent half an hour feeding on the abundant berries, but with the exception of these birds I saw no more in the city until the second week in January. Reports kept coming in, however, of their appearance in unusual numbers in the surrounding towns, and of their great increase in number during the first weeks in January. Flocks of over a hundred birds were seen in Wellesley Hills and in Arlington.

On January 9 I met with a flock of about forty-five in some spruces not far from the centre of the city, and near the same place I found, next day, a flock of fully one hundred and twenty-five. The owner of the grounds said that the birds were first seen there on the morning of the 8th; that during this and the following day they devoted themselves to some white ash trees immediately about his house; and that by the afternoon of the 9th they had stripped these trees of their fruit.

When I first saw them they were assembling in a large white ash which overhangs the street. This tree was loaded with fruit, and with snow clinging to the fruit-clusters and to every twig. In a few minutes it also supported more than a hundred Grosbeaks who distributed themselves quite evenly over every part from the drooping lower, to the upright upper, branches and began shelling out and swallowing the seeds, the rejected wings of which, floating down in showers, soon gave the surface of the

snow beneath the tree a light brownish tinge. The snow clinging to the twigs and branches was also quickly dislodged by the movements of the active, heavy birds and for the first few minutes it was incessantly flashing out in puffs like steam from a dozen different points at once. The finer particles, sifting slowly down, filled the still air and enveloped the entire tree in a veil-like mist of incredible delicacy and beauty, tinted, where the sunbeams pierced it, with rose, salmon, and orange, elsewhere of a soft dead white,—truly a fitting drapery for this winter picture,—the hardy Grosbeaks at their morning meal. They worked in silence when undisturbed and so very busily that at the end of the first hour they had actually eaten or shaken off nearly half the entire crop of seeds. Some men at work near by afterwards told me that this tree was wholly denuded of fruit by three o'clock that afternoon when the birds descended to the ground and attacked the fallen seeds, finishing them before sunset.

The next day (January 11) the city was fairly in possession of the Grosbeaks. The sound of their piping was constantly in my ears whenever I stepped out of doors, and I rarely looked out of the window for a moment without seeing a flock sweeping past in long, undulating curves. Mr. Hoffmann writes under this date: "In the afternoon there was a flock of over sixty-five birds in the college yard, feeding in the snow under the ash trees. The birds on the plank walks hardly moved to let the men pass, and one actually lit on my hat as I stood beneath the large ash tree. Numbers were feeding outside the yard between the car-tracks, and on the sidewalks. Many people were watching them."

Fully a mile from the college, but very near the trees which the birds had stripped on the previous day, stand two large ash trees in which, shortly after eight o'clock, I found over two hundred Grosbeaks feeding. Both trees were thickly hung with seeds at this hour, but the birds had thinned the clusters on the upper branches and were fast working downward. At half-past three that afternoon, when I visited the place again with Mr. Faxon, not a seed remained on either tree. The snow beneath was completely covered with fallen seeds as with a light brown carpet, and the Grosbeaks were all there eating them. By dividing the flocks into halves and counting quickly, we got a very close

approximation to the total number which we made two hundred and twenty-five. There were perhaps twenty-five to forty more scattered about on neighboring spruces and the roofs of houses.

A part of the flock was distributed over the sidewalks for a distance of several rods, feeding on the fallen seeds. As we advanced slowly the Grosbeaks flew between or alighted on the wires of the low fence within arm's reach. One even attempted to perch on my companion's shoulder, but he moved at the critical moment and it glanced to one side. Over the fence where most of the flock was feeding, the snow was so light and feathery that the birds sank into it deeply and wallowed rather than hopped from place to place. They appeared to enjoy this, and often fluttered their wings in such a way as to scatter the snow above and around them as bathing birds scatter drops of water. Many flying down from the trees above struck the snow with such force as to plump in quite up to their necks, when they stood thus for half a minute or more.

During the same day a flock of fully three hundred Grosbeaks were reported from the Botanic Gardens, equally distant from each of the two flocks described above; if the birds were as numerous in other parts of the city, Cambridge must have harbored several thousands.

The next morning the great flock at the two ash trees had decreased to a hundred birds, who were all on the ground finishing the fallen seeds. They began leaving the place in small parties while I was watching them, and at four o'clock that afternoon only about twenty-five remained.

On the 13th, I spent most of the forenoon in the cedar-grown pastures which encircle the suburbs of Cambridge. I heard a few Grosbeaks piping but could not find them. On examining the cedar trees, I could not discover one that had more than a few scattered berries. A report from Wellesley Hills, under date of January 14, showed a similar departure of the Grosbeaks from that region, and a like explanation,—the stripped condition of the food-bearing trees.

During their invasion of Cambridge the Grosbeaks seem to have concentrated their attacks on the white ash trees, and to have taken these successively, although the smaller flocks foraged

more or less widely and generally among all the trees of this species in Cambridge.

The celerity with which the Grosbeaks stripped a large ash, laden with crowded clusters of the brownish, pendent fruit, was surprising, even when due allowance is made for the great number of birds. They distributed themselves pretty evenly over the entire tree, although, as already stated, they usually attacked the upper branches first. Each bird worked busily and silently and, when the fruit was abundant, moved about but little, merely bending forward and downward for a seed, and after this had been sheared of its wings and eaten, reaching for another in the same manner without changing its foothold. I have watched over a hundred birds thus engaged for a minute or more without hearing a sound save the light crackling rustle of the seeds as they were rolled in the powerful bills.

Next to the ash trees, the Grosbeaks preferred the Norway spruces, the terminal buds of which they appeared to relish greatly. The snow under every spruce of any size in the area which the birds invaded was thickly strewn with fragments of these buds. Mr. Walter Deane, who made a microscopic examination of these small fragments, and also of the branches of the trees themselves, found that the birds ate only the nucleus, a soft, greenish mass of tissue, scarcely larger than the head of an ordinary pin, and lying at the base of the terminal or axillary buds. This nucleus may be that of a future branch, cone, or staminate blossom. The bird bites or breaks off the bud about midway between its extremity and base, and picks out the nucleus, leaving its protecting outer scales on the trees. The fragments found under the trees consist of the terminal halves of these buds, either intact, or broken into their component scales.¹ The fruit of the white ash is split along the middle of the flat sides from the base well towards the extremity and sometimes into two halves.

The Grosbeaks, as I have already said, sometimes fed without making a sound except the cracking or crunching of their food, but usually a low murmuring or whimpering whistle, audible

¹Mr. Deane has published some notes on this subject in the *Botanical Gazette* (Vol. XVIII, No. 4, April, 1893, pp. 143, 144).

only a few rods away, ran through the flocks at frequent intervals. When a number of birds took flight suddenly and simultaneously this sound was often given by most if not all of them at once. It resembles the whistling of the wings of a flock of Carolina Doves and also, if the air be still and the birds very near at hand, the rolling flight note of the Snow Bunting. The loud *peer* of the Grosbeaks is not unlike another call of the Snow Bunting when it is heard distinctly, but at a distance it may be easily mistaken for the cry of a Blue Jay. It seems to serve both as an alarm note and to call the scattered members of a flock together, and it is sometimes used during flight, but the usual flight call consists of two, or sometimes three notes, given quickly in a descending series like those of the Greater Yellowlegs (*Totanus melanoleucus*)—which they slightly resemble in tone as well as form. This call may be written “tēē-t ’yēh, tēē-tēē-t’yēh,” or “tēē-t’yēh-tē.” A fourth call defies rendering by letters, but may be fairly described as a loud rich chuckle or chuckling whistle of from two to four syllables. This I usually heard from a single bird perched on the top of a tree near some tempting supply of food to which, as it seemed, he was trying to attract the attention of distant comrades. It was not often used. Some birds which I noosed made, when first caught, a rather loud, continuous, squealing or squawking outcry very like that of a Robin in the clutches of a Hawk. A sixth vocal sound, which completes the list, was a low, harsh, grating cry, uttered only, I believe, when two birds were quarreling.

The Grosbeaks often fell out over some choice morsel of food and indulged in a brief, harmless squabble threatening each other with open bills and half-spread wings, and occasionally giving or receiving a feeble peck or two. In the main, however, they were unmistakably gentle and amiable in disposition, placid if not phlegmatic in temperament, social and affectionate in their relations to their own kind, and in their attitude towards man almost wholly free from fear or even suspicion.

Nevertheless they were subject to frequent and sudden panics. The crack of a whip, the barking of a dog, the slamming of a door, or even so slight a sound as the click of a camera shutter, frequently caused them to scatter, and dash off in the wildest

confusion. Sometimes these alarms had no obvious cause. The larger the flocks the oftener they occurred. The great flock at the two ash trees started, on an average, once a minute. Loud, continuous sounds did not seem to excite them, and they were quite as indifferent as the House Sparrows feeding with them, to the near passage of horse cars, sleighs, and the other traffic of the busy street.

A flock of about a dozen Grosbeaks fed for a day or two in a flowering apple (*P. parkmanni*) growing in our garden. This tree is only five or six feet high. Its apples, which are scarcely larger than large currants, cling to the twigs all winter and had never been previously eaten by any birds except Waxwings (*Ampelis cedrorum*). There had been an unusually large crop in 1892, and the branches of the little tree were literally crowded with the tiny fruit. The Grosbeaks did not eat the pulp, except perhaps incidentally, in small quantities, but crushing the apples they squeezed out the large seeds, of which each fruit usually contains two, and swallowed these. The pulp was dropped, or when, as was frequently the case, it adhered to the bill, shaken off, or removed by rubbing the bill against a twig. As a rule the apple was bitten off a little below the stem so that its basal portion with the long stem remained attached to the tree.

House-sparrows, who had never before molested the apples, gathered when the Grosbeaks began their raid and watched them. By the end of the first day I saw several Sparrows crushing the fruit between their mandibles exactly in the manner of the Grosbeaks, but I think they ate the pulp as well as the seeds. They afterward finished what the Grosbeaks had left.

I snared several of the Grosbeaks which frequented this tree, using two joints of a light fly rod and a running noose of twine. It was not always an easy task, for the wind blew the noose about, and the birds seldom remained perfectly still for more than a second or two at a time, although they showed not the slightest suspicion or nervousness, allowing the coarse brown twine to rub against their bills and the end of the pole to strike their crowns without, at the most, doing more than to push the noose aside, or to bend their heads to avoid the pole. I actually caught one without alarming the rest of the flock, but usually the

screams and flutterings of my victim started his companions at once. They would return, however, as soon as I walked away, and sometimes while I was still engaged in freeing the captive bird from the noose. One Grosbeak which escaped from my hands after being snared would not again permit me to get the noose near him, and even, I thought, tried to warn his companions of their danger; nor was he wholly unsuccessful, for his alert behavior and loud cries often caused them to stop feeding and more than once when he took wing they all followed him.

The remarkable numbers and tameness of the Grosbeaks which visited Cambridge led me to suspect that they formed part of a much larger body of birds which had come an unusual distance and spread over an exceptionally wide territory. Hoping to get light on these points I sent circulars throughout New England, to the Middle States, as far west as Illinois and Wisconsin, and as far north as Canada, asking for information as to the local presence or absence of the Grosbeaks during the winter of 1892-93, their numbers, and the approximate dates of their arrival, departure and greatest abundance, the proportion of adult males to females and young, and their food. Through the kindness with which these circulars were answered I am now able to trace with some degree of apparent accuracy the route followed by the majority of the birds and the total area covered by their flight.

Before doing this, however, it may be well to consider briefly the biographical matter furnished by my correspondents. This relates chiefly to food and the ratio of bright males to dull-plumaged birds. The tables given below summarize the evidence on these two points. It will be seen on examining Table I that the chief food of the Grosbeaks consisted of the seeds of the white ash (*Fraxinus americana*), and of the apple, the fruit of the apple and of the American and European mountain ash (*Pirus americana* and *Pirus aucuparia*) and of the buds of the sugar maple (*Acer saccharinum*), and Norway spruce (*Abies excelsa*). The birds apparently attacked the fruit and buds of other plants only when the supply of their favorite food was exhausted.

That the birds ate the seeds of the apple is clearly shown, and it seems probable that they ate the pulp as well. One corre-

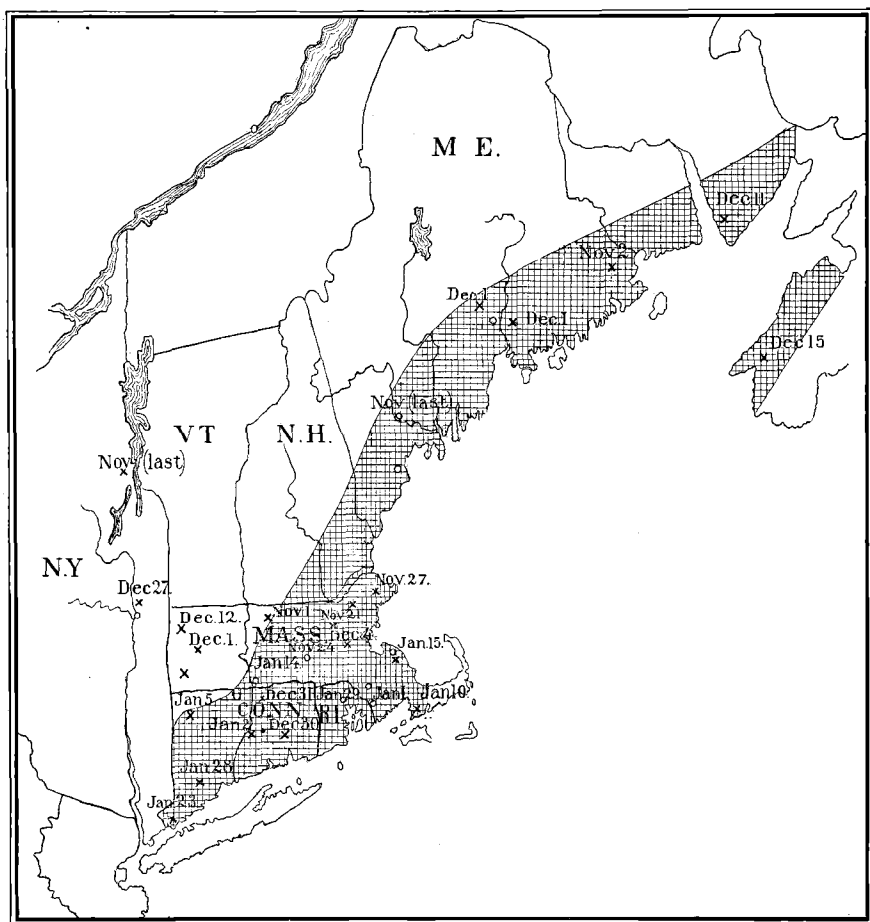
spondent (M. Hardy), however, is sure that in Maine they ate the pulp only incidentally in their efforts to get the seeds.

With regard to the order of preference which the Grosbeaks followed when more than one kind of suitable food was within reach, it may be mentioned that eighteen specimens examined at Andover, Mass., between Nov. 30 and Mar. 11, show that up to the second week in January the birds ate ash-seeds almost exclusively. Between that time and the beginning of March, they fed chiefly on rotten apples, and during March mainly on maple buds. A report from Arlington gives ash-seeds as their principal food till January 15, rotten apples during February, and maple buds in March.

That the movements of the Grosbeaks were governed by the abundance or absence of food was clearly shown by the behavior of a flock of about thirty-six birds which appeared at West Medford about the 1st of December and soon stripped an English hawthorn of its fruit. The owner of the place then put out hemp seed to which the birds came regularly, collecting in the neighboring pastures, and flying in a body to the feeding ground. The hemp was placed on the top of a kennel surrounded by twenty dogs, whose noise, however, did not seem to disturb the Grosbeaks in the least. They fed four times a day — at morning, noon, four P. M., and sundown. One day when the hemp had not been put out for them, the birds ate all the seeds of a Roxbury waxwork vine (*Celastrus scandens*). By February 16, their number had diminished to eighteen, but these came regularly, and grew exceedingly tame. On March 12, the date of the last report, they had increased again to twenty-eight.

With regard to the relative number of bright males to dull plumaged birds, the evidence shows very clearly that as the flight pressed southwards the number of bright males steadily diminished until at Woods Hole, the southernmost station for Massachusetts, flocks of a hundred members each often did not contain a single red bird. This change in the normal ratio seems to have been due chiefly if not wholly to the fact (attested by many different observers) that as the flocks passed slowly through the more thickly settled districts the conspicuous and attractive red birds were nearly all picked off by country gunners and taxidermists.

Thus at Andover, Mass., twelve red males were killed ; in Framingham two were taken early in December, and much shooting was reported later in the month. Similar reports came from many other stations.



MAP I. DISTRIBUTION OF THE PINE GROSBEAK, WINTER OF 1892-93.

It remains to discuss the route taken by the Grosbeaks during this remarkable flight, and to define the area which they are known to have covered. The lack of observers north of New

England leaves their starting point and the route by which they reached Nova Scotia and the coast of Maine a matter of conjecture, but after they had passed the Maritime Provinces, their progress through Maine to southern New England may be easily traced.

Map No. 1 shows with two exceptions all the stations from which Grosbeaks were reported in unusual numbers. These exceptions are Locust Grove, in northwestern New York, and Halifax in Nova Scotia. At the former station they were seen from the end of November up to the end of January. In Halifax they were very numerous about November 28. They were also reported from Godbout, Quebec, and from Toronto and vicinity, but in no unusual numbers. A few were seen at Ottawa, but none at Montreal. On the Saskatchewan River they were found in only their usual numbers.

These facts indicate that there was no marked flight in the St. Lawrence Valley, and that the flocks which invaded New England came from Labrador or Newfoundland across or around the Gulf of St. Lawrence to New Brunswick and Nova Scotia.

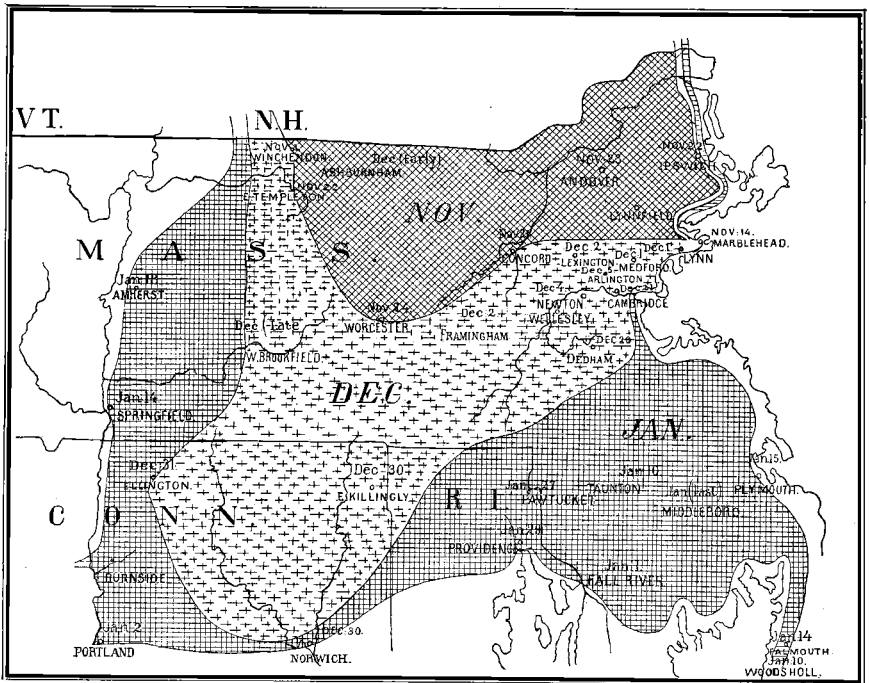
From eastern Maine, where they were seen in flocks of from ten to forty birds each, they entered northeastern Massachusetts, the first flocks having been noted there about the third week in November. In Massachusetts the horde seems to have divided, one party entering Connecticut, and pushing its vanguard as far as Stamford¹; the other invading Rhode Island and southern Massachusetts as far as Woods Hole, where they were numerous as late as February 7.

A reference to Map No. 1 shows also a number of stations to the westward of the area supposed to have been covered by the principal flight. With the exception of Locust Grove, these stations were all either in Berkshire County, Mass., or just over the New England line in New York. It is possible of course to consider the birds which visited them as belonging to the great flight, but inasmuch as Grosbeaks appear much more frequently in Berkshire County and northern New York than in eastern

¹ Mr. J. T. Delafield reported one bird about Dec. 1, at New Rochelle on Long Island Sound, New York.

Massachusetts, and as several of the extralimital records— notably for New York—relate to dates in November or early December, it seems better to treat them as representing independent movements, such as were noted during the same winter in northern Maine and New Hampshire.

Map No. 2 shows the gradual and fairly regular southward advance of the greater part of the flock across southern New England, from the end of November through December and January. That the birds pushed no further southward is evidence that they found food enough to supply them until their return, which, though difficult to trace, apparently occurred in



MAP II. DISTRIBUTION OF THE PINE GROSBEAK, WINTER OF 1892-93.

the early part of March. Several observers in eastern Massachusetts, who were in the field throughout the winter, and kept regular observations, reported a falling off in February, and a marked increase in March. The latest records were Fitchburg, April 2, and Arlington April 4.

TABLE I.

Food of the Pine Grosbeak.

Seeds of	}	1. <i>White Ash</i> .—Nova Scotia (1); Massachusetts (9); Connecticut (1); New York (1). = 12
		2. <i>Apple</i> .—Maine (1); New Hampshire (1); Massachusetts (4). = 6
		3. <i>Crab Apple</i> .—Maine (3); Massachusetts (2) [P. parkmanii (1)]. = 5
		4-6. <i>Norway Spruce, White Pine, Weeds</i> .—Massachusetts (3). = 3
		7. <i>Grasses</i> .—Massachusetts (2). = 2
		8-11. <i>Ailanthus, Roxbury Waxwork, Pitch Pine</i> (J. H. Bowles, Punkapog), <i>Black Ash</i> (O. Durfee, Fall River).
Buds of	}	1. <i>Rock Maple</i> .—Maine (2); New Hampshire (1); Massachusetts (9); Connecticut (1); New York (1). = 14
		2. <i>Norway Spruce</i> .—Massachusetts (6); Connecticut (1). = 7
		3. <i>White Pine</i> .—Maine (1); Massachusetts (1); Connecticut (1). = 3
		4. <i>White Ash</i> .—(N. B. Hale, Worcester), (J. H. Bowles, Punkapog). = 2
		5. <i>Larch</i> .—Massachusetts (2). = 2
		6-10. <i>White Maple, Sycamore</i> (H. A. P. Smith, Digby, Nova Scotia), <i>Red Cedar, Honeysuckle</i> (F. H. Kennard, Brookline, Massachusetts), <i>Walnut</i> (J. H. Bowles, Punkapog, Massachusetts). = 1
Soft fruit of	}	1. <i>Apple</i> .—Massachusetts (8); Connecticut (1); New York (1). = 10
		2. <i>Mt. Ash</i> .—New Brunswick (1); Maine (3); Massachusetts (2). = 6
		3, 4. <i>Black Alder, Honeysuckle</i> . = 2
		5-10. <i>Bush Honeysuckle</i> (Diervilla), <i>High Bush Cranberry, Privet, Cedar, English Hawthorn, Sumac</i> . = 1

TABLE II.

Proportion of Red Males.

1. Canada (Inland)	= 1 to 6½ gray birds
2. Northern New England and Maritime Provinces	= 1 to 10 " "
3. Massachusetts (western and northern sections)	= 1 to 10 " "
4. Massachusetts (eastern and central sections)	= 1 to 30 " "
5. Massachusetts (southern section)	= 1 to 100 " "
6. Rhode Island	= 1 to 150 " "