

DESCRIPTION OF *FORTUYNIA YUNKERI* NOV. SPEC.,
AND NOTES ON THE FORTUYNIIDAE NOV. FAM.
(ACARIDA, ORIBATEI)

BY

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Recently (VAN DER HAMMEN, 1960), I described an interesting Oribatid mite (*Fortuynia marina*) from the intertidal zone at Biak Island, Netherlands New Guinea. The mite fauna of the littoral is not very well known, especially outside Europe, so that it is not surprising that the Acarid material collected by me at the above-mentioned locality contained also five new species belonging to other groups of mites (see WOMERSLEY, 1961). Among these species, a *Platytrombidium* appeared to be closely related to a species from the Pacific coast of Panama, which proves the accidental character of our knowledge of the mite fauna of the littoral.

Shortly after the publication of my paper, Dr. C. E. YUNKER of the Middle America Research Unit in Panama collected Oribatid mites in the intertidal zone along the Pacific Ocean, which he thought to be related to the genus *Fortuynia*; he kindly offered the specimens to me for study. Because the description of *F. marina* was founded on one specimen only, a larger series of a related species was in fact very welcome in order to permit of a more complete description.

The material collected by Dr. YUNKER appeared to represent indeed a new species of the genus *Fortuynia*; it contains a complete series of the juvenile stases, whilst the sufficient number of adults permitted me to clear up some very interesting structures (by means of dissection) and to state important secondary sexual differences. In this way more definite conclusions on the relationship of the genus *Fortuynia* can be given.

It is a pleasure to me to dedicate the present species to its collector, in naming it *Fortuynia yunker* nov. spec. I am indebted to Prof. GRANDJEAN with whom I made a preliminary study of the species.

Fortuynia yunkeri nov. spec.

Locality. — Ft. Kobbe Beach (Pacific Coast), Canal Zone, Panama, May 29, 1960; collected at low tide in empty barnacle shell attached to jetty rocks in the intertidal zone.

Material. — 11 females (among which the holotype), 20 males, 1 larva, 7 protonymphs, 2 deutonymphs, 6 tritonymphs. Only some of the females contained one large egg.

DESCRIPTION OF THE ADULT.

Measurements. — Length of the female 0.450-0.480 mm (average 0.460 out of 8 specimens), breadth 0.270-0.300 mm (average 0.290 out of 8 specimens); 3 ♀♀ had been damaged or dissected and could not be measured. Length of the male 0.435-0.465 mm (average 0.450 out of 20 specimens), breadth 0.260-0.275 mm (average 0.265 out of 20 specimens).

Habitus and colour. — A secondary sexual difference can easily be stated. The notogaster of the male is more flattened and distinctly extending beyond the anal opening, whilst the outline of the male ventral plate is triangular (rounded in the female).

When observed in reflected light in a dry condition, the animal appears to be glossy brown, with a light spot in the anterior central part of the notogaster. The white hairs, especially the posteriors, are larger than in *F. marina*.

A study of the animal in transparent light reveals that the colour is of irregular intensity. Genital and anal plates (with anterior locking piece), rutellum, trochanter III and IV, the femur (with the exception of a small basal part), genu, and a small basal part of the tarsus are dark brown. The posterior part of the ventral plate is distinctly darker than the anterior; in figs. 1*b* and 4*a* these two parts are separated by a dotted line. The light spot in the anterior part of the notogaster is slightly irregular in shape; two pigment spots are visible under this area. As a rule the notogaster is slightly darker posteriorly; it has a nearly colourless border, but in the male this light border is not visible in the posterior lateral part. The centre of the prodorsum is lighter than the lateral parts. The coxisternal region is as light as the anterior part of the ventral plate; the mentotectum is slightly darker.

Cerotegument. — When studied in a dry condition the cerotegument is not visible as a white layer. Nevertheless the body is covered by a continuous layer of irregular thickness, which is difficult to separate. It is colourless, not birefringent, and for the greater part only faintly granulate. In the lateral parts of the idiosoma, viz., the lateral border of the prodorsum, the lateral part of the podosoma, and the lateral part of the ventral plate (partly covered by the noto-

gastral tectum), the cerotegument is thicker and more granulate. I succeeded in separating as a whole the complete strip of cerotegument that precisely covers the granulate border of the prodorsum; apparently the thicker granulate cerotegument of the lateral parts is distinctly bordered.

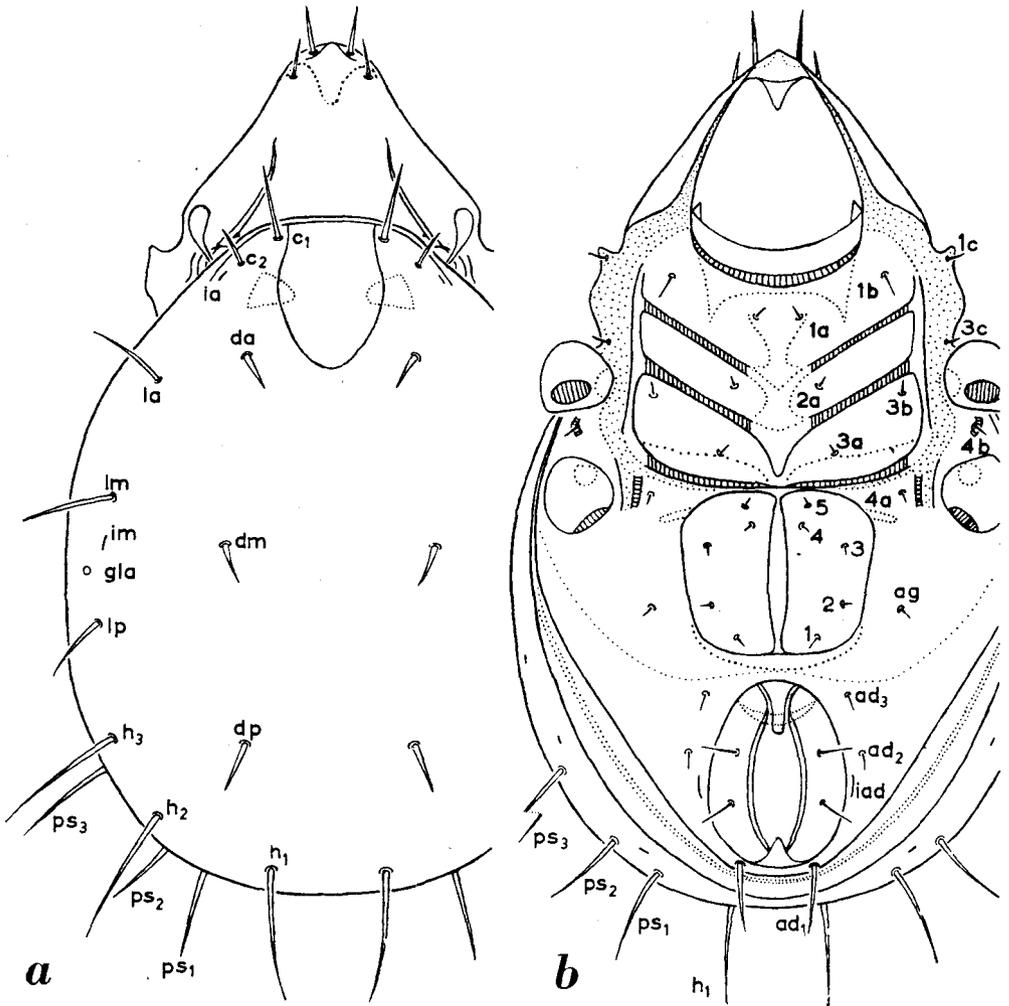


FIG. 1. — *Fortuynia yunkeri* nov. spec., ♀; a, dorsal view; b, ventral view; a, b, × 245.

Cuticle. — The cuticle is thin, and the notogaster is easily deformed. In transparent light a finely punctate structure can be seen, which is situated apparently under the epiostracum. The unequal coloration of the cuticle is dealt with above.

In a definite area of the idiosoma, the cuticle is granulate (also after removing the cerotegument). This area comprises the lateral border of the prodorsum,

the lateral part of the podosoma (the precise extent is shown in figs. 2a, 3a), and the posterior border of the third epimeral furrow (cf. fig. 1b).

The lateral and posterior colourless border of the notogaster is very thin and flexible and forms a special type of tectum that will be dealt with below.

Prodorsum. — The prodorsum has a pair of converging lamellar ridges (figs. 1a, 2a : cl) that are, moreover, slightly curved inwards at the end, and reach only till halfway the lamellar hairs ; the faint inner ridge *ci*, found in *F. marina*, is not visible in the present species.

The sensilli are directed upwards and slightly curved inwards. The exobothridial hairs are extremely small, and reduced to their alveolus ; the interlamellar hairs are reduced to the same degree. The rostral hairs are relatively long and strong, and are placed in depressions of the rostrum ; the lamellar hairs are smaller.

The lateral border of the prodorsum is granulate, with the exception of the rostrum.

Notogaster. — The notogaster has no porose areas. It has a remarkable lateral and posterior tectum. The nearly colourless band which borders the notogaster is very thin and flexible (but chitinous and shining), and forms a fold ; cross sections of this fold are represented in figs. 3b-e, an oblique section in fig. 3f. The thin, colourless tectum is firmly connected with the ventral plate, so that the notogaster can only be separated by tearing the cuticle, even after heating with lactic acid. At the place of attachment, the border of the ventral plate forms a dark tube with thickened wall, which is lengthwise open ; the tube is hidden by the tectum. Because the tectum is not prolonged by a limbus, it differs from the lateral and posterior tectum found in *Achipteriidae* and other families. The granulate cerotegument of the lateral region continues under the tectum and extends to the border of the dark tube. It is probable that the tube is connected with the system of air reservoirs described below.

The shape of the notogaster is represented in figs. 1, 2a, and 4. There is a remarkable secondary sexual difference. In ventral view the enclosure of the ventral plate of the female is rounded (fig. 1b), whilst it is triangular and much narrower in the male (fig. 4a). In lateral view the notogaster of the male appears to be more flattened and distinctly prolonged posteriorly (fig. 4b).

The surface of the notogaster is smooth ; it presents no ridges. There is no lenticula, but a simple light spot that is slightly variable in shape, especially posteriorly.

The notogastral hair c_3 , of which the alveolus appeared to be still distinctly present in *F. marina*, is absent in *F. yunkeri* (in one or two specimens I have seen a very small light spot on the original place near *ia*, but at one side only). The adult is therefore bideficient (28 hairs), but because it is certain that c_3 is one of the lacking hairs, I have used the notation of unideficiency. The posterior hairs are notably longer than in *F. marina*. The hair ps_1 has a distinctly more lateral position than in the last-mentioned species : it is not placed under h_1 as in many

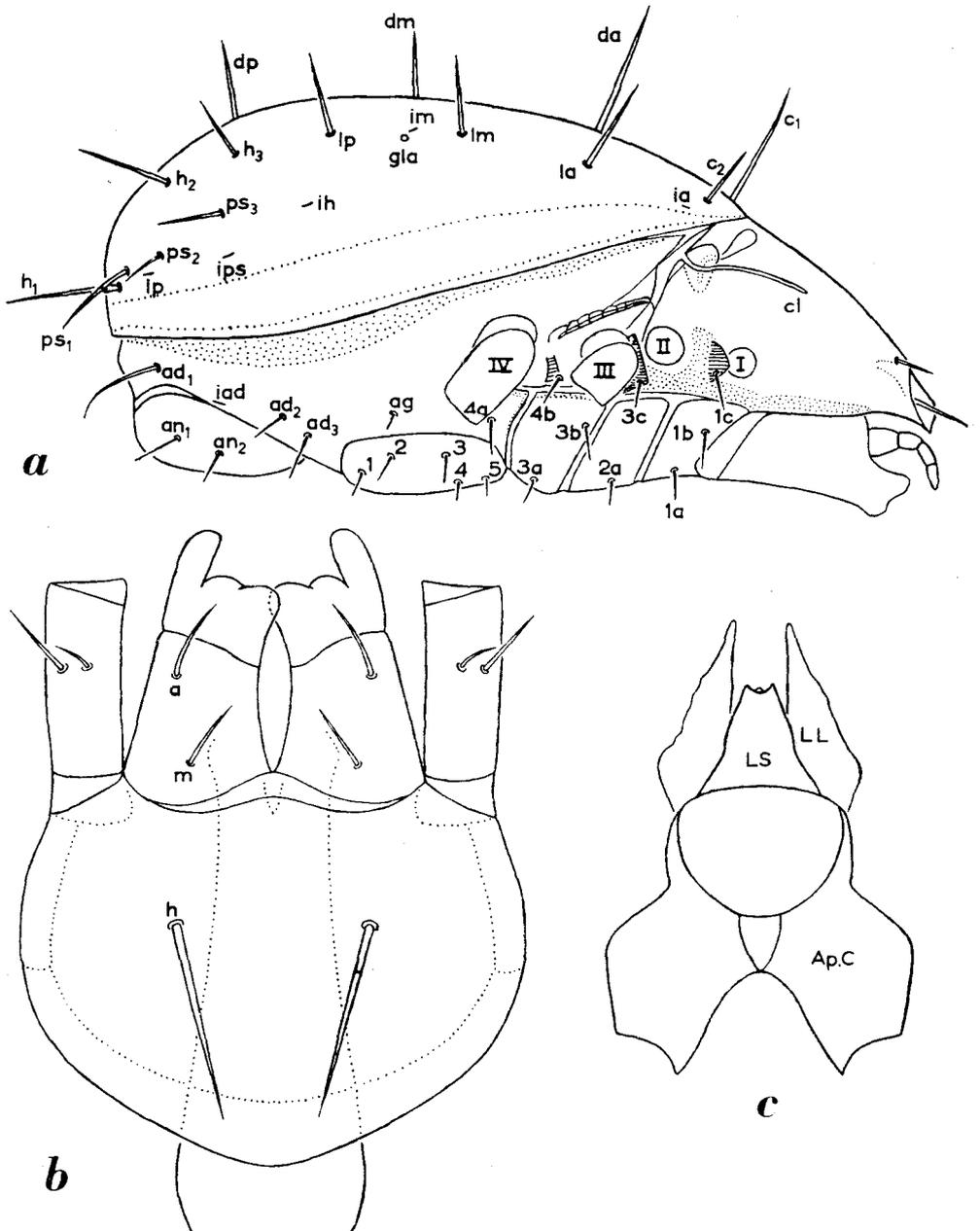


FIG. 2. — *Fortuynia yunkerii* nov. spec., ♀; a, lateral view, $\times 245$; b, ventral view of gnathosoma (lateral lips omitted), $\times 700$; c, dorsal view of gnathosoma, showing labrum and apodemata (the lateral lips are bent too much to the outside), $\times 700$.

Oribatid mites, but beside it. The places of insertion of the hairs are strikingly light spots in the brown notogaster.

The fissures *ia*, *im*, *ih*, and *ips* are easily visible, just as the latero-abdominal gland (*gla*); their position is represented in figs. 1, 2*a*, 4. The position of *im* especially is, however, variable: it can be in front of the latero-abdominal gland, laterally of it or medially; it is placed lengthwise, obliquely, or transversely. The position of *ip*, *ih*, and *ips* is also slightly variable, partly because of the secondary sexual difference in the shape of the notogaster.

Ventral plate. — Genital and anal openings are large and rather close to each other. The genital opening of the male appears to be relatively smaller (especially shorter) than in the female. There is one pair of aggenital hairs.

As mentioned above there is a striking secondary sexual difference in the shape of the ventral plate. In the female (fig. 1*b*) the ventral plate is rounded, the lateral borders are remote from the anal opening, whilst the posterior border is rather close to it. In the male (fig. 4*a*) the ventral plate is nearly triangular, the lateral borders are close to the anal opening, whilst the plate is distinctly elongated behind it. The ventral plate of the male shows in a ventral view also a pair of distinct ridges between the lateral border and the adanal hairs; in fact these ridges are the margins of a steep declivity, the adanal hairs being inserted in an elevated area. In a lateral view (fig. 4*b*) it is also distinct that the male ventral plate is produced posteriorly. In connection with the different shape of the ventral plate, the adanal hairs have a distinctly different position in the male.

Anal region. — There are two pairs of anal hairs. The anal region is remarkable because of the large, dark anterior locking-piece; in figs. 1*b*, 6*b*, *d* this is represented in different views, together with the smaller, colourless, not sclerotized posterior locking-piece.

Genital region. — Each genital plate bears 5 hairs, a number not often met with in Oribatid mites. In fig. 1*b* the hairs are indicated with the numbers 1-5; the hairs 4 and 5 have a marginal position.

I have seen no females with extended ovipositor. Judging from the retracted specimens, the ovipositor is short.

Coxisternal region. — Epimeral furrow 2 and sejugal furrow are less distinct in the median part. The sternal furrow becomes indistinct anteriorly. The region of the furrows is distinctly bordered by a granulate area, as shown in fig. 1*b*.

The chaetotaxy of the epimeres is to be expressed in the formula 3 — 1 — 3 — 2. The numbers given here for epimeres 3 and 4 (3 — 2, and not 2 — 3) have been established by a study of the development, as will be dealt with below.

Lateral region of the podosoma. — This area is very interesting and shows some completely new structures. It is represented in fig. 2*a*, and more highly magnified in fig. 3*b*.

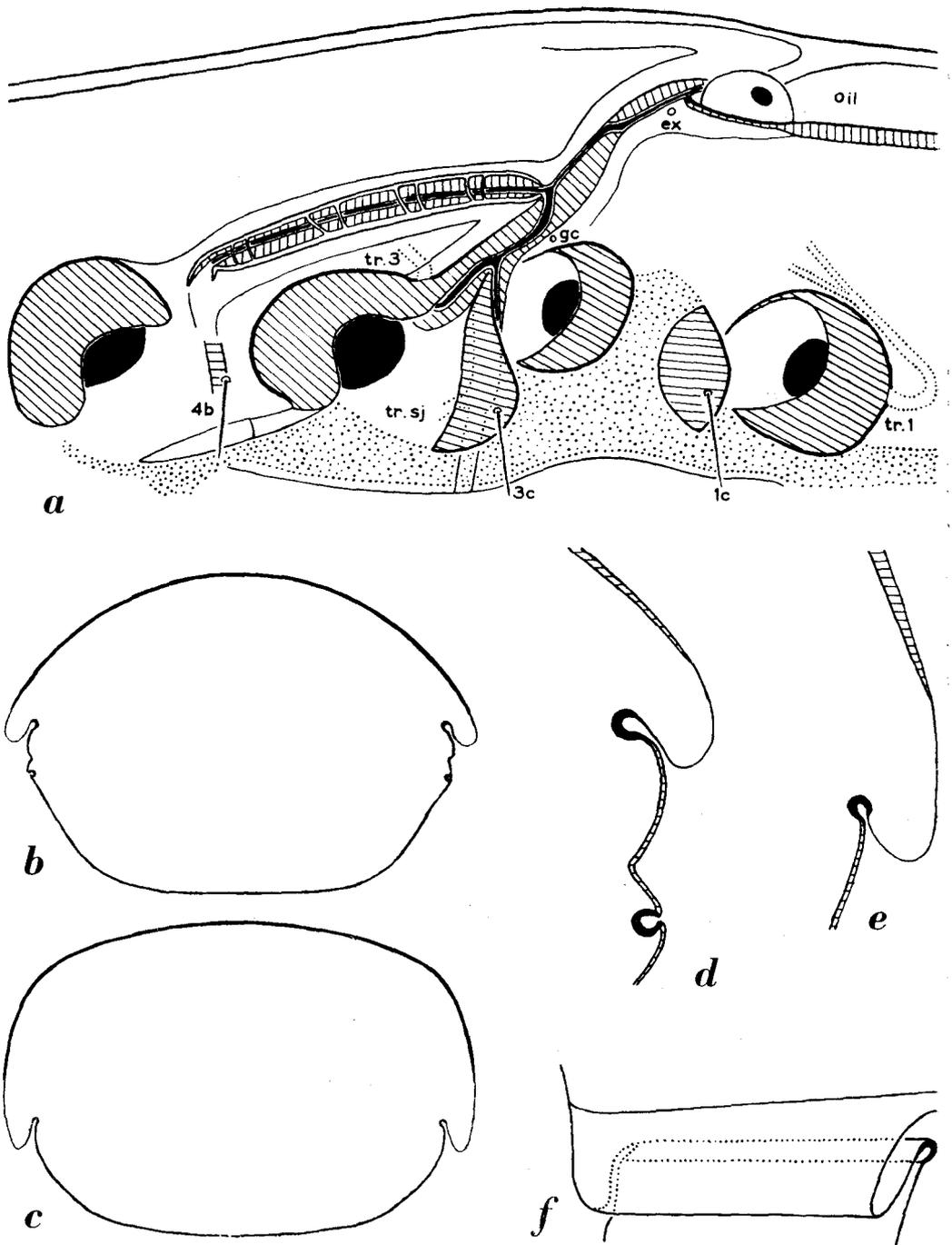


FIG. 3. — *Fortuynia yunkerii* nov. spec., ♀; *a*, right lateral part of the podosoma (legs removed), showing openings of tracheae and system of air reservoirs, $\times 640$; *b*, transverse section through the idiosoma, between the third and the fourth pairs of legs, $\times 255$; *c*, *idem*, behind the fourth pair of legs, $\times 255$; *d*, part of fig. *b*, showing tectum and cross section of reservoir, $\times 640$; *e*, part of fig. *c*, $\times 640$; *f*, hind-part of hysterosoma, showing posterior attachment of tectum and oblique section, $\times 640$.

Pedotecta I and II are both present and well-developed ; they bear the places of insertion of the epimeral hairs *1c* and *3c*. There is a discoidal ridge (bearing the hair *4b*) between acetabula III and IV. The distinctly bordered granulate area is represented in figs. *2a* and *3b*. A coxal gland *gc* is present above acetabulum II.

The lateral region is extremely interesting because of a chitinous tube above acetabulum III, connected with the sejugal furrow. This chitinous tube, reinforced by an irregular number of chitinous rings, appears to be lengthwise open, so that it can be regarded as covered by two tecta. A section of the tube is repre-

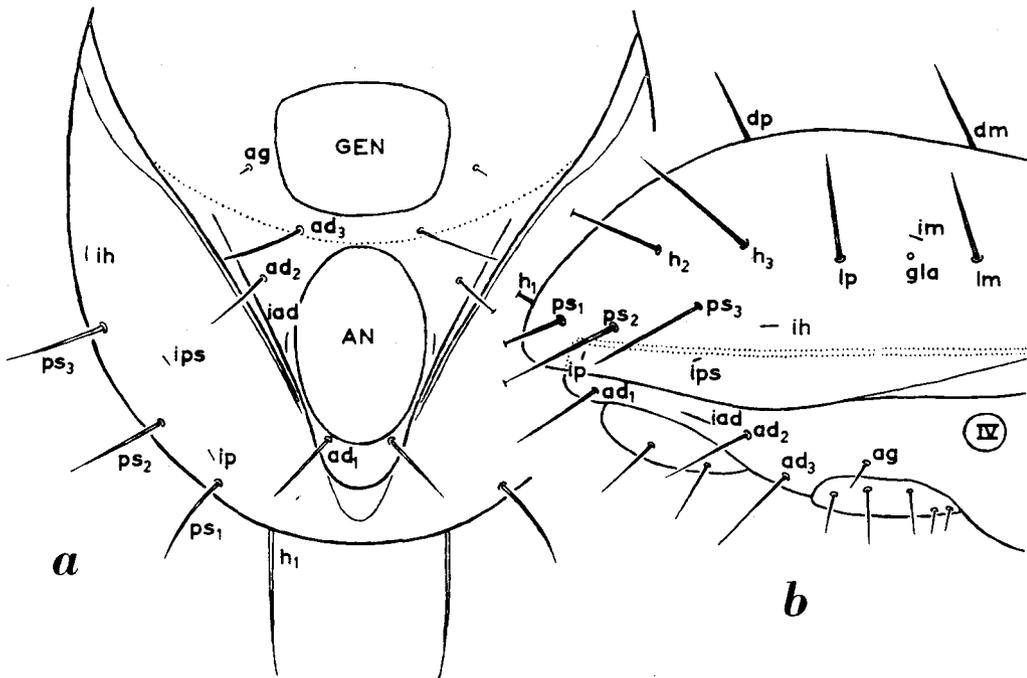


FIG. 4. — *Fortuynia yunkerii* nov. spec., ♂; posterior part of the hysterosoma ;
a, ventral view ; *b*, lateral view ; *a*, *b*, × 290.

sented in fig. *3d*. The tube is connected with the sejugal furrow that has developed here as a canal, covered by tecta. In principle a section through the sejugal canal resembles a section through the tube, but the tecta are more complicated and alternating. The main tectum of the upper part extends from the posterior border, the tectum of the lower part from the anterior border of the canal. In the lower part, the sejugal canal divides into two branches. The posterior branch enters acetabulum III and reaches trachea 3 ; the anterior branch continues under pedotectum II and reaches the sejugal trachea. It is evident that these complicated structures serve as an air reservoir during high tide (I recall that species of the genus *Fortuynia* live in the intertidal zone). It is probable that during

immersion the air in the sejugal canal is connected with the air in the circum-gastric tube under the notogastral tectum (cf. figs. 3a-f).

Gnathosoma. — The infracapitulum has the usual ventral hairs (*h*, *m*, and *a*) which are rather long and of ordinary shape. There is a labiogenal articulation that reaches to the base of the palp, and consequently belongs to the diarthry type. The rutellum is broad and dark; the inner lobes cover each other (fig. 2b).

A dorsal view of the infracapitulum is represented in fig. 2c; the labrum (*L S*) is distinct, just as the capitular apodema (*Ap. C*). The labrum is attached to the dorsal surface of the infracapitulum, to which the name cervix (cf. VAN DER HAMMEN, 1961, p. 177) could be applied; this dorsal piece is nearly not sclerotized and ill-defined, whilst cheliceral grooves are not visible.

Palp. — The palp (fig. 6c) has the normal formula 0 — 2 — 1 — 3 — 9. There is no double horn: the solenidion ω of the tarsus is free. The eupathidia (*acm*, (*ul*), and *sul*) are relatively large; *sul* is slightly curved; of the two eupathidia (*ul*), the antiaxial one, *i.e.* *ul''*, is closest to *sul*.

Legs. — I have observed a distinct secondary sexual difference in the fourth leg, which relates to the shape of the tibia, and to some hairs of genu, tibia, and tarsus. In tibia IV of the male the basal part is distinctly shorter than in the female, whilst it is narrow and suddenly broadens at the paraxial side, near *v''* (fig. 5d). In lateral views this sudden broadening looks like a ridge (fig. 5c, e). The hairs which appear to be differently shaped in the male are the following: *l'* of the genu IV, *l'*, *v''*, *v'* of tibia IV, and *pv'* of tarsus IV; they are large and sickle-shaped, with the exception of *v''* of the tibia, which is only larger than in the female.

Leg I is represented in fig. 1a, femur II in fig. 1b, parts of the male leg IV in figs. 1c-e, and the terminal part of the female leg IV in fig. 1f; the hairs are indicated in the usual way. The femora have two porose areas; in the anterior legs, I stated that one porose area is antiaxial and ventral, whilst the other is paraxial and extends to the dorsal surface.

I prepared the following formulae for the hairs of the legs: I (1 — 4 — 2 — 3 — 18 — 1), II (1 — 4 — 2 — 3 — 15 — 1), III (2 — 3 — 2 — 3 — 15 — 1), IV (1 — 2 — 2 — 3 — 13 — 1); and the following for the solenidions: I (1 — 2 — 2), II (1 — 1 — 2), III (1 — 1 — 0), IV (0 — 1 — 0). The solenidions are free, not coupled with a dorsal hair. The hair *bv''* of femur I is weakly developed; it is much stronger in femur II. The proral hairs (*p*) of tarsus I are the only eupathidia of the legs. Tarsus IV has no lateral hairs (*it*). The large claw has a thin inner border, especially in leg I, as drawn in fig. 1a.

Diagnostic characters. — The species differs from *F. marina* by the smaller total length, the shorter lamellar ridges, the absence of an inner ridge *ci*, the shape of the sensillus, the much longer posterior notogastral hairs, the absence of an alveolus of *c*₃, the lateral position of *ps*₁, the position of *ad*₂ in front of *iad*, and the relatively smaller lateral tube.

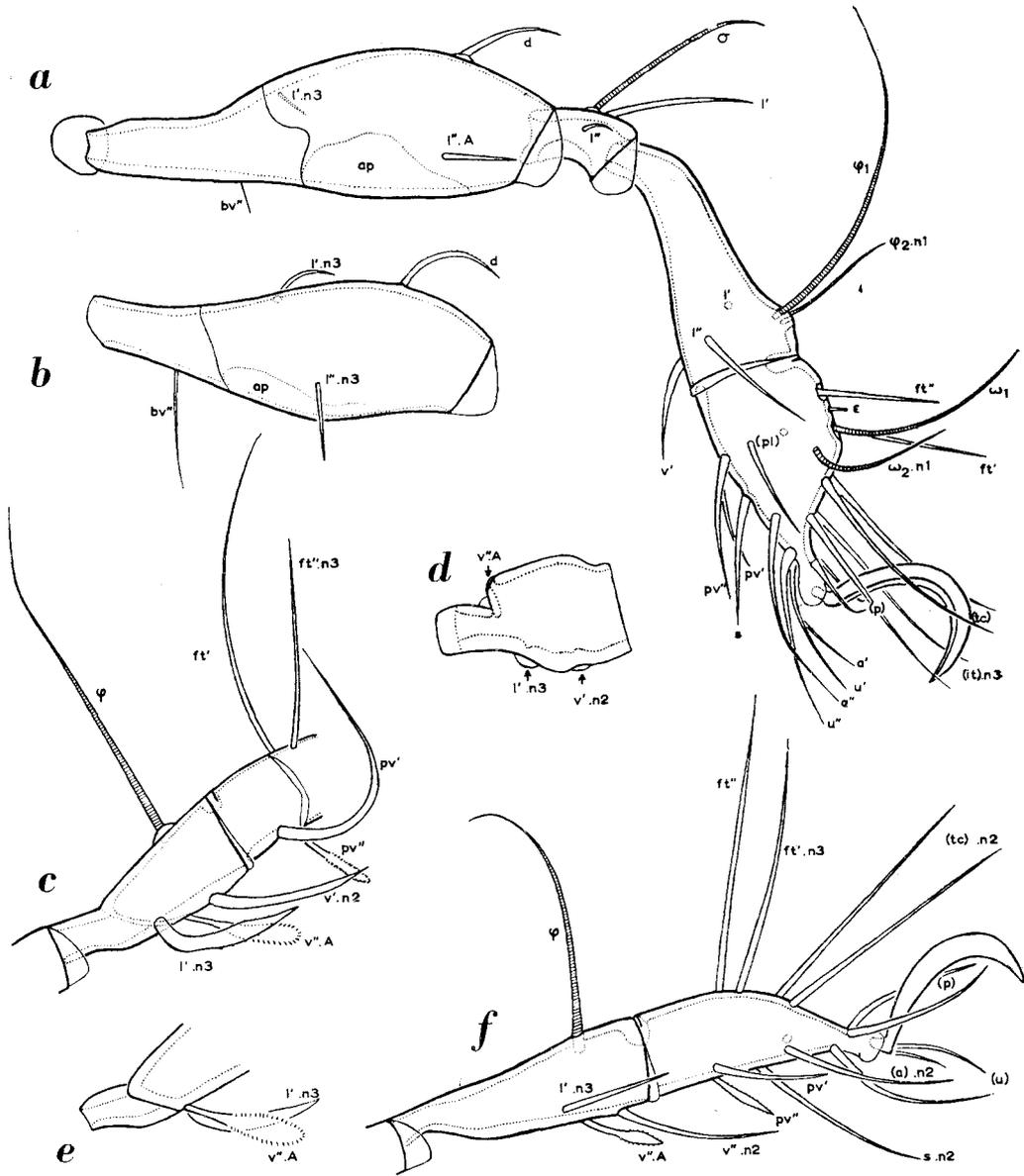


FIG. 5. — *Fortuynia yunkerii* nov. spec. ; a, lateral (antiaxial) view of a right leg I of the female ; b, *idem*, femur II ; c, lateral (antiaxial) view of the tibia and part of the tarsus of a left leg IV of the male ; d, ventral view of a right tibia IV of the male ; e, lateral (paraxial) view of part of a right tibia IV of the male ; f, lateral (antiaxial) view of tibia, tarsus, and apotela IV of the female ; a-f, $\times 445$.

DESCRIPTION OF LARVA AND NYMPHAE.

Measurements. — The lengths of one specimen of respectively larva, protonymph, deutonymph, and tritonymph are : 0.240, 0.275, 0.345, 0.450 mm.

Habitus and colour. — The nymphs are represented in figs. 6a and 7 ; in my single larva the central notogastral region is damaged, so that it could not be figured. The juvenile stases belong to the plicate type. The folds are, however, less numerous than in related groups, such as the Achipteriidae, etc. ; they are mainly present in the lateral (fig. 6a) and ventral (fig. 7b-d) regions. A distinct dorsal area, containing the hairs *da*, *la*, *dm*, *lm*, *dφ*, and *lφ*, is, however, smooth.

The colour is brown, the paraproctal lips are hardly different ; the large folds and the narrow border of the genital slit are distinctly darker. The genu and the greater part of the femur of the legs are darker than the other segments.

Cerotegument. — There is a continuous layer of colourless cerotegument, for the greater part thin, but slightly thicker in the lateral region.

Cuticle. — The cuticle is soft and thin. As mentioned above, an important dorsal part of the notogastral region is smooth ; this area does, however, not stain with Unna's polychrome blue, but because the lateral border (cf. fig. 6a) is rather distinct, I think that it represents a transition to a dorsal sclerite. The micro-sculpture of this dorsal area consists of small pits.

Genital sclerites are absent or anyhow indistinct ; the paraproctal lips are not distinctly bordered in the posterior part ; there is no distinct prodorsal sclerite and there are no porose areas.

Prodorsum. — The prodorsal region is posteriorly bordered by a "dorso-sejugal" fold. Other folds are present between the bothridia, anteriorly of the lamellar hairs, and in the lateral region. A pair of lamellar ridges run from the bothridia to the front, curve inwards, and slightly surpass the lamellar hairs. In the larva the lamellar ridges are connected between the lamellar hairs ; posteriorly they nearly reach the dorso-sejugal fold.

The bothridium is simple, the sensillus club-shaped with nearly circular head. The rostral hairs are rather long, the lamellar hairs shorter ; a vestige of the inter-lamellar hair is present in the fold between the bothridia.

Notogastral region. — The notogastral region has only few folds. Anteriorly it is bordered by the "dorso-sejugal" fold. There is further a fold behind the hairs of the *c* row, which is more or less connected with lateral folds that continue ventrally ; there are several other lateral folds and a fold posteriorly of *dφ*. There is also a large fold posteriorly of the paraproctal lips. As mentioned above, the central dorsal area is smooth.

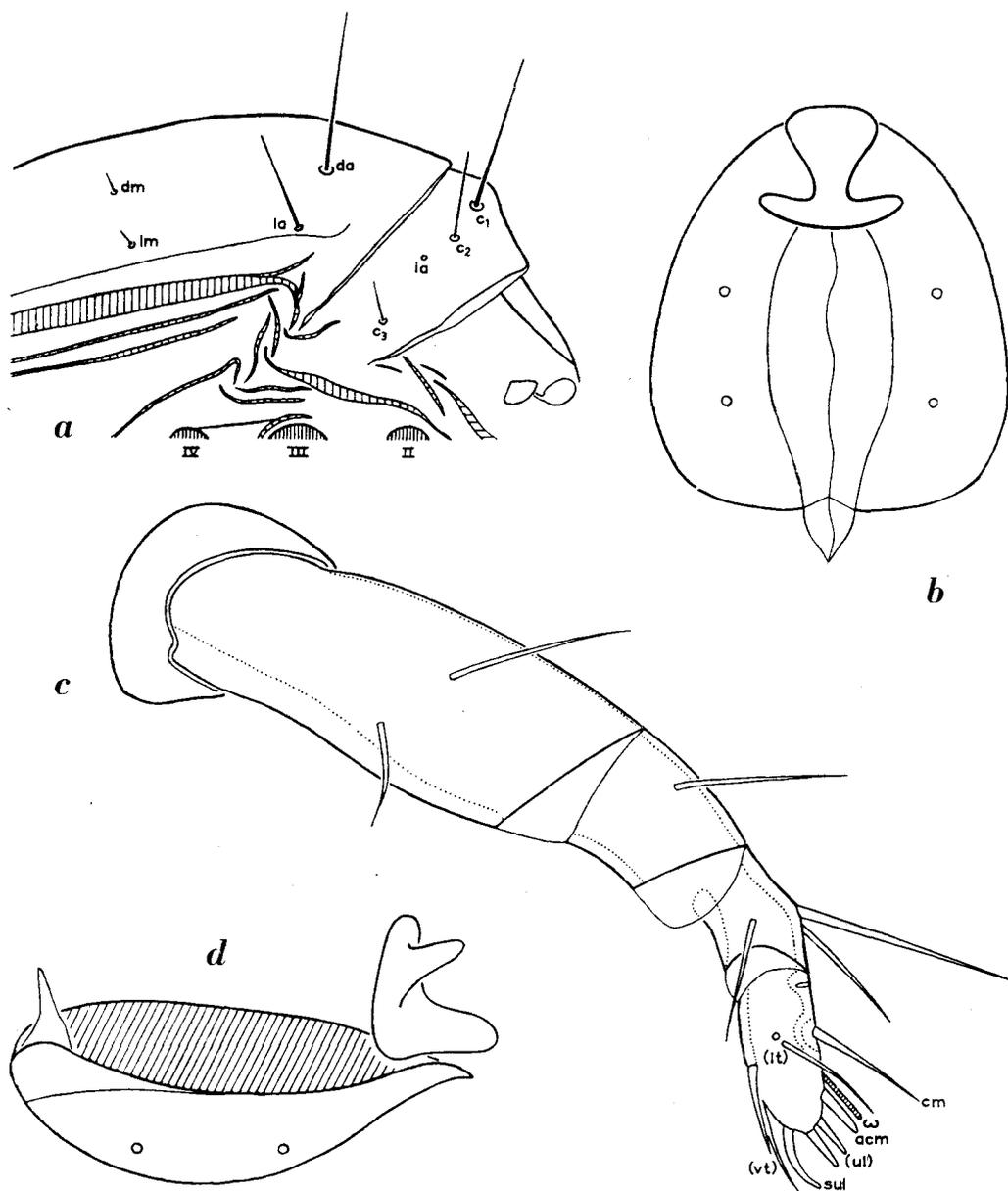


FIG. 6. — *Fortuynia yunkerii* nov. spec. *b-d*, ♀; *a*, lateral view of part of a protonymph, $\times 400$; *b*, anal shields seen from the inside in order to show the two locking-pieces, $\times 530$; *c*, lateral (antiaxial) view of the right palp, $\times 1375$; *d*, lateral view of the anal shields and locking-pieces after separation from the reste of the idiosoma, $\times 530$.

The nymphs are unidificent : there are 30 notogastral hairs. In the larva ps_1 , ps_2 , and ps_3 are lacking, whilst h_3 is a vestige, so that the number is here 22. The notogastral hairs are of simple shape ; c_1 , da , and h_2 are long, strikingly longer than the remaining hairs. In all nymphal stases ps_1 has a rather lateral position (not under h_1).

The cupules and the opening of the latero-abdominal gland are difficult to observe because of the folds in the lateral and posterior part of the notogastral region ; ia (situated between c_2 and c_3) is, however, easily visible.

Anal and adanal region. — The paraproctal lips are hardly darker than the surrounding cuticle ; the posterior border is indistinct. The lips bear no hairs in larva, protonymph, and deutonymph, so that there is a paraproctal atrichosy at 3 levels. The anal and adanal region in the 3 nymphal stases are represented in fig. 7*b-d*. The cupule iad is easily visible ; it is of deutonymphal origin.

Genital and aggenital region. — The genital lips are not bordered laterally ; the posterior border is indistinct. As usual, there are 1 — 2 — 3 pairs of genital papillae in proto-, deuto-, and tritonymph respectively ; it is probable that the large papilla of protonymphal origin remains the largest and is the posterior one in deutonymph and tritonymph. The formula of the development of the genital hairs from protonymph to adult is 1 — 2 — 4 — 5. A comparison of the figs. 7*b-d*, and 1*b*, in which the hairs are indicated by the numbers 1 — 5, gives some evidence that *gen* 1 is of protonymphal, *gen* 2 of deutonymphal, *gen* 3, 4 of tritonymphal, and *gen* 5 of adult origin ; the anterior hair 4 of the tritonymph and 4 and 5 of the adult have a marginal position.

The aggenital formula (from protonymph to adult) is 0 — 1 — 1 — 1.

Coxisternal region. — The ventral region of the podosoma shows a large “sejugal” fold (which is in reality a furrow bordered by two folds), a large fold just in front of the genital opening, and smaller incomplete separations between epimeres 1 and 2, and 3 and 4. The formulae of the hairs of the epimeres in larva and nymphae are : larva (2 — 1 — 2), protonymph (3 — 1 — 2 — 1), deutonymph (3 — 1 — 2 — 2), tritonymph (3 — 1 — 3 — 2).

Legs. — The formulae of the hairs at the 5 stases (or at the 4 stases in leg IV) are the following.

Trochanter : I and II (0 — 0 — 0 — 0 — 1) ; III (0 — 0 — 1 — 1 — 2) ; IV (0 — 1 — 1 — 1).

Femur : I (2 — 2 — 2 — 3 — 4) ; II (2 — 2 — 3 — 4 — 4) ; III (2 — 2 — 2 — 3 — 3) ; IV (0 — 2 — 2 — 2).

Genu : I and II (2 — 2 — 2 — 2 — 2) ; III (1 — 1 — 1 — 1 — 1) ; IV (0 — 2 — 2 — 2).

Tibia : I (3 — 3 — 3 — 3 — 3) ; II (2 — 2 — 2 — 2 — 3) ; III (1 — 1 — 1 — 2 — 3) ; IV (0 — 1 — 2 — 3).

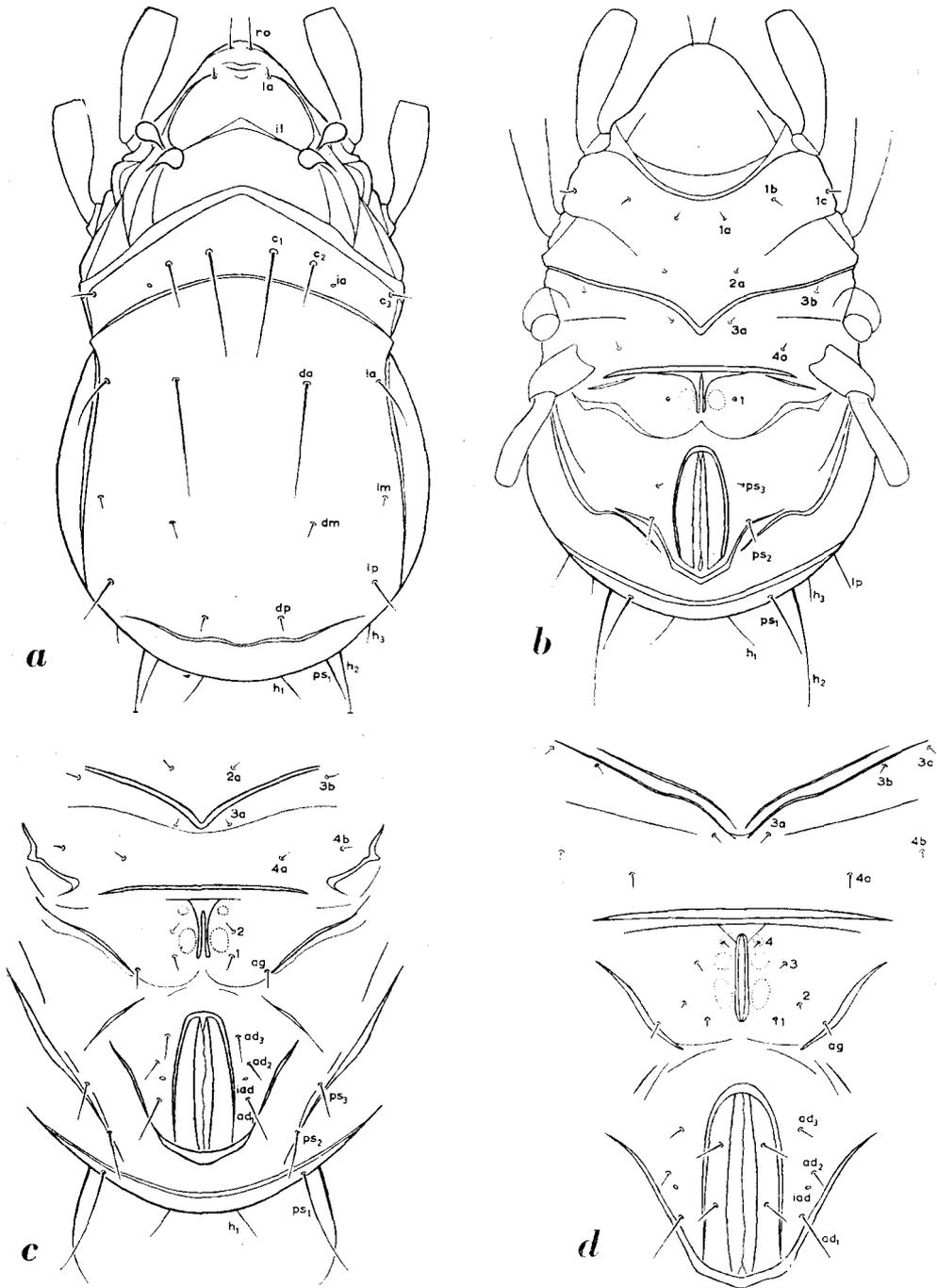


FIG. 7. — *Fortuynia yunkerii* nov. spec.; a, dorsal view of protonymph; b, ventral view of the same protonymph (less flattened); c, posterior ventral part of deutonymph; d, ano-genital region of tritonymph; a-d, $\times 320$.

Tarsus : I (16 — 16 — 16 — 18 — 18) ; II and III (13 — 13 — 13 — 15 — 15) ; IV (7 — 12 — 13 — 13).

The formulae for the solenidions are the following.

Genu : I, II and III (1 — 1 — 1 — 1 — 1) ; IV (0 — 0 — 0 — 0).

Tibia : I (1 — 1 — 2 — 2 — 2) ; II and III (1 — 1 — 1 — 1 — 1) ; IV (0 — 1 — 1 — 1).

Tarsus : I (1 — 2 — 2 — 2 — 2) ; II (1 — 1 — 2 — 2 — 2) ; III (0 — 0 — 0 — 0 — 0) ; IV (0 — 0 — 0 — 0).

SYSTEMATIC POSITION.

As mentioned by me in 1960, the genus *Fortuynia* is related to the Ameronothridae and the Podacaridae ; it was classified at that moment with the last-mentioned family. Because the development and several interesting structures are now thoroughly studied, I prefer to review, however, the systematic position of the genus between the two families.

It appears that *Fortuynia* is related to the Ameronothridae by the thin, easily deformable cuticle, by the presence of a light spot in the anterior part of the notogaster, by the free solenidion of the tarsus of the palp, and by the occurrence in the intertidal zone.

The genus is related to the Podacaridae by the bifid notogaster, the shape of the large dark prae-anal organ, the presence of pedotecta I and II, the presence of porose areas on the legs, the free solenidion of genu and tibia of the legs, and the absence of the hairs (*it*) IV.

Nevertheless, the genus has a number of special characters that justify the creation of a new family Fortuyniidae with the following diagnostic characters.

Fortuyniidae nov. fam. — Cerotegument colourless. Notogaster with remarkable lateral and posterior tectum. Special lateral structure with air reservoirs. Interesting secondary sexual difference relating to posterior part of hysterosoma and leg IV. Genital formula : 1 — 2 — 4 — 5. Formula of epimeres III and IV : 3 — 2. The infracapitulum belongs to the diarthry type with complete labio-genal articulation. Nymphs with a relatively large, smooth centro-dorsal area.

BALOGH (1961, pp. 247, 303) created a superfamily Ameronothroidea without giving a diagnosis. In this superfamily he united Ameronothridae, Podacaridae, Cymbaeremaeidae, and Micreremidae. Because detailed descriptions of representatives of Cymbaeremaeidae and Micreremidae (with reference to all stases) are still badly wanted for a definite classification of these families, I prefer to restrict the superfamily here to Ameronothridae, Fortuyniidae, and Podacaridae. This results in the following diagnosis of the Ameronothroidea.

Ameronothroidea. — Nymphs plicate and unidificent. Cuticle softer than in other groups of higher Oribatid mites. Interlamellar hairs lacking or weakly

developed¹. No genal incision. Notogaster of the adult with 28 or 30 hairs, and without porose areas. Genital formula (1 — 3 — 5 — 6) or (1 — 2 — 4 — 5). Atrichosy at 3 levels. Marine or terrestrial, but as a rule not far from the sea.

The superfamily forms part of the group of Oribatid mites with plicate nymphs (cf. GRANDJEAN, 1954, p. 445 ; 1958, p. 138). I remark that BALOGH (1961) artificially separates the families of this group in distributing them over his two main divisions of the higher Oribatid mites ; some families are moreover classified with superfamilies to which they are apparently not related (the Tectocephidae must be removed from the Carabodoidea ; the Achipteriidae and the Tegoribatidae from the Oribatelloidea). It will be important to make further detailed studies of structure and development of various species of the group in order to arrive at a satisfactory classification.

REFERENCES

- BALOGH (J.), 1961. — Identification keys of world Oribatid (Acari) families and genera. *Act. Zool. Ac. Sci. Hung.*, vol. 7 (3-4), pp. 243-344.
- BERLESE (A.), 1916. — Centuria prima di Acari nuovi. *Redia*, vol. 12, pp. 19-67.
- DALENIUS (P.) & WILSON (O.), 1958. — On the soil fauna of the Antarctic and the Sub-Antarctic Islands. The Oribatidae (Acari). *Ark. Zool.*, vol. 11 (5-6), pp. 393-425.
- GRANDJEAN (F.), 1954. — Essai de classification des Oribates (Acariens). *Bull. Soc. Zool. France*, vol. 78 (5-6), pp. 421-446.
- 1958. — *Charassobates cavernosus* Grandj. 1929 (Acarien, Oribate). *Mém. Mus. Nat. Hist. Nat. (N. S.)*, Sér. A., Zool., vol. 16 (4), pp. 121-140.
- HAMMEN (L. VAN DER), 1960. — *Fortuynia marina* nov. gen., nov. spec., an Oribatid mite from the intertidal zone in Netherlands New Guinea. *Zool. Med.*, vol. 37 (1), pp. 1-9.
- 1961. — Description of *Holothyryus grandjeani* nov. spec., and notes on the classification of the mites. *Nova Guinea (N. S.)*, vol. 10, *Zoology*, no. 9, pp. 173-194.
- HAMMER (M.), 1955. — Alaskan Oribatids. *Acta Arctica*, fasc. 7, pp. 1-36.
- WOMERSLEY (H.), 1961. — New species of Acarina from the intertidal zone in Netherlands New Guinea. *Zool. Med.*, vol. 37 (12), pp. 189-209.

1. DALENIUS (in DALENIUS & WILSON, 1958) created two genera (*Pertorgunia* and *Anareia*) which are probably related to the Ameronothridae, but present distinct lamellar hairs. Differential characters between the two genera are not mentioned ; type species are designated by BALOGH (1961).

Other genera with distinct lamellar hairs that must be reinvestigated are *Halozetes* Berlese (1916) and *Alaskozetes* Hammer (1955). *Pertorgunia* is apparently closely related to *Alaskozetes*. It is possible that these genera can be classified in a new family of the Ameronothroidea.
