

THE BLACK SWIFT AND ITS HABITS.

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Plate XXIV.

THERE appears to be somewhat of a dearth of information in regard to the habits of the Black Swift (*Cypseloides niger borealis*), and this is not surprising when the difficulties attendant to a study of the species are considered. Within its range the number of ornithologists is somewhat limited, the bird itself does not seem to be at all uniformly distributed, and there is also in connection with it what may be termed a degree of elusiveness. These reasons then, may perhaps explain why there is lacking a greater knowledge of its habits.

In studying most of the species of birds some degree of certainty exists, and one has more or less regular contact with them during definite periods, but this to an extent is not the case with the Black Swift. On occasions one may come across these birds most unexpectedly and then again they may not be seen for days, and this at a time when the species is restricted to a defined habitat. Possibly this may be accounted for by its apparent unlimited power of flight, resulting in a wide range each day over some portion of its territory and this generally at a height that enables it to escape the notice of the observer.

Our first acquaintance with the Black Swift was many years ago and for a time thereafter we regarded the occasions on which it was observed as rather noteworthy, but later changed our opinion for as more attention was given the conditions under which the birds were seen, an inkling was had as to when and where they were likely to be found. But this required patient observation extending over a long period of years and we still at times find ourselves at sea. Yet there is a fascination in connection with the Black Swift that seems to be lacking in most of our other species, for it is not only uncertain in its occurrence, but also a bird whose life history should be better known, and these very qualities offer an incentive to tempt the observer to continued effort.

The range of the Black Swift is given as "Western North America. Breeds from southern British Columbia and southern Colorado to Central Mexico; winters in southern Mexico,"¹ the type of the species having been taken at Simiahmoo Bay, Puget Sound.² Our observations in regard to this Swift have been made mostly in the region that extends from the Sound eastward to the Cascade Mountains, although the entire territory covered extended from nearly the summit of this range to the Pacific Ocean itself.

During the vernal migration in the region about the Sound the first Black Swifts will be seen sometime between the fifteenth and the twenty-fifth of May. Quite frequently during the latter half of this month there will occur a spell of foul weather, and the arrival of the birds seems to be coincident. When this fact was first noticed it was regarded as incidental, but as it occurred with a degree of regularity our attention became attracted to it and we then gave the matter especial attention. Soon after the first of May we began to closely follow the weather conditions of this region and also those existing far southward, and after a time a good idea was obtained as to when to expect the arrival of the Swifts. In fact, on several occasions our expectations were confirmed almost to a day.

It is during the first week in June that the Swifts remaining in this region appear to establish themselves for their summer stay. This is inferred because, without exception, the first arrivals and those seen on a few subsequent days invariably pursue a general northerly course. Then this route changes to one almost due east, directly towards the Cascade Mountains; and it is noticeable that this latter is the one thereafter followed during the summer months. In certain localities during most of June one is quite apt to see companies of these Swifts hawking about for their insect food, and we have likewise found that they have what appear to be favorite hunting grounds or sections in which a person may reasonably expect to find them more frequently than in others. The Swifts that remain in this region undoubtedly nest far within the Cascade range, and each morning from their chosen retreats make a trip to the lowlands where they seem to stay most of the day. In one

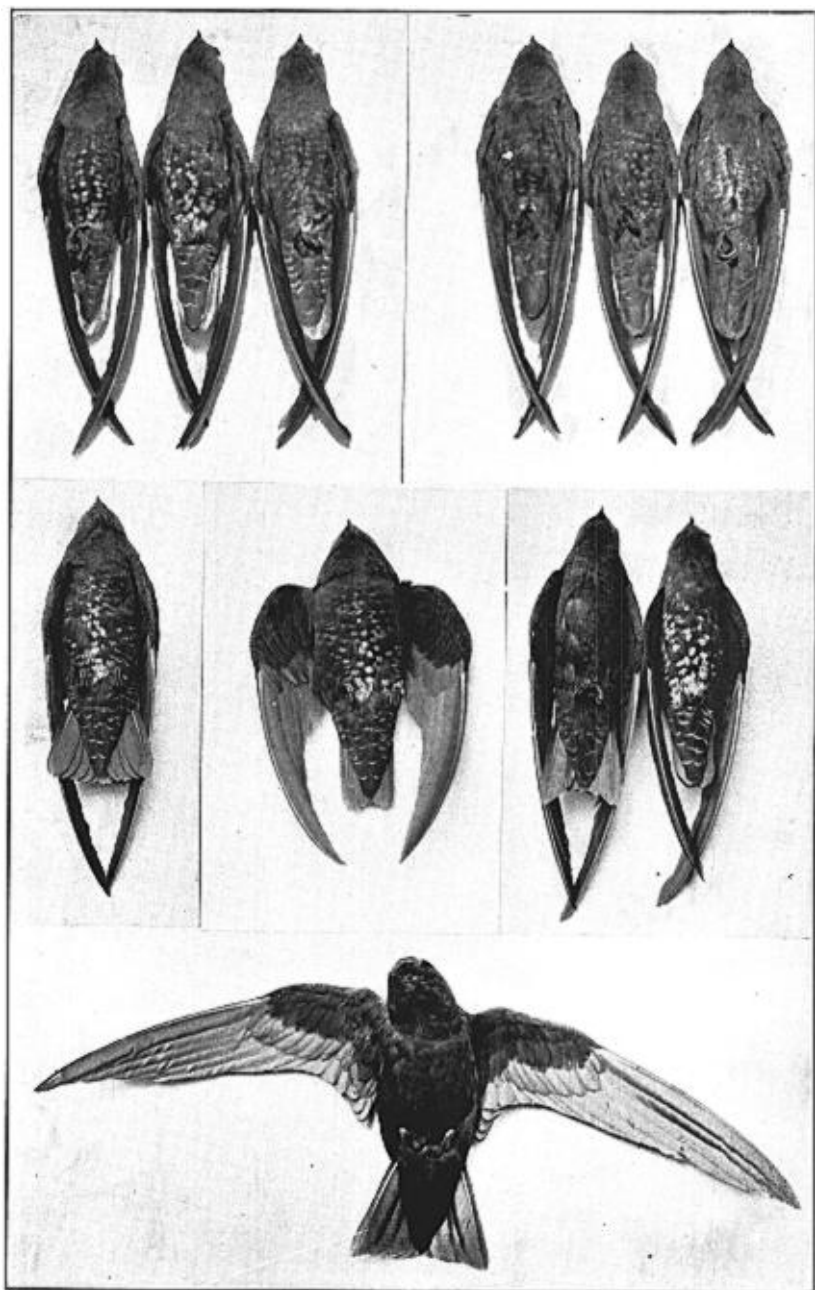
¹ The A. O. U. Check-List of North American Birds, 1910, p. 200.

² *Ibid.*

locality not far from the Sound where we have often found them, their arrival may take place anytime following a half hour after sunrise although on occasions it will not occur until rather late in the morning hours; and here they remain either for a short time or for an extended period. We have also noticed that until about the middle of June the number of Swifts associated is much larger, as if all within a certain territory had united to drift above it back and forth, an occurrence that is not soon to be forgotten. And such a sight it has been our fortune to see at times, and one instance we relate. For two successive days early in June the weather had been cool with intermittent light rains and the following day was quite stormy. Early on this latter day we went to Lake Washington on the outskirts of the city with the expectation of seeing the birds, and above its surface as far as we could see the Swifts were flying. Many were likewise above the shore of the lake and, at times some passed close to where we stood. While crossing the lake on the ferry a distance of about four miles, the birds were flying on all sides while others were in sight to the limit of our vision. The greater number were just above the water's surface barely skimming it, but it was noticeable that none ever touched it which is so commonly the case with the Swallows. I stood on one side of the upper deck of the boat about twenty feet above the water, and many a Swift would glide by just below. One does not often have the chance to look down upon a Black Swift, but such was frequently the case on this occasion. At times some of the birds would pass on a level with my face, and so near, that I could plainly see their glistening black eyes and the turning of their heads from side to side on the lookout for insects; for all judging from their actions were intently engaged in feeding. The same conditions prevailed on our return across the lake, and once again we crossed and returned to view the sight; and during all the time consumed there was no diminution in the number of the Swifts, they being distributed over the entire route we followed as far as we could see, no estimate of their numbers being possible. On this occasion the flight of the birds was not rapid, as a rule being merely a repetition of short glides with frequent twists and turns, often one would tower by a few quick movements of the wings and then with a sharp turn it would once more descend

to its former level. Frequently a number in company would rise to a height of two or three hundred feet and circle about for a short time before again descending to the lower level where the greater number were. And during all this space of time, nearly four hours, a light rain fell.

By the middle of June, the Swifts instead of associating in such large numbers seemed to have separated into colonies of varying sizes, each of which, during the summer months, appears to follow a certain more or less defined route every day, which the birds used each morning when flying from their mountain resort to the lower country, returning over it with equal regularity as the evening drew near. These journeys have the appearance of being long excursions, but the wide distances mean little to this Swift with a power of flight to which there seems but small limitation. The valley of the Middle Fork of the Snoqualmie River, some thirty miles almost due east of Seattle, is one such route that we have noticed the Swifts following; and here at various times during several summers we have watched the daily flight of a colony of these birds that numbered nearly one hundred and fifty. The spot from which our observations were made was an open one, a so called prairie, lying between two forks of the river and nearly surrounded on three sides by the mountains; but as it expanded to the westward in the broad reach of the river that here began to enter the lower country it had a wide visibility and thus afforded a most favorable place from which to view the actions of the Swifts. We found that near the middle of June it was a habit of these birds each morning to stream down the river valley and then along toward evening a return movement would take place. On occasions we were at this spot before the break of day and at the time of sunrise the first Swift would be seen far up the valley between the mountain ranges, coming in rapid flight down the river. Sometimes two or three would be in company, these followed by others at intervals, but the earlier ones were always far apart and straggled past from time to time at different heights. And this would be the case until perhaps twenty or more had flown by, all following the same course which was due west and down the river valley, their flight rapid and direct as if there was some objective point in view. After the passage of the earlier



BLACK SWIFT (*CYPSELOIDES NIGER BOREALIS*).

Top Row: ♀ ♀ July 6, 14, Aug. 2. June 22, July 6, 6.

Middle Row: ♀ Aug. 2; ♀ Aug. 2; ♂ July 24; ♀ Aug. 2.

Bottom: ♂ July 6.

birds often a space of time would elapse before any more were seen, and then numbers would appear which remained gliding and circling above the locality. Sometimes we stayed the greater part of the day in or near this place and found that the larger number of the Swifts would at times confine themselves to a limited part of the section, drifting to and fro. Then when evening drew near the birds began to move up the valley of the fork and at this time it became noticeable that their numbers were increased by the arrival of others from the west. It was as if some of the Swifts always had a wider range, but returned near the close of the day from their roving, and just as twilight fell, the last would be seen as stragglers, fast flying to their mountain haunts. The character of the weather made no change in the actions of the birds. Wind or calm, rain or shine, there was no variation in the routine of their habits. On fair days the Swifts flew high—often to the limit of sight, and when it rained they would descend to a height of from two hundred to five hundred feet.

This habit of the Swifts to follow the same route in the mountains, when flying to and from the lower country, continues until the time for them to migrate. But in July and the early part of August they appear less sociably inclined, for as a rule they are seen in smaller numbers, and on occasions it is not unusual to see detached pairs, although these in turn may not be found ranging far from others. And at this time the birds are more scattered over the particular area within which they are foraging or gliding about; they are not so often closely together as during the earlier part of summer or shortly prior to the time when they migrate in autumn. During the midsummer, too, the Swifts are less frequently seen ranging widely over the region, which leads to a belief that they restrict this tendency somewhat during the time of nesting, for though at this period we do occasionally see these in the section about the Sound and far from the mountains, the number is always limited.

At this time also a change is seen in the manner of the return flight near the close of day. Now the birds straggle much and linger little on their way, the larger number flying quickly by following a more or less direct course. They will pass as single birds or sometimes a pair, or a few widely apart, and intervals of time

elapse when none are seen at all, and their numbers are decidedly less; a possible reason for this last being that a portion remain about their breeding places, and fail to make the daily excursion.

About the middle of August a slight increase will be seen in the number of the Swifts and as the days pass their number grows. This increase must represent the young of the year that have joined the adults and are preparing for the migration that soon takes place. By the last of this month large numbers of the birds in company may once again be seen at times roaming about the lakes in the vicinity of the Sound, where they so regularly occur at the time of the arrival of the species, and these must represent more than a single colony. It seems that when the young are on the wing the Swifts return to their wide ranging habit and association in large numbers, and when this occurs then one knows that the time when they will migrate is not far away.

Black Swifts appear to mate in June. There is no sign that this has taken place when they arrive in May, as then the birds are always seen in companies and not in pairs as is subsequently often the case. But soon after they have become distributed in colonies about the region and begin to make the daily flight to and from the lower country, indications of mating are seen. All may be gliding about when suddenly—perhaps from a far height, a Swift will dash at one beneath, this followed by erratic flight actions on the part of both and their disappearance in the distance. This dive I have seen made with such speed that the eye could scarcely follow it, and during the time that the birds are darting and twisting about it is a common thing for them to descend almost to the ground. Actions of this character are most frequent in late June and the early part of July, but continue to occur for a limited time thereafter, and soon many of the Swifts appear to be mated, for though all may be more or less associated as they fly around, a pair often keep quite close together.

During the latter part of June the Swifts begin to breed, as is shown by an examination of a number of birds collected in late June, throughout July, and in early August. And it may be of interest to mention, that with one exception, none of the females taken during the period named, showed any denudation of the feathers of the breast or abdomen. This bird was taken on the

second of August, and the denuded area was narrow, extending along the keel of the sternum to the vent, and becoming slightly wider on the abdomen.

Where the Swifts breed within this region as yet we do not know; but it must be well within the mountains and in the more elevated regions. During the summer months they have been seen about some of the mountain lakes and also above the valleys of some of the mountain streams that are at a considerable elevation. Their flight in the valley of the fork of the Snoqualmie River, already described, has likewise been noted a long distance up that stream the headwaters of which are not far from the main divide. As it is very rugged in that region, there would then be no lack of suitable places where these birds could nest and there is no doubt that in such localities the species will eventually be found breeding.

This Swift is generally regarded as a silent bird, and to an extent this is correct. During its spring migration and shortly following, a period when the birds are associated in numbers, we have watched them for long spaces of time and always a perfect silence seemed to prevail among them. And this apparently is the case until the time comes when by their actions they show that they are mating. Even now their chatter-like note is but seldom heard, although invariably it is given at the time when one dashes at another, and this often proves the case when a pair may happen to fly in close company. During the midsummer we have heard their rapid notes as the birds passed in flight near the close of day, and in the autumnal migration when rarely one would make a quick dash at another. But these instances are uncommon and the species can properly be regarded as quite silent, being very different in this respect from the Chaeturine Swifts whose shrill twitterings are so frequent as they fly about. And the chatter of the Black Swift somewhat resembles that of these smaller ones; it being as rapid, but smoother in quality and more rolling, in fact rather pleasing to hear.

In all its flight actions this Swift shows a power and an easy grace that win our admiration. It seems to live upon the wing, and to restrict its flight most of the time to a considerable elevation, the height being seemingly influenced by the character of the weather. It is generally the case that during the continuance of

a low atmospheric pressure the Swifts will not fly very high, but when this condition ceases they then ascend. At the time of high pressure the Swifts are often at a great height and it is not uncommon to see them gliding at the very limit of vision. At such times so high are some of them that even with the aid of field glasses they show but faintly against the sky. It would be a mere surmise as to the height that they attain, several thousand feet certainly, and as some have even disappeared from view, when the glasses were in use, one has no knowledge of the height to which they go. On a bright summer day to see these dark birds circling far above is always captivating. Should the sky happen to have clouds some of which are white and shining, the Swifts as they wheel across their glistening surfaces, are plainly outlined, but seem to fade insensibly from view when in turn they cross the open spaces of the sky. At such times it is the constant shifting view with the seeming change in distance of the gliding Swifts that adds to our interest when watching them.

It sometimes happens that when the birds are widely scattered at a great height, all will quickly come together within a very limited area and glide and circle without uniformity either in speed or direction, the paths they trace now forming an intricate maze. More than once, too, I have seen some of them glide long distances against the wind, their flight being slightly undulatory, while they seem to rock on the breeze.

When hunting its insect food the Black Swift does not appear to circle much, but describes arcs, some of which will end in slight ascents made by rapid movements of the wings. Sometimes just at the termination of the rise, the bird hangs motionless as if in balance, which is often followed by a short descent or drift as the bird slides down the wind. Should there happen to be somewhat of a breeze the Swifts are apt to quarter into it, then drift off diagonally, often following with a short quick flight ending in a wide swing. And all these actions are repeated endlessly and with marked ease.

But this bird has also the power of very rapid flight. Infrequently it happens near the close of day that some will be seen hastening to their mountain retreats, at such times being widely scattered and flying rather low. With strong and rapid wing

beats an almost direct course is followed, and but a few seconds elapse from the time one is first seen until after passing it fades from sight in the distance. And when thus observed in full flight, the power shown for fast flying never fails to impress the beholder.

The position of the Black Swift's wings as it glides or circles is dihedrally down. We have never seen any variation from this, and in this respect a contrast is shown by our *Chaetura*, whose wings are often highly elevated when sailing short distances or on entering their nesting places or roosting resorts. This wing position of the Black Swift seems worthy of mention, although it may be possible that it varies at times under conditions with which we are not familiar.

Our conclusions as to sexual variation in the species are based on an examination of thirty-one of these birds, all but one being adults, taken at various times during the summer months and early in September. Four of these were secured at Bellingham, Washington, by Mr. J. M. Edson, to whom due acknowledgment is made; the remainder we collected in different parts of the territory about Seattle. Although the number is somewhat limited it gives a good idea of certain definite differences existing between the sexes.

The males are larger and darker than the females. As a rule their sooty underparts from the breast down lack any trace of light tipping on the feathers, and when this does occur the tips are of a brownish tint and very faint. In all our males the undertail coverts are tipped with brownish, rather well defined though much obscured in some individuals. There is a large variation in the amount of hoariness on the forehead. In the male Swift the tail is more emarginate. This is so marked that we have often distinguished between the sexes as the birds circled above us at a moderate height. For as one would make a quick turn in the air it would expand its tail, and should the bird happen to be a male, then the emargination showed plainly though it was not evident in the opposite sex. If conditions are favorable, with the aid of glasses this difference can often be noted when the birds are several hundred feet away. [See Pl. XXIV.]

In the female there seems to be a seasonal variation in the markings of the under parts posteriorly, but it must be borne in mind

that this statement is based only on the specimens taken during the period we have mentioned. Birds of this sex show the under parts not so sooty black as in the male. Those of early June have narrow tippings of white on the feathers of the abdomen and under-tail coverts, this being more marked in one secured late in the month. But in three taken July 6, the white tippings are much wider and still more so in another, taken July 14, in which they are so wide as to form nearly circular spots, producing a marked effect. Another collected August 2, is quite identical in all respects, and the entire under parts of these two birds have a lustre that is lacking in others taken earlier in the season. But one of August 15, is very lightly white-tipped, while yet another of September 2, is one of the strongest marked of all. And a juvenile female taken September 7, shows but a trace of the white tippings on the abdomen or under-tail coverts, the color of its under parts being almost as dark as that of some of the adult males.

In all the specimens that we have, the plumage seems to have been recently renewed; it is fresh and bright and shows no traces of a moult.

In the territory on the east side of the Sound, particularly that part quite contiguous to it lying north and south of Seattle, the route followed by the Black Swift in the spring migration is somewhat well defined. We have traced it for more than thirty miles and each year found the birds using it with regularity. At this time our main place of observation has always been the same, a spot on the west shore of Lake Washington and as it happens within the limits of the city. Here, adjacent to the lake the land is quite level for a wide space, but at the south rises somewhat abruptly forming a ridge, this being one of several lying between the lake and Sound and all having a general trend slightly diagonal to the shore line of the lake. The maximum height attained by any of these ridges is about three hundred and fifty feet, and nearly all terminate at a broad river valley lying not far southwest of the end of the lake, this valley extending many miles southward. As we know when to expect the arrival of the Swifts, it has been our practice to be at this place of observation on each of several successive days immediately prior to the time when their coming was anticipated, so it is fair to assume that when the Swifts did appear,

we were seeing some of the first to reach this particular part of the region.

The Swifts invariably come in sight above the rise of land at the south. They fly at various heights, are often quite scattered and the course followed is a general northerly one. But when the open and rather level space is reached, a change takes place in the direction of their flight. Not far north of here the lake expands into a bay of considerable size beyond the entrance of which the trend of the lake shore changes. It then runs nearly northeast for more than two miles; and this variation of direction in the shore line of the lake evidently has an effect on the course followed by the birds, for their flight deflects rather northeasterly and diagonally across the lake. Here the lake is several miles wide and as a rule the Swifts cross it to continue on their way more toward the north; although at times we have seen some birds following this course above the land not far from the eastern shore and also above the lake itself which still continues to extend four miles north. Beyond this limit we know very little regarding their route.

From what we have seen of this spring movement it appears to be soon completed, not lasting much more than ten days. This surmise is based on the change in route we have many times noticed the birds make not long after reaching this section, and though not conclusive it at least has sufficient merit to be taken into consideration.

In order that a more definite idea may be had of the flight of the Swifts at this time, we quote from our notes regarding it; these records being but a few of the many made at the time of the spring migration.

May 25, 1921. After four days of pleasant weather there is a change, this morning being somewhat misty with a light wind. We went to the lake early and on reaching it could see many Black Swifts flying about above it. While crossing the lake and when returning we found them quite well confined to an area some distance from the west side, and to number several hundred. None were much below a few hundred feet and many higher. The Swifts remained about this locality for nearly two hours seeming merely to shift back and forth above the lake, but had begun to move somewhat toward the northeast at the time we were obliged

to leave the spot. These are the first we have seen this spring although for the past three days we have looked for them. Today the visibility was so poor that it was quite difficult to form an estimate of their numbers.

May 26. We were at the lake this morning and crossed it soon after nine o'clock. Near its west side a few of the Swifts were seen, and when about a half mile from this shore the birds began to be quite numerous, flying about over the water at a height of two hundred feet and upwards, some very high and just discernible. None were seen much beyond the center of the lake or at all on the east side. On our return about an hour later they were again seen near the middle of the lake and became quite common as the west shore was neared. On rare occasions one would fly rather low, but the larger number were at a height of several hundred feet and upwards. Many were above the land on the west side of the lake, and it was noticeable that the main body of the birds, both over the water and land, was slowly progressing in a general north-easterly direction. At times there would be a break in this flight as it moved along, for the Swifts were circling widely and a few were feeding. We stopped for some time on the west shore and occasionally small companies would appear coming from the southwest or nearly so, to in turn slowly disappear from sight toward the northeast, circling on the way. Shortly after eleven o'clock we left the spot and at this time the movement was still in progress, the birds following the same general course toward the northeast.

No estimate could be formed of the number of Swifts seen today, but it was very large for at one time they seemed to cover an area from about the center of the lake to half a mile inland, and a distance north and south as far as we could see. Over this territory Swifts were always in sight, and as the course of our return across the lake was somewhat opposite to that followed by the birds it gave an excellent chance to see their numbers.

Today the weather was of all kinds. Some sunshine and light rains, but mostly lowery and cool. At times large spaces of blue sky would show among the clouds and here the Swifts appeared very high. The day closed with a hail-storm and a sudden drop in the temperature.

May 27. A cloudy morning with a light wind, but the day

proved fair. On reaching the lake early we could see Swifts scattered from above the land on the west side and over the lake to the east and northeast, as far as the eye could reach. Some were as low as just above the surface of the water, but most were at a height of more than a hundred feet and a few at the limit of the vision. Nearly all were gliding back and forth, but about eight o'clock a well defined and general movement among them began to take place, the birds moving in companies of varying numbers toward the northeast or nearly so. At times this movement was very plain. On one occasion fifty-six Swifts were first seen in the southwest, and circling, they passed overhead quite rapidly to disappear in the northeast, this taking place within fifteen minutes.

9.02—Another company numbering sixty, slowly circled past, nearly above us, these also coming from the same quarter to fade from sight in the northeast.

9.15—Swifts are now in sight in all directions, this having been the case more or less during the past hour. In view of subsequent observations, the height of the movement must have been about this time, as soon following there were times when no birds were visible.

9.45—We crossed the lake and on the way found the Swifts scattered about in all directions and at various heights; sometimes in small companies, the individuals of which kept well together, then broad spaces where only a few occurred. On our return to the west side the birds were still to be seen but more time elapsed between their passing and they were in lesser numbers.

11.05—Fifteen Swifts flew by coming from between the south and southwest to disappear in the northeast.

11.14—Nine straight from the southwest following the same course.

11.17—Six more appeared following nearly the same route.

11.26—Four Swifts passed by straight from the south and circling as they flew, vanished from sight north of northeast.

We remained in this vicinity until early afternoon, and during our stay the birds continued to pass in the manner described; in straggling numbers at irregular intervals and always coming from some point south to southwest. Sometimes one or two would be

seen circling far in advance of those comprising a company; and the way in which nearly all moved forward was by a continual overlapping of the circles described in their flight.

May 28—A beautiful day with rising temperature. We spent the entire day in the section about the lake but did not see a Swift. The large numbers seen the past two days would appear to have indicated the height of the movement, and if there were any of the birds within the territory covered today they were so high as to be invisible.

May 29-30. Conditions similar to those of the 28th, have prevailed on these days and no Swifts have been seen at all.

Autumnal migration. The first sign of the southward flight will be seen very early in September, and soon after it is in full swing. There is this difference, however, between the spring migration and that of fall; in the former, the Swifts are observed passing in considerable numbers on each day until the movement seems to have ended; whereas, in the latter, during its early stages there may occur a break of a day or so when none will be seen, but this soon ceases and then the birds are noted passing with regularity although on some days they are more numerous than on others.

Again, sometimes near the close of this migration there will be a "wave" of the Swifts, provided there occurs a storm or even threatening weather, or perhaps a drop in temperature. This seems to hold good, for the few seasons in which we have failed to see the wave were those that happened to be fair during the time the birds were migrating. The fall migration is the more prolonged and seems to exceed that of spring by several days.

In autumn, however, the route followed is changed to some extent in the territory lying immediately north of the city. The topography of the site of Seattle is rugged, and a better understanding of it is necessary in view of the remarks that follow. The city is located on the eastern side of the Sound, and eastward the land rises in a series of benches until a height of something like four hundred feet is attained midway between the Sound and Lake Washington, which latter forms the city's eastern boundary; this height of land representing what may be termed a ridge that runs irregularly in a general northerly and southerly direction. Although the northern end of this ridge is first deflected and then

terminated by a lake of some size, the land beyond again rises enclosing a smaller lake to the north of which is a somewhat elevated section bounded on its west side by the Sound. Here the height of land is nearly two hundred and fifty feet, the shore line of the Sound is bluff, and a similar character of country continues indefinitely northward. An extension north of the high ridge within the city would unite it with the northern section; and running as it does, in a general southerly direction to the wide river valley previously mentioned, a route is defined that the Swifts appear to follow. This opinion is based on several years' observance of the autumnal flight, for not only have we watched them many times from a high spot on the ridge, but also north and south of the city as well; the line of flight we have traced being not less than thirty-five miles.

The following will convey a good idea of the manner of this migration, these notes having been made mainly from our place of observation on the high ridge within the city.

September 2. A morning with haze that soon cleared, the day proving fine with much sunshine and a north wind. Early there was a flight of the Swifts, appearing in large numbers above the elevated section north of the city and not far from the small lake. Some were foraging for insects, but many simply gliding about, and this was the case until nearly nine o'clock when a movement in a general southerly direction began taking place among them. This was a deliberate one as it was more than an hour before the last Swift had disappeared from the locality. We then went nearly twenty-five miles in the course of their line of flight, this bringing us to the northern end of the river valley south of the city. Here Swifts were again seen. They were very high and straggled when flying past, the manner of flight being a few rapid wing beats followed by long glides, and the course pursued due south above the river valley. In the afternoon we covered a wide territory at the north and northeast, but failed to note any of these birds until nearly six o'clock when a few were seen far northeast of the city, circling at a great height and moving toward the south, and these proved to be the last observed during the day.

September 3. A fine morning with a brisk southwest wind, but the afternoon was cloudy with signs of rain.

8.30—We began our watch for the Black Swifts.

9.55—Four Vaux's Swifts passed at a height of little more than a hundred feet, coming from the northwest and disappearing in the southwest.

10.30—At the north a Pigeon Hawk was seen not high in air, and while watching it with the glasses three Black Swifts came in sight at a height invisible to the eye. These drew nigh almost directly from the north, were not circling, and proceeded on their way by gliding almost against the wind with little wing movement, soon being lost in the south.

11.10—Nine Vaux's Swifts passed quite low from north to south, with them being five Barn Swallows following the same course.

11.12—Two Vaux's Swifts flew by quite high from north to south.

11.30—Three Black Swifts seen fully a thousand feet high. Two were soon lost to view in the south, and the remaining one, after passing, suddenly turned and joined some fifteen or more of the Vaux's Swifts at a much lower height, all soon disappearing in the northeast.

11.47—Three Black Swifts from nearly north at a height of many hundred feet. One soon faded in the south, the others at first flew east and then were lost to view in the southeast. All were circling, and one happening to come near another, the latter immediately darted at it, this followed by both diving and irregular flight actions before circling was resumed, and their disappearance.

12.05—Two of these Swifts seen in company at a considerable height. They came from the northwest, but separated after passing by and were soon lost in the south.

12.10—A single Black Swift came from the northwest flying past quite low directly overhead. After passing, it described a wide circle and then drifted west, where, on being joined by another, both soon disappeared in the southwest.

12.15—By the aid of the glasses we saw, far in the west, two Black Swifts coming from the north, these circled very much as they moved toward the south.

12.27—Three seen very high in the west passing rapidly toward the southeast, one flew exceedingly fast, distancing the others.

12.45, 12.50—During this interval one of these Swifts and a few Swallows flew by very high from north to south; these followed by

three Swifts not above three hundred feet, and in turn by nine at a great height.

12.53—A single Black Swift quite high far in the north. This bird was swinging in wide circles and passed flying toward the south.

1.30—Up to this time no more Black Swifts have been seen. The sky is now heavily overcast with signs of rain.

September 4. This morning there was a stiff wind from the south-southwest. We did not begin to watch for the Swifts until 10.30, and none were seen before 11.50. At this time several flew past. One was so high that it could just be seen by the aid of the glasses. It came straight from the north and with hardly a movement of the wings sailed against the wind. The visibility at this time was good as there was much blue sky with cumulous clouds. While watching an airplane flying at a height of several thousand feet we saw below it a few of the Black Swifts; the plane suddenly dropped a thousand feet or more, but the birds paid no attention to it probably because it was still far above them. No more Swifts were seen up to two o'clock when we ceased watching for them.

6.00—At this hour two of these birds were seen in the west circling very widely, and they finally disappeared in the northeast at the limit of our glasses.

6.20—Eleven Swifts in sight and circling. At this time there were many beautiful cumulous clouds banked high in the eastern sky, and the birds were finely defined against them.

6.28—Three seen coming from the north circling over a wide area. These finally faded from view in the south rising and falling in their flight, for at this time there is a brisk wind.

6.30-6.45—During this interval three of the Swifts have been seen. Two circled widely as they flew toward the south. The remaining one ranged over a wide area and then passed directly overhead at a low height. After flying by it circled a few times rising and falling on the wind, to then fade from view almost due south being sharply outlined against a brilliant towering cumulous cloud, which gave fine visibility. From what has been seen during the past hour, Swifts must have been flying east of where we are, for at times a glimpse was caught of some passing in that quarter, but we were unable to follow them to any extent.

Sunset—It is now too dim to see.

September 7. Last night the wind reached a velocity of twenty-eight miles, but this morning is fair. Early we were on the high ridge north of the city and here a great number of the Swifts were flying about mostly at a height of several hundred feet. They continued to stay in and about this locality for several hours and then a general drift toward the south took place among them, at this time all having ascended much higher. The remainder of the day we spent in going over a wide section of country, but did not again see any of the Swifts.

In view of later observations it would appear that this flight represented the height of the fall migration of the species, for although we continued to see Black Swifts on a few of the following days the number was always limited.

Over a long period of years the latest date on which we have seen this species is September 21. This was in 1923. We were near the Indian village of Lapush, situated at the mouth of the Quilayute River that flows into the Pacific Ocean. On the morning of that day, fifteen of the Swifts were seen at a good height, circling and gliding about above the ocean beach, and not far north of the village. Beneath them were very many of the Vaux's Swifts flying around in all directions, but keeping well together. And this body of birds was slowly proceeding on a nearly southerly course almost parallel to the shore of the ocean. Occasionally this forward movement ceased and the birds would circle within a limited area for a short time before once more moving on their way. Both species kept well in company, but the Black Swifts always maintained the greater height; the time all remaining in sight being a little more than half an hour.

Food. The stomachs of nineteen Black Swifts have been sent by us to the Bureau of Biological Survey, Washington, D. C., for an examination of the contents, and reports on them have been received for which we express our thanks. These prove of much interest as from them it would appear that nothing in the nature of aerial insect life is rejected by this bird. Some of the reports are appended; and to better show the diversity of insect food, these relate to birds variously taken during the period that the species is found in the region.

(1) Locality: Sallal Prairie, King Co., Washington. Date: June 22, 1923. Hour: 11 a. m. Sex ♀.

Condition of stomach: Full. Percentage of animal matter, 100.

Contents: Remains of more than 20 *Aphrophora permutata*, 50%; 12 or more *Hylemyia setiventris*, 1 *Tabanus* sp., and 1 *Hilara* sp., 33%; 25 or more Psocidae, 10%; 1 caddis fly, 1 May fly, 3%; a few plant lice and 1 *Anthocoris* sp., 1%; 1 *Agriotes* and 2 other small beetles, 1%; 3 hymenoptera (Lissonotinae, Ichneumoninae), 1%; 2 or more spiders, 1%.

(2) Locality: Sallal Prairie, King Co., Washington. Date: July 6, 1923. Hour: 7.30 p. m. Raining. Sex ♂.

Condition of stomach: Full. Percentage of animal matter, 100.

Contents: Remains of many crane-flies, including numerous *Tipula* sp., and *Helobia punctipennis*, 77%; other flies including Chironomidae, *Mycetophila* sp. (2), *Allodia* sp. (3), and *Scaptomyza terminalis* (2), 3%; 2 *Vespa vulgaris*, 1 Braconid, 3 Tryphoninae and 1 Campoplegine, 19%; 1 Staphylinid and 1 other beetle, tr.; a few caddis flies, 1%; and plant lice, tr.

(3) Locality: Sallal Prairie, King Co., Washington. Date: July 14, 1924. Hour: 7.25 p. m. Sex ♀.

Condition of stomach: Full. Percentage of animal matter, 100.

Contents: 1 *Gnathotrichus materiarius*, 1 *Henoticus serratus*, 1 *Cercyon* sp., 1 *Helophorus* sp., 2 Staphylinidae, and 2 other beetles, tr.; 2 *Vespa consobrina*, 4 Ichneumoninae, 2 Amblytelinae and numerous ants, 25%; 1 *Limosina*, 2 *Mycetophila*, 3 *Limnophila*, 1 *Orthocladius*, 1 *Blepharocera*, 1 *Hylemyia*, 1 *Scatophaga furcata*, 2 *Sciara*, 1 Cecidomyid, 2 *Agromyza*, 1 *Hilara*, 1 *Chrysotus*, 2 Empididae, 1 *Drosophila*, 1 Ephydrid, and a few Tipulidae, 6%; several moths, 10%; several May flies, 10%; one caddis fly and 1 Psocid, tr.; 3 *Agallia*, 3 *Cicadula*, 1 *Oncopsis*, 1 *Aphrophora*, and a few other leaf hoppers, 1%; 7 *Adelphocoris superbus*, 8%; and remains of hundreds of plant lice, 40%.

(4) Locality: Sallal Prairie, King Co., Washington. Date: August 2, 1924. Hour: 7.15 p. m. Sex ♀.

Condition of stomach: Full. Percentage of animal matter, 100.

Contents: 1 *Aphrophora permutata*, 8 *Oncopsis* sp., 1 *Agallia* (s.l.), 1 *Phlepsius*, 1 other Jassid, 1 *Lygus* and a few plant lice, 3%; more than 20 Ephemera, 1 Hemerobiid and 1 Trichopteron, 30%; 4 *Cercyon* prob. *fulvipennis*, 1 *Microbregna emarginatum granicollis*, 1 *Serropalpus barbatus*, 1 *Aphodius fimetarius*, 2 *Pactopus horni*, 1 *Simplocaria columbica*, 1 *Pseudohylesinus*, 6 *Gnathotrichus materiarius*, 1 Elaterid, 2 *Henoticus serratus*, 4 *Epuraea*, 1 *Anthobium* (?), 1 Scarabaeid, and 2 other beetles, 12%; 1 *Paniscus*, 1 Eupelminae, 2 Alysidae, 5 Mesochorinae, 6 Ichneumoninae, 1 Vipioninae, 1 Vespidae, 1 Serphidae, 2 Paniscinae, and 6 Ichneumonoidea,

16%; 1 *Sapromyza luteola*, 1 *Mycetophila* sp., 1 *Platyura* sp., 1 *Erioptera*, 2 *Rhamphomyia*, 1 *Mycetaulus*, 1 *Hylemyia*, 3 *Gonomyia*, 1 *Helina rufitibia*, 8 or more Eriopterini, 1 *Culex*, and 1 *Heteromyia*, 39%.

(5) Locality: Bellingham, Washington. Date: September 2, 1921. Hour: About 6 p.m. Sex ♂.

Condition of stomach: Full. Percentage of animal food, 100.

Contents: 9 termites (*Termopsis augusticollis*), 70%; 2 caddis flies (Trichoptera), trace; 1 tree-hopper (Membracidae), numerous leaf-hoppers (Jassidae), 2 predacious bugs (*Nabis* sp.), 1 plant-bug (*Lygus* sp.), 10%; 3 dung beetles (*Aphodius fimetarius*, *A. eleutus*), 1 ground beetle (*Amara* sp.), 1 fungus beetle (Cryptophagidae), 1 rove-beetle (Satphylinidae) and 1 other beetle, 6%; 1 soldier fly (*Mircochrysa* sp.), 3 fungus gnats (*Mycetophila* sp., *Platyura* sp.), 2 hump-backed flies (*Rhamphomyia* sp., *Hilara* sp.), 1 crane-fly (*Tipulidae*), 1 flower-fly (*Platychirus* sp.), 1 robber fly (Asilidae), 1 long-footed fly (Dolichopodidae) and 2 other flies (*Pegomyia* sp., *Hylemyia* sp.), 8%; 1 yellow jacket (*Vespula* sp.), 1 ant (Formicidae), and 18 parasitic wasps (Tryphoninae, Porizoninae, Alysiidae, *Aphidius* sp., *Campoplex* sp., Diplazoninae, Amblyteles sp., Phygadevoniae, *Mesochorus* sp., *Glypta* sp.), 6%.

(6) Locality: Seattle, Washington. Date: September 7, 1922. Hour: 7 to 7.30 a. m. Sex ♂.

Condition of stomach: Full. Condition of gullet: Contained a few flies. Percentage of animal matter: 100; of gravel, etc., tr.

Contents: Remains of many *Chironomus* spp., 1 *Helobia punctipennis*, 1 *Dichrochira glabricula*, 3 Psychodidae, 1 *Mycetophila* sp., 2 *Aphiochaeta* sp., 1 *Hilara* sp. and possibly other diptera, 60%; remains of 10 *Meteorus* sp., 2 Vipionidae, 1 Pteromalid, 1 Hemitelina, and three or more other Hymenoptera, 36%; remains of numerous plant-lice, a few small leaf-hoppers and traces of a heteropteron, 4%; 1 Byrrhid (*Tylicus subcanus*) and bit of water-beetle, tr.

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