

XII.—*The Fossil Cockroaches of North America.*<sup>1</sup>

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(Presented by Mr. James Fletcher.)

Although not in favour with the general public, the cockroach is to the paleontologist the most interesting of insects; for it alone occurs at every horizon at which insects have been found in abundance, and it is so dominant in the Carboniferous period, when insects first existed in large numbers, as to have led me to call this period, so far as its insect fauna is concerned, the "age of cockroaches." Its existence to-day is an example of the persistence of an antique but now waning type.

Fifteen years ago when I published a revision of the fossil cockroaches of the world<sup>2</sup> only nineteen American specimens had been seen, representing seventeen species and seven genera. To-day more than three hundred and fifty American specimens have passed under my eye, and from the Paleozoic series alone I have recognized among these no less than one hundred and thirty-two species belonging to fourteen genera. A recent study of all these forms, soon to be published by the U. S. Geological Survey, offers an occasion for some general remarks upon them which have some interest.

In 1879 I claimed that Paleozoic cockroaches, with which we are most concerned to-day, *i.e.*, those known from Carboniferous and Permian rocks, differed from modern forms of cockroaches to such an extent and by such characters as to warrant our separating them bodily as a group under the name of *Palaoblattariae*. This view has been attacked, but I think unsuccessfully, and every new discovery since then (the number of fossil species having been multiplied many fold) has only strengthened my position: that Paleozoic cockroaches differ from modern forms in the far greater similarity of the fore and hind wings in texture and venation; by the presence in the fore wings of the full complement of principal veins, some of which are completely or almost completely amalgamated in modern forms; and by the course of the anal veinlets, which as a rule ran in ancient times to the hind margin of the wing parallel to each other, while now they strike the anal furrow or collect apically in a bunch near its tip. This view has received no modification whatever by later discoveries, except that we find in certain Triassic rocks of Colorado an assemblage of forms, partly *Palaoblattariae*, partly *Neoblattariae*, in some of the latter of which the anal veins preserve their ancient course.

In further classification of these extinct cockroaches I then separated the American forms into two groups, *Mylaeridae* and *Blattinariae*, by the structure of the mediastinal vein of the fore wings. All the then known European forms were classed in the *Blattinariae*. Now although the number of American Paleozoic genera has doubled, two genera of *Mylaeridae*

<sup>1</sup> Published by permission of the Director of the U. S. Geological Survey.

<sup>2</sup> Mem. Bost. Soc. Nat. Hist., vol. iii., pp. 23-134, pl. 2-6.