

residence here, where I have had ample opportunity for observation. My most important discovery is that this species is double brooded. This is evident from the fact that in 1873 large numbers came here from the south, laid eggs and produced a second brood that flew south in August of the same year. This accounts for their migrations. They can not be local anywhere, because there would not be sufficient herbage to support a second brood in a region already laid bare by the first; and because in the northern part of their range the season is not long enough to mature two broods. They must, therefore, migrate every year; and their migrations are conducted as follows:

Hatching in Texas, New Mexico and Arizona early in spring, these insects, as soon as matured, fly north and deposit their eggs on this latitude about the last of May, although they arrived here this year as early as May 12th. They probably do not lay many eggs south of Nebraska, but they go much farther north. The second brood being able to fly in August, goes south with the first favorable wind, reaching Texas in September, where they deposit eggs to lie over winter. But as eggs were deposited by the first brood all along their route, from Kansas probably to the northernmost limit of vegetation; the young from these eggs are proportionally later, and, as they acquire their wings and fly south during the autumn months, each successive brood necessarily falls short of the extreme southern limit reached by its immediate predecessor, and many being retarded by contrary winds, cold and storms, eggs are deposited over nearly the whole extent of country traversed by their ancestors in the spring.

The next spring, the new brood hatching in Texas and all hatching farther north that acquire wings earlier than the 20th of June or 1st of July, fly north, while those maturing later fly south. They deposit eggs that produce a second brood, as before, which lays eggs for the spring brood. The second brood always flies south. Thus we see that this grasshopper is not forced upon its migrations for want of food, as is commonly asserted by Entomologists, but is guided in its flights by that instinct which teaches every insect to provide for its young. The natural habitat of this insect is probably the plains lying east of the Rocky Mountains, where it goes through its annual migrations as I have described. Now, let us see how it can spread into the cultivated districts of the Mississippi valley without moving directly east. When ready to fly, it always waits for a favorable wind; and, if it is going north, will take