

Millipedes from Australia, 9: A new polydesmoid millipede from Queensland (Diplopoda, Polydesmida: Dalodesmidae)*)

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ABSTRACT. — Description of *Orthorhachis pallida* nov. gen., nov. spec. (Dalodesmidae) from southeastern Queensland. The genus appears to be related most closely to *Gephyrodesmus* Jeekel, 1983, from Victoria, and *Queenslandesmus* Verhoeff, 1924, from northern Queensland, but is well characterized by the structure of the gonopods.

Introduction

The polydesmoid species described in the present paper is part of a collection of millipedes obtained by the author and his wife during a trip through eastern Australia and Tasmania in 1980 (Jeekel, 1981).

Records of non-paradoxosomatid Polydesmida from Australia are still extremely scarce. They were enumerated in the cited publication and concern *Paurodesmus acutangulus* Chamberlin, 1920, and *Queenslandesmus sjoestedti* Verhoeff, 1924, from the Cairns region, northern Queensland, *Agathodesmus steeli* Silvestri, 1910, from Avoca, New South Wales, and *Lissodesmus martini* (Carl, 1902) and the recently described *Gephyrodesmus cineraceus* Jeekel, 1983, from Victoria.

Until recently all Australian Polydesmida not belonging to the Paradoxosomatidae were presumed to belong to the family Dalodesmidae (Jeekel, 1981). However, a careful reconsideration of the descriptions of the Tasmanian polydesmoids has recently lead to the conclusion that some genera are to be excluded from the Dalodesmidae and may find their proper place in the family Haplodesmidae (Jeekel, in press).

With regard to the genera mentioned above, there is no doubt that *Queenslandesmus*, *Lissodesmus* and *Gephyrodesmus* are true Dalodesmidae. The same probably applies to the enigmatic genus *Paurodesmus*. The latter genus, however, is based on a female specimen; it may be identical with *Queenslandesmus*.

On the other hand, *Agathodesmus*, of which the male characters are unknown, is a haplodesmid rather than a dalodesmid on account of its peripheral characters.

No dalodesmids have been recorded from the area between northern Queensland and Victoria. The present record of a new genus and species from southeastern Queensland bridges this enormous distributional hiatus.

Key to the families of the order Polydesmida, and the genera of the families Dalodesmidae and Haplodesmidae reported from eastern Australia.

1. Coxae of gonopods elongate, cylindrical, entirely free from each other; the gonopod aperture medially more or less constricted. Waist between pro- and metasomites usually with a distinct sculpture of longitudinal ribs, "beads", or striae. Metatergites usually hairless, generally with a distinct transverse furrow, but without areas marked by furrows or dense granulation. Paranota, if present, with callous lateral margins; the ozopores situated on the lateral surface of the paranota, laterad of the dorsal premarginal furrow. In case the paranota are absent, the ozopores are situated on the lateral surface of the metasomites. Legs of male ventrally rather densely set with longish, unmodified hairs; the tibiae and tarsi usually with dense ventral scopulae Paradoxosomatidae

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- Coxae of gonopods short, broad, medially solidly connected; the gonopod aperture elliptical or heart-shaped, not medially constricted. Waist broad, without distinct sculpture, or with weak longitudinal striation on the transition area to the metatergites or finely irregularly rugulose. Metatergites with or without transverse furrow, entirely without sculpture, or with a more or less pronounced sculpture of areas demarcated by furrows, sometimes with dispersed tiny setae, or densely covered by setiferous granules. Paranota without callos margins; the ozopores situated in or mesad of the dorsal premarginal furrow. Legs of male ventrally with normal setation, or with dense brushes of short, modified setae 2
- 2. Metatergites either smooth and without sculpture or with a transverse furrow and a number of somewhat inflated areas marked by sulci. Setation of tergites dispersed and unapparent or absent. Second somite not much wider than the collum; its paranota not differing essentially from the subsequent paranota. Legs of male ventrally with a dense setation of short, stiff bristles and globular setae. 6th antennomere shorter or not much longer than the others. Larger species of over 10 mm length Dalodesmidae 3
- Metatergites covered with numerous setiferous granules, without transverse furrow or areas. Second somite wider than collum; its paranota strongly extended downward and cephalad so as to embrace the head and collum like a collar. Legs of male without modified setae. 6th antennomere much longer than the others. Small species not longer than 10 mm Haplodesmidae: *Agathodesmus* Silvestri
- 3. Tergites without transverse furrow and without sculpture of areas; setation of tergites restricted to a long hair mesad of the caudal edge of the paranota. Tarsi of legs not widely arched and usually not (much) longer than the other podomeres *Lissodesmus* Chamberlin
- Tergites with a transverse furrow and a more or less well developed sculpture of inflated areas marked by sulci. Setation of tergites absent or dispersed and unapparent. Tarsi of legs widely arched, slender and distinctly longer than the basal podomeres 4
- 4. Gonopods with a distinct undivided femorite. The solenomerite and tibiotarsus taking only about one quarter of the total length of the entire telopodite *Orthorhachis* nov. gen.
- Gonopods immediately distad of prefemur divided into two main branches, which take much more than half the length of the entire telopodite 5
- 5. The two branches of the gonopods each undivided; the solenomerite projecting distad of the tibiotarsus. Body composed of 20 somites *Gephyrodesmus* Jeekel
- The two branches of the gonopods each deeply split into two branches; the solenomerite not projecting distad of the other branches. Body composed of 19 somites *Queenslandesmus* Verhoeff (? *Paurodesmus* Chamberlin)

Orthorhachis nov. gen.

Diagnosis. — Medium-sized Dalodesmidae with 20 somites and a normal poreformula.

Head without particulars; antennae long, weakly clavate; the 6th antennomere a little longer than the 5th.

Collum with sides almost horizontal, and with a distinct lateroposterior edge.

Somites weakly constricted; the waist broad. Metatergites with a distinct transverse furrow and a distinct longitudinal furrow parallel to lateral border of paranota. Areas weakly indicated. No pleural keels.

Paranota well developed, with angular posterior edges; their level horizontal.

Sternites longer than wide, without processes or cones. Legs long, the basal podomeres incrassate, the tarsi widely arched and exceeding the other podomeres in length. Dense ventral brushes on prefemora and femora, and globular setae on postfemur, tibia and tarsus.

Anal somite without particulars.

Gonopods with large coxae which are broadly connected medially, their free part strongly tapering, the caudal side arched. Prefemur short, ovoid, giving rise to one single element: a moderately thick femorite, about one and a half times as long as the prefemur, which apically

splits into a lateral solenomerite and a medial tibiotarsus. Spermal channel running along anterior, lateral and caudal sides of telopodite. The solenomerite projecting distad of tibiotarsus, finely tapering.

Type species. — *Orthorhachis pallida* nov. spec.

Remarks. — In a previous paper (Jeekel, 1983) a group of genera was distinguished among eastern Australian dalodesmids, characterized by the males having legs with slender sabre-like tarsi. This group consists of *Tasmaniosoma* Verhoeff and *Tasmanodesmus* Chamberlin from Tasmania, *Gephyrodesmus* Jeekel from Victoria, and *Queenslandesmus* Verhoeff and *Paurodesmus* Chamberlin from Queensland. In the structure of the gonopods, as far as these have been described, these genera are widely different, but the similarity in the legs is so obvious that a close relationship can hardly be denied. It distinguishes the group very well from the genera *Lissodesmus* Chamberlin and *Gasterogramma* Jeekel.

Orthorhachis evidently belongs to the group with long tarsi, and seems closely related to *Gephyrodesmus*. But whereas in the latter genus the telopodite of the gonopods is deeply split into two branches, presumed to be solenomerite and tibiotarsus, the bifurcation of the telopodite in *Orthorhachis* concerns only its apical quarter. The type-species of the new genus is also distinct in having the lateral margins of the paranota almost straight instead of widely curved, but the classificatory importance of this character is as yet uncertain.

Orthorhachis pallida nov. spec.

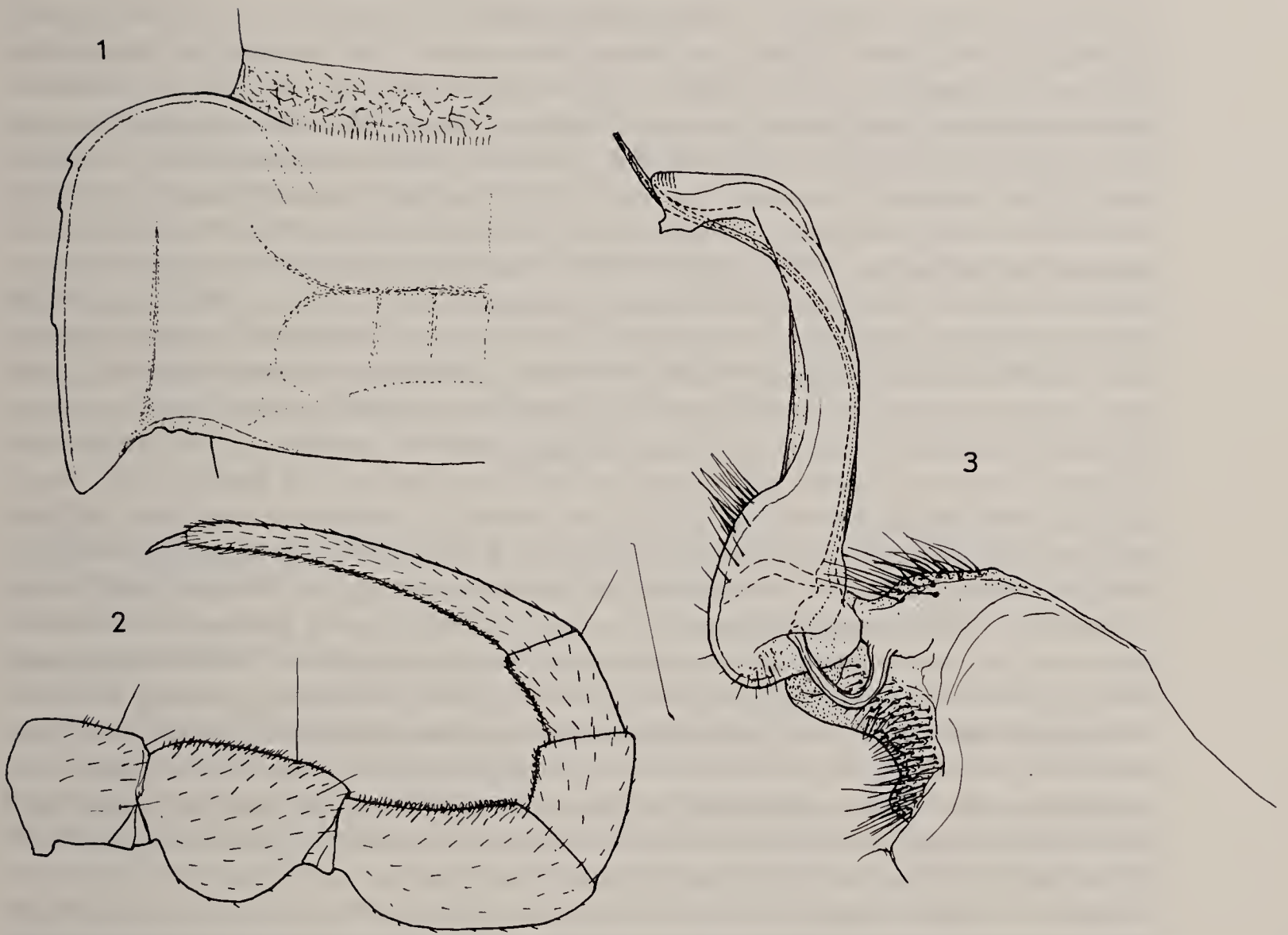
Material. — Sta. 45. Bunya Mts. Natn. Park, 27 km WSW Tarong, 23.X.1980 (Koonawarra near Mt. Kiangarow, along nature track in dry type rainforest, under logs), C. A. W. & A. M. Jeekel leg., ♂ holotype.

Description. — Colour: Uniform light brown, with a pinkish tinge.

Width: 2.3 mm.

Head and antennae: Labrum faintly emarginate. Clypeus evenly and widely convex, not particularly impressed towards the labrum; its lateral border about straight, faintly and rather widely emarginate towards the labrum. Headplate rather shiny, slightly rugulose and finely pitted; up to the middle of the vertex rather densely setiferous, with short to rather short setae in general and some on vertex a little longer. Upper part of vertex and the lateral sclerites of the head with quite unapparent but dense, almost furry short setation. Antennal sockets somewhat impressed, especially anteriorly, separated by 2.3 times the diameter of a socket or by almost the length of the 2nd antennomere. Postantennal groove rather deep, wide; the wall in front rather prominent. Vertex longitudinally moderately and evenly convex, transversely quite weakly convex. Vertigial sulcus sharply but not deeply impressed, running downward to well above the upper level of the antennal sockets, accompanied by small oblique wrinkles like a fishbone. Antennae long and rather slender, weakly clavate, with the 5th and especially the 6th antennomere thickest. Antennomeres 2 and 3 subcylindrical, each widening a little distad; the 4th and 5th antennomeres a little more obconical; the 6th almost cylindrical with sides weakly convex. Relative length of antennomeres 2 to 6: 0.90, 1.00, 0.85, 0.80, 0.85 (6th to 8th inclusive: 1.20). Pubescence of antennomeres short to rather short, rather dense in the proximal antennomeres, becoming dense in the distal ones.

Collum: A little narrower than the head, subtrapezoidal in dorsal outline. Anterior border weakly convex in the middle, more strongly rounded towards the lateral sides; the lateral sides weakly convex again, distinctly diverging towards the lateroposterior edge. Posterior border widely emarginate in the middle, widely convex more laterally and widely concave again towards the lateroposterior edge. Lateroposterior edge about rectangular, subacuminate, produced a little caudad but not projecting behind the medio-caudal margin of the collum. Surface of collum longitudinally widely and almost evenly convex, transversely weakly convex in the middle, a little more convex towards the lateral sides, with a slight longitudinal impression setting off the lateroposterior edge. Marginal rim along the lateral sides narrow; the premarginal furrow disappearing gradually towards the middle of the anterior border, and vanishing quite



Figs 1-3, *Orthorhachis pallidus* nov. gen., nov. spec., ♂ holotype. 1, left side of 11th somite, dorsal aspect; 2, leg of 7th somite; 3, right gonopod, medial aspect.

near the lateroposterior edge. Laterocaudal margin of collum with a fine premarginal furrow which disappears near the lateroposterior edge. Surface of collum smooth, shiny, with about 16 short and unapparent setae along the anterior border and dispersed similar setae on the surface; no setae along lateral margin.

Somites: Constriction rather weak. Waist broad, sharply demarcated from the prosomite; the transition to the metatergite marked by a slight transverse impression. Its surface shiny, with fine leathery sculpture of irregular sulci; the transition to the metatergite with fine and weak longitudinal striation. Prosomites with rather coarse cellular structure. Metatergites shiny, hairless except in the 2nd somite where some short unapparent setae may be discerned. Surface flattened, with a well impressed transverse furrow on the 5th to the 17th somites, weakly indicated on the 3rd and 4th somites. Base of paranota with a similar sharply impressed longitudinal furrow running from caudal border of somite to about one third of length of tergite. The transverse furrow bifurcates laterally before disappearing; behind it weak longitudinal furrows vaguely mark three plus three areas. About halfway between the transverse furrow and the posterior margin of the tergite a faintly indicated second transverse furrow may be seen. In front of the transverse furrow a weakly impressed median furrow. Sides very finely subgranulose, and with some irregular wrinkles; no pleural keels.

Paranota: 2nd somite wider than the collum; the 3rd about as wide as the 2nd and a little narrower than the 4th; the 5th more distinctly wider than the 4th. Paranota of 2nd somite with the anterior border widely and weakly convex, shouldered a little at base and thrust forward a little. Lateroanterior edge widely subangular, marked by a distinct tooth. Lateral border widely rounded, with two small teeth. Posterior border widely and moderately deeply emarginate.

Lateroposterior edge rectangular, subacuminate, produced caudad but not projecting behind the margin of the somite. Anterior and lateral borders with a fine marginal rim; the premarginal furrow disappearing a little in front of the lateroposterior edge. A distinct but fine marginal rim along the caudal border, also disappearing a little mesad of the lateroposterior edge. The lateral border weakly diverging caudad. In lateral aspect the lateral border is straight, sloping a little cephalad. Paranota of 3rd somite largely similar to those of the 2nd, but the anterior border more distinctly shouldered at base and directed laterad. Paranota of 4th somite similar to those of the 3rd, but the anterior border a little more convex, and the caudal border a little more concave. The lateroposterior edge rectangular, and projecting a little caudad of the posterior border of the somite. In lateral aspect the border of the paranota is sloping distinctly in the anterior direction, and faintly concave ventrally. Paranota of 5th and subsequent somites (fig. 1) with the anterior border rather widely rounded, and shouldered up to the 17th somite. The anterior and lateral borders merging by a slightly narrower rounding. Lateral border widely rounded, becoming almost straight from the 6th somite onwards and parallel to the axis of the body; three marginal teeth, the caudal one weakest, in poreless somites; four marginal teeth, with the additional one situated about halfway the third and the lateroposterior edge, in poriferous somites. The pore of moderate size, situated between the third and fourth tooth, just mesad of the premarginal furrow, at the anterior end of a narrow longitudinal impression which ends just in front of the lateroposterior edge. Pores facing laterad, slightly dorsad and a little caudad. Posterior border of paranota moderately widely emarginate, gradually becoming more strongly emarginate near lateroposterior edge in subsequent somites. The posterior margin from about the 7th somite onwards with a few teeth. Posterior edge acutely angular, subacuminate, in all somites, and especially in the 17th and 18th, strongly produced caudad and projecting behind the margin of the somites. Paranota in lateral aspect about straight, scarcely sloping cephalad. Marginal rims as in anterior somites.

Sternites and legs: Sternites of middle somites longer than wide (ratio 1.2 : 1.0). Cross impressions well developed; the transverse impression rather deep, furrowlike; the longitudinal one wider, less deep and with a fine median furrow. No sternal cones. Pubescence dense, the setae short and unapparent. Sternite of 4th somite broadish, with a rather deep median furrow. Sternite of 5th somite scarcely modified. Sternite of 6th somite with a deeply impressed median furrow, not affecting the coxal sockets; setation dense. Sternite of 7th somite with the gonopod aperture triangular with base cephalad, the edges rounded. Anterior, prosomal, bridge narrow. Lateral margins of aperture a little raised, rounded. Posterior part of sternite behind the aperture relatively broad, the median impression rather deep; setation rather dense. Sternite of 8th somite not modified. Legs (fig. 2) long, except those of the first two pairs. Prefemur and femur incrassate; the prefemur dorsally rather strongly convex; the femur and tarsus widely arched. Claw of moderate length. Relative length of podomeres 2 to 6 in middle somites: 0.55, 0.75, 0.40, 0.35, 1.00. Setation moderate to rather dense, with short setae; the ventral side of the prefemur and femur with a brush of short, apically slightly recurved setae; the three distal podomeres ventrally with globular setae of the usual type.

Anal somite: Dorsal profile straight. Epiproct of moderate length, dorsoventrally of moderate width. Sides from above strongly converging, concave at base, and not becoming parallel near apex. The apex rounded truncate, narrowish. Setation of anal somite moderately dense with distinct longish setae arising from fine granules. Paraprocts rugulose, the margins rather narrow and of moderate height. Setae on small granules. Hypoproct rather long, triangular, the sides widely convex, the apex rather narrowly rounded. Setae close to the margin, not on granules.

Gonopods: (fig. 3) Telopodite in situ reaching to about the anterior border of the sternite of the 6th somite. Coxa with dense setation on anterior and caudal sides. Prefemur elongate oval, sparsely setiferous except on mediolateral side near apex. Femorite faintly curving caudad. Tibiotarsus ending in a rounded lobe, which is minutely transversely striate, and a tiny edged lobe. Solenomerite gradually tapering, the apex narrowly truncate.

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FRANCISSSEN, Frans P. M. & Ad W. M. MOL, 1984. AUGERIUS CLUTIUS AND HIS "DE HEMEROBIO"; AN EARLY WORK ON EPHEMEROPTERA. pp. 128, onderwerpenindex 3 kolommen, personenindex 5 kolommen, Basiliken-Presse (ISBN 3-9800020-6-3, Postfach 1503, BRD-3550 Marburg/Lahn 1), prijs (ingenaaid) DM 38,—.

In 1634 publiceerde de Amsterdamse arts Outgert Cluyt, ofwel Augerius Clutius, een klein boekje over twee zeer uiteenlopende zaken die zijn aandacht hadden getrokken: de gigantische zaden van de palm *Lodoicea maldivica*, en de eendagsvlieg. In dat tweede deel neemt Cluyt afstand van de tot dan toe gevolgde methode om zich uitsluitend op oudere auteurs, en uiteindelijk Aristoteles, te baseren, en voegt aan de kennis van zijn voorgangers eigen waarnemingen toe. En hoewel die waarnemingen zowel in methodiek als techniek — zonder microscoop of zelfs loupe — zeer primitief waren, vormden ze een vroege exponent van de geheel nieuwe methode van wetenschappelijk onderzoek zoals wij dat nu kennen.

Men krijgt een indrukwekkend beeld van de snelheid waarmee de wetenschapsbeoefening een nieuw gezicht kreeg als men zich realiseert dat nog geen mensenleven later Jan Swammerdam een boek publiceert, over hetzelfde insect, dat dermate gedetailleerd en exact is dat zijn afbeeldingen de toets van een recente criticus kunnen doorstaan.

Het boekje van Francissen en Mol geeft, na een inleiding omtrent de geschiedenis van de studie der Ephemeroptera, een bespreking van de persoon Cluyt, en diens methode van werken. Vervolgens volgt een herdruk van de volledige Latijnse tekst van „De Hemerobio”, en een becommentarieerde vertaling van de belangrijkste passages.

Ik vond het jammer dat de vertaling niet completer was — een klassieke en entomologische belangstelling gaan zó zelden samen dat vrijwel geen enkele geïnteresseerde de Latijnse tekst kan volgen, waardoor de sfeer en de moeizaamheid van Cluyts werk toch aan hem voorbijgaat.

Dat zou uiteraard niet gekund hebben voor deze prijs. Een boekje uitbrengen over zo'n onderwerp voor de prijs van een flinke pocket-roman is een bewonderenswaardige prestatie. Over de historie van de entomologie is niet zo erg veel geschreven, en dat is een reden te meer dat ik dit boekje graag wil aanbevelen. — W. N. Ellis.