ON SOME DESTRUCTIVE LOCUSTS OF NORTH AMERICA,
TOGETHER WITH NOTES ON THE OCCURRENCES
IN 1891.

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In introducing this subject it is my intention to speak shortly upon
the various species of Locusts which have appeared in injurious numbers
within the territorial limits to be designated with each species. Some of
these species have covered a vast area of territory, and have caused
extensive injury from time to time, while others have appeared over
limited areas only, and have caused but slight injuries; but yet these have
been sufficient to necessitate their mention amongst the destructive
species of the country. Taking them altogether, we have exactly twelve
destructive locusts within the territory designated.

*Dissosteira longipennis.*—Selecting the species as they occur to me, I
will mention first the Long-winged Locust. During the early part of July
reports came from the eastern and south-eastern portions of Colorado of
locust depredations. The first of these was that trains had been stopped
by grasshoppers getting on the rails of the Santa Fe Railroad, 100 miles
or thereabouts east of Denver. Shortly after this, reports appeared in the
newspapers of serious damage being done around the point where they
were first mentioned as stopping trains. About this time other reports
of depredations came in from North Dakota and Minnesota and other
portions of the west and north-west. On the strength of these reports
Prof. Riley instructed me to visit the localities, for the purpose of ascer-
taining the extent of country overrun, the actual and possible future injury
which might result, and the exact identity of the species concerned. Being
a Nebraska man, and looking out for first interests, I naturally went to
Colorado, the nearest locality to my home from which reports had been
received. I first visited Akron, Colorado, the nearest point on the Bur-
lington and Missouri line to the region infested. There securing a team
and driving to the south only about six miles, the advance guard of the
enemy was encountered. Imagine my surprise at finding here an entirely
new insect, as far as destructive locusts are concerned. There in Colorado,
and in immense numbers, was the *Dissosteira longipennis,* an insect usually
considered rare in collections, and one heretofore only known to occur
over the higher portions of the plains lying to the eastward of the Rocky
Mountains, in the States of Wyoming, Colorado and New Mexico. This
insect, as ascertained from inquiry, covered an area of about 400 square
miles of territory in sufficient numbers to materially injure the grasses
growing on the ranges of the entire region—and amongst these grasses,
the species of Bouteloua, or Gramma grasses, and the Buffalo grass,
Buchloe dactyloides, seemed to be the most attacked, grains and other
cultivated plants not appearing to be especially attractive to it. In fact
very little or no injury was done by it to the cultivated crops growing
within the region infested. About the same time that I was investigating
this insect upon its northern line of injury, Profs. Snow and Popenoe
were studying the same insect upon the southern border of its range, and
they found practically the same food-habits there that I had noted in
the north, and, by enquiry, found that the insects had come into that coun-
try from the south last fall, and had laid their eggs over a large area.
This year when the eggs hatched, the young began to move from their
breeding centres in all directions, seeking open places and the edges of
ploughed fields, and following roadways. This trait of seeking open spots
this season is probably due to the habit of the insect of naturally living
on open ground where grasses are short and scattered. The present
year was very wet in this particular region and caused an undergrowth of
grasses, hence the desire to find the natural conditions under which the
insect lives. The young began moving and finding these open places,
there congregated. Having thus gathered together in large numbers, they
must feed, and they naturally swept the grasses clean around these spots;
so noticeable was this in certain spots where they had gathered about the
hills of a species of ant which raises mounds of small gravel and cuts
away the vegetation for some distance around them, they had enlarged
these areas, in some places for fully half an acre. This year Messrs. Snow
and Popenoe observed them flying southward with such ease, by reason
of their long wings, that they resembled birds.

Dissosteira obliterata, Thomas. Closely related to the above and
very similar in appearance to it, is a second species of these large, long-
winged locusts, which was found in injurious numbers along with Camnula
pellucida in Idaho last year. It was quite common in the Wood River
county lying north of Shoshone, and in the vicinity of Boise City, Idaho.
One form of this species was described by Saussure as Dissosteira spur-
cata in his "Prodromus Edipodorum". This is not the Edipoda oblit-
ata of Stoll.
Camnula pellucida.—This is the insect which has occasionally been very destructive in parts of California and Nevada. It has since spread eastward into Idaho, where it is very destructive the present season, covering an area of at least 1,300 square miles of territory. It also appears in great numbers, with several other species, in the Red River Valley of Minnesota, North Dakota and Manitoba. I also observed it abundantly in the Prickly Pear and Gallatin Valleys of Montana, near the mouth of the Yellowstone, in North Dakota, in portions of Wyoming, Colorado and the extreme western parts of Nebraska. It also occurs in the New England States and British America. This is a species which readily adapts itself to any new locality, being the most easily acclimated of any of our injurious locusts. When once established it is there to stay, and will require earnest attention from time to time in the future. In fact, I consider this locust, though not migratory, fully as destructive as the Rocky Mountain or true migratory locust, from the fact that it so soon becomes acclimated.

Acridium americanum.—This large, handsome locust is the species which occasionally devastates Yucatan, Central America and Mexico, and even reaches the United States in injurious numbers along our southern coasts. It has also been known in dangerous numbers as far northward as the Ohio River, and occurs sparingly as far north as the Northern States, but I imagine never reaches British America.

Dendrotettix longipennis.—"Post Oak Locust" of Texas. During the spring of 1887, while visiting Washington County, Texas, to investigate a local outbreak of an injurious locust, I heard of a species that was attacking the oaks of that particular region, and in some places entirely defoliating them. On my way from the region where I had been working, to the city of Brenham, we passed through the infested locality, and I obtained some of the insects in question, which were then in the larval stage. A careful examination proved the insect to be new and congeneric with a species heretofore collected only in the vicinity of St. Louis, Missouri, which also occurred only on oak. About a year later this species was described by Professor Riley under the above name. The insect occurs in two forms, long-winged and short-winged. The former flies with great ease and often leaves the trees in midday and alights in fields and other clearings—with the least disturbance it rises again and flies to the tops of the adjoining trees. The larvae and pupae are also exceedingly active, and run over the branches and trunks of trees with great
rapidity. The eggs are laid in the ground around the bases of the trees. An area of at least fifty square miles of forest was completely defoliated by these insects during that and the previous year.

*Melanoplus spretus.*—The Rocky Mountain or Migratory Locust. This is the insect which is generally referred to as the destructive locust of North America, and has caused more injury during the past twenty years than any dozen of the other species combined. It is this species which we most fear, on account of its migratory habits—so marked is this trait that swarms hatching on the Saskatchewan have been traced to the Gulf of Mexico in one season. Its habits have been so frequently described that further mention is unnecessary. Suffice it to say that at the present time it is again decidedly on the increase along our northern boundary. During the present year reports of its injury were received from Minnesota, North Dakota and Manitoba, by the Department of Agriculture, and upon investigation I found these reports to be only too true. In Minnesota and Dakota the authorities, ably assisted by the efforts of settlers, have been carrying on a vigorous warfare with marked results, which will doubtless save their crops from devastation next season.

*Melanoplus atlanis,* Riley. The Lesser Migratory Locust.

This locust, which frequently becomes very injurious on account of its excessive increase, is somewhat smaller than the Rocky Mountain species. It is also migratory in its habits, but to a much less degree than is *spretus.* In its distribution this insect is much more widely spread than the preceding—being a common one in almost all parts of our country from the Mexican boundary to the 53rd degree of north latitude, and even beyond in some parts of the country. It is the species which most frequently does the locust injury in the New England States, much of that in our Northern States, and some of that in the extreme north-west. It has also been known to become injurious even in the Middle and Southern States. In its distribution *atlanis* appears to be more partial to hilly or mountainous country, and especially is this noticeable in reference to its appearance in destructive numbers. It also seems to prefer wooded or mixed country to the open prairie or plains.

As would naturally be expected from its wide distribution, this particular locust presents some variation in its size, colour, and to some extent also, its structure. At any rate, there appear to be three well-marked forms of the species to be met with within the confines of North America.
Melanoplus devastator, Scudd.

A third species of the genus Melanoplus is the one that occasionally appears in destructive numbers in portions of California and the adjoining States. It is about the same size as the atlanis just mentioned, and often does considerable injury to the crops of the regions where it occurs. Although this locust is known to inhabit almost the entire region lying to the west of the main divide of the Rocky Mountains, and to reach even beyond in Montana and Colorado, it has never, to my knowledge, been injurious except in Nevada, California, Arizona and Oregon. This species also occurs in two forms, viz., small and large, being the spring and fall broods as nearly as I have been able to decide from specimens in collections.

Melanoplus bivittatus, Say. The Two-striped Locust.

This is our common species of "native grasshopper" all over the country, and the one that so frequently becomes injurious to our gardens and about the edges of fields. It occurs from the Atlantic to the Pacific, and from the Gulf of Mexico to the Saskatchewan. Its increase in destructive numbers appears, however, to be confined chiefly to the regions lying between the Rocky Mountains and the Atlantic. This locust also appears to vary considerably in its size and colour. There are, however, two well-defined forms of it, the one receiving the name bivittatus and the other going by that of femoratus—the latter occurring only northward.

Melanoplus differentialis, Thos. The Differential Locust.

Next to the species just mentioned we frequently find a second species of our large native locusts appearing in destructive numbers. This latter species occurs in the Western and Middle States only, and is here very often known to become unduly numerous and destructive to both field and garden crops. It has been reported at different times to have been present in such numbers in portions of Illinois, Indiana, Missouri, Kansas, Iowa and Nebraska. A melanistic or black form of it is quite frequent in portions of Nebraska and Kansas; but otherwise it is quite permanent in its characters.

Melanoplus ponderosus, Scudd. The Ponderous Locust.

An insect very closely related to the preceding is that known to the entomologist by the above name. It is a native of several of our Southern States, and has on several occasions been the depredator of crops in portions of central Texas. As the name would imply, it is of robust form, and it has a somewhat similar appearance to differentialis.
Melanoplus femur-rubrum, DeG. The Red-thighed Locust.

Last on the list of destructive locusts is herewith presented the one that perhaps enjoys the greatest geographical range of all of our species. It is the common one in all parts of the country from the Atlantic to the Pacific and from the Arctic circle to Central America. Its devastations, while perhaps not as vast as some of the preceding, have been more frequent and have occurred at more localities than those of any other one. Like the bivittatus, differentialis and several of our non-destructive species, femur-rubrum is a frequenter of rather low places and rank vegetation.

After giving these brief notes on the various species of locusts that have been known in the past to have been connected with the injuries from this class of insects within the country, it will not come amiss for me to say a few words about the subject for the present season, and to give my opinion as to the probable outlook for the coming year. Briefly, then, let me say that there have been received reports of locust injury from the following States:—Alabama, Mississippi, Texas, New Mexico, Arizona, California, Idaho, Colorado, Kansas, Nebraska, North Dakota, Minnesota, Iowa, Indiana, Ohio, Michigan and New York. In fact, there have been more separate reports received the present year than ever heretofore from this cause.

Now a word or two as to the different species of these destructive locusts that are responsible for the injuries of the present year. In California the devastator is present; the Camnula pellucida is known to be unduly common in Idaho, Minnesota, North Dakota and parts of the Rocky Mountain region; the Rocky Mountain or Migratory locust is the one that is responsible for most of the injury that has been reported from the Red River Valley of Minnesota and North Dakota as well as in Manitoba to the north of the international boundary; Melanoplus differentialis is the one that must receive much of the blame for Kansas and Nebraska injury; while in the States of Indiana and Ohio femur-rubrum and bivittatus are the guilty parties. Melanoplus atlantis is present in injurious numbers in the Red River Valley along with bivittatus, spretns and the Camnula pellucida. In Colorado and New Mexico for the first time Disosteira longipennis has appeared as one of the injurious species of the country.

While all of these locusts, along with nearly every other species of the
group which are native to North America, are to be counted as injurious, the particular one that has been the dread of the whole country, and especially of the region lying between the Mississippi River and the Rocky Mountains, is the Migratory species, Melanoplus spretus. This insect is now on the increase in a limited area on our northern boundary and across the line in the province of Manitoba. By continuing the prompt and energetic efforts that are being carried out by the populace and State authorities of the States of Minnesota and North Dakota we can be assured of success only provided the Canadian Government will also see the advantage of co-operation at this time. This, let me state, is all the more necessary at this particular time, as all reports seem to indicate that at present this locust is not present in abnormal numbers in any other part of the country. A stamping out of the pest in this region might, therefore, give immunity from their further injury for many years to come.

Finally, let me urge on the inhabitants of all infested regions that a "stitch in time saves nine." In other words, we do not know what the climatic conditions may be a year hence, whether they will be such as to favour the hoppers or not, so we had best do the wise thing and stamp out the pest. This has been done time and again in the past, and the recent work in the north shows how very profitable is the warfare when carried on persistently. By the plowing under of the eggs laid last fall, and the use of the kerosene pans or hopper-dozers in the destruction of the young locusts that did hatch, the twelve counties in the two States of Minnesota and North Dakota saved by actual computation on wheat alone the neat little sum of $400,000. This, mind you, in a year not considered a locust year, and not to take into consideration what was saved to the region for other crops and the injury that might have resulted next year had the hoppers not been destroyed. With every favouring circumstance, the comparatively few locusts of this one species that have thus far been destroyed, the present year in this region would have been sufficient to overrun at least calculation the entire area of the State of Minnesota, the two Dakotas and Nebraska, along with portions of Iowa and Kansas. True, these favouring circumstances might never occur, but it is always best to be on the safe side. This we should know from our past experience with this same insect.

"Native" locusts, while perhaps not to be dreaded equally as much as the species just spoken of, certainly can commit an equal amount of injury when size and numbers of the insects are taken into consideration.