border of the other spots; of the spots below these, the first is triangular, the second is largest of all and subquadrate, the third and fourth are unequal and oppositely rhomboidal; midway between these and the base of the wing is a small roundish spot.

Secondaries with two spots between the subcostal and median nervures, dividing equally the distance from the base to the tip of the wing, the inner ovate, and scarcely half as large as the outer roundish one; a third small ovate spot at the first divarication of the median nervure, and, sometimes, a fourth small ovate spot between the terminal divarications of the subcostal; sometimes a submarginal row of spots.

Beneath dull fulvous, the primaries with brownish spots, the secondaries with very large silvery white spots, encircled with yellowish brown; the darker parts of the primaries are as follows: the basal half of the wing, beneath the median nervure, fuscous; the basal two-thirds of the costal area obscured with fuscous; a dark spot occupying the upper half of the middle of the cell; a large oblong quadrate spot between the subcostal and median nervures, extending from just within the tip of the cell (where it encloses a yellow spot) more than half-way to the outer margin; above its basal third a slight infuscation; a quadrate spot between the first and second median nervules, its outer border reaching the second median nervule; a submarginal row of spots just without the row of yellow spots on the upper surface, those between the subcostal and median nervures sagittate. The spots on the secondaries are as follows: a very large oblong-oval one in the middle of the interspace between the subcostal nervure and its first nervule, two spots dividing equally the interspace between the subcostal and median nervures, the inner oblong-oval, as large as the first mentioned, the outer the largest on the wing, and subquadrate; the latter forms one of a straight discal row of spots subparallel to the outer border, the others being as follows: a spot similar to the first two mentioned, situated between the median and submedian nervures; a small roundish or ovate spot between the latter and the largest spot, and beyond the largest; a roundish or subtriangular spot, half as large as the first mentioned spot, situated near the outer angle; above this, at right angles to the extremity of the straight row, a small roundish spot; a submarginal row of five small roundish spots, those between the subcostal and median nervures small and marginal, sometimes obsolete. Expanse of wings one inch. Taken at Norway, Me., June 13th, by Mr. Smith.

Mr. S. H. Scudder stated that he had recently been studying the mole crickets, with a view to their classification, and found that they were naturally divisible into two groups. For one

he retained the name of *Gryllotalpa*, under which all the species had formerly been grouped, and to the other applied that of *Scapteriscus*; these two groups were separated by the following characteristics.

In *Scapteriscus* the posterior margin of the sternum of the eighth abdominal segment of the ♂ is produced into a stout prominent central tooth; in *Gryllotalpa* the margin is entire.

The mesosternal ridge of *Gryllotalpa* is prominent, and almost equally so throughout; that of *Scapteriscus* is never prominent on the anterior half of the segment, and is often limited to the posterior half, or is even obsolescent.

The fore trochanter of *Scapteriscus* is large; the free portion almost always equals the tibial dactyl in length, and is of about the same size at the tip as at the base; that of *Gryllotalpa* is proportionally small, seldom exceeding half the length of the tibial dactyls; the form is cultrate or lenticular.

Scapteriscus is furnished with only two fore-tibial dactyls, both of which are movable; *Gryllotalpa* has two movable dactyls besides a second pair which are immovable.

With but few exceptions, the hind femora of *Scapteriscus* more than equal the pronotum in length, while in *Gryllotalpa* they are always shorter than the pronotum.

In *Gryllotalpa* the length of all the hind tarsal joints taken together seldom exceeds half the width of the pronotum, while they equal its whole width in *Scapteriscus*.

The hind tarsal claws of *Scapteriscus* are clothed with short hairs nearly to the tip; those of *Gryllotalpa* have hairs only at the base.

The tegmina of *Scapteriscus*, with but few exceptions, cover, when at rest, two-thirds of the abdomen; in *Gryllotalpa* they seldom conceal more than one-half of the abdomen.

The nervures of the middle field of the tegmina in the females of *Gryllotalpa* are distant and rather irregular, somewhat resembling those of the males; in *Scapteriscus* they are approximate, regular and straight.

The anal cerci are longer than the pronotum in *Gryllotalpa*; shorter in *Scapteriscus*.

Finally, the ninth, and sometimes the eighth abdominal segments are furnished above, in *Gryllotalpa*, with two transverse lateral rows of long hairs directed inwards, as if to keep the long folded wings in place; these are absent from *Scapteriscus*, where the wings are equally long and similarly folded.

Only one species of *Scapteriscus* has been found without the limits of South and Central America, and that—occurring in a single in-

stance in Europe—must undoubtedly be considered an emigrant from the same warm regions; the members of the genus *Gryllotalpa*, on the contrary, are found throughout the whole world, not excluding Central and South America.

Comparing these two genera with their nearest allies, *Tridactylus*, *Cylindrodes*, etc., we find great and striking differences—differences which are extraordinary compared with those which divide *Scapteriscus* and *Gryllotalpa;* the comparatively simple fore tibia, and the abnormal appendages which supplant the hind tarsi in *Tridactylus*—the abbreviated legs fitting into cavities in the body, and the absence of articulated appendages at the extremity of the abdomen in *Cylindrodes*—these characteristics are far more important than the sexual sculpture of the abdomen, the ultimate neuration of the tegmina, the length of the legs, the contour of the trochanters, or the digitation of the tibiæ, which separate *Scapteriscus* and *Gryllotalpa*.

The facts cited above present two features which bear upon the question of the origin of species.

First: these little mole crickets, so unique in their structure as to be widely separated from their nearest allies, are spread uniformly over the whole surface of the globe; but few species occur in any one place, and at least one is found in every temperate or hot region.

Now, if species originate or change from physical causes, or by "Natural Selection," why is it that under every physical condition and surrounded by every variety of antagonism possible in their habitat, this same unique structural form has sprung up all over the globe?

Again, how can such theories account for another feature—common, indeed, to all natural groups—that it is not one striking characteristic which separates *Scapteriscus* and *Gryllotalpa*, and which "Natural Selection" might have seized upon, with reference to some special benefit, but a combination of features which have no apparent dependence upon each other, correlated, but not necessarily connected? Why should "Natural Selection," altering for its own purpose the palm of the four-fingered mole cricket into that of the two-fingered species in South America; or, developing in South America, from some previous synthetic form of mole cricket, both the present four-fingered and two-fingered species, and in other parts of the world the four-fingered species only—destroying at the same time the primæval form all over the surface of the globe—at the same time, place rows of hairs on the hinder part of the abdomen of the tetradactylate group, and none on that of the didactylate? or make the veins of the tegmina of the ♀ of one group distant and irregular, and those of the other straight and approximate? Why furnish the eighth abdominal segment of the ♂ of one with a projecting tooth,

and deprive those of the others of such a prominence? Why give one long and the other short anal cerci, or clothe the hind tarsal nails of one with short hairs and leave the other naked? What have these features to do with the differences of structure we have mentioned in the palm-shaped fore leg, or in the length of the hind leg? These and similar difficulties, arising on every hand, seem to attend every derivative theory of the origin of species.

Dr. A. S. Packard, Jr., read the following account of two species of salt fly, by Mr. Cox :—

"I send you the larva and pupa of a dipterous insect (*Ephydra*) found in the salt brine at the salt works near Equality, Gallatin County, Illinois, in such prodigious quantities as to fill up the wooden conduit pipes. These pupæ are gregarious, collecting in masses, and form great rope-like bunches, by clinging around small fibrous roots on the sides of the little ditch that conveys the brine from the first 'Graduation or Thorn house,' to the pump at the furnace.

"The brine, as it comes from the well, has a strength equal to $7\frac{8}{10}$ Baume, and is graduated after the German plan, by showering it successively over thorn bushes arranged on beams from top to bottom of three separate frames, from forty to forty-five feet high, called 'Graduation or Thorn houses.'

"What is remarkable in this is, that the above larvæ can nowhere be found except in the brine after first graduation, that is, passed over the first house, when they are found in such quantities as to prove a great nuisance. Neither in the fresh water, weak brine, or brine of second and third graduation can they be found at all.

"The people at the works believe that they are generated by some peculiar property in the water acquired after first graduation. I send them in their favorite brine. Professor Leo Lesquereux found a new species of plant in the brine pools. The short time at our disposal was so much taken up with geology, the object of our visit, that I forgot to collect specimens of the plant, which was abundant. I hope soon to revisit the locality, when I will try to collect some.

"The pupa of a species of *Eristalis* was found in the same place. The fly of the first worm sent you (identified by Baron Osten-Sacken as a species of *Ephydra*) was seen in great abundance on the pool at the bottom of the Graduation house. When alarmed they will fly up a few inches from the water, then alight upon it again in another place, and will glide about upon its surface with rapidity and the greatest ease. I think the worms come from a small egg, deposited by the fly, which sinks to the bottom of the water, where it is hatched, and the first visible stage of life is a very small white