DEPARTMENT OF GEOLOGY
Volume IV. (New Series) 1952 Number 2.

FOSSIL INSECTS FROM THE TERTIARY SEDIMENTS AT DINMORE, QUEENSLAND

By

E. F. RIEK

UNIVERSITY OF QUEENSLAND PRESS
BRISBANE

DATE OF PUBLICATION:
11th FEBRUARY, 1952

FOSSIL INSECTS FROM THE TERTIARY SEDIMENTS AT DINMORE, QUEENSLAND

By E. F. RIEK.

(Plate I and Text-Figures 1-4).

Few Tertiary insects have been described from Australia so it is interesting to record the occurrence of a further fossiliferous locality for such forms. The locality is separated only by three or four miles from that at Redbank Plains, from which two forms have been described by Tillyard (1916, 1923).

This insect material was collected from one of the clay-pits at Dinmore, situated between Brisbane and Ipswich. The specimens occurred in a clay shale in association with an extremely rich flora. The shales lying above and below this band, which is one to two feet wide, are even softer and contain only a few poorly preserved plant fossils. This clay shale series unconformably overlies beds of Mesozoic age.

Very few specimens have been obtained from the locality, but two of them are beautifully preserved and are described in this paper. The others are too fragmentary to warrant description but, as the fossiliferous band is submerged now at the bottom of the pit and additional specimens cannot be obtained, they are mentioned at the end of the paper. One specimen, a complete forewing, represents a primitive type of termite showing strong affinities to the archaic *Mastotermes*. The differences are sufficiently marked to warrant the erection of a new genus *Blattotermes*. The other specimen is an almost complete forewing of a tettigoniid grasshopper, considered to be from a female specimen as it lacks stridulatory modification.

SYSTEMATICS.

Order *ISOPTERA*.

Family *MASTOTERMITIDAE* Silvestri 1909.

In this family there is only a single living species, *Mastotermes darwiniensis* Froggatt from north Australia. This insect is of large size compared with that of most other termites. The venation is complete with the veins greatly branched and there is a complex network of irregular veinlets (archedictyon).

In the forewing Sc is reduced, simple or branched close to the base and extends only a short distance along the wing margin. R has an interior series of strongly oblique pectinate branches which are normally simple. The radial field is not continued round the apex of the wing. M lies more or less parallel to R as a simple vein to at least the basal third of the wing. CuA (Cu_1) is parallel to M and gives off a series of pectinate branches on its lower side. CuP (Cu_2) is generally a simple vein.

Five genera are placed in this family—*Mastotermes* Froggatt 1896, *Miotermes* von Rosen 1913, *Pliotermes* Pongrácz 1917, *Diatermes* Martynov 1929, and *Blattotermes* gen. nov. Most of the recorded species are referred to either *Mastotermes* or *Miotermes*.

Genus **BLATTOTERMES** gen. nov.

Genotype *Blattotermes neoxenus* sp. nov.

Forewing only.—Characters as given for the family, with the following additions: Archedictyon strongly developed, similar to that of *Mastotermes darwiniensis*, but more obvious in the median and radial fields than in that species. Sc reduced,

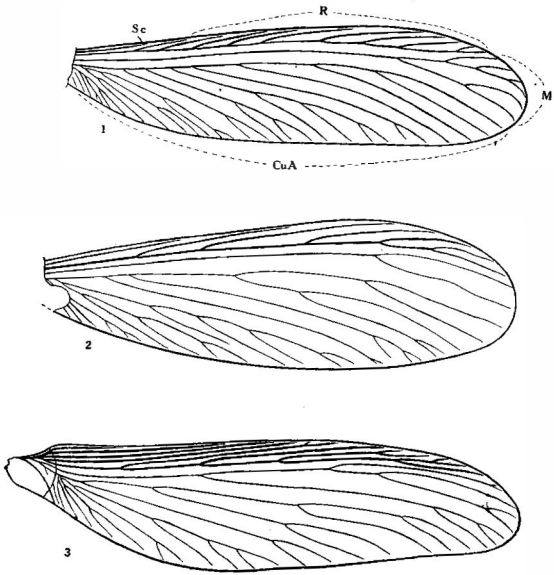


Fig. 1—*Blattotermes neoxenus* gen. et sp. nov. Venation of the reverse impression of a left forewing X 4. From the Eocene (?) of Dinmore, Queensland.
Fig. 2—*Blattotermes wheeleri* (Collins) X 4 (after Collins). From the Lower Eocene of Tennessee. Wing drawn with apex to right to conform with the other figures.
Fig. 3—*Mastotermes darwiniensis* Froggatt. Right forewing X 4. Recent of North Australia. For comparison with the fossil species.

simple, extending for only a very short distance along the margin of the wing. This vein may possibly be R_1, in which case Sc is either absent or at least not preserved.

M lies more or less parallel to R as a simple vein for the greater part of its length, forking only in the apical third of the wing. These branches of M do not form a pectinate series but occur somewhat irregularly. The main stem of CuA lies above the mid-longitudinal line of the wing. The basad branches of this series show secondary branching, particularly the two most basal branches. CuP not preserved. The clavus, which has not been preserved, must have been quite reduced. The wing was apparently shed as in the recent *Mastotermes*.

The genus differs from *M. darwiniensis* in the much stronger development of Cu with a corresponding reduction of M. The branching of M is reduced and restricted to the apical third in *Blattotermes*, whereas in *Mastotermes* it is more extensive. Sc is branched and R forks before the basal suture to the wing in *Mastotermes*.

In addition to the genotype, from the Australian Lower Tertiary (Eocene ?). *Mastotermes wheeleri* Collins from the Eocene of Tennessee is considered congeneric. *Mastotermes anglicus* von Rosen from the Middle Oligocene of the Isle of Wight shows the strong development of CuA as in *Blattotermes*, but the branching of M, though reduced, occurs at the middle of the vein and the radial field is very different.

Blattotermes neoxenus sp. nov.

(Plate I, figs. 1-3; Text-fig. 1).

This species is represented by a reverse impression of a left forewing complete except for the clavus, and by the obverse impression of which only the apical half is preserved. Total length of wing 24 mm., greatest breadth 6.0 mm.

In addition to the generic characters may be added: M with five branches, reaching the wing margin at its apex. R nine-branched, although this is probably a variable character within the species as well as may be the precise number of branches of M. CuA forming a pectinate series of ten branches, the more basad branches showing secondary branching generally of a pectinate nature, though the second branch forks dichotomously twice close to its origin from the main stem of CuA, with the upper two branches dividing again before reaching the wing margin. Although there is no evidence of a suture at the base of the wing, the break in the fossil occurs at the point where one would have expected such a suture had it been present. This would account for the absence of CuP and the clavus.

Holotype.—F. 10431 a and counterpart F. 10431 b, University of Queensland, Department of Geology Collection.

Type Locality.—Dinmore, Q., in clay shales of the Eocene (?) Redbank Plains Series (Portion 230, Parish of Goodna).

Affinities of BLATTOTERMES to other Mastotermitidae.

Mention has been made of the similarity of *Mastotermes anglicus* von Rosen in some characters to *Blattotermes*. *Mastotermes bournemouthensis* von Rosen, also known from a forewing, is too poorly preserved to indicate its affinities within the Mastotermitidae. In the forewing of *Mastotermes vetustus* Sc is absent and R arises as a simple vein from the base of the wing. M forks close to the base and

CuA occupies a relatively small part of the wing. This species is considered distinct from *Mastotermes* as the radial field is so markedly different. The remaining species referred to *Mastotermes* are described either from hindwings or else lack the distinctive characters of the basal portion and the costal margin.

Miotermes shows no evidence of Sc or an anterior branch to the stem of R before the basal suture, in some ways recalling *Mastotermes vetustus*. M branches close to the base of the wing in this genus. *Pliotermes* is known only from the hindwing. *Diatermes* is a very distinct genus in which M has fused with R in the basal third of the wing. Its affinity with this family is doubtful.

A comparison of the venation of *Blattotermes neoxenus* with the tracheation of the penultimate nymphal instar of the living *Mastotermes darwiniensis* Froggatt as figured by Tillyard (1931) shows the close similarity of the two. Sc is weakly developed in both but extends further and is forked in *Mastotermes*. In both the fossil and the nymphal tracheation there are eight or nine branches to the pectinate series of R. M branches more or less dichotomously only in its apical third, though it shows fewer branches in *Blattotermes*. M also lies somewhat closer to the costal margin in *Blattotermes*. CuA is similar in both forms. Unfortunately the clavus has not been preserved in the fossil, but from the shape of the wing, particularly its narrowing towards the base, this structure must have been quite small, though possibly relatively larger than in adult *Mastotermes*. The last nymphal instar of *Mastotermes darwiniensis* approaches more closely to the imaginal venation and differs more from that of *Blattotermes*.

Order *ORTHOPTERA SALTATORIA*.

Family *TETTIGONIIDAE*.

Subfamily *TETTIGOIDINAE* nov.

Allied to the Recent Conocephalinae but differentiated from them by the greater development of branching to Rs and R_1. The origins of M and Cu are apparently very similar in the two subfamilies. Cu arises from the base or from very close to the base of the wing in the female. It approaches the Phasgonurinae but has a strongly branched R_1, different basal origin of Cu and unexpanded costal area.

Genus **TETTIGOIDES** gen. nov.

Genotype *Tettigoides pectinata* sp. nov.

Insects of moderate size, with the forewing long and narrow, narrowing somewhat towards the apex, which is evenly rounded. Sc long, close to R_1, both reaching the margin a little before the apex. Rs arises a little beyond the middle of the wing and converges towards R_1 distally. It consists of a pectinately arranged series of several (five) obliquely descending, subparallel branches. Between R_1 and Rs a series of slightly oblique, transverse veinlets arranged at rather wide intervals, and enclosing a series of rhomboidal areas filled with a meshwork of fine veinlets. R_1 with four anterior branches, only the two apical ones reaching the wing margin.

M, which arises from the base of the wing and runs parallel to R, gives off from its distal half a series of several (five) strongly oblique, evenly spaced, sinuous

branches forming a pectinate series (of six branches) similar to those developed on Rs. The basal portion of Cu and the anal veins are not preserved, but Cu does not fuse with M unless it is very close to the base of the wing.

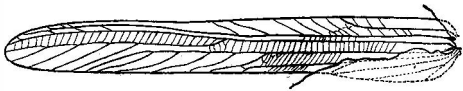


Fig. 4—*Tettigoides pectinata*. X 3½ diameters.

Tettigoides pectinata sp. nov.
(Plate I, fig. 4; Text-fig. 4).

There is a single almost complete forewing of the female of this species. Length of wing 32 mm., greatest width 4 mm.

C a short vein arising from the base of the wing and reaching the costal margin at one-fourth the length of the wing from its base. R_1 with four short branches anteriorly, the first two meeting Sc, the third and fourth reaching the wing margin. Rs forming a pectinate series of five branches. This may be a variable character in the same way that M may vary. The crossveins between Sc and R and between R and M are strongly developed and almost transverse while those between M and Cu are more oblique. The veinlets in the costal area form an irregular oblique series between which is developed a finer archedictyon.

Holotype.—The almost complete forewing F. 10640, Queensland University, Department of Geology Collection. The type is considered to be the wing from a female specimen as it lacks stridulatory modification.

Type Locality.—Dinmore, Q_2, in clay shales of the Eocene (?) Redbank Plains Series (Portion 230, Parish of Goodna).

Relationships of the Fossil.

The only other late Mesozoic or Tertiary Orthopteron described from Queensland is the wing fragment of *Austrodictya corbouldi* Tillyard preserved in a crystal of selenite of a copper lode. Only the distal third of this wing is preserved so that its affinity is not clear.

Tettigoides could have evolved from the Triassic and Jurassic Locustopsidae by reduction in the number of anterior branches to R_1 and an increase in the branching of M and its development into a pectinate series. The Recent Conocephalinae show a reduction in the branching of R_1 and Rs as compared with *Tettigoides*.

Further Fossil Insects.

In addition to the above described specimens there are a few fragmentary remains too indefinite for specific description. There is an almost complete hindwing of a cicada differing little from recent forms, also a small fragment of the forewing of an anisopterous Odonata, and finally a very small fragment doubtfully referred to as Orthopteron.

REFERENCES.

COLLINS, R. L., 1925. "Lower Eocene Termite from Tennessee."Amer. J. Sci., 9 (5) : 406-410.

HANDLIRSCH, A., 1906. "Die Fossilen Insekten und die Phylogenie der rezenten Formen, etc."

ROSEN, KURT VON, 1912. "Die fossilen Termiten, eine kurze Zusammenfassung der bis jetzt bekannten Funde." Trans. Congr. Entom. Oxford 2 : 318:335.

TILLYARD, R. J., 1916. "Mesozoic and Tertiary Insects of Queensland and New South Wales." Qld. Geol. Surv. Publ. No. 253 : 1-55.

———— 1922a. "Mesozoic Insects of Queensland, Part 2. No. 9. Orthoptera." Proc. Linn. Soc. N.S.W. 47 : 448-470.

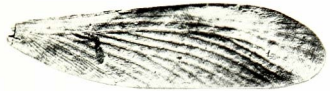
———— 1922b. "An Insect Wing in a Crystal of Selenite (Order Orthoptera)." Rec. Geol. Surv. N.S.W. 10 : 205-207.

———— 1923. "On a Tertiary Fossil Insect Wing from Queensland (Homoptera, Fulgoroidea), with Description of a New Genus and Species. Proc. Roy. Soc. Queensl., 35 (2) : 16-20.

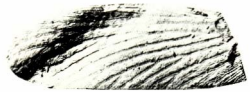
———— 1931. "The Wing Venation of the Order Isoptera. I. Introduction and the Family Mastotermitidae." Proc. Linn. Soc. N.S.W., 56 : 371-390.

———— 1937. "Kansas Permian Insects. Part 20. The Cockroaches or Order Blattaria, Part II." Amer. J. Sci., 34 : 249-276.

PLATE 1



1



2

3

4

EXPLANATION OF PLATE I.

Figs. 1-3—*Biattotermes neoxenus* gen. et sp. nov. Holotype. Left forewing.
Fig. 1—Reverse impression X 3 diameters.
Fig. 2—Obverse impression (counterpart of Fig. 1) X 3 diameters.
Fig. 3—Same as fig. 2, X 8 diameters.
Fig. 4—*Telligoides pectinata* gen. et sp. nov. Holotype. X 4½ diameters.