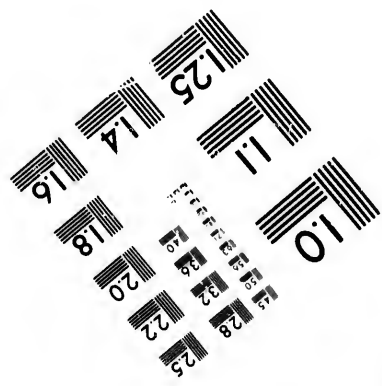
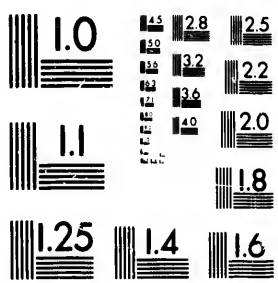


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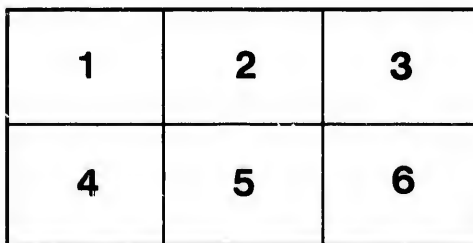
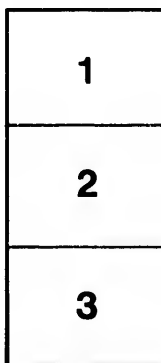
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NOTES

ON THE

LOCUST INVASION

OF 1874,

IN MANITOBA AND THE NORTH-WEST
TERRITORIES.

By G. M. DAWSON,

ASSOC. R. S. M., F. G. S.



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(From the *Canadian Naturalist*.)

NOTES ON THE LOCUST INVASION OF 1874 IN MANITOBA AND THE NORTH WEST TERRITORIES.

BY GEORGE M. DAWSON, Assoc. R. S. M., F. G. S.

The ravages of the western locust, or devastating grasshopper, have of late years been very great, over all the eastern fertile region of the plains, and the insect has forced itself on the attention not only of the farmer, who directly bears the loss, but also on that of all interested in the western spread of settlement and civilization: liability to its inroads constitutes in fact, at the present time, the greatest difficulty in the way of the rapid occupation of a vast tract of otherwise desirable country.

While a member of the British North American Boundary Commission, I had the opportunity of passing over a great part of the region subject to the ravages of the locust; and it was intended to include in my first report as complete an account of the locust raid of 1874 as I could compile. For several reasons, however, this proved impracticable. Though by circulars, with a list of specific questions, issued for the purpose, much information was obtained from various parts of British North America, and the Western States, much of it was of a somewhat indefinite character. Mr. C. V. Riley, Entomologist to the State of Missouri, has also since published a pretty full account of the invasion in so far as the Western States of the

Union are concerned, in his Seventh Annual Report, to which my information could only enable me to add a few particulars. I therefore present here in a summary form the facts collected from the region lying north of the forty-ninth parallel, as a contribution to the history of the invasion of the summer of 1874, and a slight addition to the general knowledge of the locust and its migrations.

My thanks are due to the gentlemen who have kindly answered the questions addressed to them, and especially to those who have furnished me in addition with general results of their experience.

It now seems certain that the locusts causing such widespread damage on the western plains, belong to a single species, known to entomologists by the name of *Caloptenus spretus*. For its description, Prof. Thomas' Synopsis of the Acrididæ, or Mr. Riley's report above mentioned, may be referred to. The locust is a native of the high and dry western portion of the interior plain, and not of the alpine vallies of the Rocky Mountains, as at one time supposed. North of the forty-ninth parallel, the whole area of the third, or highest prairie-plateau, and probably much of the second, are congenial breeding places, and here the locusts are always in greater or less numbers, but in certain seasons they sweep eastward and southward in immense hordes, reaching to, and even beyond the limits of the region of prairie. In range, the insect is not bounded westward by the Rocky Mountains, save where they coincide with the eastern unbroken front of the western forest region, as in British America. They extend southward at times to the Raton Mountains, and into Texas, while to the east they have spread to the prairie country of the Mississippi, and on more than one occasion have penetrated far into Iowa. Northward, they appear to be limited by the margin of the coniferous forest which opportunely follows the line of the North Saskatchewan River.

It is difficult to ascertain exactly what the causes are which lead, or drive the locust in certain years to leave its western habitat, though it is possible that simply an excessive increase in numbers may bring about that result. Only a mere fraction of the vast multitude of eggs deposited can under ordinary circumstances come to maturity, and their vitality and the survival of the young insects, may depend on so many circumstances, climatic and otherwise, that even on the above simple supposi-

tion a broad margin of uncertainty appears. It is probable, however, that the great locust invasions are the resultants of the actions of many agents, favorable or otherwise, all which it is highly desirable should be known as a preliminary to methodical and carefully devised efforts towards amelioration.

The spring and summer of 1874 in the northern part of the interior region were unusually dry, A dry climate is generally supposed to be favourable to the locust, and chiefly to the greater dampness of the eastern cultivated region is attributed the deterioration in vitality of the insects produced in a following year from eggs laid by an invading swarm. It is also noticed that in the eastern region the insect seldom survives to a third year. Over the western breeding-grounds, therefore, a dry and temperate spring may enable great numbers to come to maturity; while the continuance of the drought, combined with the unusual abundance of locusts, may tend to bring about wholesale emigration.

The locust has, however, many specific enemies, of which Mr. Riley catalogues four. *Trombidium sericum* and *Astoma gryllaria* are mites and external parasites; *Tachina anonyma* and *Sarcophaga carnaria*, flies, the larvæ of which feed on the grasshopper and live within it. All these, or at least representatives of both classes, appeared with the locust swarms in Manitoba in 1874, and the insects of some swarms appear to have been weak and sickly from the number of parasites clinging to them; circumstances lessening to a considerable degree the damage done by the insects, and the vitality of their eggs. The quantity of locusts destroyed by birds, especially while the insects are quite young, must be very great, and it has even been suggested that the rapid succession of invasions during the last few years may be due to the destruction of game birds, especially the prairie chicken. It would hardly seem, however, that this is by itself sufficient cause, though it may be one among the many.

The position of Manitoba near the north-eastern limit of the range of the locust, is in so far favourable, as it is only exposed to invasions from directions included between west and south, and the prevailing winds being north-westerly and coinciding with the direction of the migration instinct of the insect, carry the greater number of the swarms from their breeding places to the South-Western States. The northern situation of

the province also tends to exempt it from a double visitation, first from southern, and then from northern and north-western broods. This Mr. G. M. Dodge shows, has occurred in Nebraska, southern swarms arriving as early as May and June, and others in July and August. The number of grasshoppers borne to Manitoba is, however, more than sufficient, and in the neighbouring State of Minnesota, according to Mr. Solberg, the grain destroyed in 1874 by the insects is estimated at over 5,000,000 bushels!

The years in which the locust has appeared in Manitoba in great numbers, are as follows, as far as I have been able to learn:—In 1818, six years after the foundation of Lord Selkirk's colony, they arrived on the wing in the last week of July, and destroyed nearly all crops except wheat, which being almost ripe partly escaped. Eggs were deposited, and in the following spring wheat and all other crops were destroyed as fast as they appeared above ground. In 1819 eggs seem again to have been deposited,* and in 1820 the crops are said once more to have suffered greatly. The next recorded incursion is that of 1857, from which it would seem that for 36 years the insect had not appeared, or at least not in numbers sufficient to attract attention. In 1857 the crops are said to have been so far advanced as to escape great damage, but eggs were left, and in 1858 all the young grain was devoured. We do not now hear of them for five years, but in 1864 they again appeared, but neither the adults nor the young of 1865 were sufficiently numerous or widespread to do much injury. They did not visit the province in 1866; and in 1867, though numerous swarms poured in, they arrived late in summer, and did little damage, showing a practical exemption for nine years, or since 1858. In 1868, however, the young brood devoured everything, causing a famine. They left Portage La Prairie in a southerly direction. Foreign swarms again arrived in 1869, but too late for the crops, which were very bountiful. The young in 1870 did much harm, but were, I am told, chiefly confined to the vicinity of the Red River, not extending up the Assiniboine as far as Portage La Prairie. In 1872, fresh swarms arrived, but as usual too late to do much damage to wheat. Eggs were, however, left in abundance in the northern part of the province, and about Winnipeg and Stone Fort the farmers did not sow in 1873. The young grasshoppers were migrating southward up the Red

* Hon. Mr. Gunn states from fresh swarms in August.

River Valley before their wings were fully developed. In 1874, winged swarms again came in from the west, leaving an abundant deposit of eggs over all parts of the province.

The records thus include, for this area, a period of fifty-eight years, and during that time locusts may be stated to have appeared either on the wing from abroad, or directly from the egg, in numbers sufficient to attract attention, in fifteen seasons, but caused wide-spread and serious destruction of crops in ten years only. The record shows an exceptional and alarming increase in the frequency of invasion of late years, an increase which has also been noticed in the Western States, and which though no doubt partly due to the fact that larger tracts have come under cultivation and consequent observation, apparently leaves a balance in favour of some real cause of increase; and this it should be the object of every one interested in the matter, to ascertain if possible.

In 1874, in British America, it would seem that no locusts were produced from the egg east of the 103rd meridian, and perhaps not east of the 104th, though southwards, in Dakota, some are said to have hatched near Minnie Wakan Lake, long. 99° , and the young insects also appeared in several localities on the Missouri River, near long. 101° lat. 47° . From various places included between the 104th and 111th meridians, and the 49th and 53rd parallels of latitude, the insects are known to have been produced in large numbers; and from the outcoming direction of swarms, and other facts, it may be safely concluded that eggs were hatched in many places over this great uninhabited tract. The young locusts do not seem to cover uninterruptedly any great area, but to occur in extensive patches here and there, where flights of the preceding season have rested. Nor do the separate swarms arrive at maturity at exactly the same time, though a sudden change in the weather, and more especially of the wind, may cause a nearly simultaneous departure of broods from a large tract. In 1874, in the area in question, movement appears to have begun late in June, and continued during July; the direction of flight where it has been recorded, lying between east and south. On July 12th, I observed swarms ready for flight on the high plains near White Mud River (long. $107^{\circ} 35'$ lat. 49° .) The day was hot and calm, and though many of the insects were on the wing at all altitudes, they were following no determinate direction, but sailing in circles and crossing each

other in flight. The greater number were hovering over the swamps or spots of luxuriant grass, or resting on the prairie. A slight breath of wind would induce them all to take to wing, causing a noise like that of the distant sound of surf, or a gentle breeze among pine trees. They appeared ill at ease, and anxiously awaiting a favourable wind.

These eastern and northern hordes were those which afterwards fell on Manitoba, though a part of those hatched near the 49th parallel probably went south of that line. The dry season must have brought them to maturity rapidly, for in some parts of the province they arrived earlier than before known, though coming from the latest hatching grounds.

When examined in detail, the advance of the host loses to a considerable extent the definite form which it appears to have when more broadly viewed; for the grasshopper, like a sailing vessel, depends on the wind for propulsion, not having intrinsic power of swift flight; and the movement of the different bands is affected by all the mutations of the weather. Even omitting a few dubious dates, the well authenticated ones show a difference in the times of arrival in some parts of Manitoba, not corresponding with their geographical position. It appears certain that one extensive swarm traversed a part at least of the province north-eastward. They reached the Red River further south at Scatching River on July 11th. We hear of them on July 8th and 10th at St. Norbert, on the 14th at Winnipeg ten miles off, on the 17th at Little Britain seventeen miles further in the same direction. Swarms also arrived at Fort Ellice—180 miles west of Red River—with a similar direction of flight, on July 14th, or on the same day that they arrived at Winnipeg. These must have been a separate body travelling parallel to the first.

These dates only refer to the first arrival of locusts in considerable numbers, and the localities mentioned were afterwards traversed by other swarms. The second main direction of invasion, was from west to east, with occasional slight local deviations, and was that followed by most of the insects. Bands first appeared within the limits of the province on the Assineboine River at Portage La Prairie on July 3rd. They seem to have travelled eastward along the river, reaching Poplar Point—fifteen miles off, on July 12th; other and very extensive swarms are heard of north-westward of Portage La Prairie, at Beautiful Plain on July 15th, at Burnside, July 17th, Palestine, July 19th;

and on the 18th and 19th at St. Laurent, on the eastern shore of Lake Manitoba. On July 11th we find the hordes at Pembina Mountain, on the boundary line, and these in the course of their migration reached West Lynne on the Red River—thirty miles distant on the 15th.

On July 11th the front of the various swarms would be approximately bounded by a line drawn from Pembina Mountain on the forty-ninth parallel, to Seratching River, thence following the Red River to a point between St. Norbert and Winnipeg, from there probably bending southward through a region for which we have no information, but again turning northward, and striking the Assineboine a few miles west of Poplar Point, and thence running—though no doubt with many flexures—north-north-westward.

It will be observed that while great swarms of the locusts had thus nearly reached the eastern border of their range, there were still immense numbers just beginning their migration about the 107th and 110th meridians. These are no doubt the hordes which according to the Hon. Mr. McKay arrived in Manitoba during August. The directions taken by the insects on their departure from the various localities in Manitoba, show much diversity. They often remain some time on the ground, and after depositing their eggs they are weak and their organization is broken.

The most astonishing fact in connection with the habits of the locust is the fixed determination of the swarms to travel in a certain direction, and the wonderful instinct which leads them to wait for a wind favouring their intention. The usual direction of migration when swarms fall upon the cultivated lands and settlements, is south-eastward or eastward, and to this there is abundant testimony. There is evidence, however, that the insect occasionally migrates in great bodies in a nearly opposite direction, and in 1875 it would appear that many swarms, the progeny of those of 1874, have shown a like decided inclination to travel northward, toward the breeding grounds of their parents, while yet in their full strength and vigour. It would be a fact surpassing in interest the journeys of birds of passage, if it should be found that the locust requires two generations to complete the normal cycle of its migration.

The locusts are recorded on one occasion at least (1867, by Prof. Hind) to have reached the shores of the Lake of the

Woods, but I have not heard that they did so in 1874. Their limit in this direction is pretty definitely fixed by the western margin of the great woods, about long. 96°. They did not appear at Fairford Port, on the northern part of Manitoba Lake, nor at Swan Lake House (long 100° 30', lat. 52° 40'), Cumberland House (long. 102° 30', lat. 54°), Prince Albert (long. 105° 30', lat. 53° 10'), or Fort Pitt (long 109° 20', lat. 53° 30'). They are very seldom seen at the second, and never at the third and fourth of these localities. The exemption of Prince Albert is noteworthy and instructive, as, on the testimony of several gentlemen acquainted with the locality, it is due to a *belt of coniferous timber*, which stretches between the North and South Saskatchewan Rivers here; and though grasshoppers in great abundance have visited the country south of the line thus formed, *they have never been known to cross it.*

The only crops which under ordinary circumstances the locust will not eat, appear to be sorghum and broom corn; but besides a general preference for those plants which are tender and juicy, it shows a considerable degree of aversion to certain species, and these generally escape when the insects are not in very great number. Potatoes, beets and tomatoes are usually thus exempt, and a very decided dislike is shown to the *Leguminosæ* or plants of the pea and bean family. May not this last fact serve to explain, to some extent, the vast number of leguminous plants found on the western plains, which have no doubt been subject for ages to the ravages of grasshopper armies? In *Astragalus pectinatus* the leguminous flavour is developed to a very offensive extent. I have seen *A. adsurgens* stripped of its flowers by the locusts, while the leaves, though young and tender, remained entire.

Experience abundantly proves that in years when foreign swarms are to be expected, wheat is one of the safest crops, as it is very generally too far advanced to be much injured at the time of their arrival. It is essential, however, that it should be as early as possible.

It seems hardly necessary at this date, to review all the means which have been proposed or tried, on a more or less extensive scale, to protect crops from winged swarms, or to destroy the eggs and young insects. Methods applicable with advantage to well settled countries, are not useful, or only to a very limited extent, in those with much waste land in proportion to the cul-

tivated, yet by persistent and combined effort much may be done towards the protection of limited areas, by disturbing and harassing the winged insects on their arrival in summer, and by collecting and killing the eggs and young brood in autumn and spring. A great area of the western plains incapable of cultivation or use for other purposes than stock raising, must, however, always remain as a breeding place for the locust, and it is only by the application of some broad and general remedy, if such can be found, that permanent amelioration can be effected. It would seem possible by an organized system of supervision, and the division of a large part of the prairie region into blocks protected by rivers and other natural fire-guards, and by ploughed lines, to prevent the general spread of prairie fires in the autumn, and afterwards to destroy the young locusts by burning the grass off over those areas found to be tenanted by them in spring. A similar course is urged by Dr. Studley as worth trial. Mr. Mair informs me that it has been attempted in the spring of 1875 near Portage La Prairie without effect; but by choosing a time when the grass is dry, the wind moderate, and the young insects pretty well advanced, it seems scarcely possible that many should escape. Again, when winged swarms are known to be moving on the province, making use of a similar system of fire-guards, it would be possible to form by preconcerted firing a strip of black country of great width, altogether beyond its limits, over which it is improbable the locusts would voluntarily attempt to pass. The extensive planting of trees in all the cultivable districts, besides probably effecting a climatic change causing increased damp and rainfall, which would be unfavourable to the locust, would so break up and divide the now uniform surface of the country as to prevent the destruction of crops being so universal as it now sometimes is. Coniferous trees, from the experience of Prince Albert Post, seem specially worthy of attention.*

It is my intention in a future paper, to summarize and discuss the facts concerning the grasshopper visitation of 1875, with especial reference to Manitoba and the North-west Territories, and I shall be much indebted for any particulars which will help me in this object.

*This and other points will be found more fully treated in my Report on the Geology and resources of the regions in the vicinity of the 49th parallel, 1875.

The following is a summary of the more important items of information for the summer of 1874, the localities being arranged in order from west to east:—

Battle River and Red Deer River, North West Territory.—(W. McKay, from reports of H. B. Company's officers). 'A tract of country extending sixty miles north and south, and fifty miles east and west between Battle River and Red Deer River. Grasshoppers produced from the egg about the beginning of June. Left about the end of July, going southward from the Battle River.

Fort Pitt, North West Territory.—(W. McKay). Did not appear within 140 miles of this place.

Observations in the vicinity of Wood Mt. and Westward.—On the 7th, 8th, 9th, and 10th of July, I noticed grasshoppers in great abundance on the high plateau of Wood Mt. (long. $106^{\circ} 30'$) and its vicinity. They were migrating eastwards with the prevailing winds during the warm hours of the day, and flying at a great height. On the 12th they were met with in vast numbers covering the country to the west of White Mud River (long. $107^{\circ} 35'$).

Swarms were also observed by other members of the Boundary Commission parties, on the 9th, 10th and 11th of July, at numerous points between long. 108° and $109^{\circ} 30'$, the last named meridian being about the western limit of the main horde at this time. Their general direction of travel was eastward, with the wind. On July 11th, their course is stated at several localities to have been south-east.

It would thus appear that on July 9th to 11th, the width of the belt of grasshopper-covered country was about 150 miles on the forty-ninth parallel, stretching from beyond the West Fork of Milk River nearly to Wood Mountain.

Carleton House, North West Territory.—(L. Clarke.) Produced from the egg in 1874 almost immediately after the disappearance of the snow, early in May. When full grown took flight southward. Foreign swarms appeared in the beginning of September and stayed all the autumn. No crops put in here.

Mr. Clarke writes:—East of this there is a settlement called Prince Albert, about fifty miles distant. Between us and this place there is a tract of sandy soil covered with a forest of fir.

Strange to say the grasshoppers have been in myriads from Carleton to the boundary of this timber, but none on any occasion have ever passed it, or troubled the farmers of Prince Albert.

Prince Albert, North West Territory.—(Philip Turner). No grasshoppers appeared here.

Missouri Coteau, North West Territory.—Long. 105° 30', lat. 49° 30'. On June 19th, 1874, I passed over about twenty miles of country near the western edge of the Tertiary Plateau, which was covered with young grasshoppers, not yet able to fly.

Fort Qu'Appelle, North West Territory.—(Wm. J. McLean.) Produced from the egg, hatching from early in May to the beginning of July. On July 25th began to take flight, going south-east by south. Foreign swarms were first observed about July 20th coming from north-west, and north-west-by-north. Continued passing for ten or twelve days, and remained on the ground only while contrary winds lasted. All were gone early in August, and no eggs were deposited.

Crops totally destroyed before the insects began to fly. Mr. McLean observes, that the insects before they were able to fly, took certain directions for several days at a time, and all travelled simultaneously in the same direction.

In 1875 full grown insects appeared June 17th in myriads. Seemed to come from about the same direction in which they flew from here last year, but rather more southerly.

Wood End, North West Territory.—Long. 103°, lat. 49°. Dr. Burgess on July 1st and 2nd noted grasshoppers flying westward with the wind. They are said to have been very numerous. (The wind at Wood Mt., 150 miles further west, was variable on these days, changing from south-east on the first, to east-north-east, south and north-north-east on the second.) The observed direction of flight is abnormal.

Cumberland House, North West Territory.—(H. Belanger.) Grasshoppers never known to appear here in swarms.

Fort Ellice, North West Territory.—(R. McDonald.) Not produced from the egg here. Arrived in swarms July 14th, from the south-west. Left July 17th, after devouring all the crops, going north-east. Eggs were deposited and some were

observed to hatch in the autumn. (On June 7th, 1875, the young insects had already destroyed all growing crops.)

Swan Lake House, North West Territory.—(D. McDonald.) The grasshoppers did not appear here this summer, and are said to do so very seldom.

Beautiful Plain, North West Territory.—(Prof. Bell, Geologic Survey of Canada.) Not produced from the egg here. Swarms arrived on the wing July 12th and were nearly all gone July 15th. Came from the west, and departed about east-south-east. Eggs were deposited in great numbers in gravel and sand ridges, on badger mounds, &c. Very few were observed to hatch in autumn. Between Prairie Portage and Headingly about two-thirds of crop destroyed.

Manitoba House, North West Territory.—(J. Cowie, J. P.) Not produced from the egg here. Swarms arrived about the third week of July, from the south-west, but not in great numbers. Passing over the place for about a week, going generally south-east. Eggs were deposited.

Crops destroyed, about one-tenth.

None were seen to the north of this place. Multitudes were drowned in the lake (Manitoba Lake), on the shores of which they were piled up in masses three feet deep.

Fairford Post, North West Territory.—(J. Cowie, J. P.) No swarms of grasshoppers have as yet appeared here.

Palestine, M.—(D. Ferguson.) Not produced from the egg here. On July 19th a few appeared, and were afterwards followed by great swarms coming from the north-west. Insects left about July 30th, going north-east. No eggs deposited.

Destruction of grain total, of potatoes one-fifth.

Burnside, M.—(K. McKenzie). Half-breeds told Mr. McKenzie that grasshoppers were very thick in the Saskatchewan country, and within sixty miles of Burnside on July 14th; on July 17th they arrived. Came from the west, and kept pouring in till July 22nd, being most numerous on July 19th. By July 29th had nearly all gone. Direction of flight on departure east or north-east. Eggs were deposited.

Wheat crops at Burnside averaged 16 to 20 bushels per acre against 28 to 32 in former years; in western settlements not

4 bushels per acre. Oats and barley nearly all destroyed. Potatoes not much damaged. Turnips half crop. Peas uninjured. Carrots nearly all taken. Onions one-half. Beets and mangolds hardly touched.

The grasshoppers made their appearance, especially in the western part of the province, earlier than ever before. Mr. McKenzie was informed by the half-breeds that the insects hatched at Qu'Appelle and other western localities, and that very few were left there to deposit eggs in the autumn of 1874. Mr. McKenzie also writes, "I was at Lake Manitoba, twelve miles north, about August 10th. Grasshoppers were dead and dry on the shore from four to ten inches deep, and from twenty to thirty feet wide as far as I could see all along the beach."

Portage La Prairie, M.—(Charles Mair). Not produced from the egg here. Swarms first seen about July 3rd, coming from the west. Left about July 10th, going eastward. Many eggs deposited. Crops destroyed. Oats seven-eighths, barley three-fourths, wheat one-half. Potatoes not much injured; gardens much damaged.

Mr. Mair also observed the grasshoppers to be covered with parasitic mites, and the presence of the larva of an ichneumen in the bodies of many of the insects.

Poplar Point, M.—(L. W. McLean.) Not produced from the egg here. Swarms first appeared July 12th from the west. Insects left about the last of July, going east. Eggs were deposited.

Barley and oats totally destroyed, wheat one-third.

Pembina Mt., M.—(Lt. Col. French, Commissioner N. W. M. P.) First met large flights of grasshoppers at Pembina Mt., July 11th. They were going eastward, and continued to appear for several days while Col. French travelled westward, but were afterwards no more noticed. The grass from La Roche Percée to the Old Wives Lakes, and possibly to the Cypress Hills, appeared to have been eaten down by grasshoppers. In the vicinity of the Three Buttes, no such appearance.

They nearly destroyed a field of grain sown by the Mounted Police at Fort Ellice.

St. Laurent, M.—(J. Mulvihill.) Not produced from the egg here. Swarms appeared July 18th and 19th from the west and north-west. Left about August 4th, going southward. Eggs were deposited. At least one-fourth of crops destroyed.

Headingly, M.—(John Taylor). Not produced from the egg here. Swarms arrived from the south, and from the west, about the first week of August. The majority remained till about the first of September and then went southward. Some stayed till the end of September. Eggs were deposited and a few of them hatched in the autumn and the young insects were killed by the frost. About half the crops destroyed.

St. Charles, M.—(W. Adshad). Not produced from the egg here. Appeared about the middle of June (?) from the west. Most remained till killed by frost, though a few went southward after depositing their eggs. Destruction of barley and oats total, wheat one-third, potatoes somewhat injured.

Rockwood, M.—(J. Robinson). Not produced here from the egg. Swarms appeared about the last of July from the south and west. Departed about the middle of August, going south and west. Eggs were deposited, a few were hatched in autumn and the insects destroyed by frost. More than half the crops destroyed.

Scratching River, M.—(W. C. Cowan). Not produced from the egg here. Swarms arrived July 11th, from the southwards, bearing westerly. Left July 16th, going northward. Eggs were deposited and some insects came out and were killed by the winter. Crops destroyed, two-thirds.

West Lynne, M.—(Colton M. Almon.) Not produced here from the egg. Swarms arrived on July 15th, about 11 a.m., from the westward. Commenced rising early on the morning of July 22nd, and by noon had disappeared. Direction of flight, north. Eggs were deposited, and it is reported that many hatched in the autumn. Oats and barley, two-thirds destroyed, wheat about one-fourth, potatoes a little damaged.

St. Norbert, M.—(Joseph Lemay, M. P. P.) Not produced from the egg here. Swarms first seen July 8th or 10th, and arrived both from the south-west and north-west. Remained about seven weeks, departing south-eastward. Eggs were depo-

sited, but many said to have been destroyed by "small red insects." The whole of the oats and barley, three-fourths of wheat, and four-fifths of garden stuff destroyed.

St. James, M.—(Hon. J. McKay.) Mr. McKay furnishes various particulars, from which I extract the following points of interest :—No grasshoppers were hatched in Manitoba in 1874. The nearest breeding ground for the swarms is said to have been about 250 miles west, and thence to extend westward for about 400 miles. The nearest swarms moved in July and passed St. James overhead, going eastward, about the end of July. Other swarms from further west arrived about the beginning of August, and left after a few days without doing much damage. Then came larger swarms till the middle of August, carrying everything before them. Estimated that two-thirds of crops of entire province destroyed.

Winnipeg, M.—(James Stewart and R. H. Kenning). Not produced from the egg here. Swarms arrived July 14th from south-west, and the majority remained about two months, leaving about the middle or end of September, and going to the west and north-west. Many remained, however, till killed by frost. Eggs were deposited about the end of August, and it is reported that some young insects came out and were destroyed by frost in autumn.

The whole of the oats and barley, and about one-fourth of wheat destroyed.

Mr. Stewart observed that nine-tenths of the grasshoppers had small red parasites under the wing, and that those remaining late in the autumn had, almost invariably, each a fully developed grub within it.

Little Britain, M.—(Hon. D. Gunn.) Not produced from the egg here. Swarms first appeared July 17th, from the south and south-west, and continued passing over the settlement till the last of August. Those that alighted deposited eggs, and generally left afterwards east or south-east. Many eggs deposited. Crops destroyed, about one-third.

In a more recent communication (February, 1876), Mr. Gunn states that, the spring of 1875 having been late, the young locusts from the eggs began to appear about the tenth of May, and continued to come out until the end of that month. They

were very numerous and destructive, but he noticed that many were attacked with a small red parasite. When mature, the swarms went, in part at least, to the north; and some were stated to have deposited their eggs near Lake Winnipeg. Other facts contained in Mr. Gunn's letter I hope to include in the report for 1875.

Stone Fort, M.—(W. Flett.) Appeared in swarms from the south and south-west, generally departing easterly. Eggs deposited, and some hatched in autumn.

Cook's Creek, M.—(G. Miller.) Not produced here from the egg. Swarms appeared about July 26th from the north-west. Remained about two weeks and departed south-eastward. Many passed overhead without alighting. Crops about two-thirds destroyed.

St. Ann's, M.—(J. H. Stanger.) Not produced from the egg here. Swarms first seen July 22nd, and coming from west-by-south. Continued arriving and departing for about two months, some leaving in the latter part of September, but many remaining till they died. The first swarms went from here eastward, the last more to the south. Eggs were deposited and some were hatched in autumn.

Barley, oats, potatoes and vegetables suffered most. Some wheat escaped. Peas suffered least of all field crops.

April, 1876.

