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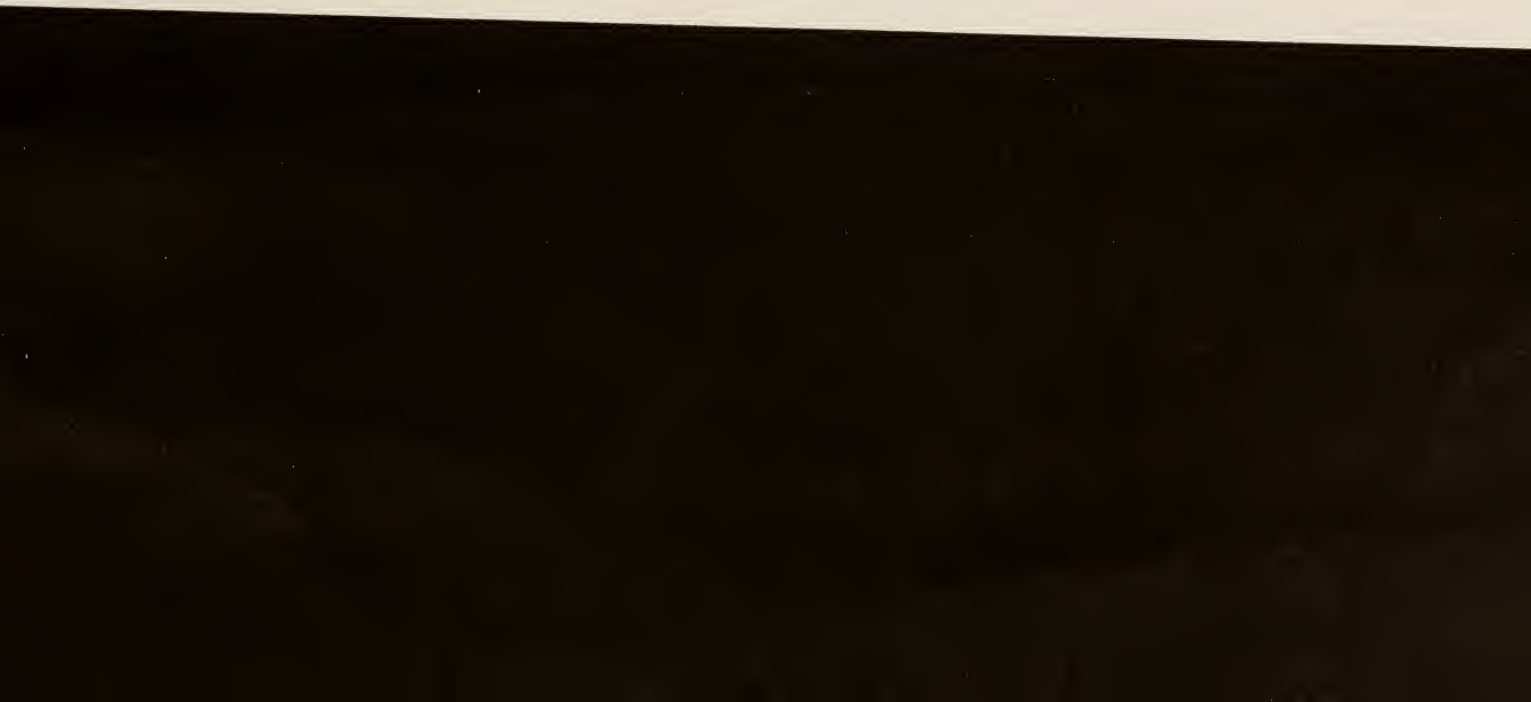

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SOUTH AFRICAN ASCIDIANS

By

CLAUDE MONNIOT, FRANÇOISE MONNIOT
CHARLES L. GRIFFITHS
&
MICHAEL SCHLEYER

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Fig. 1. A. *Aplidium flavolineatum*, showing both red and grey colour forms. Red form photographed at 8 m depth in False Bay, grey form in intertidal rock pool, Isipingo. B. *Aplidium mernooensis*, Sodwana Bay, 28 m. C. *Aplidium tubiferus* sp. nov., Sodwana Bay, 21 m. D. *Polyclinum isipengense*, intertidal rock pool, Isipingo. E. *Pseudodistoma africanum*, showing both orange-red and white morphs, Sodwana Bay, 24–34 m. F. *Pseudodistoma delicatum* sp. nov., Sodwana Bay, 24 m. G. *Riterella solida* sp. nov. Oudekraal, Cape Peninsula, 10 m. H. *Eutherdmania divida* sp. nov., intertidal rock pool, Isipingo. I. *Eudistoma illotum*, intertidal rock pool, False Bay.

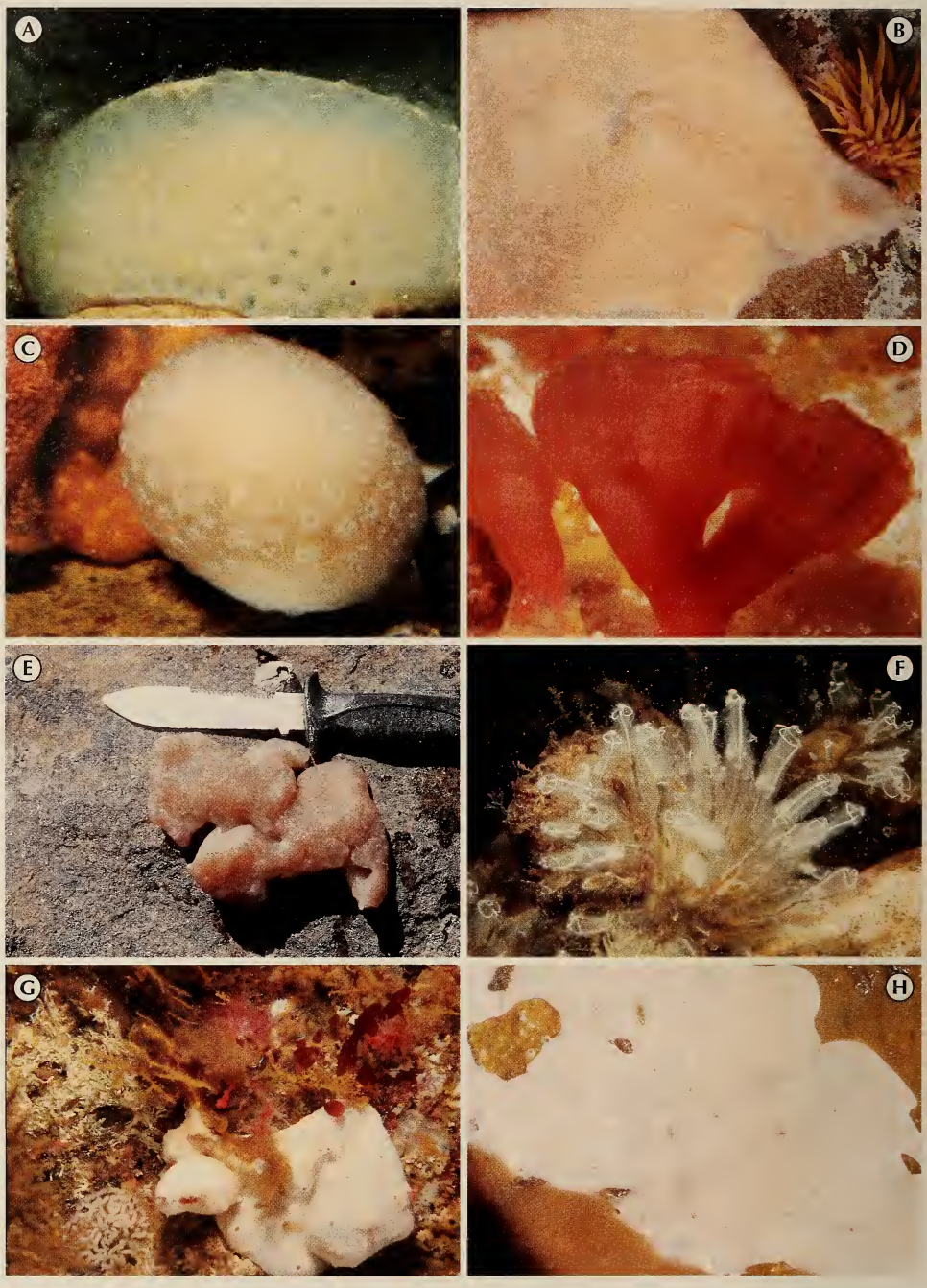

Fig. 2. A. *Polyclitor africanus*, Durban outer anchorage. B. *Cystodytes dellechiajei*, under rock on intertidal pool, False Bay. C. *Distaplia skoogi*, Miller's Point, False Bay, 15 m. D. *Sycozoa arborescens*, intertidal cave in Old Harbour, Hermanus. E. *Sigillina digitata*, in rock pool, False Bay. F. *Clavelina lepadiformis*, Knysna Estuary, growing on jetty. G. *Trididemnum cerebriforme*, Oudekraal, Cape Peninsula, 0–15 m. H. *Didemnum globiferum* sp. nov., Kommetjie, Cape Peninsula, intertidal.

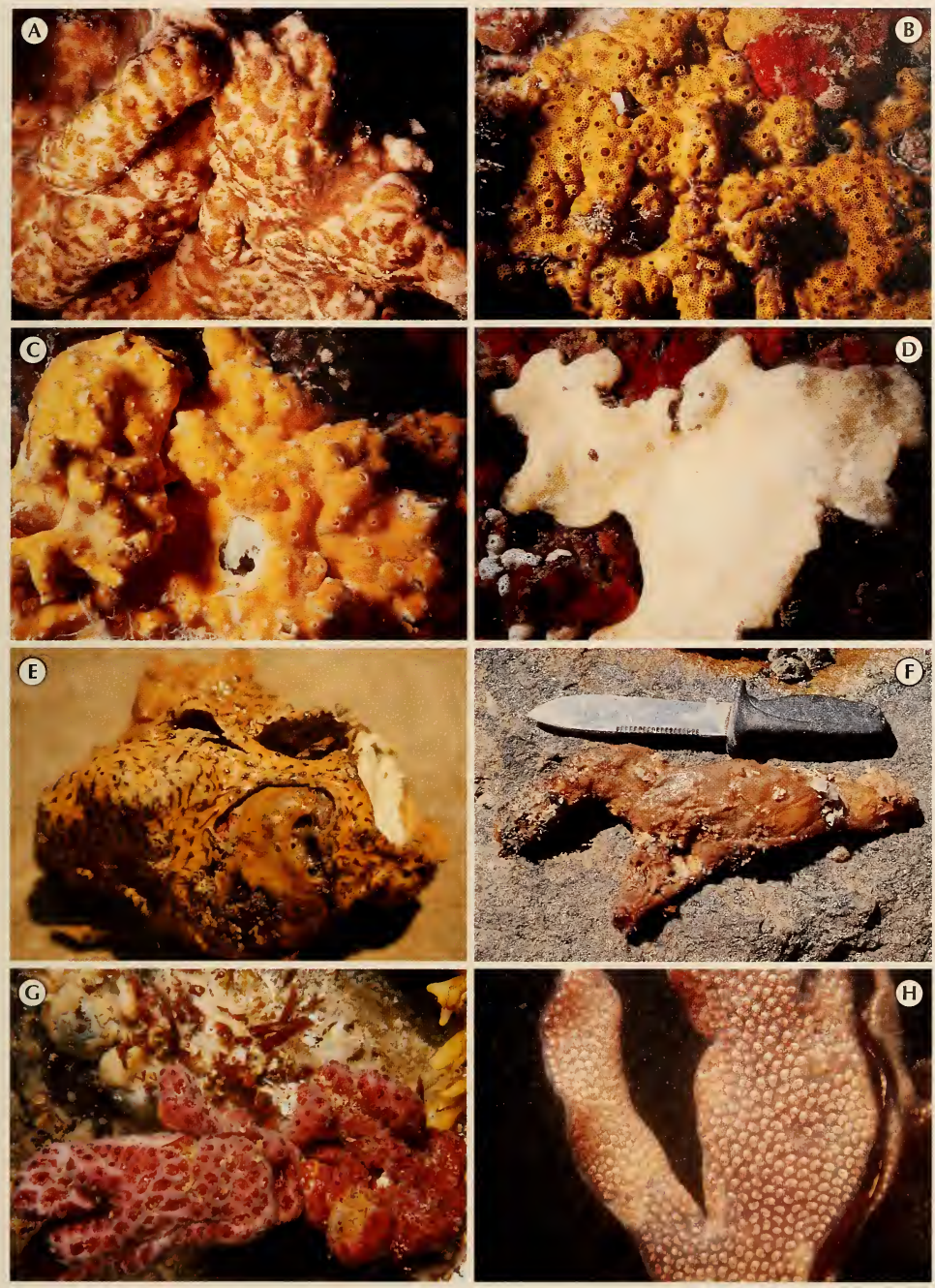

Fig. 3. A. *Didemnum leopardi* sp. nov., Sodwana Bay, 14–15 m. B. *Didemnum obscurum*, Sodwana Bay, 15 m. C. *Didemnum rodriguesi*, Sodwana Bay, intertidal to 22 m. D. *Polysyncraton aspiculatum*, Sodwana Bay, 14–15 m. E. *Polysyncratom millepore*, Sodwana Bay, 8–12 m. F. *Ascidia caudata*, False Bay, low intertidal. G. *Botryllus closionis* sp. nov., Sea Point, Cape Town, in low intertidal pool. H. *Botryllus elegans*, growing on fronds of *Epymenia obtusa* in intertidal rock pool, Sea Point, Cape Town.

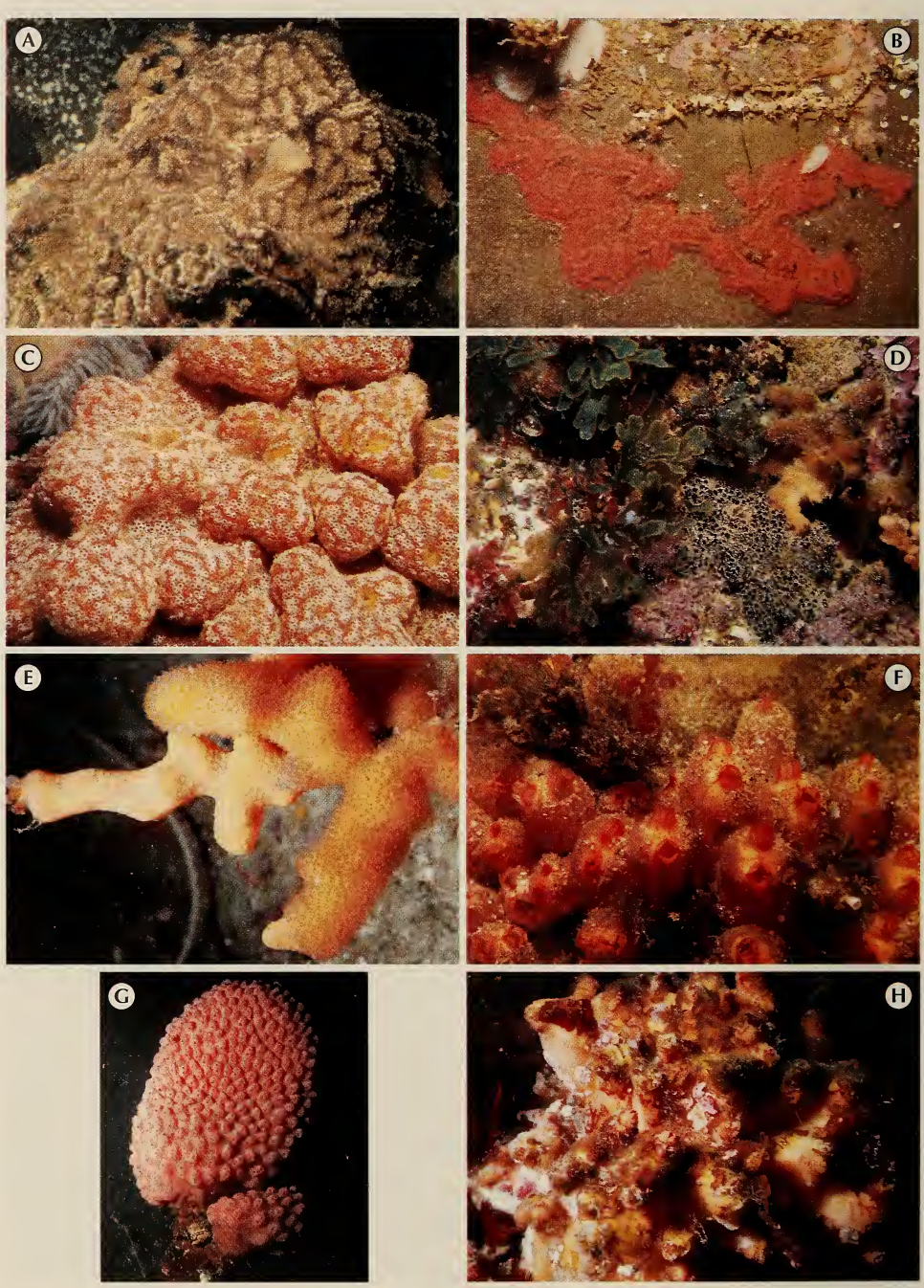

Fig. 4. A. *Botryllus gragalis*, under jetty, Saldanha Bay. B. *Botryllus meandrius*, under intertidal boulder, Sea Point, Cape Town. C. *Botryllus magnicoecus*, Miller's Point, False Bay, 2–10 m, growing on *Pyura stolonifera*. D. *Botryllus mortenseni*, intertidal rock pool, Isipingo. E. *Symplegma bahraini*, Sodwana Bay, 30–33 m. F. *Stolonica multitestis* sp. nov., intertidal rock pools, Isipingo. G. *Gynandrocarpa placenta*, Oudekraal, Cape Peninsula, 6 m. H. *Polycarpa insulsa*, in rock pools, Isipingo.

SOUTH AFRICAN ASCIDIANS

By

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(With 60 figs)

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ABSTRACT

Tunicates are described from the shallow waters of South Africa from Saldanha Bay to Sodwana Bay, and include 22 new species. A list of ascidians previously recorded from this area is also presented with relevant comments. The new material represents only part of the fauna as few stations were investigated and many specimens could not be identified as they were single, immature or without larvae. A transition was found between the tropical KwaZulu-Natal area and the Eastern and Western Cape provinces, but no significant differences were noted between the western (Atlantic Ocean) and eastern (Indian Ocean) sides of the Cape. Cosmopolitan fouling species inhabit harbours.

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Ann. S. Afr. Mus. **108** (1), 2001: 1–141, 60 figs.

INTRODUCTION

Among the 82 species collected and described in this study, 22 are new to science. The order Aplousobranchia is dominant with 44 species, the order Phlebobranchia is represented by only eight species, and the order Stolidobranchia by 30 species. It is likely that these numbers greatly under-represent the ascidian fauna of South Africa, even when the 63 species previously described are included. Among the species recently collected, several were not mature and cannot be identified, but they do not belong with certainty to any already known taxa. Several species were collected by chance, hidden between other closely packed ascidians, often covered with sand.

Many of the newly collected ascidians represent new species, whereas previously described forms have not been found again. This can be easily explained. Both collections, recent and past, do not represent a systematic inventory of the South African fauna but were the result of occasional collections undertaken at distantly spaced stations. The ascidians described here were collected on hard substrata, either at low tide or by SCUBA diving. All previously described species were collected by dredging, often on soft bottoms, sometimes in deep water at 200–400 m on the Agulhas Bank far from the shore. Their collection was incidental to larger investigations undertaken during famous oceanographic expeditions, such as the *Valdivia*, *Challenger*, *Siboga* or *Deutsche Tiefsee* expeditions. Apart from this, the ascidians have never been the subject of a local study. Many of the species already described came from more northern locations along the African or Madagascan coasts, or from the southern or western parts of Australia, and very few from the Antarctic.

With such a miscellany of data, it is not possible to draw conclusions about the geographic distribution, or endemism rate of South African ascidians. Nevertheless, a boundary appears to exist between the warmer waters of the Indian Ocean and the Eastern and Western Cape provinces region, where tropical species have not been recorded. The opposite is less evident, and southern species have been encountered in KwaZulu-Natal and farther north, in Mozambique and Tanzania. Some species are common to the Atlantic and Pacific oceans. These are fouling species mainly encountered in harbours. Among them are *Cystodytes dellechiajei*, *Clavelina lepadiformis*, *Didemnum psammathodes*, *Diplosoma listerianum*, *Ciona intestinalis*, *Ascidiella aspersa*, *Botryllus schlosseri*, *Microcosmus squamiger*, *Styela canopus*, *Cnemidocarpa humilis*.

The algal bearing didemnids common to the Indo-Pacific region—*Didemnum molle*, *Lissoclinum bistratum*, and *Diplosoma virens*—penetrate KwaZulu-Natal.

MATERIAL AND METHODS

The ascidians were fixed and preserved in 4 per cent formalin in sea water. All identifications required dissection after removing the tunic. The organs were stained with hemalum and dehydrated in ethyl and butyl alcohols for mounting on microscope slides in a plastic medium. The China ink drawings were made with a camera lucida. The tunic spicules and spinules were observed with a scanning electron microscope Jeol 800. The type specimens of new species are

registered in the South African Museum. The additional material is stored in the Museum National d'Histoire Naturelle Paris.

SYSTEMATICS

Family **Polyclinidae**

Aplidium circulatum (Hartmeyer, 1912)
Fig. 5

Amaroucium circulatum Hartmeyer, 1912: 349, pl. 39 (fig. 2), pl. 44 (fig. 6). Michaelsen, 1934: 130. Millar, 1955: 171; 1962: 122.

Material

One colony, Miller's Point, False Bay, Cape Peninsula, 8–12 m (Griffiths coll.).

Description

The colony has a hemispheric head on a conical peduncle narrowed at the base. The tunic is encrusted with sand in the peduncle and between the zooid systems. The oral siphons are arranged in circles around common cloacal apertures. The zooids can be easily seen through the pale tunic when the colony heads do not contain too much sand.

The zooids are very long, sometimes more than 15 mm (Fig. 5A). The six oral lobes have a straight margin or a median slit. The cloacal languet may be simple (Fig. 5D), but is more often divided into three unequal lobes (Fig. 5B, C); it originates from the dorsal edge of the siphon. The thorax is long with 11–14 rows of stigmata (Fig. 5B, C). The stomach is almost spherical with 25–28 longitudinal folds on tranverse sections, some of them interrupted (Fig. 5E). An oblique protruding fold is present on the post-stomach (Fig. 5B).

The post-abdomen is very long (Fig. 5A). The ovary is located far from the gut (Fig. 5B), followed by a double row of very numerous testis lobes reaching the heart (Fig. 5A).

Several larvae are brooded in the posterior part of the cloacal cavity (Fig. 5C). The trunk measures 0.75 mm. The ocellus and otolith are present. The three adhesive papillae are well separated between four odd triangular vesicles (Fig. 5F). In addition there are four round vesicles on each side and some on the dorsal side, and several irregular ones along the ventral line.

Remarks and distribution

These specimens correspond well to Hartmeyer's description and figures, and to the type specimen (ZMB 2769) from St Francis Bay, South Africa, but his colony was not mature. They also agree with Millar's (1955) sample from False Bay.

In 1962 Millar, following Michaelsen (1920*b*), hesitated concerning the possible synonymy with *Aplidium erythraeum* (Michaelsen, 1921) a species itself a synonym of *A. flavolineatum* (Sluiter, 1898*a*).

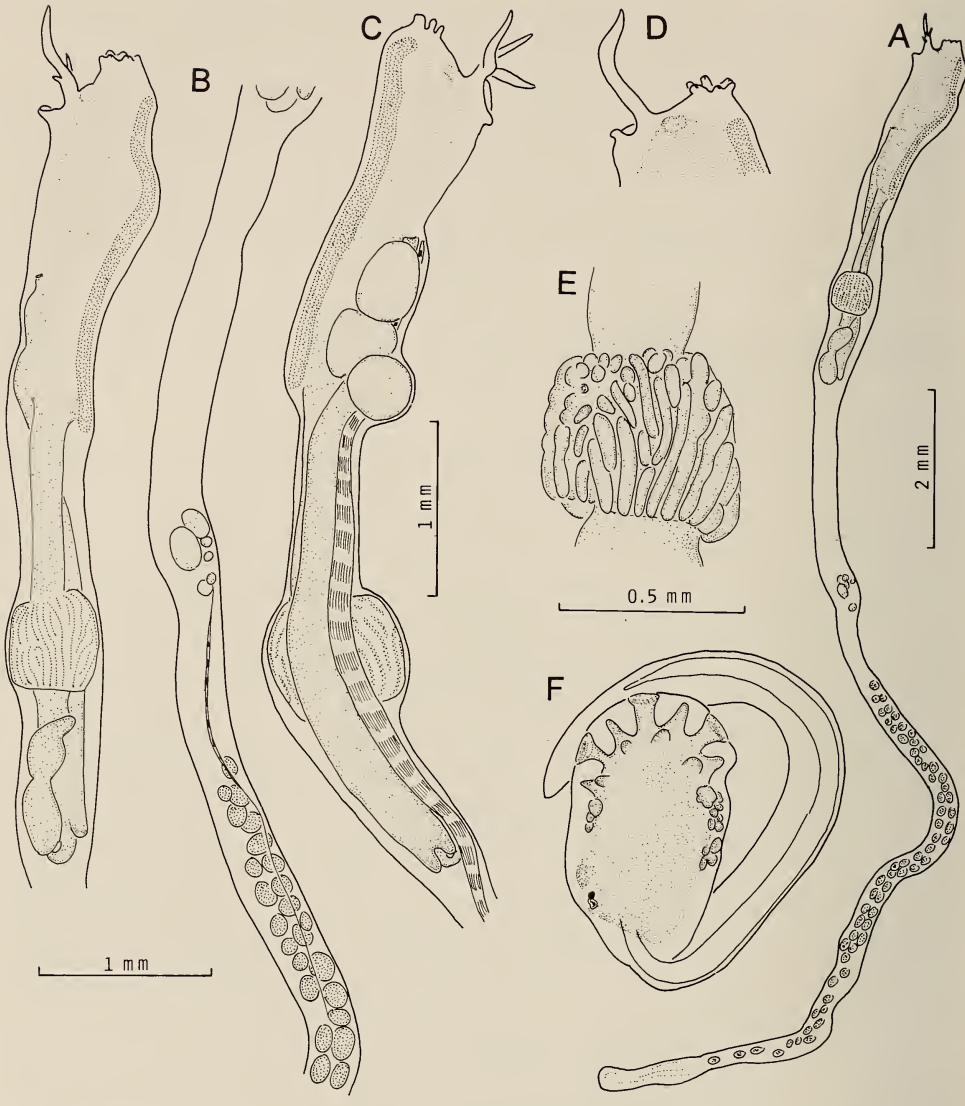

Fig. 5. *Aplidium circulatum*. A. Entire zooid. B. Thorax, abdomen and anterior part of the post-abdomen. C. Thorax and abdomen of a brooding zooid. D. Siphons of another zooid. E. Detail of the stomach. F. Larva.

Aplidium circulatum and *A. flavolineatum* are indeed very closely allied. They have in common circular systems, the same tunic consistency and shape of the zooids, the cloacal siphon in a short tube, and an average of 12 rows of stigmata. The differences are that *A. circulatum* has pedunculate colonies and different larvae of a larger size and with fewer anterior vesicles.

We have also not found in this species the dark pigment cells found in the zooid tissues of *A. flavolineatum*.

Aplidium crustatum F. Monniot sp. nov.

Fig. 6

Material

Holotype. SAM-A25841, Saldanha Bay (33°03'S 18°02'E), 1-2 m, collected by C. and F. Monniot, 8 February 1996.

Other material. Several colonies, Miller's Point (Cape Peninsula) and Saldanha Bay; intertidal (Monniot coll.).

Description

Colonies densely impregnated with sand to form irregular pads, about 10 mm thick, encrusting rocks at the interface with sand in the bottom of pools, or deeply embedded in rocky crevices. Their general consistency is hard and the

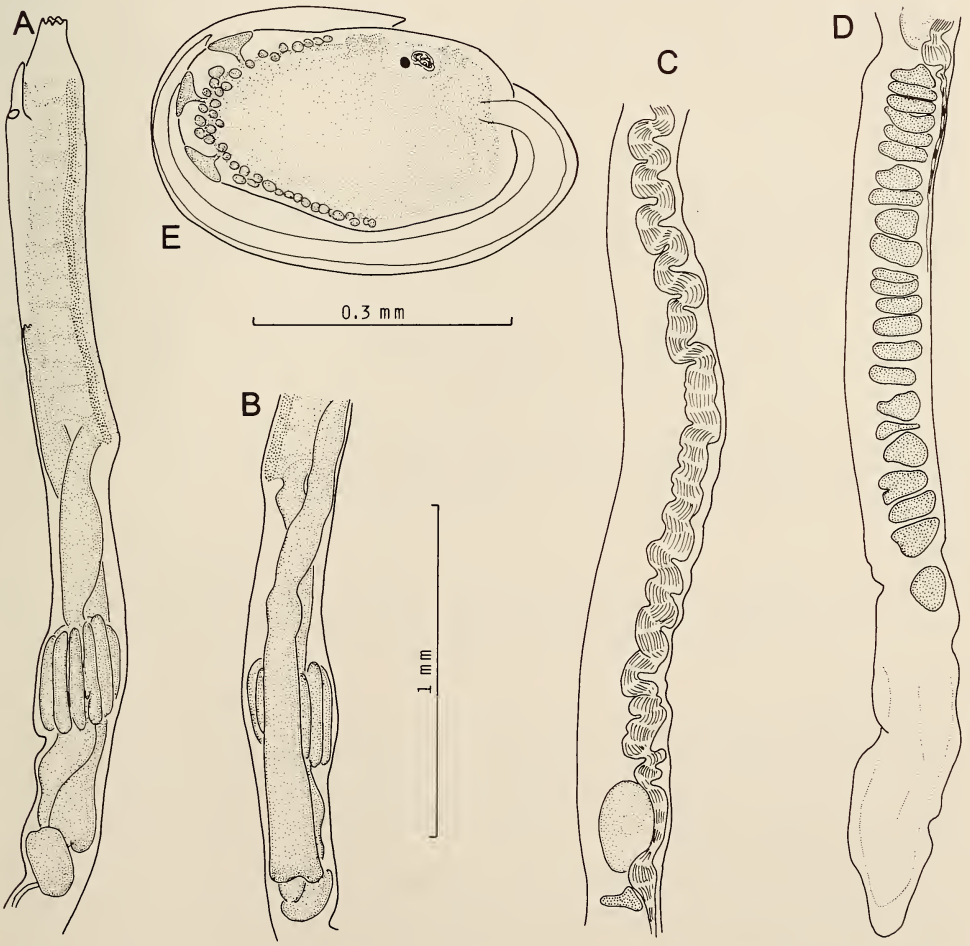

Fig. 6. *Aplidium crustatum* sp. nov. A. Thorax and abdomen. B. Other side of the same abdomen. C-D. Anterior and posterior part of the post-abdomen. E. Larva.

zooid openings cannot be seen among the sand grains. The colonies are tightly attached to the substratum and cannot be torn off without damage. Some colonies contain amphipods.

The zooids are particularly thin and elongated, with the post-abdomens crossing each other in all directions. The oral siphon is short and narrow with six pointed lobes (Fig. 6A). The cloacal siphon opens through a simple hole or short tube and is located in front of the first row of stigmata. Its dorsal edge is prolonged into a simple, stout, pointed languet (Fig. 6A). The thorax is narrow with 12 rows of a small number of stigmata. The abdomen is as long as the thorax and narrow (Fig. 6A, B). The stomach lies at mid-length of the gut loop and its wall has 10–14 folds (Fig. 6A). It is followed by the annular post-stomach. The anus opens at the level of the eighth row of stigmata. The post-abdomen is very long. The ovary is far behind the gut loop (Fig. 6C), at least at a distance equal to the abdomen length. The testicular vesicles are numerous, in a simple row extending from the ovary to the heart (Fig. 6D).

Three larvae mature in the cloacal cavity. They are small with a trunk 0.4 mm long. Their three anterior adhesive papillae are short and well separated with a continuous anterior crescent of small ampullae on each side (Fig. 6E).

Remarks

This species is characterized by colonies that are densely embedded with sand, have no definite shape, and thin zooids about 10 mm long, irregularly arranged, with a single line of testes.

Aplidium flavolineatum (Sluiter, 1898*a*)

Figs 1A, 7

Amaroucium flavolineatum Sluiter, 1898*a*: 30, pl. 1 (fig. 7), pl. 4 (fig. 12).
Aplidium flavolineatum: Millar, 1962: 120, fig. 2 (with synonymy).
non *Aplidium flavolineatum*: Monniot, F., 1987: 522, fig. 9F–I.

Material

Several colonies. From Saldanha Bay to Sodwana Bay, in rock pools and down to 9 m (Griffiths, Schleyer and Monniot coll.).

Description

The colonies form soft, thin, gelatinous crusts or cushions varying in colour: cream, pink, red or sometimes grey. The circular systems are always obvious. Each oral aperture is circled with a white line. Although there is no sand at the colony surface, there are often some sparse particles between the systems inside the colony.

The zooids are very variable in size, increasing with the size of the colony and linked to the length of the post-abdomen. The latter is elongate (Fig. 7A), the largest observed being 30 mm long. The oral siphon is wide with six large petal-like lobes (Fig. 7B). The cloacal siphon is anterior, in a short tube whose dorsal part is elongated as a long and simple languet, rarely with basal teeth

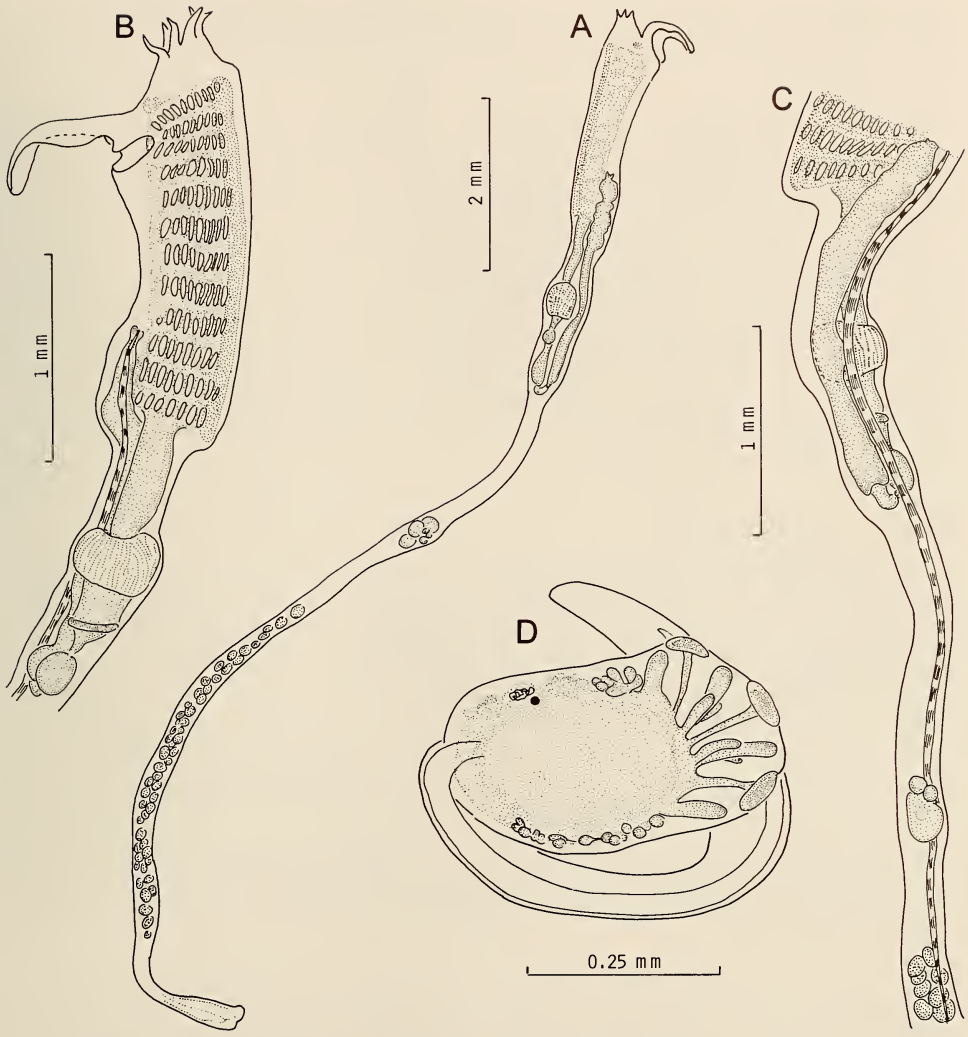

Fig. 7. *Aplidium flavolineatum*. A. Zooid. B. Details of the thorax and abdomen. C. Abdomen and ovary. D. Larva.

(Fig. 7B). Six long tentacles alternate with six smaller ones and a dozen buttons, located on a ring situated very high in the oral siphon. The thoracic muscles are essentially longitudinal with thin, regularly spaced fibres.

All tissues of many colonies contain dark, round pigment cells that may be dense or scarce, accumulated mostly in the thoracic body wall and branchial sinuses. The branchial sac has 10–12 rows of 12–15 stigmata, depending on zooid size (Fig. 7B). The dorsal line is not perforated and the dorsal languets are displaced to the left side in the posterior part of the thorax. The abdomen is approximately as long as the thorax. The oesophagus is long. The stomach is shorter dorsally than ventrally. Its wall has about 30 folds, some of them

interrupted and oblique (Fig. 7B). The post-stomach is annular, followed by an oval mid-intestine. The rectum begins with caeca at the bottom of the gut loop (Fig. 7C) and remains isodiametric when empty until its aperture. The anus has two lobes.

The post-abdomen is extremely long. The ovary is far from the gut and at some distance from the testis (Fig. 7C). The double row of testicular vesicles occupies at least half the length of the post-abdomen, and reaches the heart. In a large zooid we counted more than 100 testicular vesicles (Fig. 7A).

Two or three embryos were maturing in the cloacal cavity, which is distended at their level, but the body wall does not protrude in a pouch. The larvae (Fig. 7D) have an oval trunk 0.5 mm long, an otolith and an ocellus. The three adhesive papillae are distally flattened into discs and have thin, long stems. They alternate with four long digitiform ampullae. There are two pairs of digitiform ampullae on each side of the median adhesive papillae. In addition, there are numerous dorsal and ventral round vesicles (Fig. 7D). The tail is coiled in a three-quarter turn.

Remarks and distribution

Aplidium flavolineatum differs from *A. circulatum* in colony shape, in having more numerous stomach folds, and in larval structure. Nevertheless, the uncertainty of several authors regarding the two species can be easily understood, as the colonies are variable. The synonymy with *Amaroucium erythraeum* after Michaelsen (1921) needs to be verified. The Chesterfield Islands (New Caledonia) specimens previously identified as *A. flavolineatum* by F. Monniot (1987) are very similar, but differ in having a protruding brood pouch. Kott (1992) re-identified the material as different species (*A. multilineatum*, *A. multiplicatum*, *A. gastrolineatum*, and *A. robustum*) specimens she had previously attributed to *A. flavolineatum*. Consequently, the known geographical distribution of *A. flavolineatum* remains limited to South Africa, from Saldanha Bay to Sodwana Bay. It is common intertidally along the whole south coast.

Aplidium haesitans F. Monniot sp. nov.

Fig. 8

Material

Holotype. SAM-A25842, Isipingo, KwaZulu-Natal (30°00'S 30°57'E), in rock pool, collected by C. L. Griffiths, 19 July 1994.

Description

A single colony 5 mm across, covered with sand, was attached to the underside of a colony of *Didemnum granulatum*. The soft tunic is glassy, perfectly transparent and does not contain sand. There is a common central cloacal aperture, but oral openings are not evident. The zooids are parallel with orange-red thoraces in formalin, fading progressively.

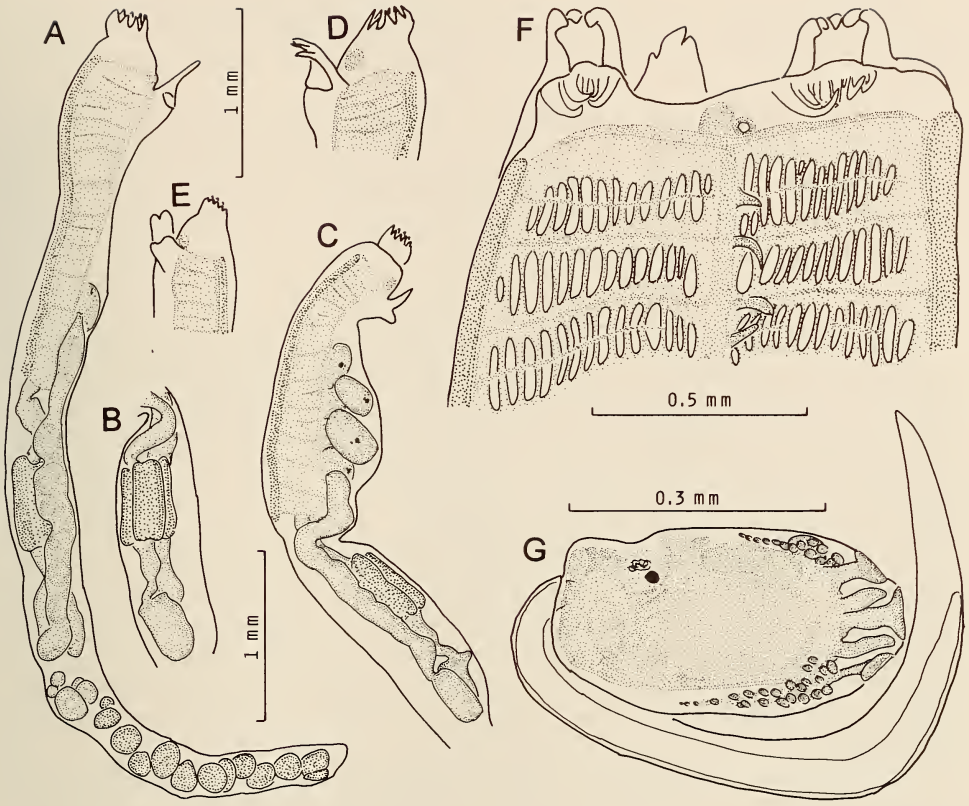

Fig. 8. *Aplidium haesitans* sp. nov. A. Entire zooid. B. Other side of the abdomen. C. Brooding zooid. D. Detail of the siphons. F. Anterior part of the branchial sac. G. Larva.

The zooids are thin and long. The cylindrical oral siphon has eight sharp lobes (Fig. 8D). The cloacal siphon is a narrow tube, its dorsal rim elongated as a stout short languet with a pointed (Fig. 8A), bilobed (Fig. 8E), or trilobed (Fig. 8D) tip. The longitudinal thoracic muscles are thin, number eight per side, and are regularly spaced. Thirty-two oral tentacles of three sizes are crowded against each other in a single ring. The branchial sac has 13 rows of stigmata in the most mature zooids, but fewer in others. Several rows are cut by a parastigmatic vessel (Fig. 8F) and some of them have divided stigmata. The rows of stigmata are interrupted along the dorsal line (Fig. 8F). On the left side, thin dorsal languets arise from the transverse vessels and smaller ones arise from the parastigmatic vessels (Fig. 8F).

The gut loop is as long as the thorax. The stomach is cylindrical with five longitudinal folds (Fig. 8B), followed by a narrow segment enlarged in a ring at middle length. The mid-intestine is wide. The rectum begins with caeca at the bottom of the gut loop. The anus opens far back in the thorax, at the third row of stigmata, above the oesophageal entrance (Fig. 8A).

The post-abdomen is longer in zooids with developed testis, shorter when the ovary has large oocytes. The ovary is anterior, just behind the abdomen (Fig. 8A), followed by a single row of testicular vesicles extending to the body extremity.

Up to nine embryos are incubated in the peribranchial cavity (Fig. 8C). The larval trunk measures 0.4 mm (Fig. 8G). Larvae possess an ocellus, an otolith and three adhesive papillae on long peduncles, separated by two odd, long conical ampullae. Numerous small round vesicles are accumulated dorsally and ventrally.

Remarks

A single colony of such small size with few but mature zooids may be an incompletely developed specimen. Nevertheless it contains many larvae, so the zooids have probably attained their final morphology. We hesitated before including this specimen in the genus *Aplidium* (thus the species name). Eight oral lobes occur in several genera of Polyclinidae and have limited specific diagnostic value. The cloacal siphon in a tube with a languet is also a character common to some species of *Aplidium*, *Ritterella* and *Synoicum*; *Synoicum* has a smooth-walled stomach. The difficulty is to decide, in so small a colony, whether the common cloacal aperture is the opening of a true common cloacal cavity or only a depression into which separate cloacal siphons open, as in some *Ritterella* species. Parastigmatic vessels are more common in the genus *Ritterella* than in *Aplidium*, but in the genus *Aplidium* the number of rows of stigmata is generally higher. The larval structure could correspond to one or the other genus.

The presence of eight oral lobes, 13 or more rows of stigmata with parastigmatic vessels, five stomach folds, and a larva with two odd ampullae between the three adhesive papillae excludes all already described species of *Aplidium* or *Ritterella*. The presence of a small common cloacal aperture persuades us finally to place this new species into the genus *Aplidium*.

Aplidium mernooensis (Brewin, 1956)

Figs 1B, 9

Amaroucium mernooensis Brewin, 1956: 132, fig. 4A.
Aplidium mernooensis: Millar, 1982: 22, fig. 8. Monniot, F., 1987: 528, fig. 11H, K.
Aplidium filiforme Kott, 1992: 542, fig. 75.

Material

Two colonies. Sodwana Bay, KwaZulu-Natal, 14–28 m (Schleyer coll.).

Description

The colonies are densely impregnated with sand and consist of lobed masses of spherical outline. The zooids are located in circular systems around very small central cloacal apertures. The zooid thoraces are red in life but yellow in formalin; the abdomens are colourless in a colourless tunic. Some lobes of the

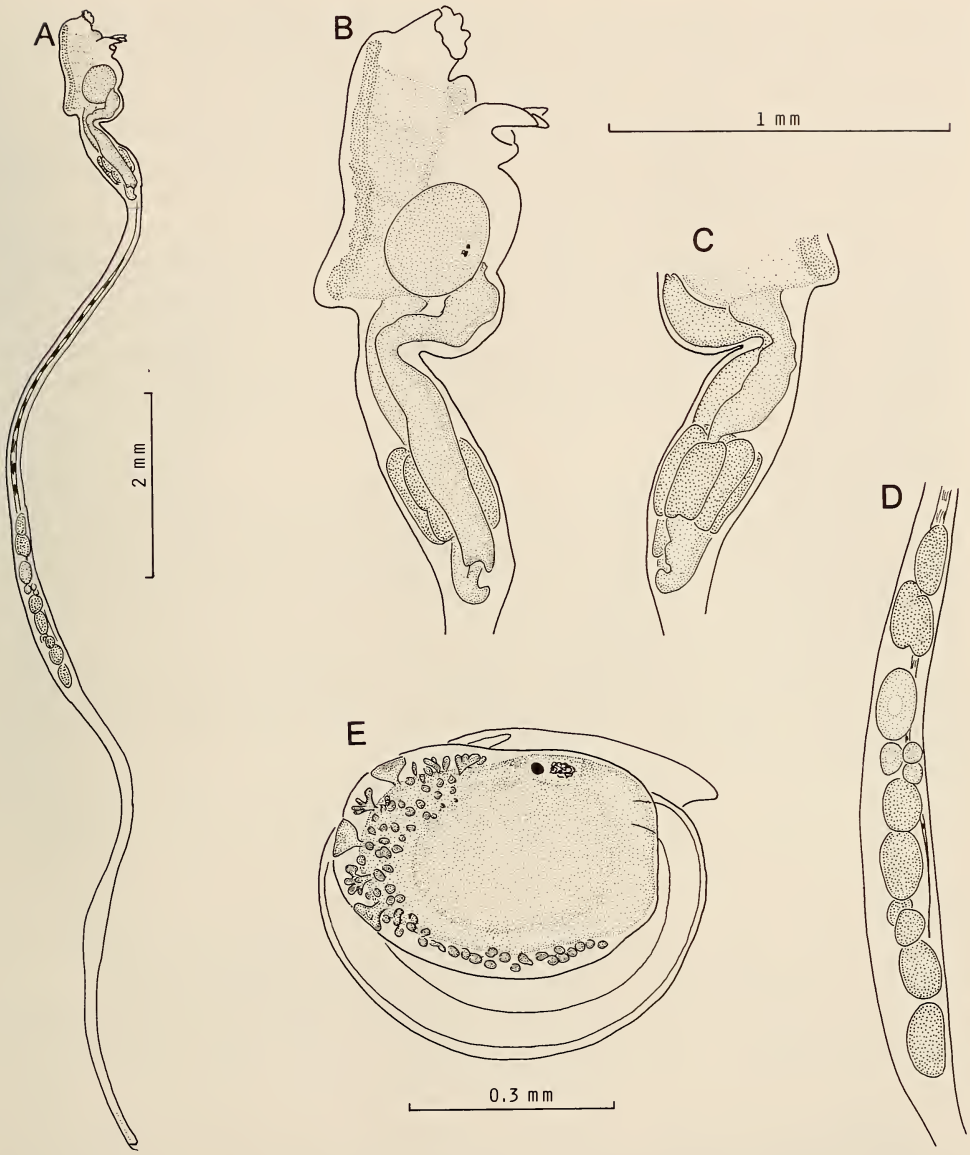

Fig. 9. *Aplidium mernooensis*. A. Zooid. B. Thorax and abdomen of a brooding zooid. C. Other side of the abdomen. D. Gonads. E. Larva.

colonies consist of only one system, but most often the lobes are grouped in large common masses.

The zooids are thin and long (Fig. 9A). The oral siphon has eight small lobes (Fig. 9B). The narrow cloacal siphon is prolonged by a trifid languet that extends its upper rim (Fig. 9B). The longitudinal thoracic musculature is made up of 7–8 muscles on each side, issuing from the oral siphon, and 4–6 muscles

coming from the cloacal siphon. The branchial sac has five rows (Fig. 9B) of 12–13 stigmata on each side. The abdomen is narrower than the thorax. The stomach wall has five deep folds (Fig. 9C), the mid-intestine is olive-shaped and the rectum begins with caeca (Fig. 9B). The post-abdomen is long, even when it does not contain gonads. The ovary is far from the gut, half way along the post-abdomen. Few testicular vesicles occur in a single row before and behind the ovary (Fig. 9D), but do not reach the cardiac extremity.

Two to three larvae are incubated in the peribranchial cavity. They are small with an average trunk length of 0.5 mm. They have three well-spaced anterior adhesive papillae, between each of which is a branched protuberance of bunched, small vesicles. Numerous small additional vesicles extend in an anterior crescent on each side of the papillae (Fig. 9E). The median vesicles between the papillae only appear at an advanced stage of the larva. They are also present in the material from New Caledonia (Brewin 1956).

Remarks and distribution

All characteristics correspond well to the Brewin's (1956) type specimen from Chatham Rise, to the material described by Millar (1982) from New Zealand, and to the specimens from New Caledonia (Monniot, F. 1987). The only difference is that the present colony is more massive and most of the lobes consist of several systems.

The species *Aplidium filiforme* Kott, 1992, comprising specimens from Western Australia and Queensland, perfectly corresponds to the South African specimens, and only differs from the type in that the colony lobes are made of several systems. We consider it a synonym.

Aplidium monile F. Monniot sp. nov.

Fig. 10

Material

Holotype. SAM–A25843, Thompson's Pool, near Ballito (29°31'S 31°13'E), KwaZulu-Natal, collected by C. L. Griffiths, 11 July 1994.

Other material. Several specimens, Sodwana Bay, KwaZulu-Natal, intertidal (Schleyer coll.).

Description

Several cushion-shaped colonies were collected, the largest being 30 mm in diameter; they are of variable thickness, up to 10 mm. They are very soft and pink with paler apertures arranged in irregular double rows, giving a botryllid appearance. The common cloacal openings are simple holes. No sand is embedded in the colony but some sediment is stuck to the sides and the basal layer of the pads.

The zooids have a red thorax in life. In formalin, the colour fades progressively, leaving only four red spots at the base of the oral siphon, sometimes linked in pairs by a red line. The other tissues turn yellow and later become colourless. The zooids are perpendicular to the colony surface. The six oral lobes are large but the siphon itself is short (Fig. 10A). The cloacal opening

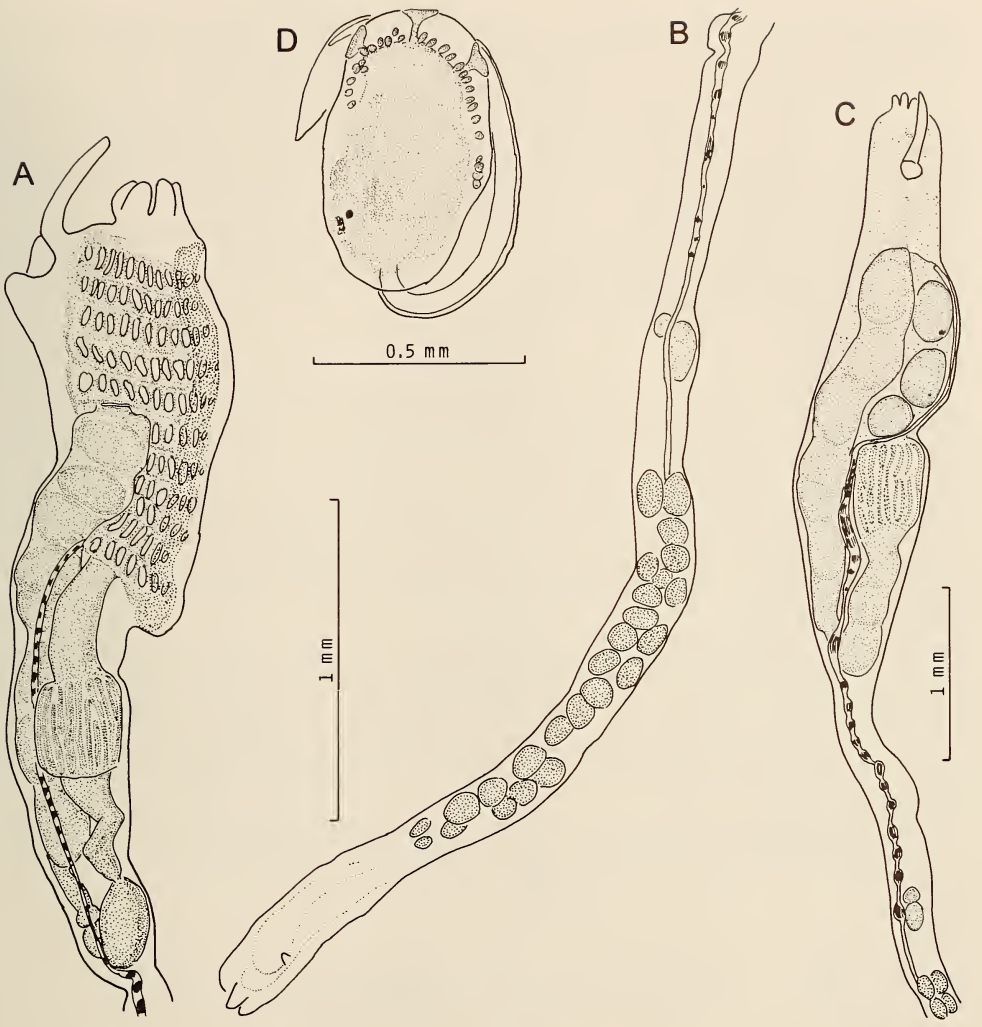

Fig. 10. *Aplidium monile* sp. nov. A. Thorax. B. Post-abdomen. C. Thorax and abdomen of a brooding zooid. D. Larva.

faces the first row of stigmata. Its upper rim has a simple pointed languet (Fig. 10A), sometimes with two small lateral lobes. The thoracic muscles are mostly longitudinal with thin fibres. The branchial sac has 10–11 rows of stigmata (Fig. 10A) that are not interrupted on the dorsal line.

The abdomen is about the same length as the thorax. The posterior side of the stomach is half way along the gut loop. There are 18–20 longitudinal folds in a transverse section, some of which are cut or interrupted (Fig. 10A, C). The post-stomach has the usual annular swelling (Fig. 10A). The olive-shaped mid-intestine is separated from the rectal caeca by a constriction. The anus has two lobes and is mid-way along the thorax. The pyloric duct enters the stomach in the middle of its side. The post-abdomen may be very long. The ovary is far

from the gut loop (Fig. 10B), and is followed by a double row of testis vesicles that occupy the posterior half of the post-abdomen to the heart (Fig. 10B).

The larvae are brooded inside the peribranchial cavity, rather posteriorly (Fig. 10C). They often protrude on the dorsal side of the thorax. We observed a maximum of five in any zooid. The larvae (Fig. 10D) have a trunk 0.6 mm in length. The tail encircles three-quarters of the trunk. The sensory vesicle is located rather far back. The three adhesive papillae are short. A half ring of round vesicles on each side of the anterior side is reminiscent of a pearl necklace (Fig. 10D), giving this ascidian its specific name. There are no median ampullae between the adhesive papillae.

Remarks

This species nearly fits the description given by Kott (1992) for what she named *Aplidium altarium* (Sluiter, 1909). However, the type specimen from Indonesia (ZMA TU 176) has conspicuously different larvae and a short post-abdomen. Millar's (1956) description of samples from Mozambique, identified as *A. altarium*, corresponds better to the type of *A. altarium* with regard to the larvae, but the post-abdomen is in a resting state and the colonies are very small. The distance between these localities increases the doubt about the species identification.

Aplidium monile sp. nov. has many characteristics in common with *Aplidium rosarium* Kott, 1992, from Queensland; both are gelatinous colonies and the zooids have 12 rows of stigmata and 20 stomach folds. The gonads of *A. rosarium* are not described. Its larvae also have a half-ring of vesicles on each side of the adhesive papillae, but differ in having median ampullae between the papillae.

Aplidium monile differs from *A. flavolineatum* in the shape of the zooid systems (which are not circular), the number of stomach folds and the larval structure.

Aplidiopsis tubiferus F. Monniot sp. nov.

Figs 1C, 11A–C

Material

Holotype. MNHN A1 APL.A 16, Ibo Island, Mozambique, 10 m, collected by Monniot, 1995.

Other material. One colony, Sodwana Bay, KwaZulu-Natal, 21 m (Schleyer coll.).

Description

The colonies form balls, the largest collected being 25 mm in diameter, supported by a wide cylindrical stalk 15 mm high. The colour is tan due to sparse clear sand grains adhering to the colony surface mixed with the dark purple colour of the tunic. The colonies turn orange in formalin. Sand is totally absent inside the tunic, which has a tough surface layer, but soft internally between the zooids.

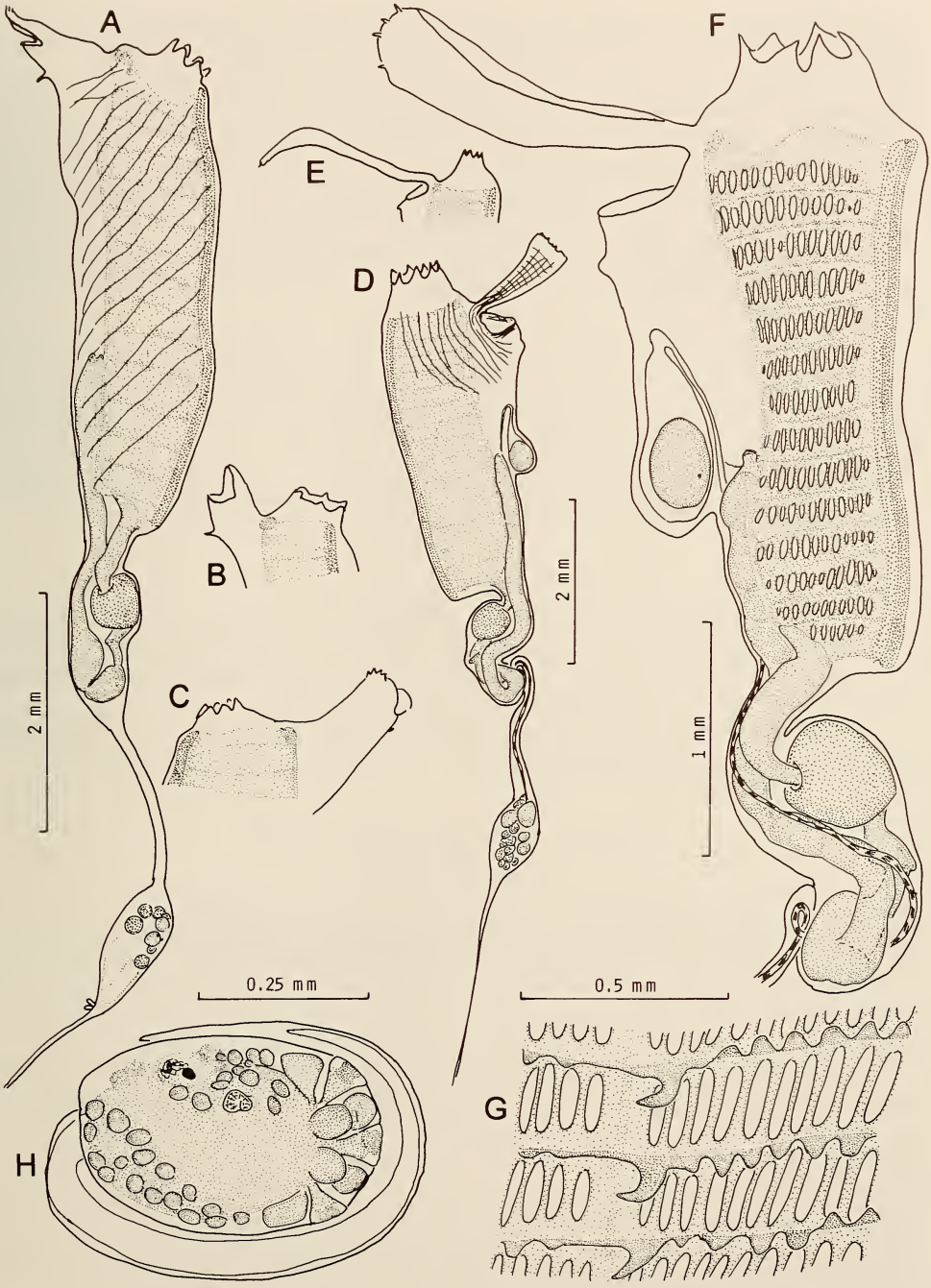

Fig. 11. A–C. *Aplidiopsis tubiferus* sp. nov. A. Zooid. B–C. Siphons. D–H. *Polyclinum isipingense*. D. Zooid. E. Siphons of another zooid. F. Details of the thorax and abdomen. G. Branchial papillae. H. Larva.

The zooids are perpendicular to the colony surface, and are arranged in circles around common cloacal apertures. In formalin their colour is orange. The oral siphon is short with six lobes (Fig. 11B, C). The cloacal siphon forms a long tube (Fig. 11B, C) and the dorsal margin can be elongated into a short, wide languet with teeth on the anterior edge (Fig. 11A). A papilla protrudes dorsally below the cloacal siphon (Fig. 11A–C). The thoracic muscles are oblique within the thin, transparent body wall (Fig. 11A). The oral tentacles alternate in three orders of size. The branchial sac contains 12–13 rows of 14–18 stigmata on each side (Fig. 11A). An unperforated area is located on each side of the endostyle. The rapheal languets are long and wide. There are no papillae along the transverse vessels.

The abdomen is clearly shorter than the thorax and the spherical, smooth-walled stomach is located in its middle (Fig. 11A). The gut loop is not twisted. The post-abdomen is inflated by the gonads and the heart, and linked to the abdomen by a long, thin, straight peduncle. No larvae were present in the colonies from South Africa or Mozambique.

This species is characterized by its long, tubular cloacal siphon (from which the specific name is derived) and the long, narrow, post-abdominal peduncle.

Remarks

The shape of the colony of *A. tubiferus* resembles the Tasmanian *A. confluata* Kott, 1992, and the Southern Australian *A. mammillata* Kott, 1992. However, these differ in having the cloacal languet inserted above the siphon, more stigmata rows, and zooids arranged in double rows.

Aplidiopsis pyriformis (Herdman, 1886) from Kerguelen has a shorter post-abdomen and more rows of stigmata.

Polyclinum isipingense Sluiter, 1898

Figs 1D, 11D–H

Polyclinum isipingense Sluiter, 1898*a*: 21, pl. 2 (fig. 1), pl. 4 (fig. 3). Millar, 1962: 136, fig. 10, synonymy. Plante & Vasseur, 1966: 144, pl. 1 (fig. 4). Monniot & Monniot, 1976: 358.

Material

Several colonies. Isipingo, KwaZulu-Natal, rock pools (Griffiths coll.); Saldanha Bay and Miller's Point, False Bay, low tide (Monniot coll.).

Description

The colonies form large cushions, the largest collected being 50 mm in diameter. They are covered with sand but there are far fewer particles inside the tunic. The colour is dark green or brown. The common cloacal apertures are raised in short chimneys above the colony surface. The zooids are arranged in circular systems. The tunic is transparent and soft but resistant.

The six oral lobes are pointed. The cloacal siphon has a long languet ending in a sharp thin tip or several teeth on a straight margin (Fig. 11D, F). There is a small papilla on the dorsal body wall behind the cloacal siphon (Fig. 11D, F).

The muscles are restricted to the anterior part of the thoracic wall (Fig. 11D). The branchial sac (Fig. 11F) contains 11–15 stigmata rows, a number which varies with zooid and colony growth. The papillae on the transverse vessels are about as numerous as the stigmata (Fig. 11G). The abdomen has the usual shape in the genus. The post-abdomen hangs on a long thin peduncle (Fig. 11D). The ovary lies in the centre of a cluster of testis vesicles. The larvae are incubated within the oviduct in the cloacal cavity (Fig. 11F). The trunk is 0.5 mm long (Fig. 11H). The three adhesive papillae are separated by two vesicles, and four ampullae are present on each side. There are also a dorsal and ventral series of vesicles. One or several calcium oxalate crystals are found in the visceral mass.

Remarks and distribution

The species is well characterized by the shape of the colony and the raised common cloacal apertures above circular systems of zooids. Its known distribution extends from Madagascar (Plante & Vasseur 1966) and Mozambique (Monniot & Monniot 1976) to the Western Cape Province. It differs from *P. neptunium* Hartmeyer, 1912, in its larval structure.

Pseudodistoma africanum Millar, 1954
Figs 1E, 12A–D

Pseudodistoma africanum Millar, 1954: 128, fig. 1; 1962: 138, fig. 12.

Material

Several colonies. Sodwana Bay, KwaZulu-Natal, 24–34.5 m (Schleyer coll.).

Description

All colonies are equivalent in shape, and correspond to that of the type specimen in the British Museum. They consist of one to several stalked lobes, each with a sandy peduncle and a wider conical head containing the thoracic and abdominal parts of the zooids. The tunic around the siphons has no sand but some particles are embedded deeper between the zooids. The colour of the colonies varies from white (rarely) or pink to a deep orange-red. The colour is partly due to the tunic, but mostly to the zooids in which the thoraces are deeply pigmented. In formalin the pigment becomes yellow and later disappears.

The zooids (Fig. 12A) are immature in all colonies. The thorax is short (Fig. 12B). The siphons are also short and have six lobes. There are at least 30 stigmata per half row. The gut forms a simple loop. The stomach, at the mid-length of the abdomen, is square in cross section, giving it longitudinal crests when contracted. The base of the rectum is enlarged. The post-abdomen is extremely long. The gonads were not developed, and no larvae were found.

Remarks and distribution

In spite of the absence of gonads and larvae, the colonies and zooids were characteristic enough to identify the species by comparison with the Millar

cotypes from the British Museum. The distribution of *P. africanum* is presently restricted to South Africa.

Pseudodistoma delicatum F. Monniot sp. nov.

Figs 1F, 12E–G

Material

Holotype. SAM–A25844, Sodwana Bay (27°33'S 32°42'E), KwaZulu-Natal, 24 m; collected by M. Schleyer, 8 November 1994.

Other material. Several colonies from Sodwana Bay (Schleyer coll.).

Description

The colonies form a soft encrustation on polychaete tubes which are over 100 mm in length. They are folded back on themselves when they extend beyond the support of the tubes. The colony thickness varies from 5 to 10 mm when fixed. In life, the colour is bright orange with transparent red siphons slightly raised above the surface. The colour disappears when fixed, and the tunic becomes perfectly transparent. There is no embedded sand. The zooids are arranged in sinuous lines, with their siphons placed one behind the other. The general consistency is soft, but the tunic is resistant.

The short zooids (Fig. 12E, F) are only 5–6 mm in length when partially contracted. Both siphons are short and have six round lobes. There is a pigment spot on the neural ganglion. The tentacles are numerous and short, in three orders of size in three circles at the base of the oral siphon. There is a large unperforated area before the branchial sac. The first row of stigmata is dorsally curved (Fig. 12F) with 22–24 perforations on each side. The waist between the thorax and abdomen is circled by a belt of pigmented tunic. The abdomen is short, with a smooth-walled stomach in the middle (Fig. 12F). The rectum begins with the usual caeca (Fig. 12E, F).

The post-abdomen length depends on the gonad development. It is generally short and may be much reduced when the testis vesicles regress and the ovary develops. In the male phase, there is a cluster of about 25 round testis vesicles that does not reach the heart. When the ovary develops, it grows close to the gut and against the testis, so that the male vesicles gather in the anterior part of the post-abdomen, swelling it and giving the post-abdomen a triangular shape (Fig. 12E, F). The post-abdomen terminates in several vascular appendages (Fig. 12E, F).

The larvae (Fig. 12G) measure 0.75 mm in length in trunk, with a tail in three-quarters of a turn around it. They are incubated, one at a time, in an extremely distended dilation of the thoracic body wall which has no peduncle (Fig. 12E, F). In mature larvae three rows of stigmata are open (Fig. 12G). The ocellus and the otolith are present. The three anterior papillae are very wide, forming large cups that are crowded together to form a compact mass separated from the visceral mass by a constriction. No vesicles or ampullae were observed.

Remarks

This species is clearly distinct from *P. africanum* by the colony shape and consistency, the absence of embedded sediment, and the shorter post-abdomen.

Pseudodistoma delicatum differs from *P. fragile* Tokioka, 1958, in the colour of the colonies, the less brittle consistency of the tunic, and, mostly, in the size and anatomy of the larvae.

Ritterella solida F. Monniot sp. nov.

Figs 1G, 13A, B

Material

Holotype. SAM-A25845, Oudekraal, Cape Peninsula (33°59'S 18°21'E), 10 m; collected by C. L. Griffiths, 18 August 1994.

Etymology

The specific name refers to the particularly solid and massive colony.

Description

The large, ridged and folded colony is white in life, 45 mm thick, tough, impregnated with sediment but with little sand at the surface. The zooid apertures do not manifest any regular arrangement. When fixed, the colony turns brown.

The zooids are slender (Fig. 13A) and perpendicular to the colony surface. Both siphons are closely spaced, cylindrical and of equal size with six sharp lobes (Fig. 13B). The siphons are orange in life. The cloacal siphon is closed by a velum. There are 16 tentacles in three orders of size. The thoracic musculature is weak. The branchial sac (Fig. 13B) has nine rows of stigmata with an average of 14–15 stigmata on each side. There are no parastigmatic vessels nor are there papillae on the transverse vessels.

The abdomen is slightly shorter than the thorax. The stomach is as wide as it is long and has five deep longitudinal folds (Fig. 13B). The gut loop is very narrow. The rectum begins with two caeca at some distance from the bottom of the loop. The anus opens in the middle of the thorax through two large lobes.

The post-abdomen is long (Fig. 13A). The gonads are poorly developed in the single colony studied. The ovary is far behind the abdomen (Fig. 13A). The testis vesicles are in two rows and occupy the second half of the abdomen but do not reach the heart at this stage.

The colony does not contain embryos or larvae.

Remarks

Of the species of the genus *Ritterella* that have about ten rows of stigmata, many have colonies made of pedunculate lobes: *R. cornuta* Kott, 1992; *R. multistigma* Kott, 1992; *R. pulchra* (Ritter, 1901); and *R. tokiokai* Kott, 1992. Among the massive colonies only two deep-sea species have stigmata rows approaching these in number: *R. mirifica* Monniot, C. & Monniot, F., 1983, and *R. rete* Monniot, C. & Monniot F., 1991. They are very different from *Ritterella solida* sp. nov.

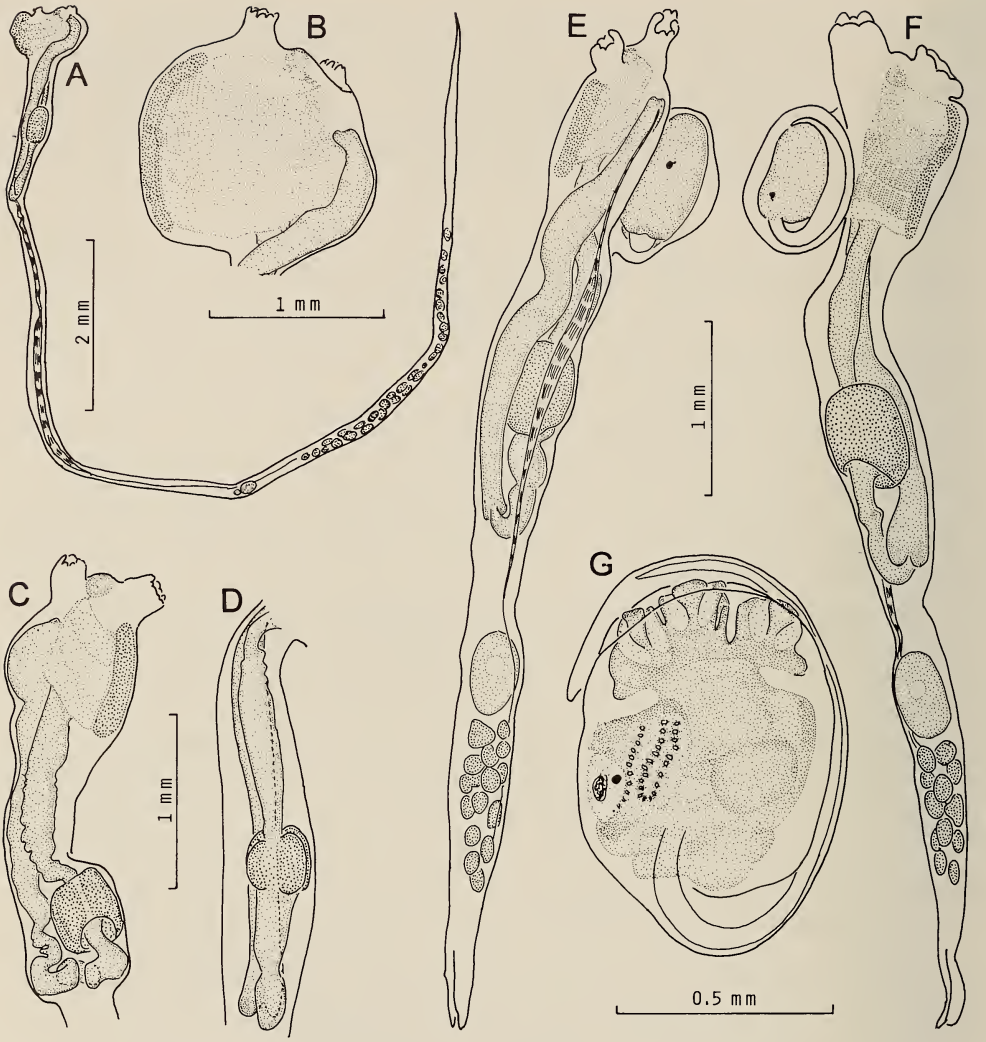

Fig. 12. A–D. *Pseudodistoma africanum*. A. Zooid. B. Detail of the thorax. C. Thorax and abdomen of another zooid. D. Abdomen of a zooid from the type colony. E–G. *Pseudodistoma delicatum* sp. nov. E–F. Two zooids. G. Larva.

Euherdmania divida F. Monniot sp. nov.

Figs 1H, 13C–E

Material

Holotype. SAM–A25846, Isipingo, KwaZulu-Natal (30°00'S 30°57'E), in rock pools; collected by C. L. Griffiths, 10 July 1994.

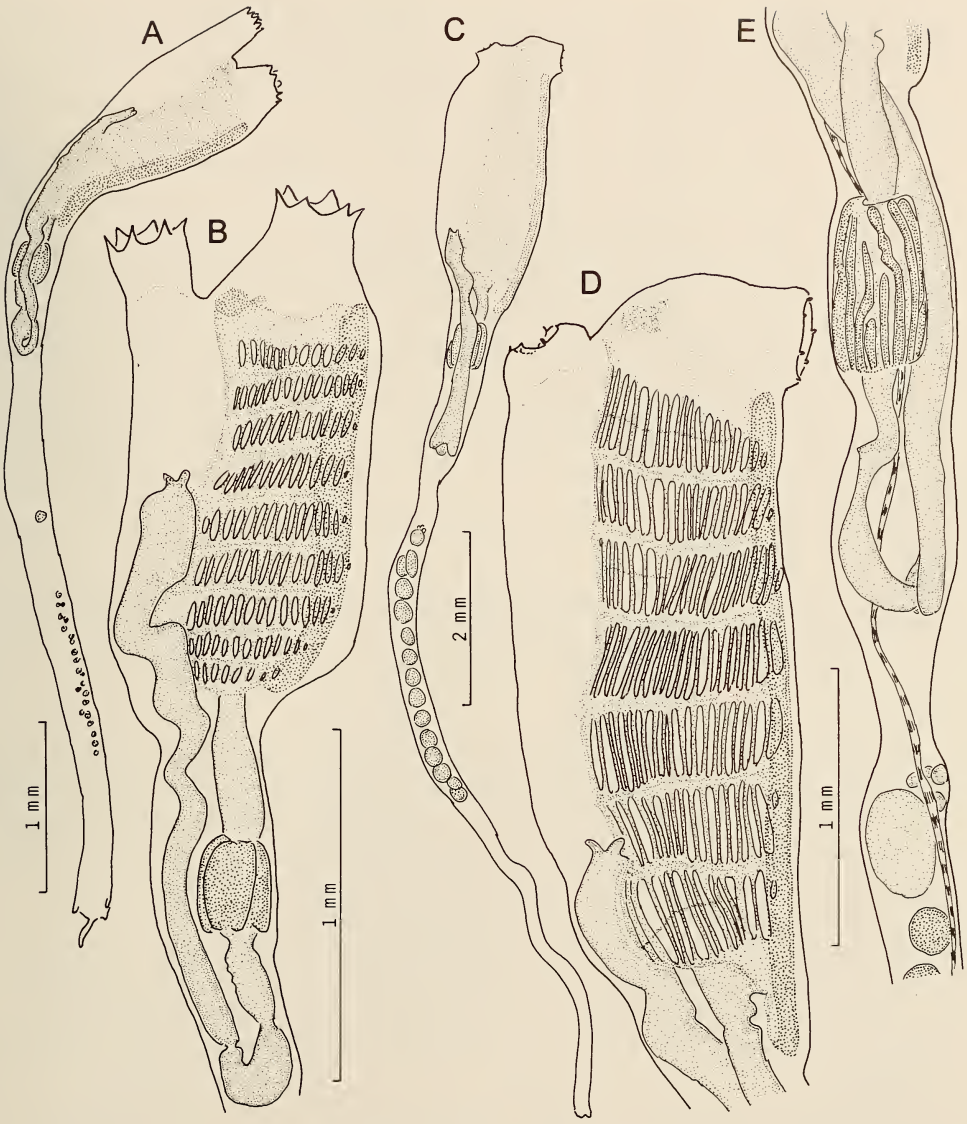

Fig. 13. A–B. *Ritterella solida* sp. nov. A. Zooid. B. Detail of the thorax and abdomen. C–E. *Euherdmania divida* sp. nov. C. Zooid. D. Thorax. E. Abdomen and ovary.

Description

Minute, elongate, stalked zooids, each coated with sand, are joined at their base into the colony. Each zooid is 20 mm long, and 2 mm in diameter at the enlarged distal end. Each cylindrical siphon has six pointed lobes (Fig. 13D). The oral siphon is oriented toward the ventral side. The number of tentacles is variable, most often 16 in three orders of size.

The thoracic musculature is weak in a network of thin transverse and longitudinal fibres, but circular muscles make sphincters around the siphons. The longitudinal thoracic fibres extend over the abdomen and post-abdomen. The branchial sac and endostyle form a posterior horn at the base of the thorax (Fig. 13D).

The branchial sac (Fig. 13D) has 6–7 rows of elongated stigmata, generally with 32 stigmata in the first half row and 20 in the last half row. The first and the last rows have a complete or partial parastigmatic vessel (Fig. 13D). The transverse vessels are low with dorsally 5–6 languets. There are no languets at the level of the parastigmatic vessels. Some stigmata rows occasionally have incomplete parastigmatic vessels. The abdomen is about the same length as the thorax. The oesophagus is short, as long as the stomach. The stomach wall is irregularly folded (Fig. 13E) and 10–12 folds can be counted in transverse sections. The typhlosole is conspicuous. The intestine is thin beyond an annular swelling (Fig. 13E). A constriction before the rectal caeca marks the bottom of the gut loop. The bilobed anus opens at the level of the second to last row of stigmata.

The post-abdomen is very long (Fig. 13C), longer than the thorax plus abdomen.

The ovary, located at some distance from the gut loop, is immediately followed by a line of testicular vesicles that are limited to the anterior half of the post-abdomen (Fig. 13C). No larvae were present in the colonies studied.

Remarks

The genus *Euherdmania* contains few species but is widely distributed in the world. Some of them have massive colonies with zooids grouped in a common tunic. They are *E. gigantea* (Van Name, 1921) in the western Atlantic Ocean, *E. morgani* Millar & Goodbody, 1974, from Jamaica, *E. rodei* Pérès, 1949, from Senegal and *E. solida*, Millar, 1953, from the Gold Coast, in which only the thoraces are isolated. Among the species with separated zooids, many have numerous rows of stigmata, as in *E. areolata* Millar, 1978, from Guyana which has an areolated stomach, *E. claviformis* (Ritter, 1903) from California, *E. digitata* Millar, 1963, from the western Pacific, *E. fasciculata* Monniot, F., 1983, from Guadeloupe, and *E. translucida* Kott, 1992, from southern Australia.

The nearest species to *E. divida* is *E. dumosa* Monniot, F., 1987, from New Caledonia. It has the same colony structure with embedded sand. However, *E. dumosa* has only four rows of stigmata cut by parastigmatic vessels, seven rapheal languets, and a very different stomach in which the wall is slightly spotted. The thoracic muscles and the gonad disposition are similar in both species.

Family **Polycitoridae**

Eudistoma bituminis F. Monniot sp. nov.

Fig. 14A–C

Material

Holotype. SAM-A25847, Sodwana Bay, KwaZulu-Natal (27°33'S 32°42'E), intertidal pools, collected by M. Schleyer, Nov. 1994.

Other material. Several colonies, Sodwana Bay, KwaZulu-Natal, intertidal pools (Schleyer coll.); Mayotte, Comoros islands (Gaydou coll.).

Description

The colonies are about 10 mm thick, large, dark pads. They are several centimetres across, tough, encrusted with sand, and resemble bitumen (hence

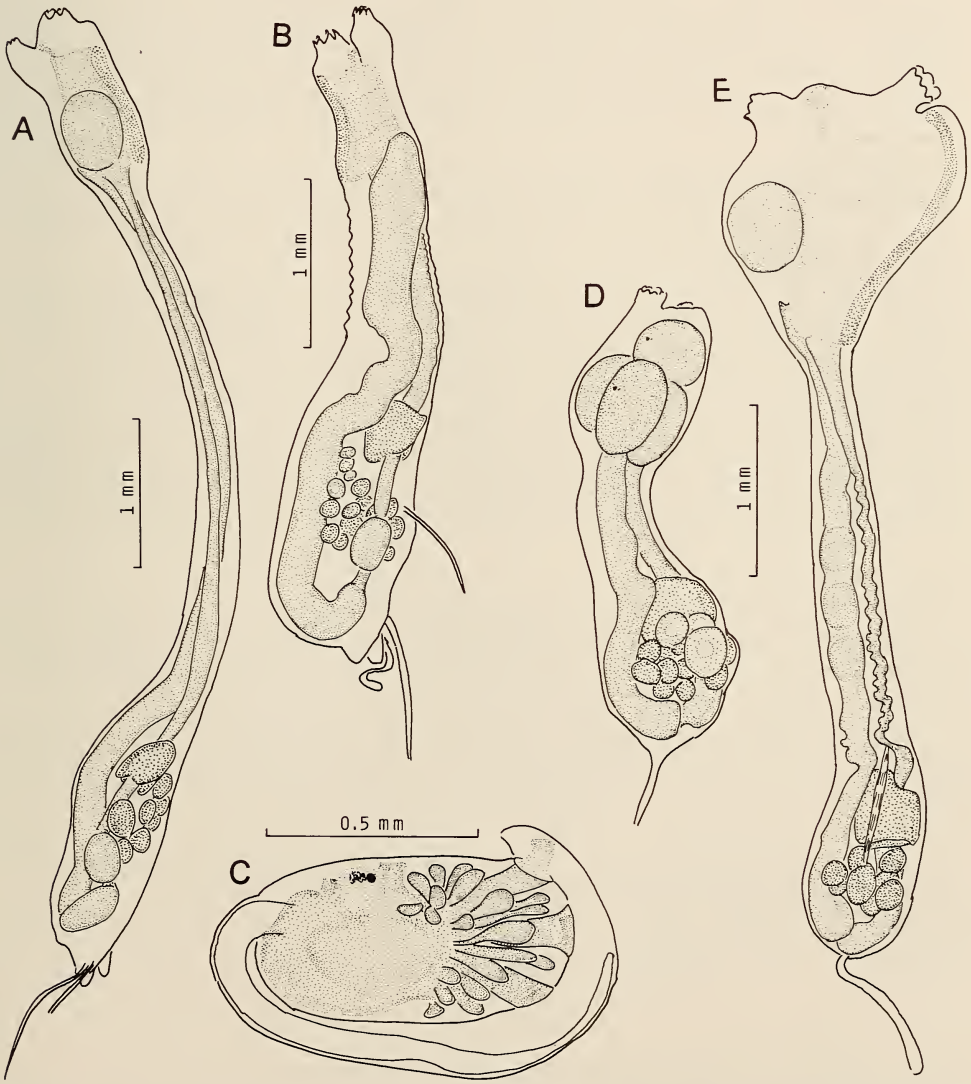

Fig. 14. A–C. *Eudistoma bituminis* sp. nov. A–B. Zooids. C. Larva. D–E. *Eudistoma caeruleum*. D. Zooid from South Africa. E. Zooid from Madagascar.

the species name). The zooid apertures are arranged in circular systems, with the oral and cloacal lobes slightly protruding above the smooth colony surface. The tunic is black in the upper part, slightly more translucent deeper. It contains embedded sand that is more abundant in the interior than at the colony surface. The tunic contains abundant brown pigment cells.

The zooids (Fig. 14A, B) are contracted and light brown in formalin. Both siphons have six sharp lobes. The longitudinal muscles are very strong and extend in two ribbons along the abdomen, making horns at the body extremity. The tentacles are very numerous in a single ring. There is no unperforated space anterior to the branchial sac. The stigmata are very elongated, about 15 per half row. The abdomen is much longer than the thorax. The stomach is as long as it is wide and is followed by a narrow cylindrical section (Fig. 14B). The mid-intestine is wide and short, sometimes as wide as the stomach. The rectum, without caeca, begins after a constriction in the descending limb of the gut loop (Fig. 14B).

The gonads are located within the gut loop, behind the stomach, and consist of a few round testicular vesicles (Fig. 14A, B) and an ovary with several oocytes varying in size. Two or more long vascular processes arise from the centre of the gut loop.

The larvae (Fig. 14C) are incubated in the peribranchial cavity. They have a light brown, elongated trunk 0.8 mm in length and half encircled by the tail. The three adhesive papillae have stout, long, brown stems. They are separated by two double, long, median ampullae. On each side are several long ampullae with shorter ones at their base (Fig. 14C). The number of these lateral ampullae seems a little variable, as well as their shape, but they are always numerous. The ocellus and otolith are present between the embryonic siphons. The branchial sac is not yet differentiated when the adhesive ampullae begin to evert.

Remarks

This *Eudistoma* species is different from other known African species. It differs from *E. atrum* Monniot, F. & Monniot, C., 1997, from Tanzania and Djibouti, which has a black but mucous-covered and naked colony with notably different larvae.

The enlarged mid-intestine and the brown base of the larval adhesive papillae in *E. bituminis* resemble those in the western Pacific species *E. reginum* Kott, 1990, but the latter has different larval anterior ampullae, colonies devoid of sand and an asymmetrical stomach.

Although only collected in Sodwana Bay and Mayotte, Comoros islands, this species probably has a wider distribution in the Indian Ocean.

Eudistoma caeruleum (Sluiter, 1898*a*)

Fig. 14D, E

Distoma caeruleum Sluiter, 1898*a*: 14, pl. 2 (fig. 4), pl. 4 (fig. 11).
Polycitor (Eudistoma) caeruleum: Hartmeyer, 1909: 1431.
Polycitor (Eudistoma) caeruleus: Michaelsen, 1919: 73.

Sigillina (Eudistoma) caerulea: Michaelsen, 1934: 141.
Eudistoma caeruleum: Millar, 1956: 919, fig. 6; 1962: 157, fig. 21; 1964: 163. Plante & Vasseur, 1966: 147, pl. 3 (figs 17–19). Lafargue & Vasseur, 1989: 61.

Material

Several specimens. Sodwana Bay, KwaZulu-Natal, intertidal pools (Schleyer coll.); Thompson's Pool, near Ballito, KwaZulu-Natal (Griffiths coll.); Nosy Bé, Madagascar, 15 m (Laboute coll.).

Description

The colonies are club-shaped and dark blue in colour. Several lobes may arise from a common base. The heads are naked but some epibionts are fixed on the peduncle. The zooids, restricted to the head, do not form systems. They are regularly spaced with the cloacal siphon above the oral siphon. The tunic in the head region is a translucent blue. Dark pigment cells are accumulated around the zooids.

The zooids are a dark or lighter blue, with the siphons darker than the remainder of the body wall. Both siphons are short with six round lobes. The longitudinal and transverse thoracic muscles are regularly spaced in a well-developed network, and longitudinal bundles extend along the abdomen. The oral tentacles are thick in two orders of size, in two circles. The urn-shaped dorsal tubercle protrudes.

The first row of stigmata curves dorsally. In a relaxed zooid, we counted on the right side 35 long stigmata in the first row and 28 stigmata in the two last rows. They are less numerous on the left side. The unperforated areas anterior and posterior to the branchial sac are very narrow (Fig. 14E). The abdomen is a least three times as long as the thorax in relaxed zooids (Fig. 14E). The stomach is asymmetrical at the posterior extremity of the abdomen and the post-stomach and mid-intestine are especially short; the rectum with caeca begins with widening at the bottom of the gut loop. The gonads consist of a cluster of round testis vesicles and a central ovary contained in the gut loop behind the stomach (Fig. 14D, E). The abdomen is prolonged by a thin and very long vascular process, devoid of muscles.

The larvae are brooded in the peribranchial cavity, which contains up to five embryos. The most mature larvae that we found have an ocellus, an otolith, three anterior adhesive papillae but no other differentiation. The tail encircles the trunk, which is 0.5 mm in length.

Remarks and distribution

The colonies and zooids exactly correspond to the type specimen, which has been re-examined. The geographic distribution of this spectacular species extends from KwaZulu-Natal in South Africa to Mozambique, the west coast of Madagascar, and Mayotte (Comoros islands).

Eudistoma hospitale F. Monniot, 1998

Eudistoma hospitale Monniot, F., 1998: 430, figs 1–2. Monniot, F. & Monniot, C., 1999: 19, fig. 13A–C, pl. 2F.

Material

Several colonies. Sodwana Bay, KwaZulu-Natal, 19 m (Schleyer coll.). Gouritz River mouth (Griffiths coll.). Port Elizabeth, intertidal (Monniot coll.).

Description

In South Africa, this ascidian is a fleshy cushion, black at the surface and grey and soft in the interior, with superficial sticky mucus and threads emerging from the siphons. One colony from the southern Cape coast had bright blue specks overlaid on a dark undertone at the colony surface. The colonies are always thick pads with a flat surface or with low swellings. The zooids are arranged in circular systems that are sometimes inconspicuous.

Remarks and distribution

This recently described material has the same structure in all locations and the same filiform symbionts of unknown taxonomic status (Monniot, F. 1998).

This species has a wide geographic distribution, from the south-western Pacific to South Africa and Tanzania, and it also occurs in a wide depth range from low tide down to 30 m.

Eudistoma illotum (Sluiter, 1898)

Fig. 1I, 15A–C

Distoma illotum Sluiter, 1898: 16, pl. 1 (fig. 3), pl. 3 (fig. 7).
Polycitor illotus: Hartmeyer, 1912: 303, pl. 38 (fig. 2), pl. 43 (fig. 5).
Sigillina (Hyperiodistoma) illota: Michaelsen, 1930: 491; 1934: 139.
Eudistoma illotum: Millar, 1955: 181, fig. 12; 1962: 160, fig. 24; 1964: 162, fig. 2.
non *Eudistoma illotum*: Rho, 1971: 110. Rho & Huh, 1984: 106. Rho & Lee, 1989: 65.

Material

Several colonies. Saldanha Bay; Kommetjie; Miller's Point, False Bay; under overhangs intertidally or in pools (Griffiths and Monniot coll.).

Description

The colonies are brown or purple encrusting cushions. The largest specimen in this collection is 90 mm across and 20 mm thick. Paler zooids are visible through a semi-transparent tough tunic. The siphons are not arranged in systems. The tunic contains some faecal pellets and green, spherical inclusions, but no sand.

The zooids are not densely packed. Their siphons are short, equal in size, with six round lobes. The most relaxed zooids reach 10 mm in length but have a thorax only 1 mm long (Fig. 15A). The thoracic musculature consists of a regular network of longitudinal and transverse fibers of equal thickness. The longitudinal muscles extend in bundles along the abdomen. The oral tentacles are numerous, in three orders of size, on three circles. There are unperforated areas anterior and posterior to the branchial sac. In large zooids, the first row of stigmata curves dorsally and contains 20 stigmata on the right side.

The gut forms a long loop and the two limbs are thin and parallel (Fig. 15A). The stomach is laterally flattened with a round outline and the oesophagus enters it dorsally. A longitudinal crest often raises its side near the typhlosole (Fig. 15A) but may have been caused by contraction. The conical post-stomach and ovoid mid-intestine are separated by constrictions. The rectum begins at an expansion of the bottom of the gut loop. The pyloric gland covers a long segment of the rectum with a network of curled tubules.

The heart is not situated inside the gut loop but behind it, in the lower part of the abdomen where the muscles are anchored. Several vascular processes of varied lengths arise on the side of the gut loop.

The gonads, made of a cluster of testis vesicles and a central ovary, lie behind the stomach, inside the gut loop (Fig. 15B). One to five larvae are brooded in the peribranchial cavity. They distend the thoracic body wall and protrude when mature and numerous.

The fully developed larvae (Fig. 15C) have a trunk 1 mm long and three large adhesive papillae on stout stems. Between each of them are two dorso-ventrally flattened vesicles. There are also one dorsal and one ventral vesicle of variable shape. A flat ampulla covers the base of the most dorsal adhesive papilla on each side of the larva.

Remarks and distribution

All the above characteristics correspond well with Hartmeyer's (1912) and Millar's (1962) descriptions of *E. illotum* from the same geographic area. It is not possible to retain as synonyms the Korean specimens identified as *E. illotum*, by Rho (1971) and Rho & Huh (1984) as their descriptions are of a different species.

Eudistoma illotum differs from other species in the Indian Ocean in its larval structure and in the posterior location of its heart behind the gut loop. Its geographic distribution is presently limited to the Western Cape Province, South Africa.

Eudistoma modestum (Sluiter, 1898)

Fig. 15D–H

Distoma modestum Sluiter, 1898*a*: 18.
Eudistoma modestum: Millar, 1962: 158, fig. 22.

Material

Several colonies. Isipingo, KwaZulu-Natal, intertidal (Griffiths coll.); Sodwana Bay, KwaZulu-Natal, intertidal (Schleyer coll.).

Description

The colonies were found on vertical rock faces, which were exposed at low tide. They are pale pink 'buttons', each colony consisting of several erect, club-shaped heads above an encrusting base embedded with sand. The largest lobe is 10 mm in diameter. The zooids can be seen through a glassy tunic, free of foreign matter.

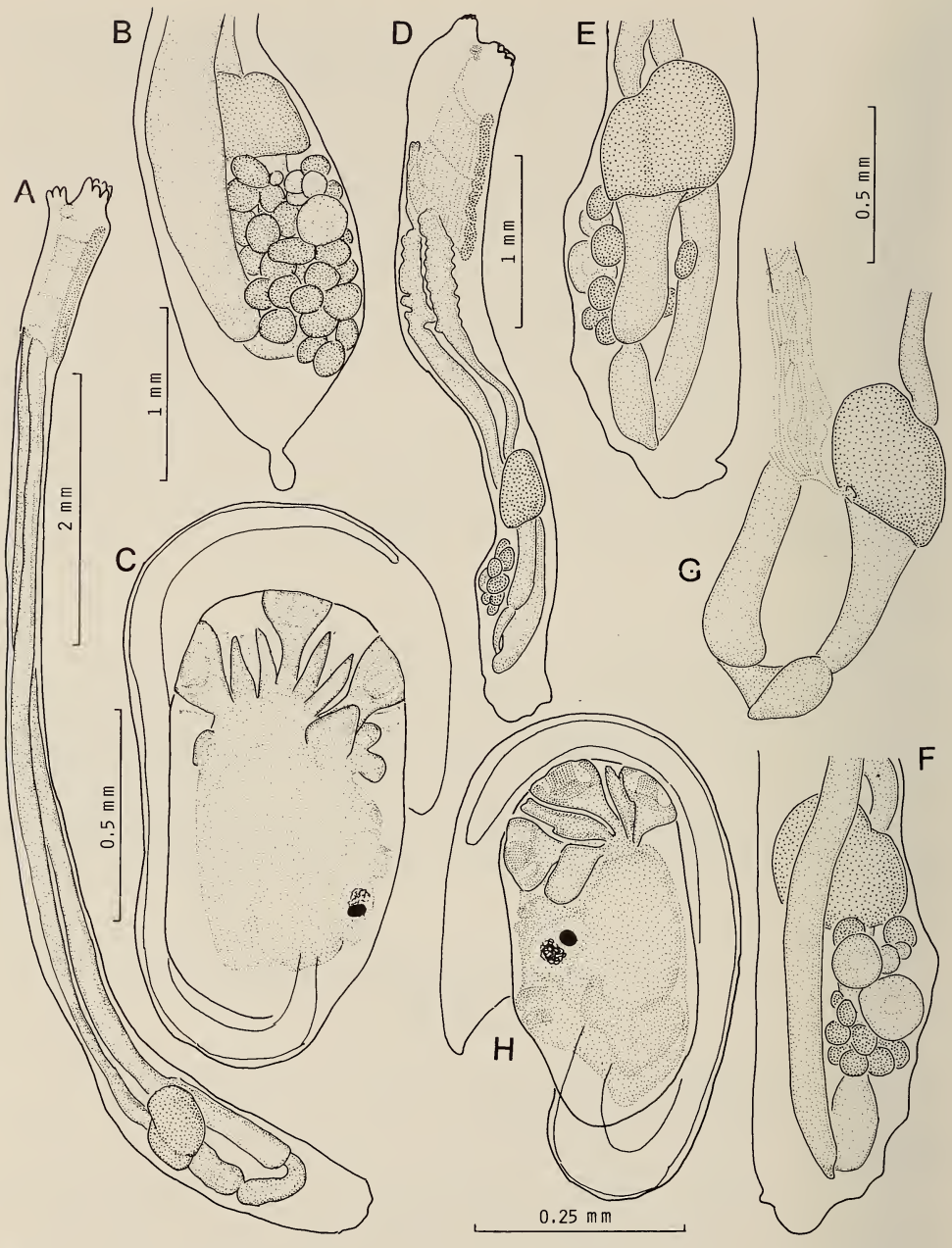

Fig. 15. A–C. *Eudistoma illotum*. A. Zooid. B. Gonads. C. Larva. D–H. *Eudistoma modestum*. D. Zooid. E–F. Both sides of an abdomen. G. Pyloric gland. H. Larva.

The zooids are rather small (Fig. 15D), 5 mm long when relaxed. The thorax represents 25–35 per cent of the total length of the zooid. The siphons are short with six lobes. The thoracic musculature is weak. On the right side

there are about 18 stigmata in the first row and 15 stigmata in the second and third rows. The stomach is asymmetrical with a smooth wall (Fig. 15E). It is followed by a long post-stomach and a short mid-intestine. The rectum begins with caeca at the pole of the gut loop (Fig. 15F); it remains straight and parallel with the oesophagus. A pyloric gland of undulating, densely packed parallel tubules (Fig. 15G) covers the rectal wall facing the stomach and more anteriorly. The pyloric duct enters the posterior side of the stomach (Fig. 15G).

The gonads lie in the gut loop. The ovary is central within a group of a few testis vesicles (Fig. 15E, F).

One or two larvae are incubated in the peribranchial cavity. The trunk, three-quarters of which is encircled by the tail, is up to 0.5 mm long. The three adhesive papillae are wide, alternating with three odd ampullae (Fig. 15H). The ocellus and the otolith are present.

Remarks and distribution

At Isipingo, some specimens of *Molgula scutata* had settled between the lobes of *E. modestum*.

This species differs from the smallest colonies of *E. illotum* in its paler colour, the shape of the gut loop and the larvae. It has only been found in South Africa.

Eudistoma occultum F. Monniot sp. nov.

Fig. 16A–D

Material

Holotype. SAM–A25848, Sea Point, Cape Town (33°55'S 18°23'E), intertidal, collected by C. and F. Monniot.

Other material. Several colonies, locality data as for holotype.

Description

Numerous colonies were collected at low tide. They are barely visible in the field (hence the species name), being colourless or pale pink, lobate colonies with a gelatinous surface on a base encrusted with sand and all kinds of foreign matter. The colonies are 20 mm in diameter and consist of several irregular lobes no more than 3 mm thick when fixed. No sand is embedded in their interior.

The zooids (Fig. 16A) are haphazardly intermingled inside the mucous tunic. Most of them are strongly retracted and very short, the most relaxed individuals being 7 mm in length. Both siphons are short with six lobes (Fig. 16A). About 20 longitudinal muscles are regularly spaced on each side of the thorax. There are numerous tentacles in three orders of size. The unperforated areas anterior and posterior to the three rows of stigmata are narrow. Twenty stigmata were counted in the first and third rows but only 15 in the second row.

The abdomen occupies 80 per cent of the body length in relaxed zooids (Fig. 16A). The stomach has a smooth wall, followed by a conical post-stomach

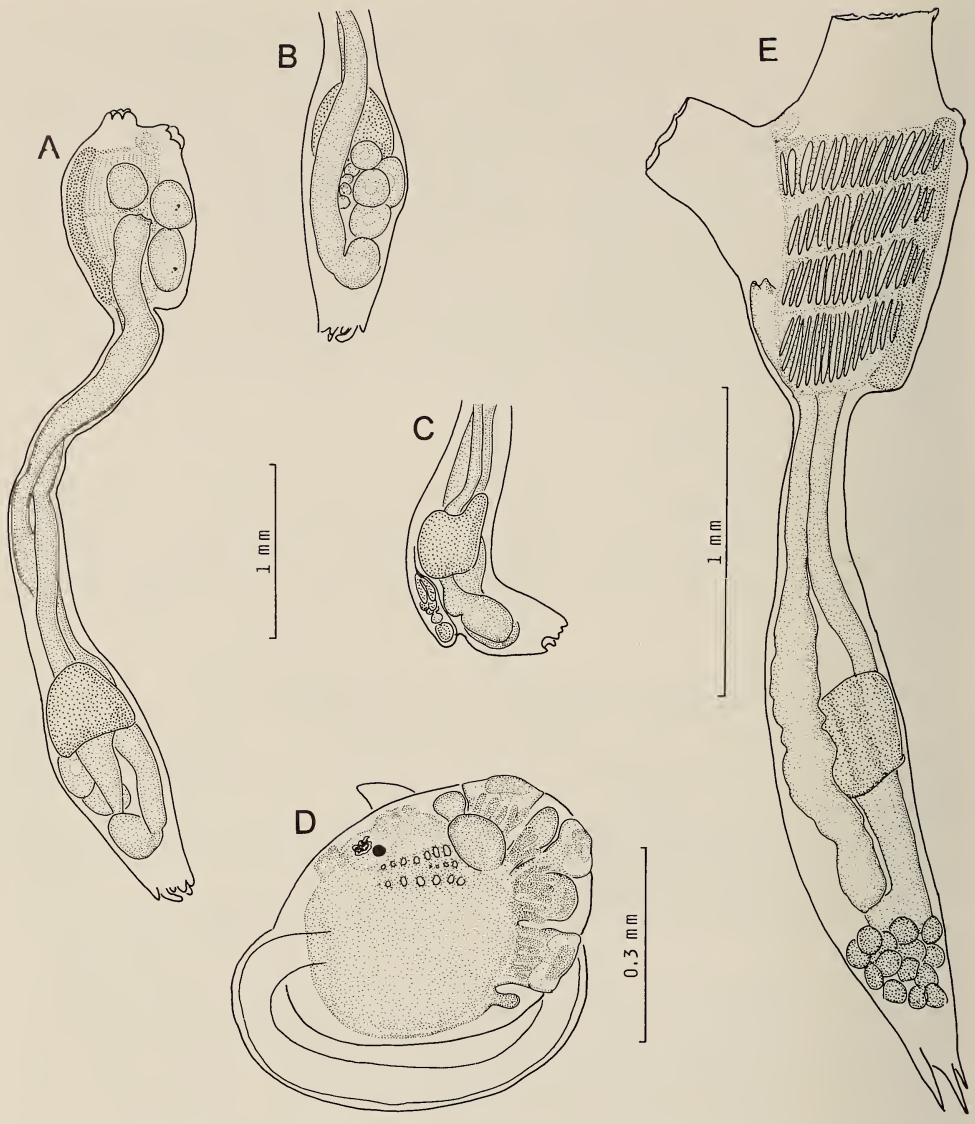

Fig. 16. A–C. *Eudistoma occultum* sp. nov. A. Zooid. B–C. Gut loop of two different zooids. D. Larva. E. *Tetrazona porrecta*. E. Zooid.

and a short mid-intestine well separated by constrictions. The rectum begins at the bottom of the gut loop and parallels the straight oesophagus (Fig. 16A). The gonads (Fig. 16B, C) and the heart are located in the gut loop, behind the stomach. There are one or several short post-abdominal vascular processes (Fig. 16A–C). Five or six embryos are brooded in the distended peribranchial cavity.

Mature larvae (Fig. 16D) are round, the trunk being 0.5 mm long. The three adhesive papillae are short and thick, alternating with four odd ampullae.

There is a flat round vesicle on each side of the dorsal adhesive papilla. A crescent of numerous filiform ampullae lies at the base of the papillae on each anterior side. The larval branchial sac is already pierced with elongated first and third rows of stigmata when the second row remains incomplete (Fig. 16D). The ocellus and otolith are present.

Remarks

This very modest species differs from all other *Eudistoma* species in the Indian Ocean in its small, lobed colonies and the structure of the larva. The second row of stigmata being shorter than the first and third ones is also distinctive.

Polycitor africanus Monniot & Monniot, 1999
Fig. 2A

Polycitor africanus Monniot, F. & Monniot, C., 1999: 22, fig. 13, pl. 3A.

Material

Two colonies, Durban, outer anchorage (Schleyer coll.).

Remarks and distribution

This species is common along the East African coast at shallow depth. It has been collected at Pemba Island (Tanzania), Ibo Island (Mozambique), Nosy Bé (Madagascar) and Durban (KwaZulu-Natal). The present colonies are not sexually mature.

Tetrazona porrecta Millar, 1962
Fig. 16E

Tetrazona porrecta Millar, 1962: 146, fig. 15.

Material

Two colonies, Oudekraal, Cape Peninsula, 8 m and 9 m (Griffiths coll.).

Description

The colonies are encrusted with sand and form white small pads or crusts, irregular in outline and 10–20 mm in diameter. The tunic is tough. Both siphons of the zooids open at the colony surface with no arrangement into systems. The cylindrical siphons are spaced well-apart at the same level and have six short lobes (Fig. 16E). The oral tentacles are distributed in three circles. The branchial sac has 16–18 stigmata on each side in the first of the four rows.

The abdomen is narrower than the thorax and most often folded under it. The stomach is located midway down the gut loop and its wall has six longitudinal folds. In these specimens only male gonads are present at the bottom of the gut loop, with the testis vesicles compacted together in a tight

mass. The heart lies behind the gut loop. Some vascular processes prolong the abdomen.

Remarks and distribution

The newly collected specimens correspond well to Millar's (1962) description. The species is common on the fronds of the red alga, *Epymenia*; it has only been recorded from South Africa.

The only other species of *Tetrazona* is the Antarctic *T. glareosa* (Sluiter, 1906), which is very different, being closer to the Holozoinae, and containing spicules (Monniot, C. & Monniot, F. 1983: 37, fig. 6E–G).

Cystodytes dellechiajei (Della Valle, 1877)

Figs 2B, 17

Distoma dellechiajei Della Valle, 1877: 40.

Material

Several colonies. Woolley's Pool, False Bay, intertidal; Isipingo and Sodwana Bay, KwaZulu-Natal, 15–20 m (Griffiths, Schleyer and Monniot coll.).

Description

The colonies look remarkably different depending on their size, stage of zooid development and the abundance of spicules. Some of the pink colonies from False Bay, which are at least 100 mm across and 10 mm thick, have densely distributed disc-shaped spicules around the zooids and elsewhere throughout the tunic mass. Others lack any well-formed spicules, having only irregular crystals in some places. When abundant, the disc-shaped spicules, which have a smooth thin edge and a maximum diameter of 250 μm, encapsulate the zooids. Smaller discs are crowded throughout the semi-opaque or transparent tunic. The spicule density varies from place to place within the same colony.

All of the colonies have zooids grouped into systems with 4–10 oral apertures in a ring and the cloacal apertures juxtaposed in the centre of each system. The colony surface is flat. Pigment cells are sometimes numerous throughout the tunic thickness, and sometimes restricted to a thin layer around the calcareous capsules. The zooids are not pigmented.

The less contracted zooids (Fig. 17A) are 5 mm long and perpendicular to the colony surface. They are generally partially or fully retracted into the spicule capsules if these are present. Both siphons have six round lobes. The oral tentacles in 3–4 orders of size regularly alternate along a single ring.

The thin thoracic muscles are mostly longitudinal and regularly spaced, they converge in two ribbons along the abdomen. Unperforated areas extend in front of and beneath the branchial sac (Fig. 17A). The four rows of stigmata are separated by high transverse membranes. The first stigmata row, with about 20 perforations on each side, is curved dorsally. In the most relaxed zooids the waist is long and the body wall forms an asymmetrical fold on its side (Fig. 17A), which is sometimes large but in others hardly visible.

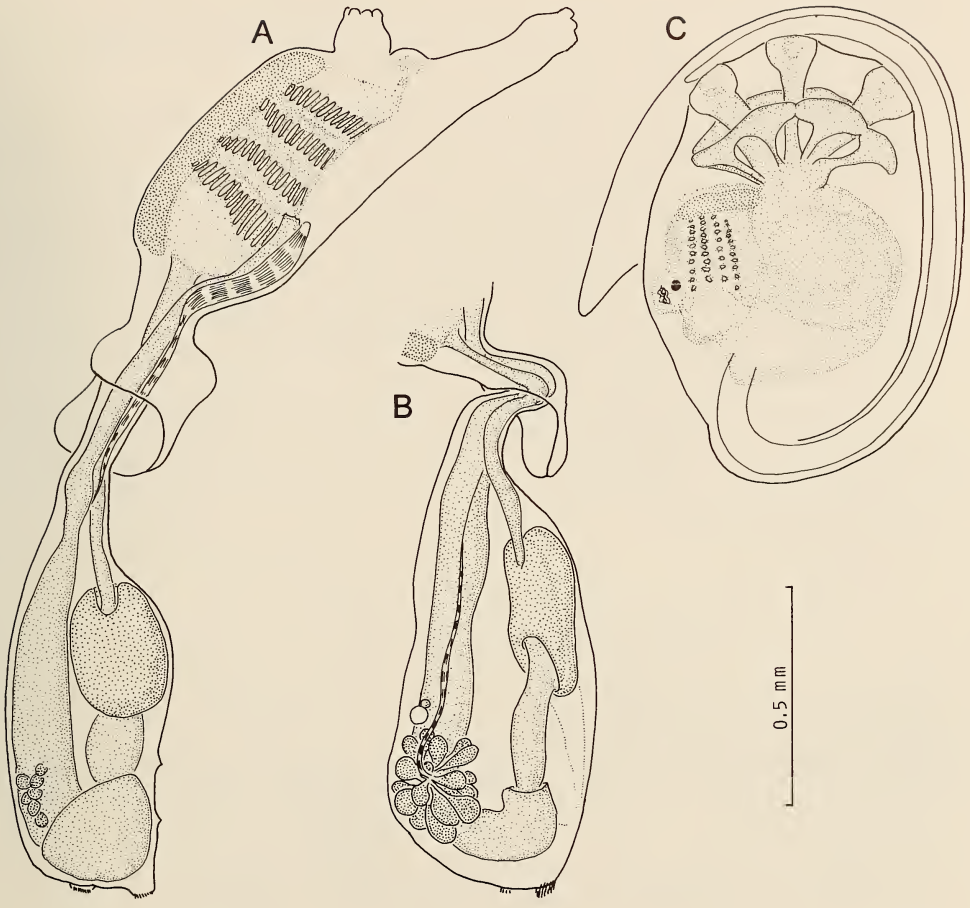

Fig. 17. *Cystodytes dellechiajei*. A. Zooid. B. Gonads. C. Larva.

The gut loop is not twisted. It is divided into a narrow oesophagus, a wide smooth-walled stomach, a narrow post-stomach and a wide rectum beginning in the descending limb of the gut loop (Fig. 17B). When mature, the testis has many lobes in a cluster (Fig. 17B). The ovary begins to develop against the testis lobes, which disappear as the oocytes reach a large size and protrude outside the abdomen. The eggs remain in the oviduct in a pouch of the body wall hanging from the waist.

The larvae (Fig. 17C) have a trunk 1 mm long, the tail being coiled in about half a turn around it. The ocellus and the otolith are present and four rows of stigmata are already differentiated. The three adhesive papillae are linearly arranged in the centre of terminally fused ampullae supported by their bases as four pillars on each side.

Two or three vascular processes of variable length are sometimes present on the side of the abdomen.

Remarks and distribution

Except for European collections, we do not accept previous identifications from distant geographic areas without seeing well-preserved and mature colonies. Thus, no further synonymy is given here.

Variability in *C. dellechiajei* at the same station and even within a same large colony is surprising. We have tentatively, but unsuccessfully, tried to find significant differences allowing us to describe geographically separate species. The tunic is transparent or opaque and the colour in life varies from white to pink and purple. The spicules may be abundant, well-formed or absent, with all possible intermediates. The anatomy of the zooids is very difficult to compare as they are never totally relaxed. The number of testis lobes increases during growth; these are radially arranged at the beginning and later compressed in a cluster. The larval size is also variable.

The colours and spicule density seem less variable in material from the eastern Atlantic Ocean and the western Mediterranean Sea than from the eastern Mediterranean Sea. The variability of South African material identified as *C. dellechiajei* thus precludes establishing a new species, a conclusion also drawn by Millar (1962).

Distaplia skoogi Michaelsen, 1934

Figs 2C, 18A–C

non *Holozoa domuncula* Hartmeyer, 1913.
Distaplia domuncula: Millar, 1955: 187, fig. 15.
Distaplia skoogi: Michaelsen, 1924: 331, nov. nom. for *Distaplia domuncula* Michaelsen, 1923*a*: 15, fig. 3.

Material

Several colonies. Miller's Point, False Bay, 4–15 m (Griffiths coll.).

Description

The colonies are large pads or balls, white, cream, mauve or light brown. The common cloacal apertures open in simple holes with an unpigmented rim. The zooids form conspicuous round systems as the oral siphons are circled with white. The zooids are limited to the superficial layer of the colony. The oral siphon has six low lobes. The cloacal siphon is either elongated in a tube with no languet (Fig. 18B), or widely opened between a wide anterior lobe and a posterior body wall extension (Fig. 18A). The thoracic musculature is thin with regularly spaced oblique fibres. The four rows of stigmata are crossed by parastigmatic vessels (Fig. 18A). There are 20–22 stigmata per side in the first rows. The zooids are colourless except for the stomach, which is brown. The stomach wall has internal thin ridges or areoles (Fig. 18A). The gut loop is wide with a central pyloric ampulla (Fig. 18A). The gonads hang in a pedunculate pouch behind the abdomen, with the testis vesicles clustered around a central ovary (Fig. 18C).

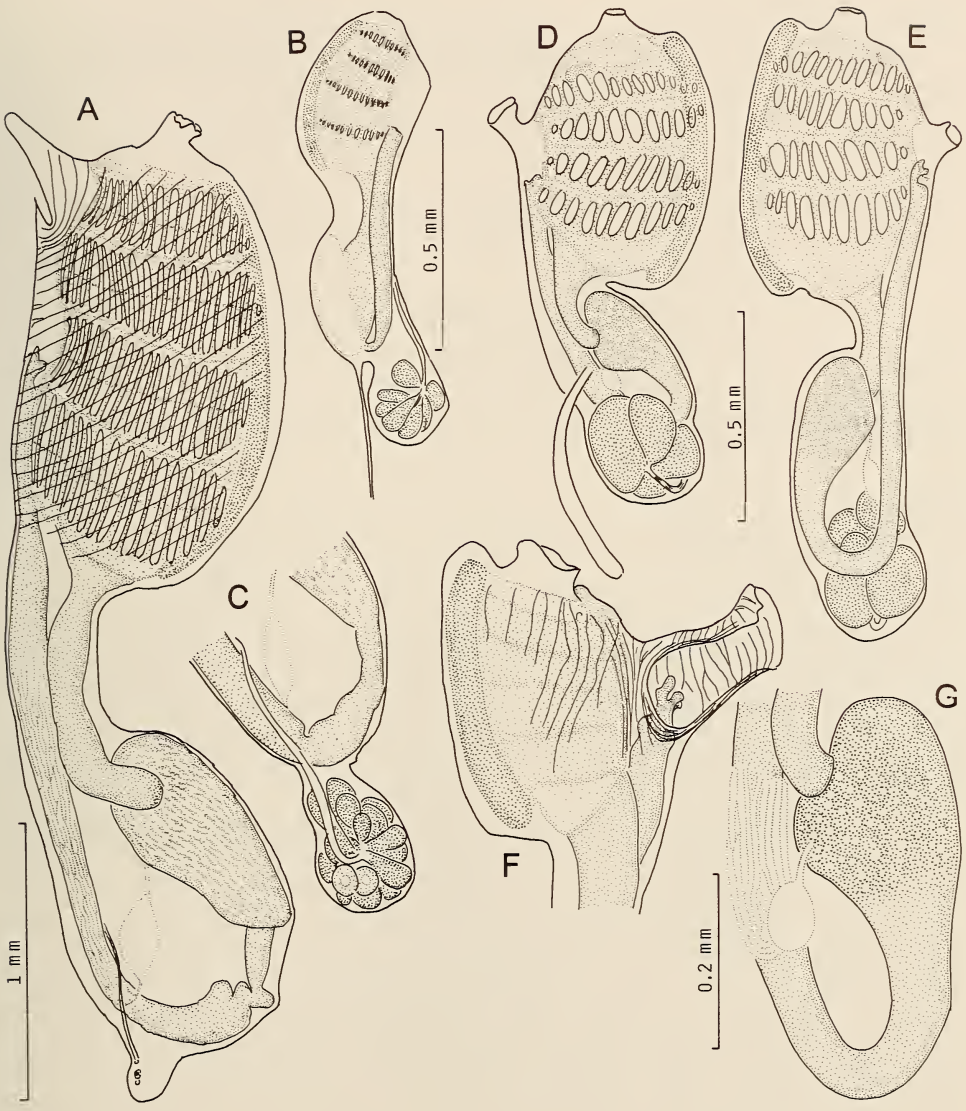

Fig. 18. A–C. *Distaplia skoogi*. A. Fully developed zooid. B. Zooid bud with gonads. C. Gonads. D–G. *Sycozoa arborescens*. D–E. Zooids. F. Thoracic musculature. G. Digestive tract.

The zooids were very young in the colonies examined and no trace of an incubatory pouch or larvae was found, but gonads already appear in young buds.

This species corresponds well with Millar's (1955, 1962) descriptions for *D. domuncula*. Our colonies were not attached to crabs but occur on hydroids or soft corals.

Remarks and distribution

Among the species that also have a smooth stomach wall and gonads in a pouch below the abdomen, *D. prolifera* Kott, 1990, from western Australia, differs by its encrusting colonies. *Distaplia domuncula* (Hartmeyer, 1913), from False Bay, also has thick colonies with zooids in circular systems, but the gonads were not developed.

Distaplia skoogi has been recorded from the Cape area, but has also been collected by Monniot in 1995 at Ibo Island in Mozambique.

Sycozoa arborescens Hartmeyer, 1912

Figs 2D, 18D–G

Sycozoa arborescens Hartmeyer, 1912: 316, pl. 38 (fig. 6), pl. 43 (fig. 6). Millar, 1962: 147, fig. 16; 1964: 166, fig. 5.

Material

One colony, intertidal cave in Old Harbour, Hermanus (Griffiths coll.).

Description

Several lobes arise from a common base, with round or laterally flattened heads held on narrower peduncles. The zooids are arranged in vertical double rows in the head, along cloacal channels. The common cloacal apertures form an oval line internal to the edge of the flat upper surface of each lobe. The colour in life is red and the tunic is translucent. No foreign matter adheres to the tunic.

The zooids measure 1–1.5 mm in length. The oral siphon is cylindrical without lobes (Fig. 18D, E). The cloacal siphon is either in a tube or gapes more with a wide upper languet (Fig. 18F). The four rows of 12–14 stigmata are grouped in pairs in the younger zooids (Fig. 18D, E). The abdomen is the same length as the thorax. The stomach tapers posteriorly with no differentiation into the intestine (Fig. 18G). Its wall is smooth, but it is slightly spotted when stained. A large pyloric ampulla (Fig. 18G) is located inside the gut loop, and joins longitudinal parallel tubules which surround the intestine to the anterior part of the stomach. The colonies in this species are dioecious The colonies examined were only male. Four to six testis vesicles at the bottom of the gut loop protrude posteriorly (Fig. 18E). The sperm duct emerges posteriorly from the centre of the barrel-shaped group of testis vesicles and curves anteriorly to follow the rectum. No ovary or brood pouch were present.

Remarks and distribution

The present colonies correspond well with Hartmeyer's (1912) and Millar's (1962, 1964) descriptions of *S. arborescens*, except for the common cloacal apertures. Hartmeyer (1912) mentioned a single cloacal aperture on the top of each lobe, but his plate 38 (fig. 6) suggests several apertures at the top of each cloacal channel. Millar did not describe the common cloacal apertures and his figures are not clear. Hartmeyer's type (ZMB 2778) was examined and clearly

shows one common cloacal aperture at the top of each cloacal channel, and all apertures placed around a dense core of tunic.

Sycozoa arborecens is only known from South Africa.

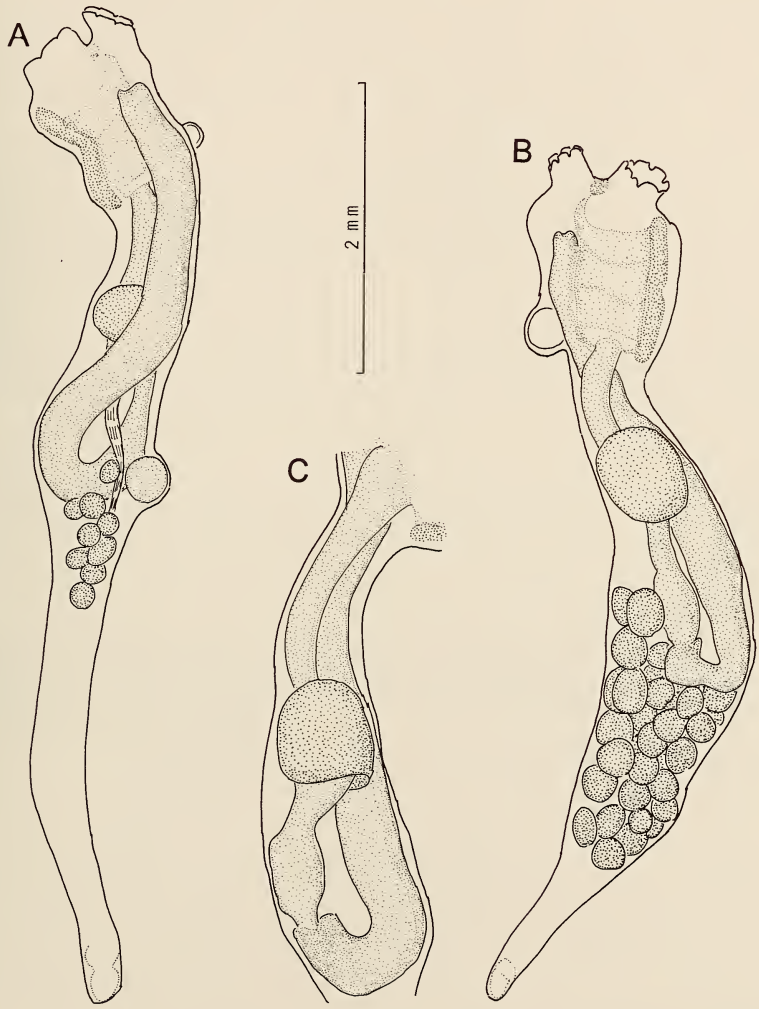

Fig. 19. *Sigillina digitata*. A–B. Zooids. C. Details of the gut.

Sigillina digitata (Millar, 1962)
Figs 2E, 19

Eudistoma digitata Millar, 1962: 155, fig. 20; 1964: 163.

Material

Several colonies, False Bay, in pools; Oudekraal, Cape Peninsula, 2–15 m (Griffiths coll.).

Description

Numerous colonies were collected in pools at low tide and deeper down to 15 m depth in the Western Cape area. They are large, very soft masses of irregular lobes, some of them 150 mm across, either white, pink, or pale brown. They are very often inhabited by numerous amphipods.The zooids open both their siphons independently at the colony surface without any arrangement into systems. The tunic is transparent and has a thin surface layer more resistant than the gelatinous internal matrix.

The zooids are perpendicular to the colony surface with six lobed siphons opening at the same level (Fig. 19A, B). The 24 tentacles alternate regularly in three orders of size. The branchial sac has about 25 stigmata in a half-row. About 20 thoracic longitudinal muscles extend through the abdomen and farther to the long post-abdominal process. The stomach has a smooth wall. It is followed by a wide mid-intestine that is clearly separated from the rectum by a constriction in the descending limb of the gut (Fig. 19C).

The gonads consist of a long cluster of testis vesicles lying partially on the gut loop and extending beyond it (Fig. 19B), and an ovary in the centre of the testis (Fig. 19A). A long post-abdominal process contains longitudinal muscle fibres and reserve cells. The heart is located inside the gut loop.

No larvae were found in the colonies examined, but a dilation of the posterior part of the cloacal cavity containing an egg (Fig. 19B) was observed in zooids having gonads.

Remarks and distribution

The present specimens collected in the Western Cape Province correspond well with Millar's descriptions of samples collected in the same area. The gonadal extension under the gut loop is a characteristic of the species, even when no larvae are present.

The distribution of *S. digitata* is restricted to South Africa.

Family **Clavelinidae**

Clavelina lepadiformis (Müller, 1776)

Fig. 2F

Ascidia lepadiformis Müller, 1776: 226.
Clavelina lepadiformis: see Berrill, 1950: 70, figs 14–15. Brunetti, 1987: 102.

Material

Several colonies. Knysna Estuary and Port Elizabeth Harbour (Griffiths and Monniot coll.).

Distribution

This European species, well defined by its morphology and square stomach, has recently been introduced to South Africa, probably on ship hulls. *Clavelina lepadiformis* was previously recorded only along the European coast from the

latitude of Trondheim (Norway) down to the Mediterranean Sea, but has not been found on the African Mediterranean coast. Isolated or introduced populations have also been found in Morocco, Madeira and Azores Islands.

Family **Didemnidae**

Tridemnum cerebriforme Hartmeyer, 1913
Figs 2G, 20, 24A

Tridemnum cerebriforme Hartmeyer, 1913: 139, pl. 7 (fig. 1), pl. 8 (figs 4–5); Millar, 1982: 55, synonymy. Monniot, C. & Monniot, F., 1976*a*: 363. Monniot, F., 1990: 518, fig. 1. Nishikawa, 1990: 75.

Material

Several colonies. Saldanha Bay to Port Elizabeth (Griffiths and Monniot coll.). Sodwana Bay, KwaZulu-Natal (Schleyer coll.). Mozambique (Monniot coll.).

Description

Colonies of *T. cerebriforme* are very common along the South African coast but vary remarkably in appearance. These range from thin encrustations to thick colonies with a convoluted surface, but the consistency is always firm. Their colour varies from light grey to pink-grey or dark grey. The colour and thickness may vary in the same colony. In life the surface of the colonies is smooth; when fixed the oral siphons protrude slightly, the spicules preventing retraction. The basal layer of the colonies, in which the spicules are less dense, often includes foreign matter.

The size of the zooids is also variable, being much larger in the thicker areas than in thinner parts of the same colony. The oral siphon is either short and lobeless or cylindrical with six lobes (Fig. 20A). It may be colourless or contain black pigment. A black spot is located at the anterior extremity of the endostyle. The cloacal siphon is tubular and differently oriented according to the position of the zooid in the colony. The cup-like lateral thoracic organs, at the level of the third stigmata row, may attain a very large size (Fig. 20A) or remain small. There are 8–10 stigmata in the first row. The retractor muscle emerges from the oesophageal peduncle (Fig. 20A) and can be longer than the thorax.

The abdomen has no special characteristics. The gut loop is straight or more or less twisted. The testis vesicle is conical (Fig. 20B) and covered with seven or, rarely, nine sperm duct coils. The ovary develops after the testis.

The larvae are colourless and variable in size and structure in the same colony (Fig. 20C, D). They possess an ocellus and otolith, three adhesive papillae and on each side a variable number of lateral ampullae. At the beginning of their development, these ampullae are well separated with four on each side (Fig. 20C). During growth they increase in length and either remain undivided or divide partially or fully, becoming bifid or doubled (Fig. 20D). As a result there may be four, six, seven or eight ampullae on each side.

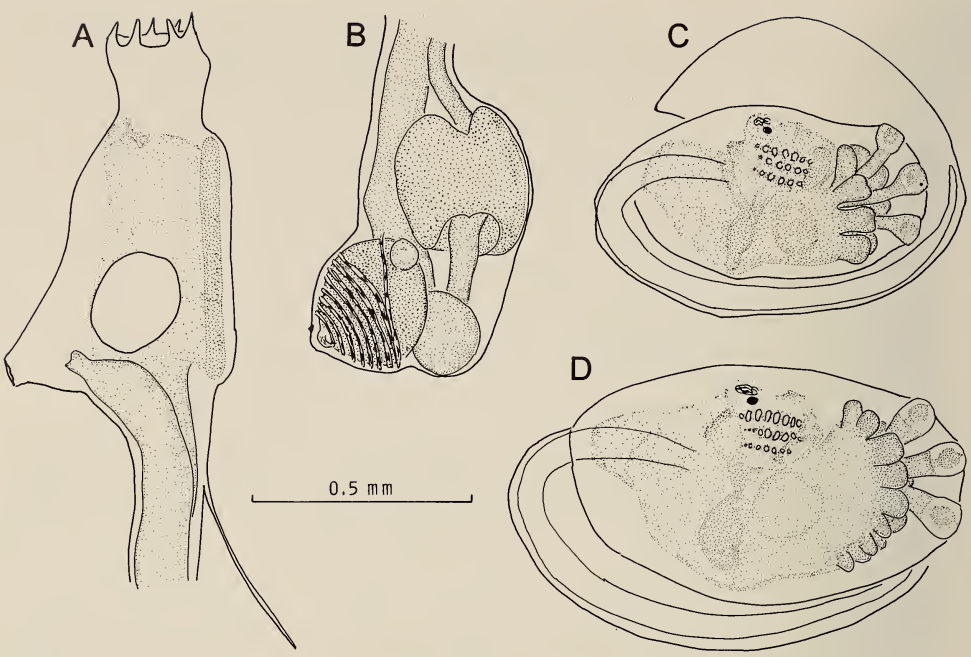

Fig. 20. *Tridemnum cerebriforme*. A. Thorax. B. Abdomen. C–D. Larvae.

The spicules always have the same stellate shape with sharp rays (Fig. 24A). Their abundance is variable from one colony to another. They are always dense in the upper layer, especially around the oral apertures, but often less numerous in the basal tunic. The spicule size and the number of rays are variable, independent of the size of the colony.

Remarks and distribution

This species has always raised difficulties in its identification in different parts of the world, and doubts remain about its being a single species. The variability is universal, and nobody has been able to find distinctive characteristics allowing the separation of species. It was first described in South Africa but has since been found throughout the Western Indian Ocean, around Australia, in the western tropical Pacific Ocean, and off Japan.

Didemnum aures F. Monniot sp. nov.

Figs 21, 24B

Material

Holotype. SAM–A25849, Port Elizabeth (33°59'S 25°39'E), intertidal, collected by C. and F. Monniot, 14 Feb. 1996.

Other material. Several colonies, Gerickespunt (Sedgefield), intertidal (Monniot coll.).

Description

This spectacular species forms large, bright red crusts 2–3 mm thick and commonly 100 mm across. The colonies are smooth but appear convoluted growing on uneven substrata such as algae, sand, shells, polychaete tubes and many hard surfaces. The margin of the colonies is thick. The cloacal channels are wide at the thoracic level, but narrower channels cross the deeper part of the tunic. The stellate spicules are crowded throughout the full thickness of the colonies.

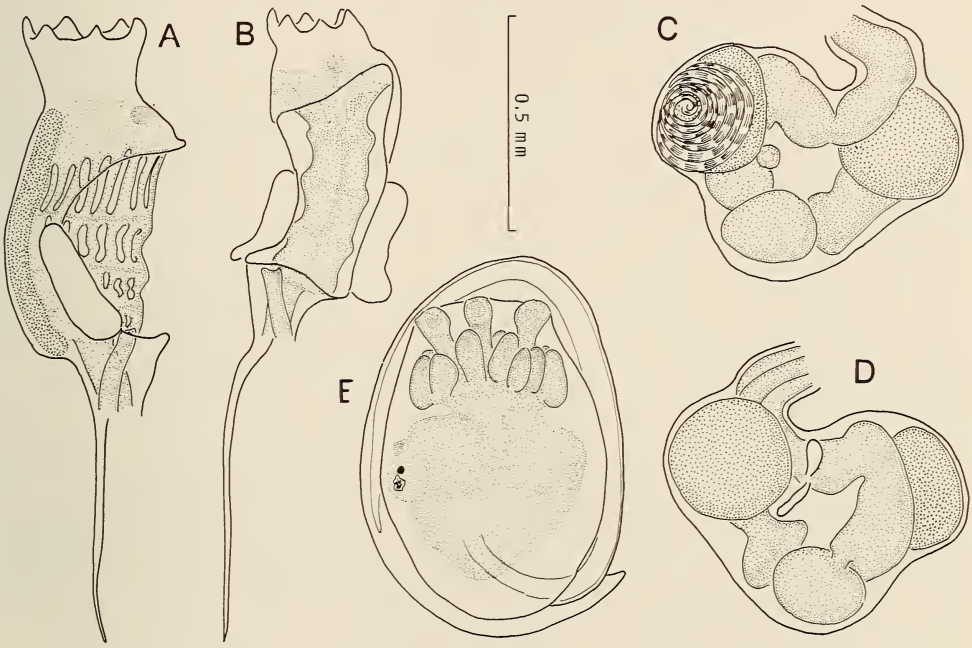

Fig. 21. *Didemnum aures* sp. nov. A–B. Thorax. C–D. Both sides of the abdomen. E. Larva.

The oral siphon is cylindrical, only slightly narrower than the long thorax (Fig. 21A). The cloacal aperture is wide, extending along the four rows of stigmata (Fig. 21A, B). There is no languet. On each side of the body wall, on the margin of the cloacal aperture, a very large leaf-shaped lateral thoracic organ protrudes like ears (giving the species its name) (Fig. 21A, B). We counted 6–7 stigmata in the first half row (Fig. 21A). The retractor muscle is at least as long as the thorax (Fig. 21B). The abdomen is folded under the thorax. The gut loop has the usual shape with well-separated components (Fig. 21C, D); it is folded on itself. The single testis vesicle (Fig. 21C) protrudes and is covered by 7–9 coils of the sperm duct; it is pushed aside over the rectum when a large oocyte develops.

Larvae were found in samples from Port Elizabeth (Fig. 21E). The trunk is 0.75 mm long and encircled by the tail. The visceral mass is separated from the anterior ampullae and papillae by a constriction. The three parallel adhesive

papillae are encircled by 12–16 ampullae, which are not regularly spaced or necessarily of equal size. The larvae have no buds.

The spicules (Fig. 24B) are small, the largest 33 μm in diameter, and are stellate with few conical rays.

The main distinctive characteristics of this species are the size and shape of the lateral thoracic organs, and the structure of the anterior ampullae of the larva.

Didemnum epikelp F. Monniot sp. nov.

Figs 22, 24C

Material

Holotype. SAM-A25850, Gerickespunt (Sedgefield) (34°02'S 22°45'E), intertidal, collected by C. and F. Monniot, 14 Feb. 1996.

Other material. Several colonies, locality as above, intertidal (Monniot coll.).

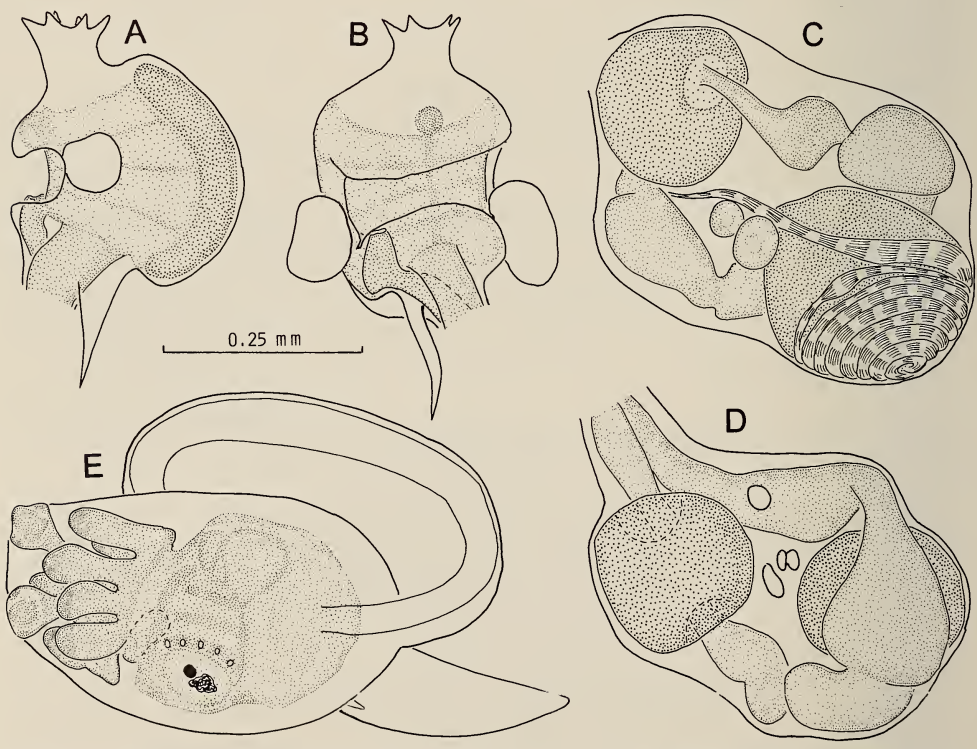

Fig. 22. *Didemnum epikelp* sp. nov. A–B. Thorax. C–D. Both sides of the abdomen. E. Larva.

Description

This white species encrusts kelp roots (hence the species name) in 1-mm thick sheets of irregular outline. The colony surface is smooth. The tunic is

filled with spicules and is hard but not brittle. The zooids are small, 0.8 mm in length when extended; the abdomen is normally folded under the thorax.

The oral siphon has six sharp lobes (Fig. 22A). The thorax is generally contracted and the cloacal opening forms a simple hole or a transverse slit (Fig. 22B) without a languet. The lateral thoracic organs are round leaves (Fig. 22A, B) that protrude from the body wall mid-way down the thorax but at some distance from the rim of the cloacal aperture. The waist is short. A short retractor muscle arises from the base of the thorax (Fig. 22A, B).

The abdomen is larger than the thorax (Fig. 22C, D). The gut loop is twisted. The stomach is spherical, large, followed by a post-stomach with an annular swelling, a short mid-intestine, and a rectum of variable diameter but always enlarged at its beginning. A large testis vesicle covers part of the abdomen. Nine coils of the sperm duct are tightly pressed against the external side of the spherical vesicle (Fig. 22C). The ovary develops in the middle of the gut loop.

The larvae (Fig. 22E) have an elongated trunk 0.45 mm long. An ocellus, otolith and some branchial perforations are present, but no bud. There are only two adhesive papillae, with four pairs of digitate ampullae on each side (Fig. 22E). In less advanced stages of development, the young tadpoles have only three pairs of digitate anterior ampullae.

The spicules (Fig. 24C) are stellate, with short rays that are frequently cut at their extremity. Their average diameter is 30 μm.

Remarks

This species has no special characteristics except the elongated larval trunk with only two adhesive papillae. The thin crusts of this white didemnid with tiny zooids do not correspond to the description of any other species of *Didemnum* in the South African area. It may have been previously collected but wrongly identified as *Didemnum candidum* (Savigny, 1816), as has occurred with many other white *Didemnum* species worldwide. Lafargue (1974) established a neotype of *Didemnum candidum* after she studied numerous colonies from the Red Sea. Her description mentions larvae with three adhesive papillae.

Didemnum globiferum F. Monniot sp. nov.

Figs 2H, 23, 24D

Material

Holotype. SAM-A25851, Kommetjie, Cape Peninsula (34°08'S 18°19'E), intertidal, collected by C. and F. Monniot, 5 Feb. 1996.

Other material. Several colonies, locality and collection details as above.

Description

The colonies encrust hard substrata in thin sheets about 1 mm thick and commonly more than 100 mm across. Live specimens are pure white. The common cloacal apertures are inconspicuous. The oral siphons are evenly distributed, and form small holes on the very flat and smooth colony surface,

giving it a spotted pattern. The spicules are densely packed throughout the tunic, and the colonies would be brittle but for their thinness. The cloacal channels are limited to the thoracic level. The abdomens of the zooids are folded under the thoraces.

The oral siphon has six pointed lobes (Fig. 23A). The cloacal aperture is large in relaxed zooids (Fig. 23A) but narrow in other parts of a same colony. There is no languet. The lateral thoracic organs protrude above the two last stigmata rows (Fig. 23A, B). There are 6–7 stigmata per side in the first branchial row. The retractor muscle originates from the oesophageal peduncle, and it is shorter than the thorax (Fig. 23A, B).

The gut loop has the usual shape found in the genus, the intestinal segments being without apparent separations. A single large, conical testis lobe protrudes from the middle of the gut loop and is covered by 7–9 coils of the sperm duct (Fig. 23C). The ovary lies at the side of the testis (Fig. 23C).

The larvae (Fig. 23D) have an oval trunk 0.5 mm long with the tail encircling three-quarters of the perimeter. An ocellus and otolith are present. The three narrow adhesive papillae have four round ampullae on each side. The larva is not gemmiparous.

The spicules are spheres, providing the species name, and the largest are 40 μm in diameter. They consist of numerous rays, formed from parallel fibres of similar length (Fig. 24D).

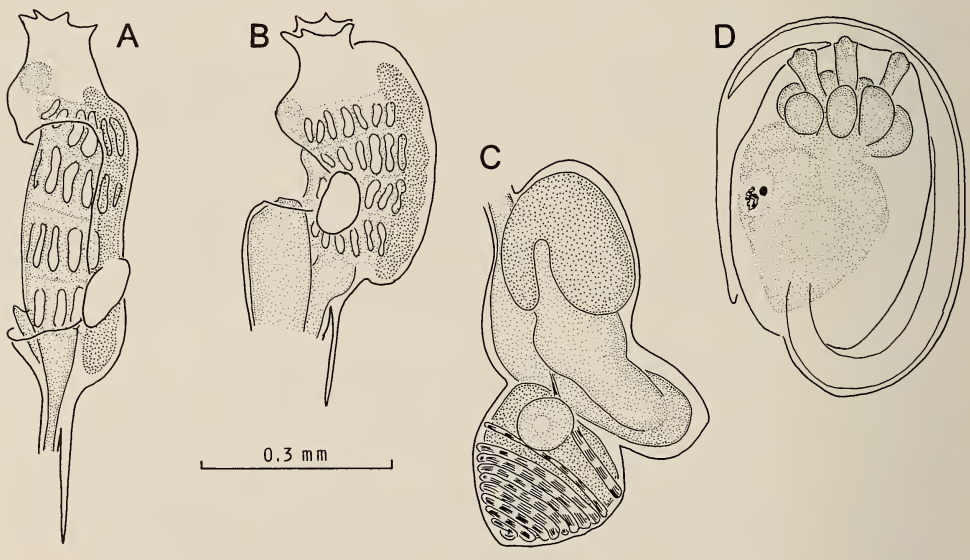

Fig. 23. *Didemnum globiferum* sp. nov. A–B. Thoraces. C. Abdomen. D. Larva.

Remarks

This species looks like *D. epikelp*, but the colonies are larger and the zooids are slightly different, and the larvae have three adhesive papillae instead of two. The spicules are quite different, being spherical but not stellate.

Didemnum globiferum sp. nov. has spicules quite different from *Didemnum candidum* Savigny, 1816, as redescribed by Lafargue (1974) or *Didemnum stilense* Michaelsen, 1934.

Didemnum granulatum Tokioka, 1954

Didemnum moseleyi f. *granulatum* Tokioka, 1954: 244.
For a detailed synonymy see Monniot, F., 1994: 311.

Material

Several colonies. Port Elizabeth (Monniot coll.); Isipingo and Thompson's Pool, near Ballito, KwaZulu-Natal, intertidal (Griffiths coll.).

Description

The thin colonies are white or yellow with a rugose surface. The common cloacal openings have a radially striated rim due to the arrangement of the spicules in converging lines, a strong characteristic of this species. The cloacal channels are wide as the very wide cloacal siphons of the zooids uncover most of the branchial sac.

Remarks and distribution

All characteristics of the zooids and larvae correspond well to the description of specimens collected in many other areas.

This species is widely distributed. It has been recorded in the western Pacific off Japan, Fiji, New Caledonia, Australia, Polynesia, Hong Kong; and in the Indian Ocean off South Africa, Mozambique, Tanzania and in the Red Sea. It has also been found in the Atlantic Ocean off Brazil.

Didemnum leopardi F. Monniot sp. nov.

Figs 3A, 25, 29A

Material

Holotype. SAM-A25852, Sodwana Bay, KwaZulu-Natal (27°33'S 32°42'E), 14–15 m. Collected by M. Schleyer, Dec. 1992.

Other material. Two colonies, locality details as above (Schleyer coll.).

Description

The three colonies are the same in appearance. They form thin and hard crusts, about 1 mm thick, with the surface slightly but regularly raised in small white spots caused by accumulations of spicules. A pinkish brown network is evident between these spots. The dark holes of the regularly spaced common cloacal apertures give the surface a leopard-skin aspect (hence the species name). The spicules are densely packed throughout the tunic. Large, brown, spherical cells are numerous, especially in the superficial layer of the colony, and probably represent symbiotic unicellular organisms. Brown pigment cells

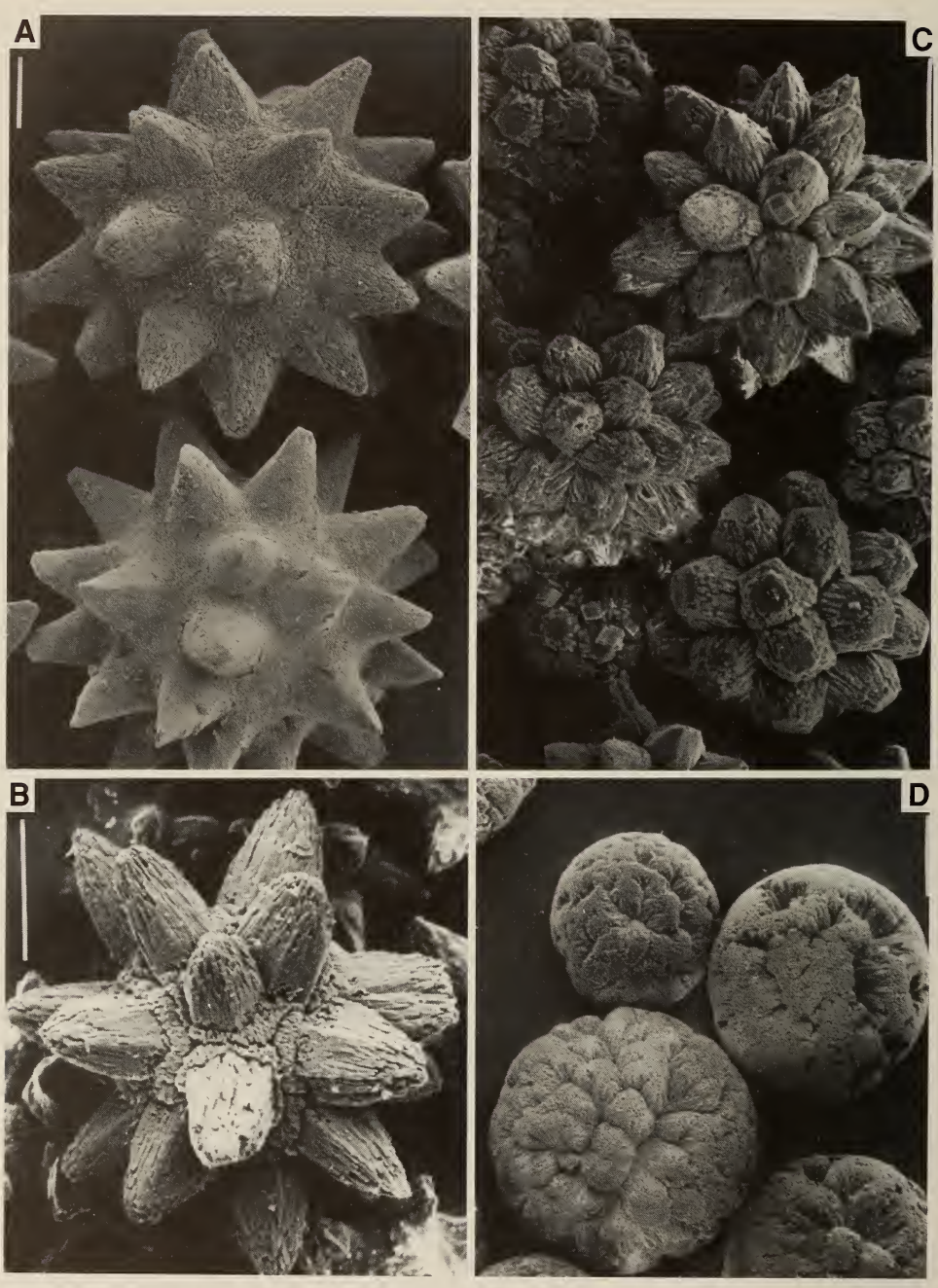

Fig. 24. Spicules. A. *Tridemnum cerebriforme*. B. *Didemnum aures* sp. nov. C. *Didemnum epikelp* sp. nov. D. *Didemnum globiferum* sp. nov. Scale bars = 10 μm.

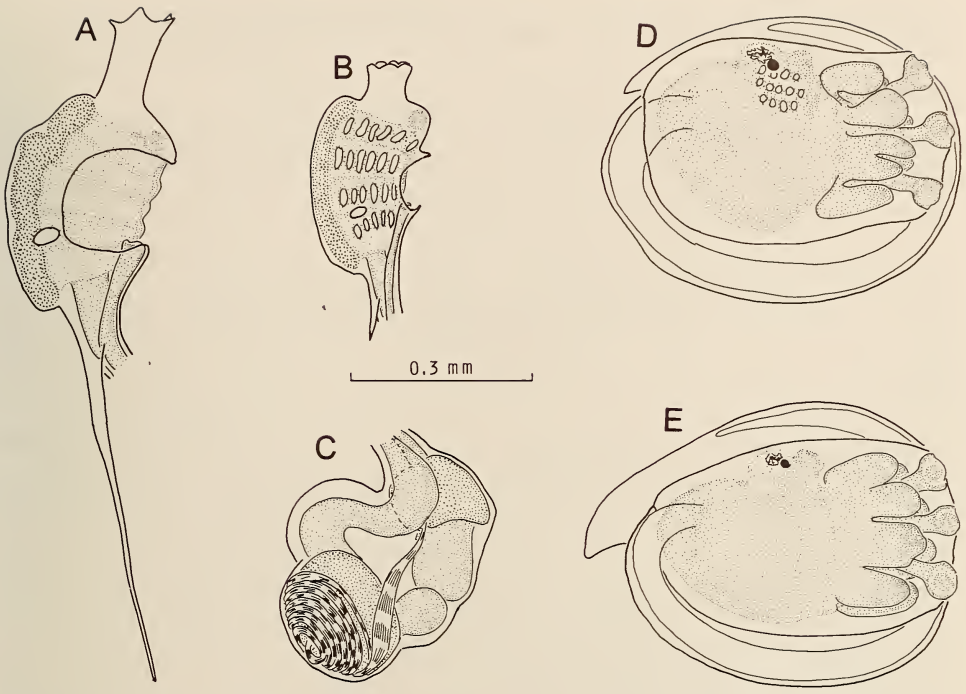

Fig. 25. *Didemnum leopardi* sp. nov. A. Thorax of a mature zooid. B. Thorax of a young zooid. C. Abdomen. D–E. Larvae.

are found throughout the tunic and especially in the zooids. The zooids are thus brown and small, less than 1 mm long, with their thoraces perpendicular to the colony surface and their abdomens folded under them. The cloacal channels are restricted to the thoracic level.

The zooids have a narrow, cylindrical oral siphon with six pointed lobes (Fig. 25A). The cloacal siphon is rather narrow in young zooids (Fig. 25B), and has anterior and posterior lips which form a kind of beak. In more mature zooids, the cloacal aperture is wider and these lips disappear (Fig. 25A).

The branchial sac has no anterior and posterior unperforated areas, and we counted six stigmata on each side in the first rows. The lateral thoracic organs are round, small, and located at the level of the third transverse vessel or fourth row of stigmata. A large area of the basal part of the thorax is unperforated. The retractor muscle (Fig. 25A) is at least equal in length to the thorax in mature zooids, and originates from the oesophageal peduncle.

The gut loop is short (Fig. 25C) with a small stomach and a comparatively large post-stomach. A spherical testis lobe protrudes from the posterior part of the gut loop (Fig. 25C). Its external hemisphere is covered by 7–9 coils of the sperm duct. The ovary appears and replaces the testis when it regresses.

The deeply pigmented larvae lie in the basal layer of the colony. The trunk is 0.5 mm long and has an ocellus, an otolith, three adhesive papillae and four pairs of anterior ampullae (Fig. 25E). In mature larvae (Fig. 25D), one of the

anterior ampullae is sometimes partially divided and a vascular process appears on the left side of the trunk between the visceral mass and the ampullae.

The spicules (Fig. 29A) are of uniform stellate shape, the largest being 35 μm in diameter. The rays are fibrous and have blunt tips.

The leopard pigmentation of this species is characteristic, as is the kind of beak made by the anterior and posterior rims of the cloacal siphon in young zooids.

The colonies are inhabited by amphipods.

Didemnum mesembrinum F. Monniot sp. nov.

Figs 26, 29B

Material

Holotype. SAM–A25853, Knysna (34°04'S 23°03'E), intertidal. Collected by C. and F. Monniot, 12 Feb. 1996.

Other material. Several colonies. As above and from Fish Hoek, intertidal (Monniot coll.).

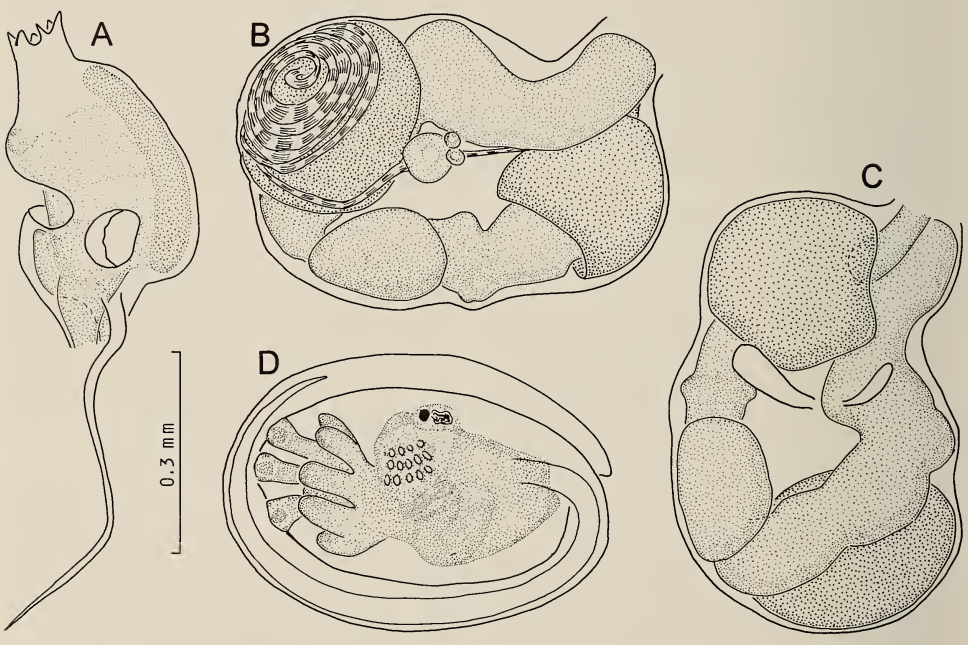

Fig. 26. *Didemnum mesembrinum* sp. nov. A. Thorax. B–C. Both sides of the abdomen. D. Larva.

Description

The colonies are large crusts, about 1 mm thick and reaching 100 mm across, covering all kinds of hard substrata. The colour in life is whitish or cream. As the spicules are not very abundant, the oral apertures and the roof of

the cloacal channels merge into a darker marbled pattern. Some amphipods are burrowed in the tunic, which also includes algae, shell debris, bryozoans, polychaetes and sponges.

The zooids are very similar to those of *Didemnum millari*. The oral siphon is cylindrical with six lobes (Fig. 26A). The cloacal aperture is narrow, closed to a slit when the zooid is contracted. The lateral thoracic organs (Fig. 26A) protrude in the middle of the thoracic wall at the level of the third transverse vessel, sometimes spreading over two stigmata rows.

The long retractor muscle originates from the base of the thorax or the proximal part of the oesophageal peduncle (Fig. 26A). The abdomen (Fig. 26B) is larger than the thorax, and forms a narrow loop folded on itself with clearly distinguished segments (Fig. 26B, C). The large testis follicle (Fig. 26B) protrudes below the bottom of the gut loop, and its external pole is coiled with 6–9 turns of the sperm duct. The ovary develops between the testis and the stomach (Fig. 26).

The larvae (Fig. 26D) have an ovoid trunk, 0.46 mm in length, three-quarters of its perimeter encircled by the tail. The visceral mass is separated by a constriction from the three anterior adhesive papillae, which are surrounded by four pairs of elongated ampullae. The three rows of branchial stigmata are already pierced (Fig. 26D) and gut differentiation has commenced, but there is no bud. An ocellus and otolith are present.

The spicules (Fig. 29B) are small, their a maximum diameter being 25 μm. They consist of many blunt rays of similar length but slightly different thickness. The spicules in the tunic around the oral apertures are smaller than in other parts of the colony.

Remarks

This species is closely allied to *Didemnum stilense* sensu Millar (1955) (non *D. stilense* Michaelsen, 1934) for the anatomical characters of the zooids. Nevertheless *D. mesembrinum* sp. nov. differs in several points: the different appearance of the colonies, the lack of a mucous sheet at the colony surface, the sparser spicules and the cloacal channels that are visible from the surface. The shape of the spicules is completely different. No pigment inclusions were found in the basal layer of the colony, whereas they occur in the other species collected in the same locality.

Both species, *D. mesembrinum* and *D. millari* (the new name for *D. stilense* non Michaelsen, 1934; Millar, 1955, 1962), were probably combined as a single species by Millar, who remarked that he was not satisfied that all colonies belonged to the same species, noting that his identification was tentative.

Didemnum millari F. Monniot sp. nov.

Figs 27A–D, 29C

non *Didemnum stilense* Michaelsen, 1934: 146.
Didemnum stilense: Millar, 1955: 176 (*part.*).
?Didemnum stilense: Millar 1962: 164 (*part*).

Material

Holotype. SAM-A25854, Woolley's Pool, False Bay (34°08'S 18°26'E). Collected by C. Griffiths and C. and F. Monniot, 22 May 1994.

Other material. Several colonies. Wooley's Pool and Miller's Point, False Bay; Kommetjie (Griffiths and Monniot coll.). Common intertidally and subtidally.

Description

The cream-coloured colonies are thin, soft and no more than a few centimetres across. Numerous amphipods inhabit cavities in the colonies; their entrances are clearly visible in the surface as slits.

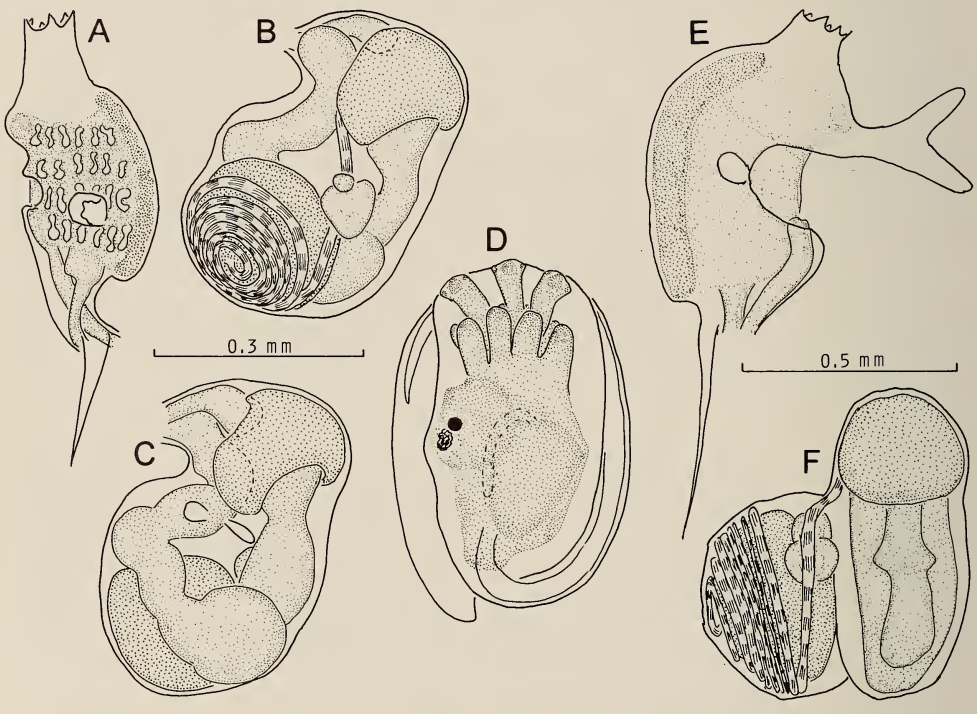

Fig. 27. A–D. *Didemnum millari* sp. nov. A. Zooid. B, C. Both sides of the abdomen. D. Larva. E–F. *Didemnum obscurum* sp. nov. E. Thorax. F. Abdomen.

The colonies encrust all kinds of material: rocks, shells, sponges, bryozoans and algae. The colony surface is either smooth or raised in tiny spots as the oral siphons protrude when the animal is contracted. The spicules are irregularly distributed and sometimes give the colony surface a thinly reticulated appearance under magnification. A very thin layer of tunic without spicules or vacuolar cells covers the surface of the colonies, giving them a shiny appearance. Orange inclusions are irregularly scattered within the basal part of the tunic. The cloacal channels are restricted to the thoracic region.

The six oral lobes of the zooids are pointed (Fig. 27A). The thorax is smaller than the abdomen, always contracted, and has a low, small cloacal aperture without languet. There are six stigmata in each half row. The lateral thoracic organs are circular, protruding, often large, extending above the third row of stigmata, and located in the middle of the thorax width (Fig. 27A). The retractor muscle separates from the oesophageal peduncle (Fig. 27A).

The gut loop (Fig. 27C) is folded back on itself. The single testis vesicle (Fig. 27B) is covered with 6–9 coils of the sperm duct and lies on the bottom of the gut loop, with the ovary on its side.

The larvae are small (Fig. 27D), 460 μm in trunk length, with three diverging narrow adhesive papillae and four pairs of lateral digitiform ampullae. They are not gemmiparous.

The spicules (Fig. 29C) are stellate with few conical pointed rays, the largest being 30 μm in diameter.

Remarks

This description corresponds relatively well with what Millar (1955, 1962) tentatively identified as *D. stilense* Michaelsen, 1934, from the same geographic area. However, our colonies do not correspond with the original description by Michaelsen (1934), who stated that his species had no spicules in the surface layer of the colony but possessed large bladder cells, and spicules 'with very numerous short conical spines'. In addition Michaelsen gave the colony thickness as 9 mm, this being quite different to the thin crusts of *D. millari*.

Didemnum molle (Herdman, 1886)

Diplosomoides molle Herdman, 1886: 310.
Didemnum molle: see Monniot, F., 1994: 316, fig. 10.

Material

Several colonies, Sodwana Bay, KwaZulu-Natal, 15 m (Schleyer coll.).

Distribution

This urn-shaped species is very common in all tropical areas of the Indian and western Pacific oceans. Its presence in KwaZulu-Natal probably represents the southernmost distribution of the species. *Didemnum molle* contains abundant mucus and unicellular symbiotic algae.

Didemnum ?obscurum F. Monniot, 1969

Figs 3B, 27E, F, 29D

Didemnum obscurum Monniot, F., 1969: 453; 1994: 319. Monniot, C. & Monniot, F., 1997: 1626.

Material

Two colonies, Sodwana Bay, KwaZulu-Natal, 15 m (Schleyer coll.).

Description

The two colonies from different stations are encrustations, 2–4 mm thick with a smooth surface. The common cloacal openings are stellate. The colony surface is very smooth and olive green to gold. The narrow cloacal channels are limited to the thoracic level. The tunic is tough. The spicules are limited to a thin layer at the colony surface and another at the interface with the substratum. The tunic is filled with large vacuolar cells throughout its thickness. It is brown in formalin.

The zooids only occupy the upper layer of the colony. They are dark brown in formalin. The oral siphon has six short sharp lobes (Fig. 27E). The cloacal languet (Fig. 27E) is very variable in size. It is wide around the common cloacal aperture and has two lobes and a transverse musculature. Elsewhere, the languet is small, T-shaped or simple. It is always fragile and difficult to extract from the tunic. The lateral thoracic organs are round and protrude at the rim of the body wall facing the second transverse vessel (Fig. 27E). The branchial sac, dark brown in formalin, has 8–10 stigmata per side in the first row. The retractor muscle is attached at the anterior part of the short waist (Fig. 27E).

The gut loop is flat (Fig. 27F). The single testis vesicle is particularly large, filling almost the whole abdomen (Fig. 27F). The sperm duct has 8–9 coils. The ovary develops simultaneously with the testis. Only one very young embryo was found in a single colony.

The spicules (Fig. 29D) are rather uniform in size and consist of numerous sharp rays.

Remarks and distribution

Didemnum obscurum Monniot, F., 1969, was described from Dakar and also collected at Bahrain, the Seychelles Islands and New Caledonia. The samples from KwaZulu-Natal do not contain larvae, so the identification remains uncertain. It is based on the similarity of the spicule shape and distribution, the dark pigment and the zooid anatomy.

Didemnum psammathodes (Sluiter, 1895)

Leptoclinum psammathodes Sluiter, 1895: 11.
Didemnum psammathodes: for synonymy see Monniot, F., 1994: 324.

Material

One colony. Thompson's Pool, near Ballito, KwaZulu-Natal (Griffiths coll.).

Description

A very small piece of colony was collected at low tide. The tunic is filled with faecal pellets, mixed with sparse spicules, except around the oral aperture, where spicules are more abundant. The zooids are similarly arranged as in colonies from other oceans (Monniot, F. 1983).

Didemnum psammathodes is widely distributed in the Atlantic Ocean from the Caribbean islands to Brazil (Rocha & Monniot 1995), in the western

and central Pacific Ocean and the whole tropical Indian Ocean south to KwaZulu-Natal.

Didemnum rodriguesi Rocha & F Monniot, 1993
Fig. 3C

Didemunum rodriguesi Rocha & Monniot, F., 1993: 261, figs 1–2. Monniot, F., 1994: 326, pl. 5A.

Material

Several colonies. Sodwana Bay, KwaZulu-Natal, intertidal to 22 m (Schleyer coll.).

Description

Underwater, the colonies are orange with common cloacal apertures on the top of swellings, circled with white. Under magnification, the colony surface has the thin reticulated pattern of the spicular arrangment observed in Atlantic and Pacific specimens. The spicules, zooids and larval anatomy are universally identical.

The presence of *Didemnum rodriguesi* in KwaZulu-Natal, recorded previously only from Brazil and New Caledonia, confirms that it has a worldwide tropical distribution.

This species can easily be confused with *Didemnum moseleyi* in the absence of larvae.

Polysyncraton ?aspiculatum Tokioka, 1949
Figs 3D, 28, 29E

Didemnum (Polysyncraton) aspiculatum Tokioka, 1949: 2, pl. 2 (figs 1–3). Kott, 1962: 301, figs 36–38; 1975. Nishikawa, 1990: 111.

Material

Several colonies. Sodwana Bay, KwaZulu-Natal, 14–15 m (Schleyer coll.). Djibouti, 5 m (Monniot coll.). Philippines, south of Maricaban Island (13°38.39'N 120°55.86'E), 16 m (CRRF coll.).

Description

The colonies from KwaZulu-Natal are pure white, thick crusts of a soft consistency. The spicules may be dense throughout the colonies, or limited to the surface and basal layers. Large cloacal channels are apparent from the surface as yellowish transparent lines delimiting irregular masses on the edges of which the oral siphons open.

The general structure of specimens from Djibouti is similar, but with fewer spicules and more pigment cells, giving the colonies a light brown colour. The network of the cloacal channels is the same. The only difference in colonies

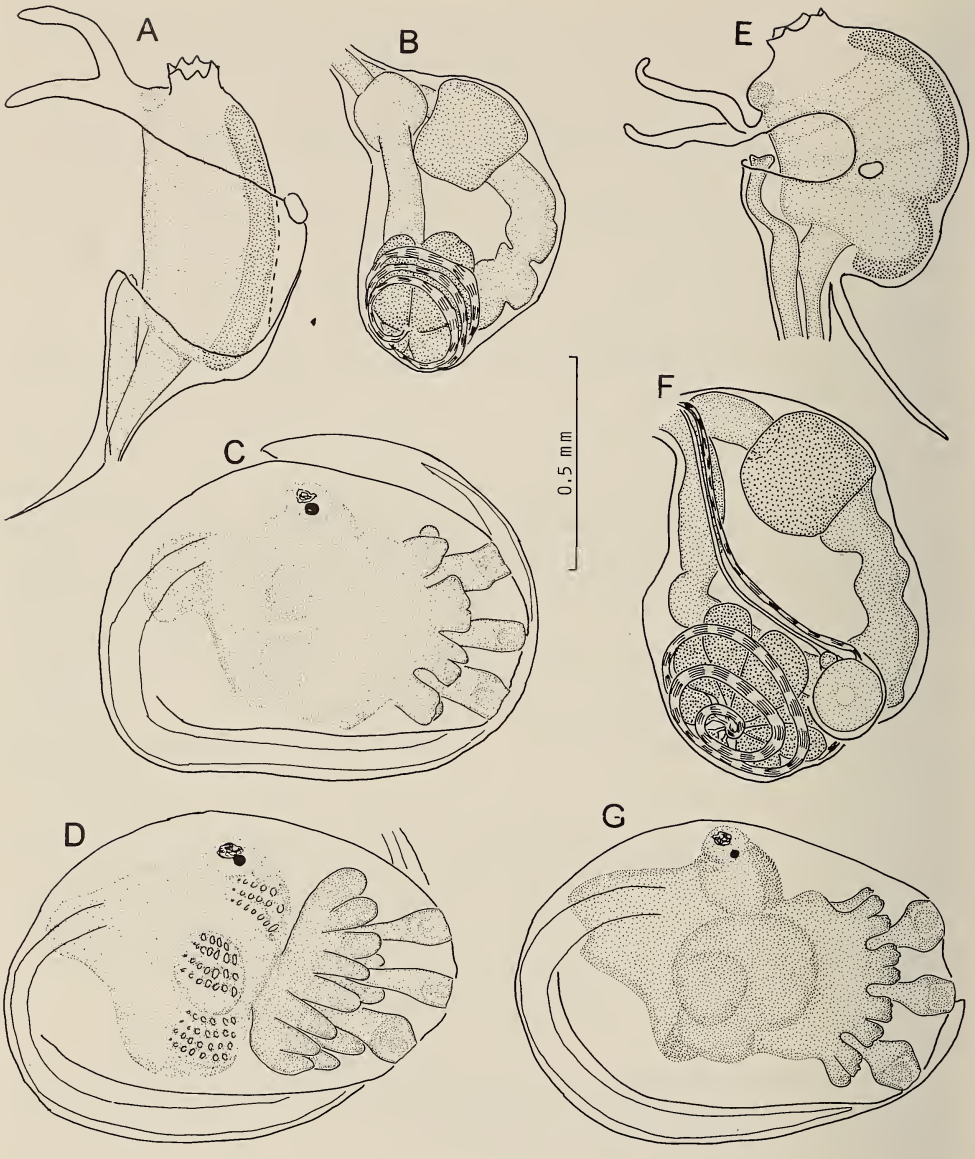

Fig. 28. *Polysyncraton aspiculatum*. A–D. Specimens from South Africa. A. Thorax. B. Abdomen. C–D. Larvae. E–G. Specimens from Djibouti. E. Thorax. F. Abdomen. G. Larva.

from the Philippines is their darker brown colour caused by a greater abundance of pigment cells in the tunic and zooids, and the absence of spicules.

The zooids are similar in structure to material from all of the above regions, as well as to the type specimen loaned from the Seto Marine Biological Laboratory.

The oral siphon is short with six lobes (Fig. 28A, E). The cloacal aperture may be very wide in relaxed zooids, exposing a large part of the branchial sac (Fig. 28A). The cloacal languet varies in shape according to its proximity to the common cloacal aperture. Close to it, it is always large, with two thin, long lobes (Fig. 28A, E), but these may be thicker and shorter elsewhere. The round lateral thoracic organs are located over the second row of stigmata or over the second transverse vessel. The branchial sac has ten stigmata on each side in the three first rows.

The retractor muscle originates in the anterior from the oesophageal peduncle (Fig. 28A, E).

The gut loop is wide open (Fig. 28B, F). The stomach is spherical and relatively small. The testis vesicles are arranged in a rosette of 5–10 elongated lobes, in the gut loop (Fig. 28B, F). The sperm duct is coiled in 3–5 loose turns. The ovary lies inside the last turn of the sperm duct and the oviduct follows the straight ascending part of the rectum.

Larvae were only present in colonies collected in KwaZulu-Natal, Djibouti and the Philippines, not Japan. They are large (Fig. 28C, D, G), with a trunk about 1 mm long and half encircled by the tail. Mature larvae have eight pairs of elongated ampullae on either side of the three adhesive papillae (Fig. 28D), resulting from the division of four pairs of ampullae in less developed tadpoles (Fig. 28C). An ocellus and an otolith are present. One bud develops on each side of the visceral mass.

The spicules (Fig. 29E) are about 30 μm in diameter; they consist of needles gathered in numerous rays to form balls. Their size varies according to their density within the colonies. They are very small and located within the lateral thoracic organs in the type colony described by Tokioka (1949). In colonies from Djibouti, the spicules are only present in tracks at the colony surface. In the specimens from KwaZulu-Natal, the spicules are sparse in some colonies and more abundant in others (Fig. 29E).

Remarks and distribution

The identification of the South African colonies would have been very speculative if the material had not been compared with samples from other areas. The colour and the density of the spicules, being variable within the same geographical region, do not allow us to separate the material into different species. The type specimen and other colonies collected by Nishikawa were examined but did not contain larvae.

Millar (1962) described *Polysyncraton magnilarvum* from a colony collected in KwaZulu-Natal. He recorded it as having a greyish-pink colour, soft consistency and few spicules. The description corresponds well with Millar's type specimen in the South African Museum. This confirms that *Polysyncraton magnilarvum* is different from *P. aspiculatum* Tokioka, 1949, in having larger spicules with fewer rays and larger larvae.

The distribution of *P. aspiculatum* is widespread, ranging from Japan to the Philippines, southern Australia, Djibouti and South Africa, if the material attributed to it consists of a single species.

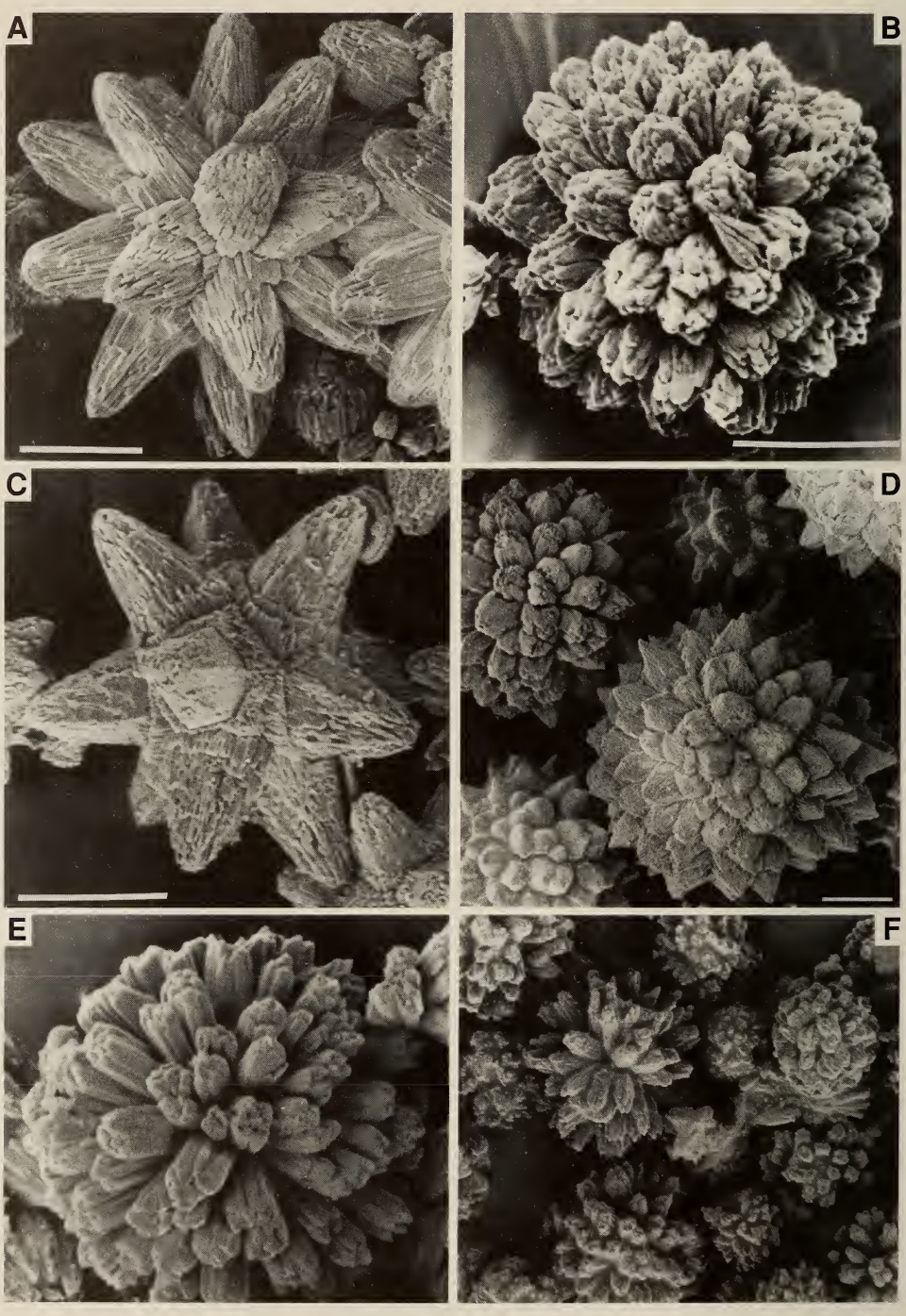

Fig. 29. Spicules. A. *Didemnum leopardi* sp. nov. B. *Didemnum mesembrinum* sp. nov. C. *Didemnum millari* sp. nov. D. *Didemnum obscurum*. E. *Polysyncraton aspiculatum*. F. *Lissoclinum bilobatum*. Scale bars = 10 μm.

Polysyncraton millepore Vasseur, 1968

Fig. 3E

Polysyncraton millepore Vasseur, 1968: 917. Monniot, F. & Monniot, C., 1999: figs 7B, 8A–D, pl. 1D, E.

Material

Several colonies, Sodwana Bay, KwaZulu-Natal, 8–22 m (Schleyer coll.).

Description

The colonies are large, convoluted sheets, with a smooth surface irregularly stained in tan and dark brown. The general consistency is hard, as the spicules are very densely packed throughout the tunic thickness.

The species has been recorded from Madagascar, Mozambique, and KwaZulu-Natal in South Africa, but not further south.

Atriolum marsupialis F. Monniot, 1989

Fig. 30C

Atriolum marsupialis Monniot, F., 1989: 674, text-fig.1, pl. 1A.

Material

Two colonies. Sodwana Bay, KwaZulu-Natal, 15 m, on *Polycarpa* (Schleyer coll.); Ibo Island, Mozambique, 10 m (Monniot coll.).

Description

The largest colony is 25 mm across and 3 mm thick. The colour is yellowish. The tunic is soft but resistant, containing few spicules in a single layer at the colony surface, sometimes gathered in white trails in the surface layer, which has small, irregular, erect papillae. Tracks of orange pigment and dark pigment cells are present in the basal tunic. Zooids and larvae are colourless. The cloacal channels are narrow.

The oral siphon is long compared to the zooid size, and without lobes at its rim. It is closed by a strong basal sphincter. The cloacal siphon is located at the postero-dorsal angle of the thorax. It has a peculiar shape: a sphincter encircles the cylindrical tube, the free extremity of which is divided in two unequal lips with the posterior lip being larger and curved in a kind of spoon. Both lips are edged with a crescent of transverse muscle fibres. The thorax is wide and almost square. Its wall has about ten longitudinal fibres on each side that are regularly spaced and not ramified. The lateral thoracic organs are located above the third transverse vessel in the middle of each side.

The branchial sac has four rows of 14 stigmata per side behind an unperforated area of one stigma length. An incubatory pouch with a narrow peduncle arises in the posterior part of the thorax against the oesophageal peduncle. There is no retractor muscle.

The waist is narrow and the abdomen is folded under the thorax. The gut loop is made of a narrow cylindrical oesophagus, a spherical stomach with a smooth wall, a conical post-stomach and an oval mid-intestine separated from the rectum by a constriction. The anus opens at the level of the third row of stigmata.

Five to seven testis vesicles in a rosette are covered by 7–8 coils of the sperm duct. The ovary develops against the testis. Two or three vascular processes arise from the centre of the gut loop on the side opposite the gonads.

The larvae (Fig. 30C) are brooded in the basal layer of the tunic, but only young, empty brood pouches were found attached to the zooids. The trunk is 0.65 mm long and spherical with the tail encircling three-quarters of the perimeter. The three adhesive papillae are thick, in a line, with four large, rounded ampullae on each side. The papillae and vesicles are separated from the visceral mass by a constriction. The larval branchial sac is already developed, as are the different parts of the digestive tract. A vascular process is differentiated on the right side of the larva, but there are no buds. The spicules are stellate, with numerous sharp rays.

Remarks and distribution

The African samples correspond exactly to *Atriolum marsupialis*, as described from New Caledonia. Only two other species of *Atriolum* have been described: *Atriolum quadratum* Monniot, F. & Monniot, C., 1996, from the western Pacific at Chuuk Island, and recently found again in Mozambique; and *Atriolum robustum* Kott, 1983, from the north of Australia but also present in New Caledonia (Monniot, F. 1990), Madagascar (Millar 1988), Mayotte (Comoros islands) and Mauritius (Lafargue & Vasseur 1989).

Lissoclinum bilobatum Millar, 1955
Figs 29F, 30A, B

Lissoclinum bilobatum Millar, 1955: 180, fig. 11. Plante & Vasseur, 1966: 146, pl. 2 (fig. 11).

Material

Several colonies. Thompson's Pool, near Ballito, KwaZulu-Natal (Griffiths coll.); Port Elizabeth, intertidal (Monniot coll.).

Description

The colonies are thin and pink or white encrustations of a soft consistency. The colony surface is smooth. The oral apertures are stellate. The cloacal channels are very wide.

The zooids have a short oral siphon (Fig. 30A). The wide cloacal aperture uncovers a large part of the branchial sac. A round languet is present (Fig. 30A) but is sometimes is very small and barely visible. The round, protruding lateral organs are located at the level of the second transverse vessel. There are eight

stigmata in the first and second half rows. The retractor muscle is absent. The abdomen is folded under the thorax. The gut loop is very narrow and contains a large, clear vesicle (Fig. 30B). The testis lies over the intestine and has two longitudinal lobes (Fig. 30B). The sperm duct is straight and enlarged at its start when the testis is fully developed.

Some larvae were present in a pink colony collected at Port Elizabeth. The trunk is 0.65 mm long and entirely covered with large pigment cells, which are dark brown in formalin. All larvae are immature and only have three adhesive papillae and an indication of four pairs of lateral ampullae.

The spicules (Fig. 29F) are generally small, 20 μm in diameter, but there are a few larger ones up to 35 μm. They are balls made of numerous rays of parallel needles which are rather irregularly spaced.

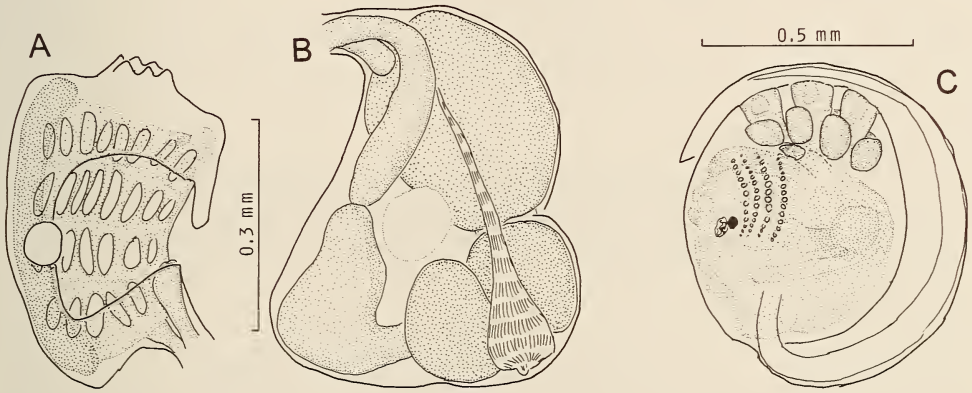

Fig. 30. A–B. *Lissoclinum bilobatum*. A. Thorax. B. Abdomen. C. *Atriolum marsupialis*. Larva.

Remarks and distribution

It was difficult to identify this species, as Millar's (1955) type could not be found at the British Museum. The description corresponds well with our specimen as well as the spicule size. Millar did not mention the cloacal languet or retractor muscle and they are absent in his figure.

This *Lissoclinum* species is closely allied to the Atlantic *Lissoclinum fragile* (Van Name, 1902) as described by Monniot, F. (1983). The zooids and spicules are similar. In the absence of mature larvae in the South African colonies, we prefer to retain Millar's name, *L. bilobatum*. Further collections of colonies with larvae would perhaps allow us to synonymize both species.

The species distribution is presently restricted to Madagascar and the east coast of South Africa.

Lissoclinum bistratum (Sluiter, 1905)

Leptoclinum bistratum Sluiter, 1905: 18, pl. 2 (fig. 10).
For detailed synonymies see Kott, 1982: 112; Monniot, F., 1992: 566, text-fig. 1, pl. 1A.

Material

Several colonies. Sodwana Bay, KwaZulu-Natal, 19 m (Schleyer coll.).

Distribution

This species contains abundant symbiotic unicellular algae. It is very common in the western tropical Pacific Ocean and in all the tropical Indian Ocean from the extreme north to KwaZulu-Natal.

Diplosoma listerianum (Milne-Edwards, 1841)

Leptoclinum listerianum Milne-Edwards, 1841: 300.
For a description and synonymy see Lafargue, 1968: 406, fig. 9; Monniot, F., 1983: 41. Monniot, C. & Monniot, F., 1987: 59.

Material

Several colonies. In all harbours from Saldanha Bay to Port Elizabeth.

Remarks and distribution

This European species has invaded numerous harbours in temperate and tropical areas in the Atlantic, Pacific and Indian oceans. It is commonly found on ship hulls and grows in thin soft sheets or thicker pads. The colony colour varies from white to dark grey.

Diplosoma virens (Hartmeyer, 1909)

Leptoclinum virens Hartmeyer, 1909: 1456. (nom. nov. for *Diplosoma viride* Herdman, 1906.)
For a detailed synonymy see Monniot, F. & Monniot, C., 1996: 170.

Material

Several colonies. Rocky Bay, KwaZulu-Natal, 2 m (M. E. Aken coll.).

Remarks and distribution

The zooids and larvae are identical to western Pacific samples. All colonies have symbiotic algae. This species is widely distributed in shallow tropical waters in the Pacific and Indian oceans.

Family **Cionidae**

Ciona intestinalis (Linné, 1767)

Ciona intestinalis see Berrill, 1950: 131, figs 40–41. Hoshino & Nishikawa, 1985, fig. 1A–C, 2, 4.

Material

Several colonies. Cape Town; Hout Bay; Port Elizabeth (Griffiths and Monniot coll.).

Remarks and distribution

Ciona intestinalis originated in the northern Atlantic Ocean, but has invaded harbours throughout temperate and subtropical climes.

This species was recorded by Millar (1955) in Durban Harbour and by Millar (1962) in Saldanha Bay. We collected this species in several harbours such as Saldanha Bay, Cape Town, Hout Bay and Port Elizabeth. The specimens from Hout Bay have short siphons circled by a thick rod of tunic that is somewhat tuberculated. This morphology is sometimes encountered in European harbours. On the contrary the red form of this species, which is occasionally found in Europe, has not been recorded in South Africa.

Family **Perophoridae**

Ecteinascidia modesta C. Monniot sp. nov.

Fig. 31

Material

Holotype. SAM-A25855, Knysna Estuary (34°04'S 23°03'E), collected by C. and F. Monniot, Feb. 1996.

Other material. Several colonies. Locality details as above.

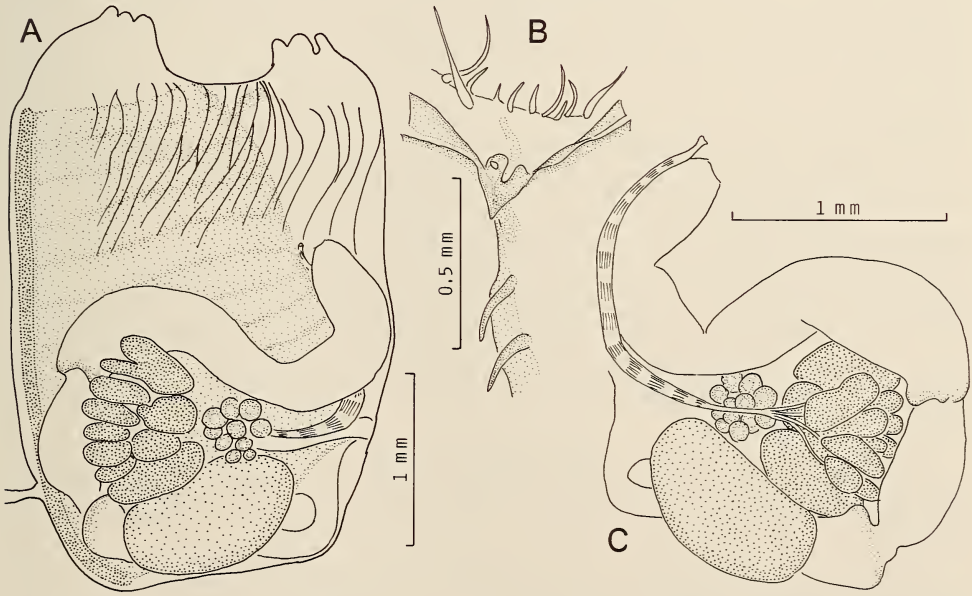

Fig. 31. *Ecteinascidia modesta* sp. nov. A. Left side of body. B. Dorsal area. C. Gut and gonads.

Description

The colonies of small zooids (3 mm) are colourless and live on bryozoan crusts. The individuals are isolated, sometimes have a short peduncle, and are

united by a network of stolons. The oral siphon is on the top, and the cloacal siphon somewhat lateral. Both apertures are encircled by six flat lobes indented by deep clefts. The musculature (Fig. 31A) comprises about 20 thin oblique and regularly spaced roughly parallel ribbons. They originate from a region on each side of the body that runs from below the oral siphon to below the cloacal siphon and includes the intersiphonal space (Fig. 31A). About 30 oral tentacles in three orders of size do not regularly alternate in a ring at mid-length of the oval siphon (Fig. 31B). The prepharyngeal groove has two inequal rims, the anterior higher. The urn-shaped dorsal tubercle opens through a round hole (Fig. 31B). The dorsal lamina consists of languets united by a basal membrane which is half the height of a languet (Fig. 31B).

The branchial sac has 11 rows of stigmata and 12–13 generally entire longitudinal vessels on each side. About 25 stigmata, consequently two per mesh, are counted in a row. We did not observe divisions of stigmata or of rows of stigmata. The posterior row is somewhat irregular. The oesophagus enters the posterior side of an oval stomach (Fig. 31C). The intestine is divided into three parts by constrictions; it has no caeca. The simple anus opens between the fifth and sixth row of stigmata.

The ovary contains numerous poorly developed oocytes. The testis (Fig. 31C) is ventral to the ovary and consists of elongated lobes that protrude just beyond the external edge of the gut. The wide sperm duct opens through a papilla adjacent to the anus. The oviduct extends to the right side of the body. The ovary was not mature and no larvae were found.

Remarks

This species is characterized by its small number of stigmata rows (11) and oblique musculature. It differs from *E. multistigmata* (= *Perophora multistigmata* Kott, 1952) from Queensland, which has fewer stigmata rows (eight), a musculature with numerous fibres more complex in origin and a single testis with few lobes. It is closely allied to *E. bandaensis* Millar, 1975, from Indonesia, Philippines, Madagascar and Mozambique (Monniot, F. & Monniot, C. 2001), a species with similar musculature but 16 stigmata rows, a globular stomach and a testis made of very numerous small lobes surrounding the ovary. In addition, *E. bandaensis* has an opaque tunic with a red line encircling the siphons.

Ecteinascidia modesta superficially resembles the small northern Atlantic species *E. minuta* Berrill, 1932, and *E. herdmani* (Lahille, 1887), but the gut loop is narrower and the stigmata more numerous in both those species.

The species name *Ecteinascidia modesta* refers to its very discrete presence, making it difficult to notice in the field.

Ecteinascidia thurstoni Herdman, 1891

Ecteinascidia thurstoni, Monniot, C. & Monniot, F., 1997: 1630, fig. 4.
Ecteinascidia hedwigiae Michaelsen, 1918: 60, pl. 1 (figs 1–2).

Material

One colony, Isipingo, KwaZulu-Natal (Griffiths coll.); Knysna, young specimens (Monniot coll.).

Distribution

This species was described from material collected in Sri Lanka and later from specimens collected in Western Australia, the Arabian Gulf, Djibouti, Tanzania and Mozambique. It is the only record of the family Perophoridae in South Africa that has been previously described.

Family **Corellidae**

Corella eumyota Traustedt, 1882

Corella eumyota Traustedt, 1882: 17, pl. 4 (figs 2, 3), pl. 5 (figs 13, 14).

Material

Two specimens. Saldanha Bay Harbour (Monniot coll.).

Remarks and distribution

This species was recorded for the first time in Cape Town by Sluiter (1898*a*) and found again by Michaelsen (1934) and Millar (1955, 1962). It inhabits seas around Antarctica, Tasmania, South Australia, and the southern part of South America. In the Atlantic Ocean it was recorded off Tristan da Cunha by Millar (1967*b*), and Namibia by Michaelsen (1915) and Turon (1988).

The adult South African specimens are small (20 mm) compared to individuals from the Antarctic, which attain 100 mm. The branchial sac is less developed with fewer coils of stigmata. The development of the branchial sac and the gut in this species varies according to environmental conditions (Monniot, C. & Monniot, F. 1983). Numerous eggs were present in the cloacal cavity in samples from New Zealand, and Lambert *et al.* (1995) described brooded larvae.

Family **Ascidiidae**

Ascidia canaliculata Heller, 1878, part of *A. sydneiensis* aut. mult.

Fig. 32

Ascidia canaliculata Heller, 1878: 84, pl. 1 (fig. 1). Sluiter, 1898*a*: 41, pl. 5 (figs 15–18). Michaelsen, 1921: 5.
Phallusia canaliculata: Hartmeyer, 1911: 576, pl. 57 (figs 13–14).
Phallusia longitubis Traustedt, 1882: 283.

Material

Several specimens. Fish Hoek, False Bay (Monniot coll.).

Description

Ascidia canaliculata is closely allied to *A. sydneiensis* Stimpson, 1855. Both species were synonymized by Van Name (1921). They have in common large, grooved siphons with digitate lobes and a characteristic transverse musculature limited to the right side of the body (Fig. 32B). The musculature consists of two ribbons of parallel fibres, one ventral and one dorsal. These ribbons are linked by very thin fibres which become visible when stained (Fig. 32B). The gut always has a bulbous widening of the posterior intestine filled with sediment (Fig. 32A) even in very young individuals.

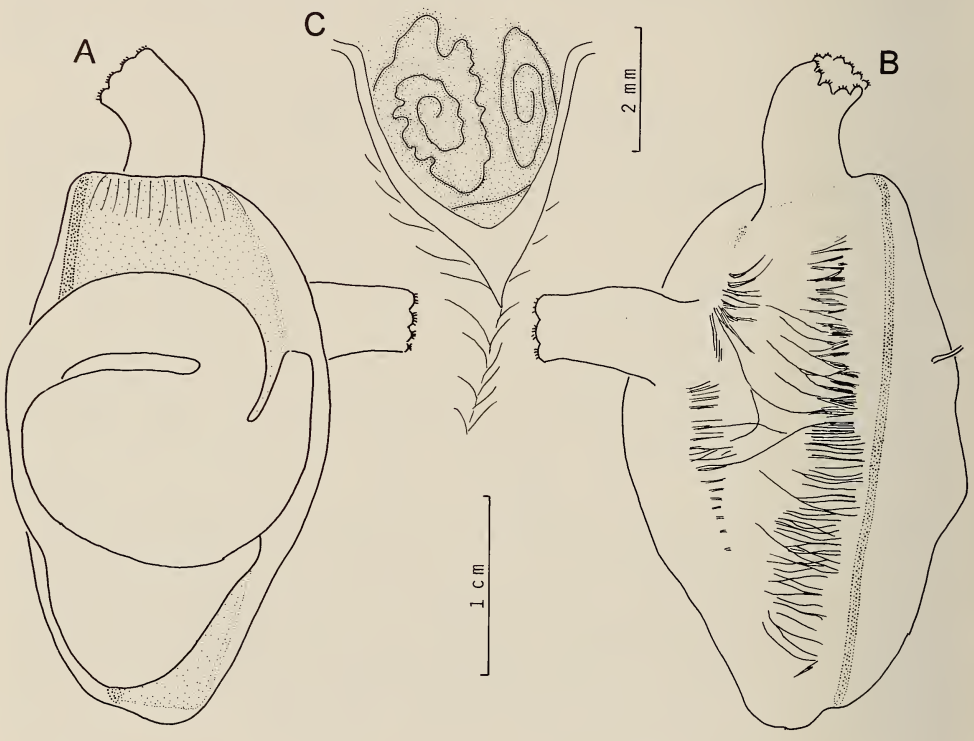

Fig. 32. *Ascidia canaliculata*. A. Left side of body. B. Muscles on the right side. C. Dorsal tubercle.

Remarks and distribution

The only distinguishing characteristic of the species is the structure of the dorsal tubercle (Fig. 32C). In all the Atlantic, South African and Mozambican populations this has the shape of a 'V' that is open anteriorly and has horns curled interiorly. It is not regular in pattern but rather undulated (Fig. 32C). In *A. sydneiensis*, a Pacific Ocean species, the dorsal tubercle is pierced by several openings. Authors who have examined both species consider them distinct (Sluiter 1898*a*; Hartmeyer 1911), except for Millar (1955) who was doubtful.

Ascidia sydneiensis is somewhat variable in the Pacific. Tokioka (1953) recognized three subspecies in Japan: *A. sydneiensis sydneiensis*, which has a

simple dorsal tubercle; and *A. sydneiensis divisa* and *A. sydneiensis samea*, whose divided dorsal tubercles differ. Nishikawa (1991) examined the same material and showed that the position of the gut is variable and that the dorsal tubercle is simple in small specimens before becoming more complex with growth. He thus did not recognize Tokioka's subspecies. An undulated opening is not mentioned in any description of *A. sydneiensis,* the shape usually being described as a 'C' open to the left side with horns slightly curved.

Although all specimens from the Atlantic Ocean, South Africa and Mozambique correspond to *A. canaliculata*, those from the western coast of Australia have complex dorsal tubercles (Kott 1985) and correspond to *A. sydneiensis*. In Mauritius, Vasseur (1967) described *A. sydneiensis* as having simple or divided dorsal tubercles; he found Tokioka's three variant morphologies but refused to use the subspecies. In Sri Lanka, Herdman (1906) described small specimens 24 mm in length, and these had a simple dorsal tubercle.

Traustedt & Weltner (1894) recorded the presence of *Phallusia longitubis* in the Indian Ocean without providing a description.

Taking this disparity of characters into account and noting the limits of variability in *A. sydneiensis* after all, we believe that *A. canaliculata* and *A. sydneiensis* are different (vicariant) species.

Ascidia caudata Heller, 1878

Figs 3F, 33

Ascidia caudata Heller, 1878: 85, pl. 2 (fig. 2).

Material

Several specimens. False Bay, low tide (Monniot coll.).

Description

Ascidia caudata has not been recorded in South Africa in over a century. This is rather surprising as it is a common species at 1–2 m depth and attains a size of 25 cm. It inhabits narrow crevices and the underside of large boulders where there is a space of some centimetres between the rock and the sediment. The ascidians are attached to the rock on their whole left side, including the siphons. The right side of the body and the siphons are generally covered with large shell fragments and gravel. The long siphons diverge and they may be 15 cm apart. The colour of the tunic surface varies from yellow to brown or almost black, according to the distance from the edge of the rock, the pigment being light-induced. The remainder of the tunic is pale grey or yellowish.

In life the body wall is sulphur yellow, pigmented by blood cells. When fixed these cells turn black (as in many Ascidiidae rich in vanadocytes). The tunic is thin on the left side of the body but forms a pad that protrudes internally between the posterior intestine and the rectum. The siphons do not show lobes. The muscles are strong on the right side, mostly transverse with some fibres issuing from the cloacal siphon in the anterior part of the body. The muscles are dense over the gut, almost joined, but more diffuse posteriorly. The left side of the body wall and the tip of the siphons are devoid of musculature.

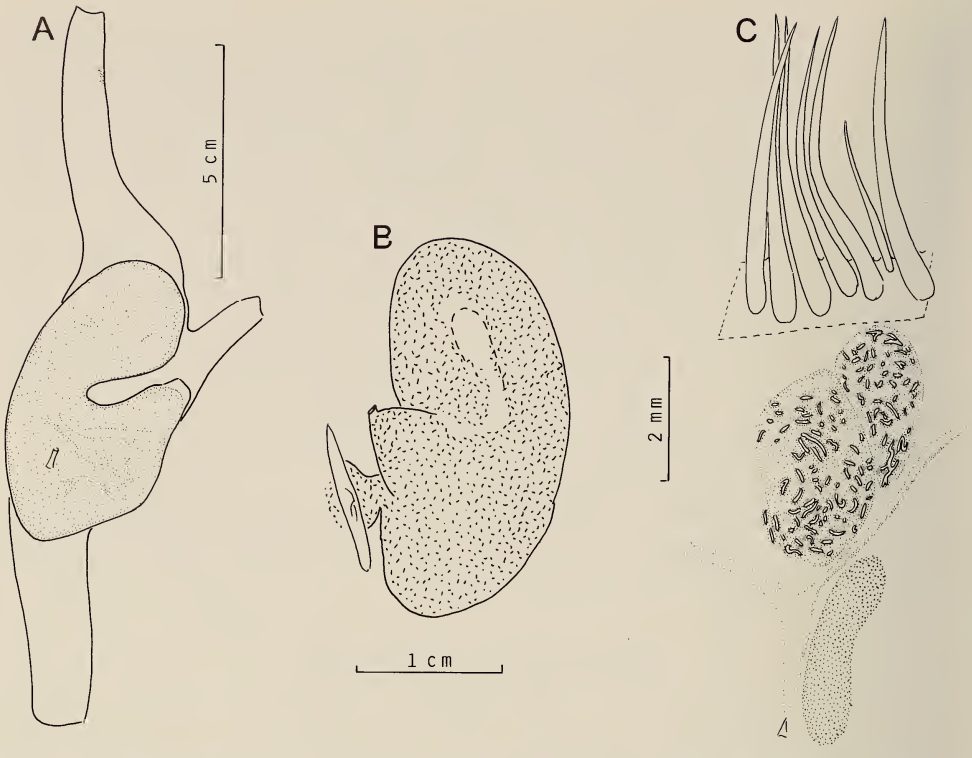

Fig. 33. *Ascidia caudata*. A. Left side of body of a large specimen. B. Testis on the gut of a small specimen. C. Dorsal tubercle.

More than a hundred oral tentacles are located on a thin high crest in large specimens. They are 4 mm long, almost all equal in size (Fig. 33C) and form a kind of comb that closes the oral aperture. The prepharyngeal band has two equal rims. The dorsal tubercle (Fig. 33C) consists of two masses of tissue pierced by numerous holes. The neural ganglion is close to the dorsal tubercle. The low dorsal lamina has a smooth margin, which is stiffly delineated only on the left side. The oesophagus entrance is located anteriorly to the bottom of the branchial sac. It is large, sometimes smooth or with protruding crests. On the right side of the branchial sac, the extremities of the transverse vessels form hooks linked by a membrane. The branchial internal longitudinal vessels only bear large papillae. The vessels are close to each other in small specimens (7 cm) and the square meshes contain, on average, three small stigmata. In large individuals, the meshes lengthen transversally and may have seven stigmata. The transverse vessels are wide on the external side of the branchial sac; they are linked together and form an irregular network covering at least half of the branchial surface, even in young specimens. The fragile branchial tissue is linked to the body wall by numerous short connections. The cloacal cavity is not spacious.

The gut describes a double loop (Fig. 33A, B). The exact path of the digestive tract is difficult to follow even in small specimens, as the visceral mass

is rendered opaque by testis vesicles (Fig. 33B). The ovary is also hidden. The anus is very small, has a plain margin and opens in the centre of the visceral mass (Fig. 33B).

Distribution

Ascidia caudata has only been recorded from the Cape Peninsula, South Africa.

Ascidia incrassata Heller, 1878
Fig. 34

Ascidia incrassata Heller, 1878: 88, pl. 2 (fig. 8). Michaelsen, 1934: 154.

Material

Several specimens. Miller's Point, False Bay, 2–10 m. (Griffiths coll.); Saldanha Bay Harbour (Monniot coll.).

Description

The largest specimens from Miller's Point are erect, about 100 mm long and only attached on the left posterior side. The tunic is translucent, hard, somewhat cartilaginous, up to 20 mm thick and covered with epibionts. The siphons are naked and protrude, the oral siphon to the anterior and the cloacal siphon towards the anterior quarter of the body. Both siphons have 6–8 lobes that are prolonged by a transparent tip. There is a red spot between each lobe. The colour in life is purple or red; it disappears in formalin. The small specimens from Saldanha Bay, 40 mm long, are deep red in life and the colour persists for some time in formalin, but fades.

Muscles are only present in the dorsal part of the body wall. These are symmetrically distributed on the sides of the body (Fig. 34A, B, D, E), an exceptional characteristic among the Ascidiidae. These probably provide an erect posture to these animals and stiffness to the tunic. In large specimens, there are about 60 oral tentacles on a crest, in 3–4 orders of size, with an underlying muscular ring. The prepharyngeal groove has two equal edges and is curved slightly dorsally. The neural ganglion is anterior near the protruding dorsal tubercle. The dorsal tubercle is C-shaped with an anterior opening and curled horns (Fig. 34G). The dorsal lamina is doubled above the neural ganglion and posteriorly forms a raised blade with small teeth on the rim. The transverse thickenings do not reach the edge of the blade and have no relationship to the teeth. The dorsal lamina encircles the oesophagus entrance; at this level and on the right side, the transverse vessels form a dented membrane (Fig. 340H).

The branchial tissue is undulated with 40 and 32 longitudinal vessels on the right and left sides respectively. The main papillae are large. The elongated branchial meshes may have up to 12 short stigmata. The branchial sac does not extend posteriorly under the digestive tract.

The gut of the largest specimens is totally enclosed in whitish tissue that consists of an accumulation of vesicles and testis lobes that largely conceal a

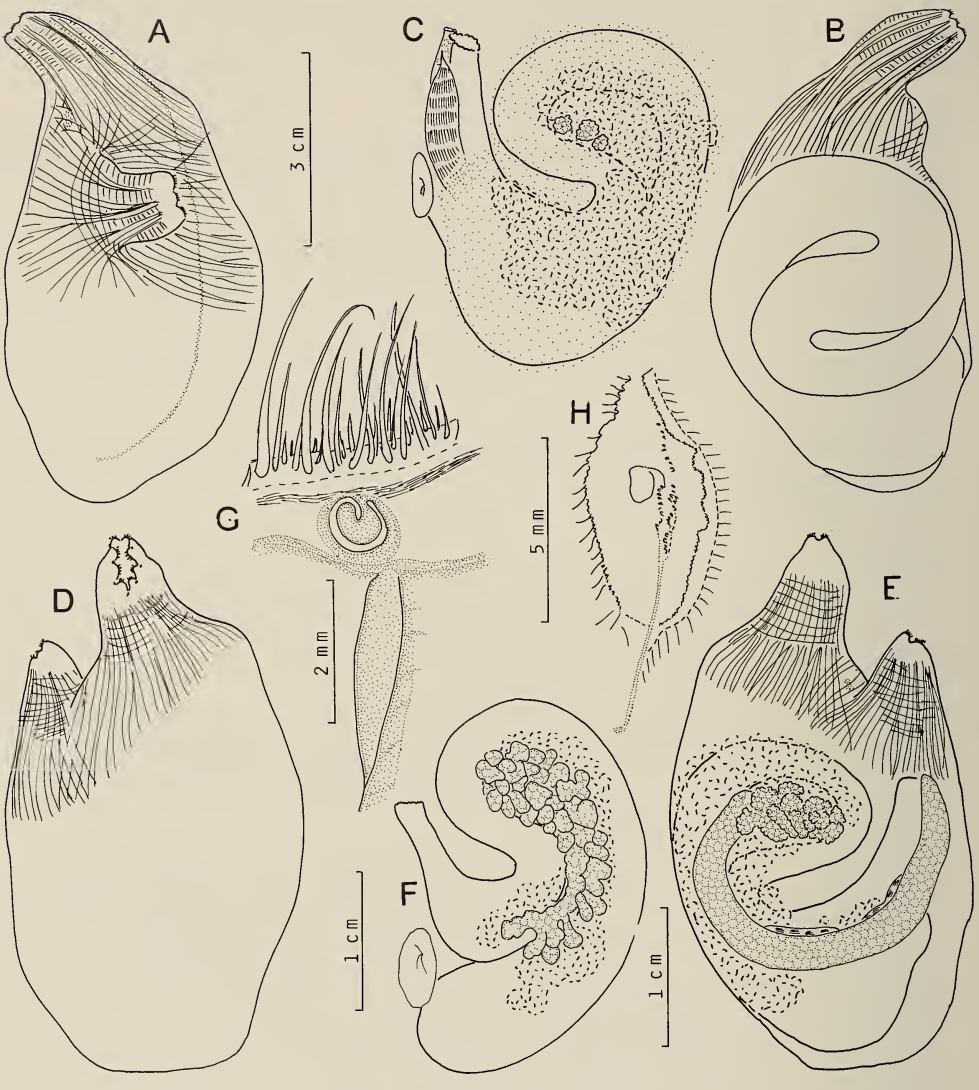

Fig. 34. *Ascidia incrassata*. A–B. Both sides of a large specimen. C. Gut and gonads of a large specimen. D–E. Both sides of a small specimen. F. Gut and gonads of a small specimen. G. Dorsal tubercle of a small specimen. H. Oesophagus entrance of a small specimen.

marked double gut loop (Fig. 34B, C). The stomach folds are not evident externally. The intestine, which is uniform in diameter, ends in small anal lobes. Although it is difficult to discern the shape of the different organs in large specimens, it is easier to observe the gut and gonads in small specimens from Saldanha Bay (Fig. 34E, F). They are mature and have numerous eggs in the cloacal cavity. They correspond to the descriptions of *Ascidia multitentaculata*

by Hartmeyer (1912) and Millar (1964). They possess a large number of oral tentacles (more than 160) (Fig. 34G). The reduction in tentacle number during the growth to a larger size has been described several times, particularly by Millar (1960) for *Ascidia translucida* and *Cnemidocarpa verrucosa*. The branchial sac of small specimens has a similar number of longitudinal vessels as larger ones (36 on the right and 34 on the left), but the branchial meshes are square and enclose an average of seven stigmata. We found numerous duplications of the stigmata rows marked by intermediate papillae. The gut makes a double loop (Fig. 34E, F). The ovary is located in the primary loop and consists of numerous tight lobes that do not protrude beyond the gut loop. The testis covers most of the gut on both sides (Fig. 34E, F).

Remarks and distribution

Ascidia incrassata is only known with certainty from the Western Cape area, where it was last collected in 1931 (Michaelsen 1934). It possibly occurs in southern Mozambique (Michaelsen 1918). Michaelsen noted that *A. multitentaculata* differs from *A. incrassata* only in the number of oral tentacles, and proposed that it be considered a variety of the latter. *Ascidia multitentaculata* was only known from three specimens. Millar (1977: 204, fig. 24) described from Salvador Beach (Brazil) an additional specimen of similar size, which had very numerous tentacles and an S-shaped gut. The Brazilian specimen differs from the South African material, having muscles over the whole right side, more longitudinal vessels (80), no intermediate branchial papillae and an ovary in two parts, located within the two intestinal loops. Millar (1977) considered his identification doubtful, and this is also our opinion.

The specimen of *A. incrassata* from Inhaca described by Millar (1956) has the musculature and dorsal tubercle characteristic of *A. canaliculata*.

Ascidiella aspersa (Müller, 1776)

Ascidia aspersa Müller, 1776: 225.
For synonymy see Berrill, 1950: 154, fig. 47.

Material

Several specimens. Saldanha Bay Harbour; Cape Town; Hout Bay; Port Elizabeth (Monniot coll.).

Distribution

Ascidiella aspersa is an European species whose distribution extends from Norway (Trondheim Fjord) to the Mediterranean Sea and the Atlantic coast of Morocco. It has been recorded in Senegal as (*Ascidiella senegalensis* Michaelsen, 1915). Brewin (1946) noted its voluntary importation into the south of New Zealand. This species has now invaded harbours and lagoons in southern Australia. It has also been collected in Porto Nuovo Bay, Argentina (42°53'S 64°42'W).

Family **Styelidae**

Botryllus closionis C. Monniot sp. nov.

Figs 3G, 35

Sarcobotrylloides racemosum Hartmeyer, 1912: 274, pl. 37 (fig. 5), pl. 41 (fig. 9).
non *Botryllus racemosus* Quoy & Gaimard, 1834: 620, pl. 92 (figs 7–8).

Material

Holotype. SAM-A25856, Sea Point, Cape Town (33°55'S 18°23'E), low tide. Collected by C. L. Griffiths, 25 May 1994.

Other material. Several colonies, locality data as above (Griffiths and Monniot coll.).

Description

This species has a characteristic appearance in the photograph and in Michaelsen's colour plate (1912, pl. 37 (fig. 5)). The red zooids form circular systems in hollows of the upper tunic, giving the colony surface a partitioned pattern as suggested by the species name (closis = fence). It covers both sides of the fronds of the seaweed *Epymenia*. The tunic has a firm constistency.

The zooids (Fig. 35A, B) are 1.5–2 mm long and perpendicular to the colony surface. A large cloacal languet lies above a very wide cloacal opening which reveals a large part of the branchial sac (Fig. 35A, B). There are nine rows of stigmata. The branchial sac is asymmetrical: the two first rows are complete on the right side (Fig. 35B), but the second row does not reach the dorsal lamina on the left side (Fig. 35A). There are 12–15 stigmata in a half-row and 2–3 stigmata between the longitudinal vessels.

The oval stomach wall has about ten protruding folds that are slightly enlarged anteriorly.

The caecum is long, curved, and has a small dilation at the tip (Fig. 35A). The gut loop is short. The pyloric gland is not well developed. The anus opens at the level of the seventh stigmata row at the base of the exposed part of the branchial sac and has a smooth edge (Fig. 35A, B).

Each zooid is linked to the vascular network of the colony by several sinuses.

In the colony studied, the nourishing zooids only have rudimentary testes (Fig. 35A, B). The first-order buds have mulberry-shaped testes that are more developed than in the adult zooids. Several oocytes are present in the second-order buds.

Remarks

The description of *Botryllus racemosus* by Quoy & Gaimard (1834) from Australia is short and could apply to any *Botryllus* with circular systems. The drawings (pl. 92 (figs 7–8)) clearly show systems of zooids at the tunic surface, thus depicting material that does not belong to this species.

Sarcobotrylloides racemosum Hartmeyer, 1912, was synonymized with *Botryllus leachi* by Hartmeyer & Michaelsen (1928), with *B. magnicoecus* by

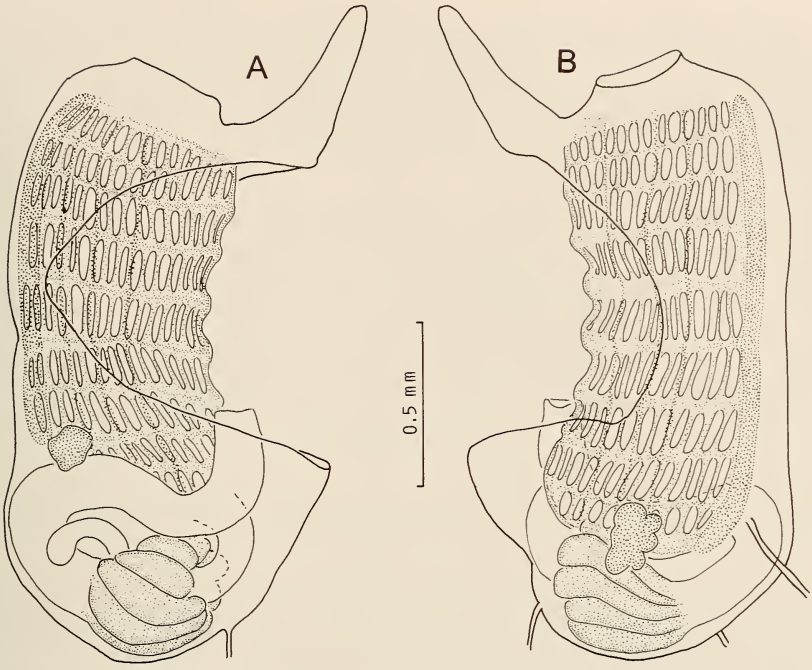

Fig. 35. *Botryllus closionis* sp. nov. A–B. Both sides of a zooid.

Tokioka (1967), and with *B. schlosseri* with some doubt by Kott (1985). *Botryllus schlosseri* sensu Kott, from Australia, is a different species from the European *B. schlosseri* and belongs to *B. aster* Monniot, C., 1991. None of the above synonymies are valid. The partitioned appearance of the colonies and its circular systems separate it from all other species of the genus.

Botryllus elegans (Quoy & Gaimard, 1834)

Figs 3H, 36

Distomus elegans Quoy & Gaimard, 1834: 623, pl. 42 (figs 11–13).
Synstyela monocarpa Sluiter, 1898*a*: 55, pl. 1 (figs 12), pl. 7 (figs 5–8).
Chorizocarpa elegans: Hartmeyer, 1912: 266. Michaelsen, 1915: 413, pl. 18 (fig. 37).
Botryllus anomalus Millar, 1962: 175, fig. 28. Monniot, C. & Monniot, F., 1976*a*: 359.

Material

Several colonies. Table Bay, Sea Point on *Epymenia* fronds (Griffiths and Monniot coll.).

Description

The colonies were thin encrustations on sea-weed fronds. The common tunic is transparent, often bluish with yellow circulatory ampullae of the tunic's blood system. The ampullae do not form a ring around the edge of the colony as is often the case in the genus. The zooids are spherical and regularly distributed.

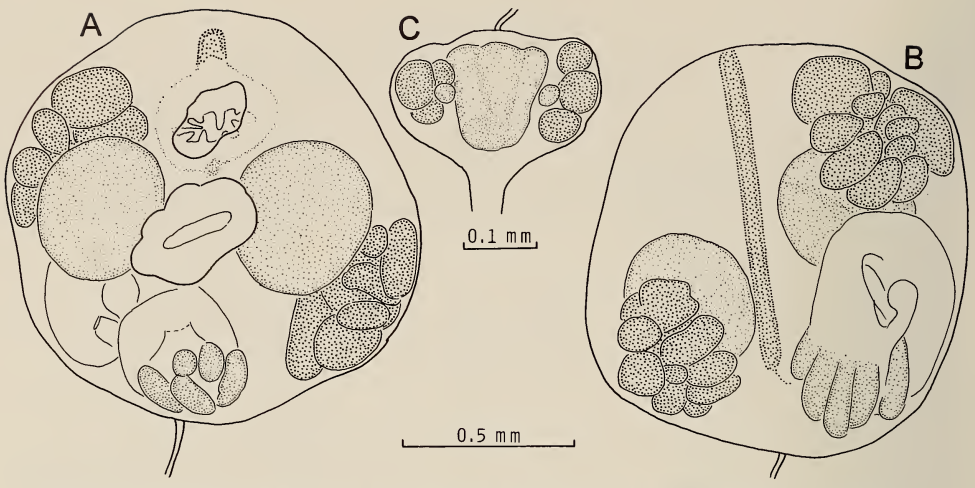

Fig. 36. *Botryllus elegans*. A. Dorsal side of a zooid. B. Ventral side of a zooid. C. Bud with gonads.

There are no systems; the cloacal siphons of the zooids open independently. The zooids are generally similarly orientated in the colony. There are white pigment spots that vary in number on the edge of the siphons.

The body wall is often yellow, except where it is red around the siphons and dorsally. All colour disappears after fixation.

We counted eight short oral tentacles. Three branchial longitudinal vessels on each side cross eight rows of oval stigmata. The gut (Fig. 36B) forms a closed loop. The globular stomach bears anterior grooves. The caecum has the shape of a pedunculate vesicle (Fig. 36B). The pyloric gland is small and does not encircle the intestine. The anus has a plain margin. The gonads are well developed. On each side there is a massive lobed testis ventrally (Fig. 36B) and a large egg dorsally (Fig. 36A). In some zooids the egg is segmented in four blastomeres.

We rarely observed even slightly developed buds in our material, but the few we found possessed *Botryllus* characteristics, i.e. gonads differentiated at the beginning of branchial development (Fig. 36C). No larvae were brooded in the zooids. Some were found in the common tunic enclosed in a membrane linked to the colony vascular system. Holes at the colony surface provided some evidence of degenerated zooids, and the larvae in their envelopes seemed to occupy the spaces vacated by zooids. Only one larva lies in each of these locations when the zooids produce two eggs. The larvae were not fully developed and had no vascular ampullae, only the beginning of a tail and one sensory organ.

Our specimens correspond well with the type material (MNHN BOT. B 14).

Remarks and distribution

We consider this a species of the genus *Botryllus*, as did Millar (1962), in view of its parietal budding with early development of the gonad, a characteristic only encountered in this genus.

In terms of its other characteristics, this species could belong to two other genera having three longitudinal branchial vessels on each side. In *Chorizocarpa* the testis is on the left side, the ovary on the right side, and the budding is vascular (Monniot, C. 1988). In *Botryllocarpa* the hermaphroditic gonads are placed on each side of the body, but the testis is deeply divided into two lobes as in the genus *Symplegma.*

Botryllus elegans has unique features for the genus: the absence of systems, and larvae brooded in the common tunic rather than the zooids. The mode of development of the larvae also seems different from that described by Zaniolo *et al.* (1998) for *Botryllus violaceus*. The life cycle of this species thus merits further studies.

The description of *Distomus elegans* Quoy & Gaimard, 1834, is extremely short and only provides its external characteristics, but the coloured illustrations leave no doubt about the species' identification. The siphons are depicted as having six lobes, which is not the case in our specimens and this is probably an error in the illustrations.

Sluiter (1898*a*) did not recognize *Distomus elegans* and created a new species, *Synstyela monocarpa.* Hartmeyer (1912) ignored Sluiter's species and created yet another species, *Chorizocarpa elegans.*

Michaelsen (1924), on re-examining Sluiter's samples, noticed labelling errors between specimens from South Africa and colonies collected in the north of Australia that Sluiter (1900) had described under the name *Synstyela michaelseni.*

Moreover, other specimens labelled from South Africa were labelled as *Symplegma* species. Michaelsen concluded that there were two species in South Africa: one with four longitudinal vessels that he identified as *Symplegma*

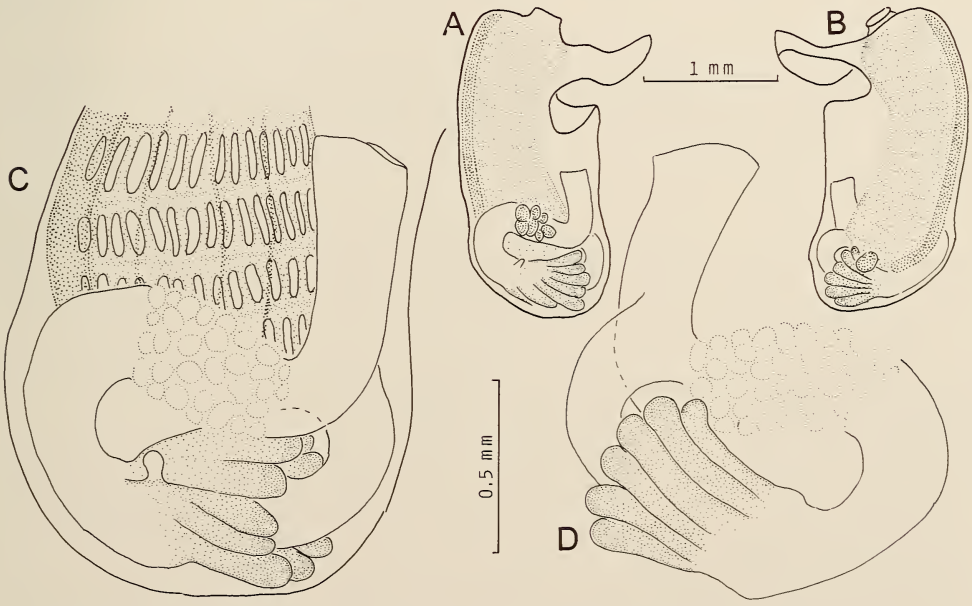

Fig. 37. *Botryllus gregalis.* A–B. Both sides of a zooid. C–D. Details of the gut.

elegans (Quoy & Gaimard, 1834), and another with three longitudinal vessels identified as *Chorizocarpa monocarpa* (Sluiter, 1898*a*). This last species might have been confused with *Chorizocarpa michaelseni* (Sluiter, 1900) from northern Australia, in view of Sluiter's labelling errors, and Michaelsen was surprised by the synonymy considering the distance between the populations. He suggested that further collections were necessary. He overlooked the fact that, in 1915, he combined as synonyms *Distomus elegans* and *Synstyela monocarpa*. He thus considered *Distomus elegans* to be the commonest species of the genus *Symplegma*, partly because six oral lobes were figured by Quoy & Gaimard, and because specimens of *Symplegma* were mixed with Sluiter's specimens.

We similarly found errors in the synonymies of *Symplegma brakenhielmi* and *Chorizocarpa michaelseni*. The synonymies listed above only correspond to descriptions of specimens and does not take into account more or less erroneous citations.

Botryllus elegans is known from Namibia to southern Mozambique.

Botryllus gregalis (Sluiter, 1898*a*)

Figs 4A, 37

Botrylloides gregalis Sluiter, 1898*a*: 46, pl. 2 (figs 6–9).
Botrylloides nigrum non Herdman, 1886. Hartmeyer, 1912: 270, pl. 41 (fig.10).
Part *Botrylloides leachi* non Savigny, 1816. Hartmeyer & Michaelsen, 1928: 342.
?*Botrylloides leachi*: Michaelsen, 1934: 154.
?*Botrylloides leachi*: Millar, 1962: 177.
Botryllus gregalis: Monniot, C. & Monniot, F., 1997: 1633, text-figs 5–6, pl. 1C, D.

Material

Several specimens. Saldanha Bay, on kelp; False Bay, 8–12 m; Cape Town, 10 m; Isipingo, KwaZulu-Natal (Griffiths coll.); Knysna and Port Elizabeth (Monniot coll.); Sodwana Bay, KwaZulu-Natal (Schleyer coll.).

Description

The colonies are 2–3 mm thick in this species. The colour varies and the oral siphons and cloacal languets are generally opaque. The zooids are distributed along an anastomosed network of cloacal cavities that have few common cloacal openings.

The zooids have 12–13 rows of stigmata, the second row being dorsally incomplete on both sides (Fig. 37A, B). The cloacal aperture extends one-third of the branchial height, under a large cloacal languet. The anterior end of the stomach (Fig. 37C, D) is wide and has about ten folds, which flare anteriorly and attenuate posteriorly. The caecum is always small but sometimes enlarged at the tip (Fig. 37C). A well-developed pyloric gland of joined vesicles surrounds the intestine like a sleeve (Fig. 37C, D). The rectum is wide and opens at the eighth or ninth row of stigmata without narrowing.

None of the colonies studied had eggs or embryos. The nourishing zooids have degenerated testes located posteriorly against the gut (Fig. 37A, B). The

first-order buds have well-developed testes. The ovaries have few oocytes and develop on the second-order buds.

Remarks and distribution

It is possible that the specimen named *Botrylloides leachi* by Michaelsen (1934) belongs to this species, together with the specimens that Millar (1962) considered doubtful. The specimen described by Hartmeyer (1912) as *Botrylloides nigrum* from the Cape Peninsula has exactly the same stomach as the specimens in our collection, and Michaelsen (1934) expressed doubt as to its identification.

This polymorphic species has a continuous distribution along the west coast of South Africa, and extending to the Arabian Gulf.

Botryllus maeandrius (Sluiter, 1898*a*)

Figs 4B, 38

Botrylloides maeandrium Sluiter, 1898*a*: 48, pl. 2 (fig. 7), *non* pl. 6 (fig. 10).
?*Botrylloides translucidum* Hartmeyer, 1912: 272, pl. 37 (fig. 3), pl. 41 (figs 8–12).

Material

Several colonies; one of them adult, on a *Mytilus* shell, represents a neotype, SAM–A25862. Sea Point, intertidal (Griffiths and Monniot coll.).

Description

The colonies are thin and encrusting. The zooids are distributed in double rows on each side of large, branched cloacal channels. Some zooids are found in circular systems, but are facing by their ventral part. There are only a few common cloacal apertures that do not protrude and are hardly visible. The colonies often have a branched pattern with rows of zooids radiating in all directions from the colony centre. The edge of the colony is marked with an accumulation of vascular ampullae. The colour is a uniform pink to reddish-pink. The pigment cells are more dense around the oral siphons and in the vascular ampullae. The tunic matrix is colourless. After fixation the pigment fades and the zooids become brownish.

The zooids have a wide rectangular cloacal languet above a large cloacal opening that reveals a large part of the branchial sac (Fig. 38A, D). There are 9–10 rows of a dozen stigmata per side and the second row does not reach the dorsal line (Fig. 38E).

The conical stomach (Fig. 38B) is asymmetrical and dilated with a dozen anterior folds that are mere protrusions on the left side but become progressively longer and form folds on the right side (Fig. 38D). The caecum is a small pedunculate ball (Fig. 38B). The intestine is constricted by a voluminous pyloric gland that encircles it. The gut loop is well defined. The anus opens in front of the fifth or sixth row of stigmata and has a curled rim.

Most colonies have no gonads at all. The colonies collected in February were male or hermaphroditic. In male colonies the testes appear on first-order buds. In hermaphroditic colonies (Fig. 38A) the zooids have bulky testes with

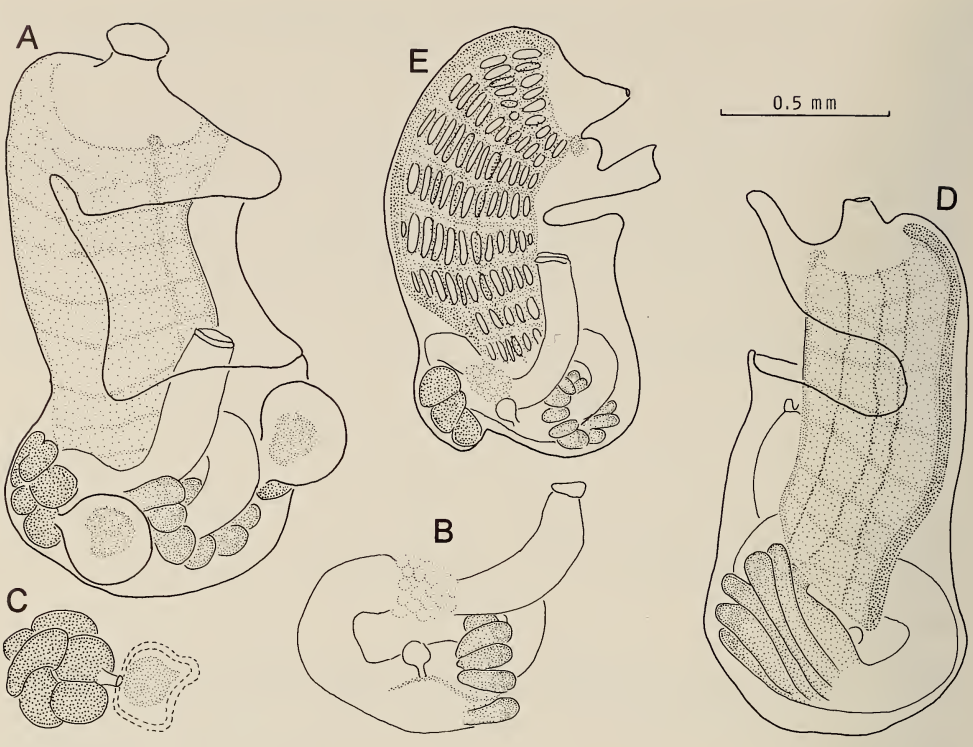

Fig. 38. *Botryllus maeandrius*. A. Zooid. B. Gut. C. Hermaphroditic gonad. D–E. Two additional zooids.

less than ten lobes. These protrude slightly to the exterior and are located almost at the same level in the posterior and ventral part of the body. An ovary located dorsal to the testis in a pedunculate pouch (Fig. 38A) contains one or two degenerated eggs.

Remarks

We have re-examined the type of *B. maeandrium* Sluiter, 1898*a* (ZMA TU 297). It is not well enough preserved to be redescribed, but does not correspond either to Sluiter's description or pl. 6 (fig. 10) of the species. It has no systems and may either be *Botryllus elegans* or a species of *Symplegma*. However, Sluiter's (1898*a*, pl. 2 (fig. 7)) colour drawing corresponds well to the species described here. His pl. 6 (fig. 10) is surprising; it depicts a zooid with five longitudinal vessels, a small cloacal aperture, a gut with the structure of a *Botryllus*, and gonads with a non-protruding ovary in the position in which it is found in *B. elegans*. His zooid description corresponds to this figure. The labelling of Sluiter's specimens is often erroneous, as Michaelsen (1924) has already noted, and it is not rare to find several species from different families in one of his type samples. His descriptions sometimes appear to be fanciful if not totally imaginary.

We propose to use the name *Botryllus maeandrius* (Sluiter, 1898*a*) for this species to simplify the synonymy, as the original description has no value and the type specimen has been lost. We have made an adult colony collected at Sluiter's type locality, Sea Point (Cape Peninsula), a neotype for the species.

The description of *Botrylloides translucidum* Hartmeyer, 1912, corresponds to this species in some respects, as it describes an ascidian with the same gut shape, and an elongated stomach with short posterior protruding rods. However, Hartmeyer's colonies are 9-mm-thick cushions, with zooids with 12 rows of stigmata and no pyloric caecum. These attributes are characteristic of *Botryllus translucidus*, leading us to conclude that it is closely allied to if not identical with *B. gregalis*.

Botryllus maeandrius has been recorded only from the Cape Peninsula, South Africa.

Botryllus magnicoecus (Hartmeyer, 1912)

Figs 4C, 39

Botrylloides nigrum magnicoecum Hartmeyer, 1912: 271, pl. 41 (fig. 11); 1913: 135.
Botryllus magnicoecus: Michaelsen, 1921: 6, pl. 1 (figs 1–4); 1934: 154. Millar, 1955: 195, fig. 22; 1962: 175.

Material

Several colonies. Table Bay, 9 m; False Bay, 0–10 m (Griffiths coll.); Saldanha Bay, Hout Bay Harbour, and Kommetjie intertidal (Monniot coll.).

Description

The flat fleshy crusts of this species may be lobed or hang in double-sided sheets in harbours. In Hout Bay Harbour, the suspended colonies reach several decimetres. The oral apertures in almost all colonies are circled with white pigment, which contrasts with their pink colour. One colony from Miller's Point had reddish zooids in a yellow tunic. The zooids are arranged along a network of cloacal channels. There are only a few common cloacal apertures; they do not protrude at the colony surface.

The zooids have a cloacal languet of variable size, sometimes very short. The transverse cloacal opening may reveal half the length of the branchial sac. There are 12–15 rows of stigmata of which the second does not reach the dorsal lamina on either side of the body (Fig. 39A). The short oval stomach (Fig. 39B) bears 8–10 rods without anterior swellings and is well defined at the pyloric extremity. The caecum is long, cylindrical and often curved in a hook (Fig. 39B). The pyloric gland is small. The anus when contracted appears bilobed.

None of our specimens had ovaries or larvae. The nourishing zooids only had a multi-lobed testis on each side, the right one adjacent to the stomach (Fig. 39A, C) and the left one more anterior at the level of the intestine. The first-order buds (Fig. 39C) have testes as large as those of the nourishing zooids. Ovaries with 1–3 oocytes only appear in buds of the second order.

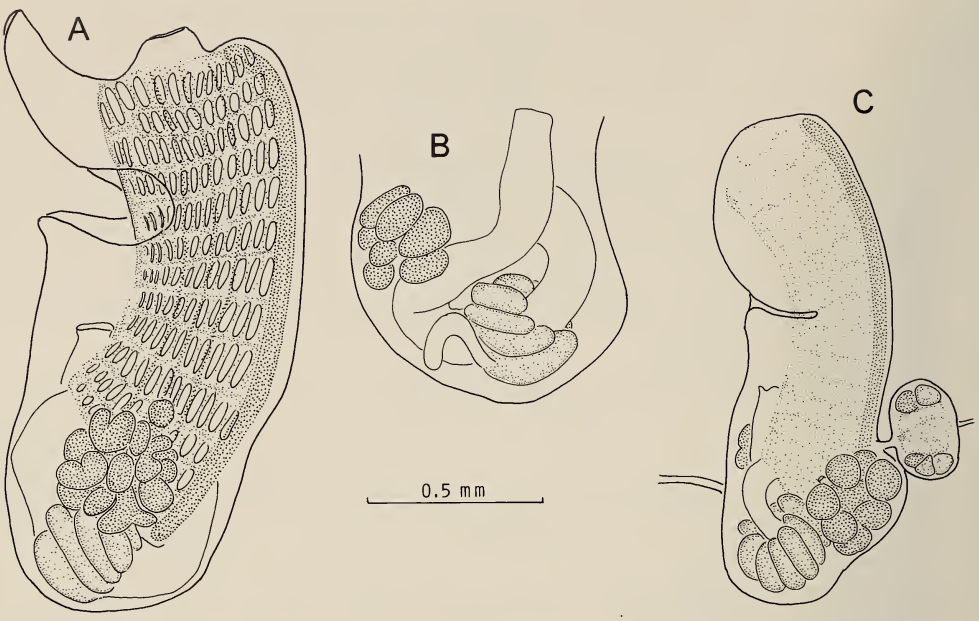

Fig. 39. *Botryllus magnicoecus*. A. Zooid. B. Gut. C. Buds of first and second orders.

Remarks and distribution

When fixed, the pigments fade and *B. magnicoecus* becomes similar in appearance to *B. gregalis*. The number of stigmata rows and the body shape are similar. The species only differ in the shape of their stomach and the caecum. This is probably why Hartmeyer (1912) considered this a variety of his *Botrylloides nigrum,* which, in our opinion, is *Botryllus gregalis* (see p. 74).

The name *B. magnicoecus* has been used worldwide for all species having a large caecum. Michaelsen (1923*b*) recorded this species in Portugal, the Red Sea, and Hong Kong. Hartmeyer & Michaelsen (1928) increased the confusion when they included the Australian *B. anceps* as a synonym.

The geographic distribution of *B. magnicoecus* in South Africa seems to be limited to the coast from Namibia to KwaZulu-Natal. All specimens recorded from other parts of the world, viz. the Mediterranean Sea, Portugal, Caraibes, Australia and Japan, belong to other species.

Botryllus mortenseni Millar, 1964

Figs 4D, 40

Botryllus mortenseni Millar, 1964: 176, fig. 13.

Material

One large colony and several small ones attached to other ascidians. Isipingo, KwaZulu-Natal, rock pools (Griffiths coll.).

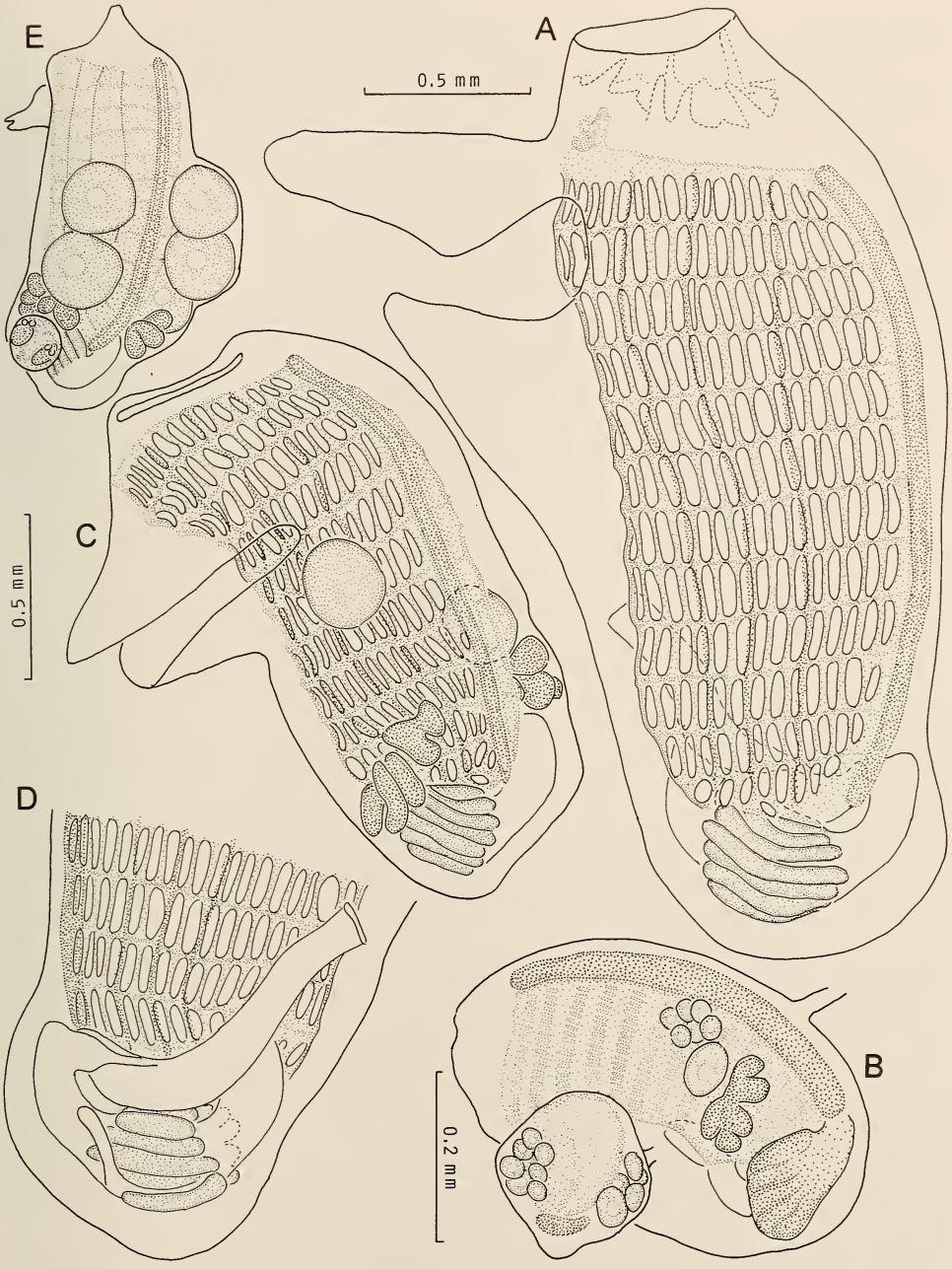

Fig. 40. *Botryllus mortenseni*. A. Nourishing zooid of the largest colony. B. Buds of first and second orders of the same colony. C. Nourishing and brooding zooid of a small colony. D. Gut of zooid C. E. Zooid with oral siphon not yet open but with mature gonads, in another colony.

Description

The largest colony is a cushion 5–6 mm thick, embedded with sand. Its black colour fades in formalin. The zooids are perpendicular to the colony surface and organized in circular systems around numerous common cloacal openings. The zooids are large, 3 mm in length, with a slit-shaped cloacal aperture and a long anterior conical languet and a posterior lip almost as long as the languet (Fig. 36A, C). The branchial sac has 12 rows of stigmata, all reaching the dorsal line (Fig. 36A). On the right side, some perforations represent a thirteenth row. The stigmata are numerous and there is an average of three between each internal longitudinal vessel. The stomach is oval, with a dozen folds that protrude slightly at the anterior end but flatten out at the posterior. The caecum is long, narrow and cylindrical (Fig. 36D). The secondary loop of the intestine is not accentuated and the rectum extends along 4–5 rows of stigmata, opening at the level of the eighth row. In the large colony, the nourishing zooids sometimes have a rudimentary testis. Ovaries with numerous oocytes appear in second-order buds and are also present in first-order buds (Fig. 36B).

Small colonies consisting of a single system were found on other ascidians at the same station. The smaller zooids (Fig. 36C), less than 2 mm long, have a cloacal aperture shaped like a whistle. There are only 11 complete rows of stigmata and a beginning of a twelfth row on the right (Fig. 36C). The nourishing zooids are hermaphroditic with a testis made of elongated fan-shaped lobes and 1–2 eggs anterior to the testes on each side (Fig. 36C). We observed a trace of segmentation in these eggs, which do not protrude outside the body wall. There are 2–3 eggs on each side in first-order buds (Fig. 36E).

Remarks and distribution

The type specimen of this species was collected 22 miles south-west of Cape Point at 55 m depth, and it is a little different to the specimens from Isipingo. The colony is thicker (15 mm) and the zooids are longer (4–5 mm). The scale included in Millar (1964, fig. 13) is probably erroneous and may correspond to 1 mm. The oral siphon is tubular. There are 16–18 rows of stigmata. Both of Millar's other specimens were dredged from Mossel Bay at 16 m depth, and have shorter and wider cloacal siphons than in our specimens.

We consider that the colonies collected at low tide at Isipingo belong to this species in spite of these differences. *Botryllus* species are relatively variable according to colony thickness. In Europe, we have observed that the zooids of *B. leachi* and *B. schlosseri* are larger and have more rows of stigmata in spherical colonies than in encrusting colonies. This was the reason that the now abandoned genera *Polycyclus* and *Sarcobotrylloides* were created for thick colonies. The length of the cloacal siphons is related to the distance between the zooid and the common cloacal aperture, and thus the age of the system and the position of the bud.

The small colonies at Isipingo were sexually mature whereas the larger ones were not. This phenomenon may be linked to ecological difficulties encountered by the small colonies, which react by maturing gonads.

Three other species of *Botryllus* impregnated with sand are known from elsewhere. They are closely allied and have in common a thick tunic, circular systems, zooids perpendicular to the colony surface, a whistle-shaped cloacal siphon placed anteriorly and sometimes in a tube, a branchial sac with an entire second stigmata row, and an ovary anterior to the testis with several eggs.

Botryllus stewartensis Brewin, 1958, from the south of New Zealand and Australia (Kott 1985) has small pedunculate lobes, distantly spaced, consisting of 1–3 systems. The stomach is oval with a long caecum. The testis is fan-shaped.

Botryllus arenaceus Monniot, C., 1988, from New Caledonia has lobes with a single system, a wide stomach with protruding folds at its anterior part, a caecum with an ampullae at the tip, and a mulberry-shaped testis.

Botryllus okai Monniot, C., 1988 (new name for the preoccupied *Psammobotrus purpureus* Oka, 1932), from Japan, has massive colonies with numerous systems. The stomach is similar to that of *B. mortenseni*, but has an ampullar caecum and an anus with a curled margin. The gonads have not been described and were only present in buds in specimens that we examined. The testis has elongated lobes.

Botryllus schlosseri (Palas, 1766)

Alcyonium schlosseri Pallas, 1766: 355.

Remarks

We have only collected this species in harbours, in Saldanha Bay and Hout Bay. The colonies are small, thin and encrusting. The zooids form circular systems. Live specimens are a green-brown colour. None of these colonies had gonads. This species has been previously recorded in South Africa, from Durban Harbour (Millar 1955).

Symplegma ?bahraini Monniot, C. & Monniot, F., 1997

Fig. 4E

Symplegma bahraini Monniot, C. & Monniot, F., 1997: 1638, text-fig. 7, pl. 1E, F.
?*Symplegma viride*: Millar, 1955: 196, fig. 24.

Material

Three colonies. Sodwana Bay, KwaZulu-Natal, 30–33 m (Schleyer coll.); Isipingo, KwaZulu-Natal, rock pool under overhang (Griffiths coll.).

Description

None of our three colonies has gonads, so the identification could not be made with certainty. An important characteristic of the species is the simultaneous presence of functional male and female gonads.

The uniform red colour of the colony from Isipingo was the same as in the type colony (Monniot, C. & Monniot, F. 1997, pl. 1E). The colonies from Sodwana Bay were pink-brown, with yellow individuals. Another colony from

Bahrain also was yellow in colour. Yellow samples were also collected in the Mozambique Channel, at Juan de Nova Island and in the north of Mozambique.

The samples from South Africa have a short gut and a branchial sac with 11 stigmata rows, as in the Bahrain specimens.

Remarks and distribution

Millar (1955) recorded the presence of *S. viride* in the Durban Harbour entrance but did not describe it. Millar referred to Van Name's (1945) description, which in reality represents *S. brakenhielmi* (Michaelsen, 1904*b*). The latter has been found in many harbours in the Atlantic Ocean, Australia, and the Pacific Ocean (often under the name *S. oceania*). *Symplegma brakenhielmi* does possibly occur in Durban Harbour. That species differs from *S. bahraini* in that its pigmentation is limited to the branchial vessels. When fixed all colour disappears, which is what Millar saw.

Metandrocarpa asymmetra C. Monniot sp. nov.

Fig. 41

Material

Holotype. SAM-A25857, Oudekraal, Cape Peninsula (33°59'S 18°21'E), 10 m depth on *Styela angularis*. Collected by C. L. Griffiths, 18 Aug. 1994. Unique.

Description

The colony consists of zooids at different developmental stages, all having female gonads. The zooids form small pink spheres, 4 mm in diameter, linked by very thin stolons, with closely spaced siphons. The tunic is thin. The translucent body wall contains weak musculature.

Twenty to 24 short thick oral tentacles in 3–4 orders of size are mounted on a crest (Fig. 41A, B). The prepharyngeal band has only one protruding edge which is not dorsally indented (Fig. 41A, B). The dorsal tubercle protrudes and has an elongated opening next to the neural ganglion. The dorsal lamina has a smooth edge that is displaced on the left side and turns around the oesophagus entrance.

The branchial sac is asymmetrical, hence the species name. It has seven longitudinal vessels on the right but only four on the left side. The 11 stigmata rows are each crossed by a thin parastigmatic vessel, except for the most posterior row. The stigmata are regularly spaced. Their number is indicated in the formula:

R.E. 8 v 4 v 5 v 4 v 4 v 4 v 4 v 4 to 15 D.L. 5 v 8 v 7 v 9 v 12 E.L.

In the anterior part of the branchial sac, the number of stigmata is the same on both sides. The first vessel deviates from the dorsal lamina and we found up to 15 stigmata at the level of the oesophagus.

The oesophagus is long and cylindrical, the stomach is wider than it is long (Fig. 41A, B) with 14 folds that are sometimes interrupted. The caecum forms a thin hook (Fig. 41C). The pyloric gland opens through a duct just before the

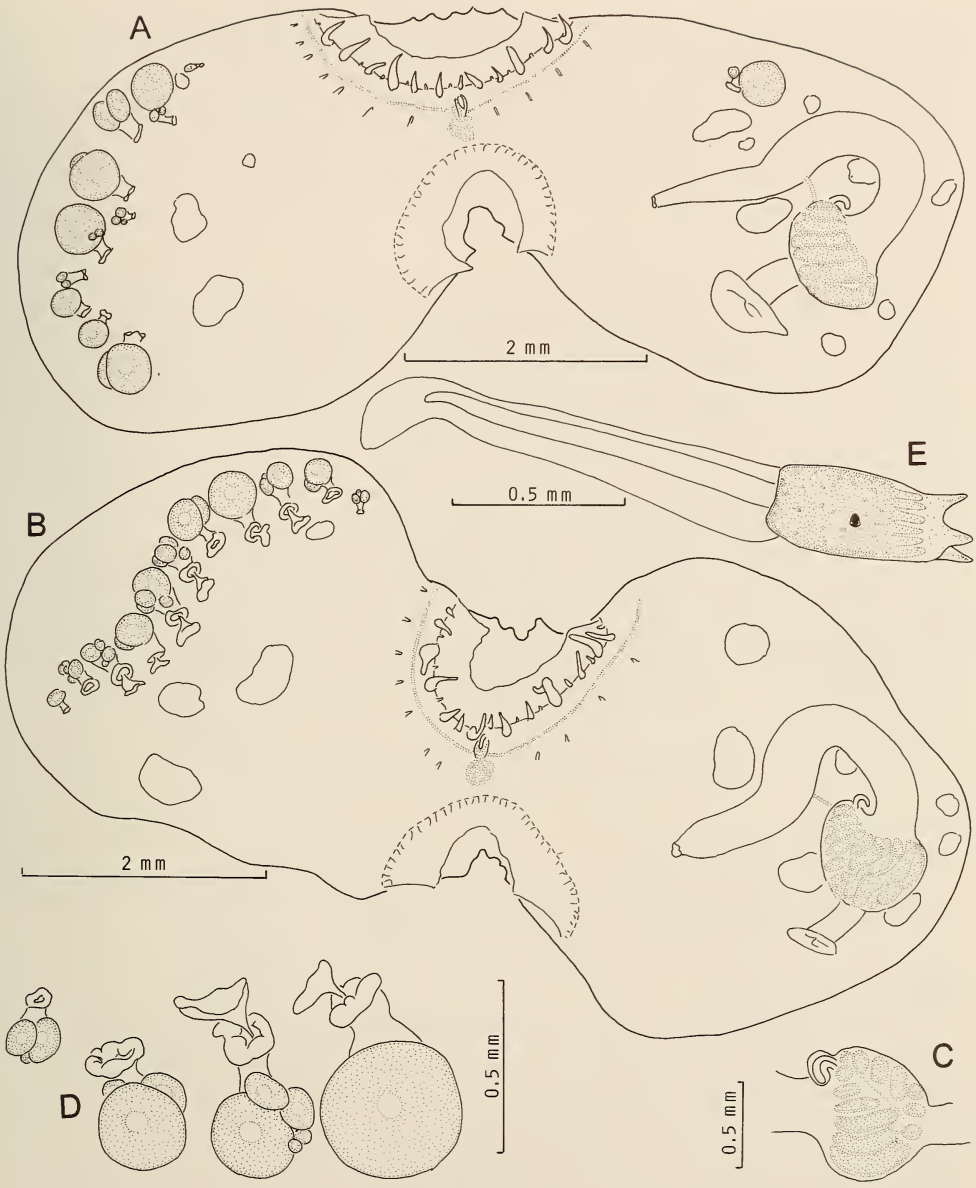

Fig. 41. *Metandrocarpa asymmetra*. A. Young zooid with ovaries on both body sides. B. Aged zooid with gonads on one side only. C. Stomach. D. Detail of the gonads. E. Larva.

caecum (Fig. 41A, B). The intestine ends in a slightly narrowed rectum. When contracted the anus is square, but it lacks angles when relaxed.

Ten to eleven ovaries lie in a line on the right side of the body (Fig. 41B), and one, two or three ovaries are found on the left side of the body, anterior to

the gut loop (Fig. 41A). Each ovary is made of a few oocytes and a large papilla (Fig. 41D). The papilla is narrow at first but becomes thick with a fleshy rim when the eggs are laid (Fig. 41D). The larvae (Fig. 41E) are brooded in a cup formed from the external egg follicle; this structure remains behind when the larvae are released. There are some endocarps on the body wall. A ring of small tentacles encircles the base of the cloacal siphon (Fig. 41A, B). Both siphons possess a velum.

Remarks

The genus *Metandrocarpa* is characterized by separate male and female gonads and the absence of branchial folds. Kott (1985) modified the diagnosis to include *M. agitata* Kott, 1985, which possesses true branchial folds. We do not agree with this modification, as it suppresses the difference between the genera *Amphicarpa* and *Metandrocarpa*. *Metandrocarpa agitata* is in fact an *Amphicarpa*. Generally the *Metandrocarpa* species have male and female gonads in the same colony. *Metandrocarpa sterreri* Monniot, C., 1972, from Bermuda and the Caribbean islands, also has dioecious colonies.

Metandrocarpa asymmetra is also original in the asymmetry of the branchial sac. Millar (1962) described *M. fascicularis* from Mossel Bay. That resembles *M. asymmetra* superficially, but the species are distinct. *Metandrocarpa fascicularis* has 7–9 longitudinal vessels on each side depending on its age, an elongated stomach, anterior ovaries and posterior testes.

Distomus antiborealis C. Monniot sp. nov.

Fig. 42

Material

Holotype. SAM-A25858, Saldanha Bay (33°03'S 18°02'E), 1–2 m depth. Collected by C. and F. Monniot, Feb. 1996. Unique.

Description

The zooids are in the shape of small spheres, 10 mm in diameter and covered with sand. The siphons are close together. The tunic is tough. The body wall is thin but opaque with a regularly distributed musculature. Sixteen wide and thick oral tentacles form a crown at the base of the siphon. Some smaller tentacles are irregularly intercalated between them. The prepharyngeal band has only one high rim and it forms a short dorsal indentation. The dorsal tubercle is protruding and opens through an antero-posterior slit. The dorsal lamina is high, with a smooth edge; it ends mid-length along the oesophagus entrance. The endostyle is not fully attached to the body wall but only connected to it by thin trabeculae.

The reduced branchial sac has one fold on the right and two on the left side. The first fold on the left side is reduced and limited to the anterior part of the branchial sac. We counted ten vessels anteriorly on each side, arranged according to the formula:

R. E. 5 (4) 1 D. L. (3) 2 (3) 2 E. L.

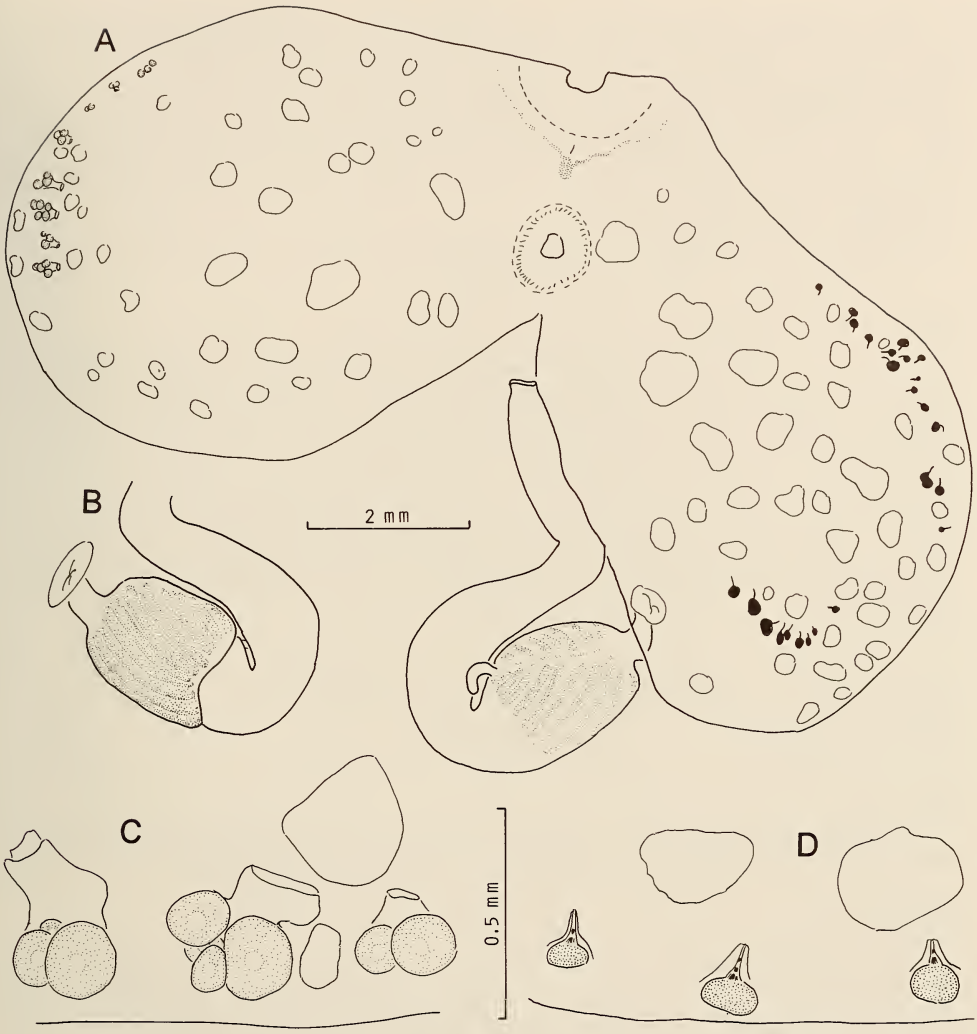

Fig. 42. *Distomus antiborealis* sp. nov. A. Zooid with reversed gut. B. Gut. C. Young ovaries. D. Young testes.

The most dorsal vessel on the right fold and the three vessels of the first left fold disappear in the median part of the branchial sac. There is a large space between the dorsal lamina and the first vessel, containing up to 16 stigmata on the right side. There are 7–9 stigmata in a mesh between the folds and two on the folds. The 14 rows of long stigmata are crossed by parastigmatic vessels only in the ventral part.

The oval stomach has a hook-like caecum and about 20 oblique grooves, most of them ending at the ventral axis of the stomach (Fig. 42A, B). The intestine is short. The rectum ends in a smooth-edged anus far from the cloacal aperture.

The zooids are not mature, but the gonads are developed enough to characterize the genus. Eight ovaries with several oocytes (Fig. 42C) lie in a line on the right side (Fig. 42A) alongside the trabeculae between the endostyle and the body wall. The oviducts are directed toward the dorsal side. The testes (Fig. 42D) are functional, in small flask-shaped ampullae. They are irregularly distributed on the left side along a line curving posteriorly (Fig. 42A). Some testes are located under the gut.

Numerous endocarps of varied sizes are present on the body wall. The cloacal tentacles are short, thin and numerous.

Remarks and distribution

Distomus antiborealis is the first species of *Distomus* recorded in southern Africa. The genus is more frequently encountered along the Atlantic coast from Senegal to the North Sea and in the Mediterranean Sea. One species inhabits deep submarine mounts in the south of New Caledonia.

The genus *Distomus* is related to the genera *Amphicarpa* and *Stolonica*. It is only characterized by female gonads on the right side of the body and male gonads on the left side of the body. In other species of the genus the testes are less numerous and larger. Their presentation here is reminiscent of the genus *Amphicarpa*.

Stolonica multitestis C. Monniot sp. nov.

Figs 4F, 43

Material

Holotype. SAM-A25859, Isipingo, KwaZulu-Natal (30°00'S 30°57'E), in rock pools. Collected by C. L. Griffiths, 10 July 1994. Unique.

Description

The zooids are joined only in the basal region by stolons and form sheets 10 mm thick. The oral siphon is terminal, the smaller cloacal siphon more lateral. The thin tunic includes some sediment. In life the tunic is orange-red with, between the siphons, two symmetrical white patches separated by an unpigmented area corresponding to the neural ganglion.

The body wall is transparent with a thin musculature. We counted about 30 stout oral tentacles joined at their wide bases, in several orders, but not very different in length. There are some others between them, variable in size but much smaller. The tentacles lie on a muscular ring. The prepharyngeal band has two high closely spaced membranes drawing a small dorsal curve. The dorsal tubercle protrudes slightly and is transversely elongated near the neural ganglion. The dorsal lamina is long, thin, low, and encircles the oesophagus entrance. The branchial sac has three folds on the right side and two folds on the left side. In the anterior part we counted:
R.E. 3(4) 2(5) 3(5) 3 D.L. 0(6) 3(6) 8 E.L.

The only folds to reach the oesophagus entrance are the first fold on the right and the second fold on the left. The most dorsal vessels disappear in the

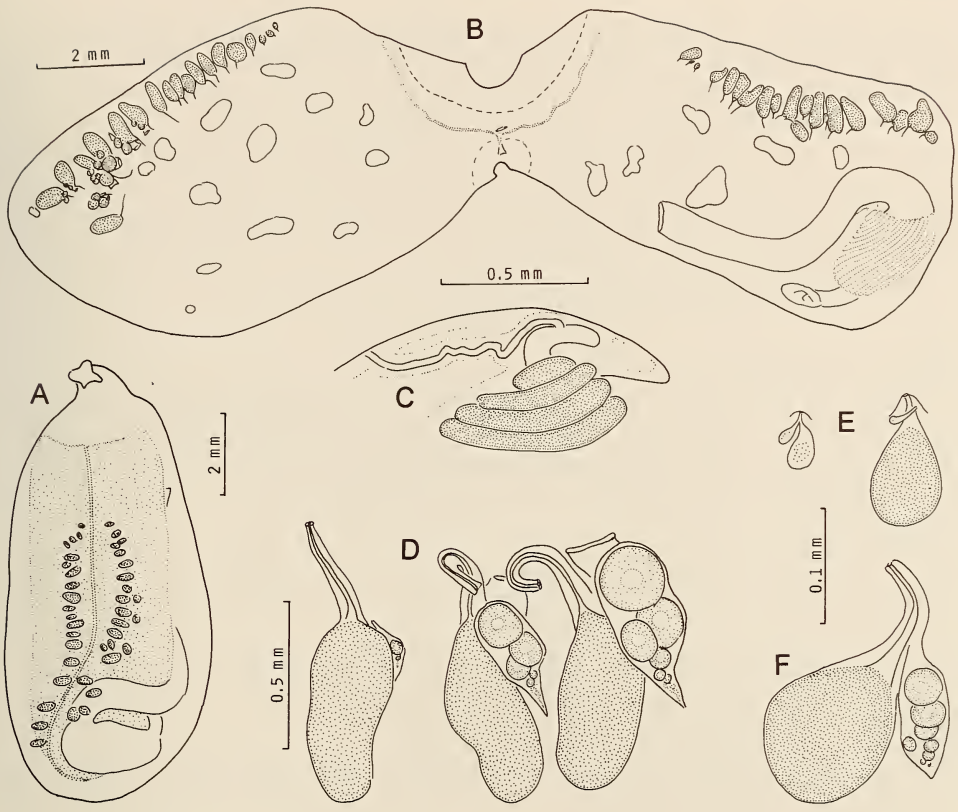

Fig. 43. *Stolonica multitestis* sp. nov. A. Ventral side of a zooid. B. Internal side of a zooid. C. Gastric caecum and pyloric duct. D. Right gonads. E. First stage of left gonads. F. Right gonad at the same stage as E, same scale.

posterior part of the branchial sac. On the left side, the first fold is parallel to the dorsal lamina.

On the right side, the first three longitudinal vessels are parallel to the dorsal lamina and three additional vessels appear successively between vessel number 3 and the base of the first fold. There are thus six vessels between the dorsal lamina and the first fold in the posterior part of the branchial sac. In some zooids there is a rudiment of a third fold on the anterior left side due to two incomplete vessels arising dorsal to the third vessel from the endostyle.

Of the 16 rows of stigmata, the most anterior 14 are regularly cut by a parastigmatic vessel, the fifteenth is incompletely divided, and the last one is irregular. There are 6–7 long stigmata within a mesh and three under the folds.

The stomach (Fig. 43B, C) widens at the pyloric end. There are about 35 regular parallel grooves and a small finger-like caecum. The duct of the pyloric gland is conspicuous and enters the caecum (Fig. 43C). The long rectum ends in a gaping anus.

The gonads lie in a row on each side of the ventral line (Fig. 43A). A row of flasked-shaped testes, of variable size (Fig. 43B), is not always well aligned

on the left side. On the right, there are testes in the anterior, hermaphroditic gonads at the level of the gut, and some testes in the extreme posterior (Fig. 43B). The number of hermaphroditic gonads varies between zooids. The colonies are not fully mature, and are not brooding larvae. In young specimens, the progressive gonadal development can be observed (Fig. 43D–F) on both sides of the body, each gonad lobe consisting of two vesicles with a single aperture (Fig. 43E, F). The posterior vesicle regresses rapidly on the left side, while it develops into the ovary on the right side (Fig. 43F). We did not observe oviduct formation.

There are few endocarps and no cloacal tentacles.

Remarks and distribution

Stolonica as a genus *sensu stricto* forms an homogeneous group. *Stolonica multitestis* sp. nov. is the first species of the genus collected in South Africa. The South African species is characterized by unlobed testes, a stomach slightly elongated, and a large number of testes on the left side with short ducts.

Gynandrocarpa placenta (Herdman, 1886)

Figs 4G, 44

Goodsiria placenta Herdman, 1886: 328, pl. 43 (figs 1–10), pl. 44 (figs 4, 8–10).
Goodsiria placenta fusca Herdman, 1886: 326, pl. 44 (figs 5–7).
Gynandrocarpa placenta unilateralis Michaelsen, 1900: 29.
Gynandrocarpa placenta fusca: Michaelsen, 1900: 29.
Gynandrocarpa domuncula Michaelsen, 1902 (*nomen nudum*); 1904*a*: 247, pl. 11 (fig. 14), pl. 13 (fig. 58).
Gynandrocarpa unilateralis: Millar, 1962: 178, fig. 27; 1964: 166.
non *Polyandrocarpa placenta*: Millar, 1955: 199, fig. 26 (= *Polyandrocarpa* sp.)

Material

Two colonies, Miller's Point, False Bay, 15 m depth; Oudekraal, 6 m depth (Griffiths coll.).

Description

This abundant species has the characteristic shape of an 'elephant ear'. It has a double layer of zooids held erect on a short peduncle of massive tunic tissue. Among colonial styelid species, pedunculate ones are the less common. The zooids are pink in life and three-quarters of their length is enclosed in a thick fibrous tunic. The zooids (Fig. 44A, B, C) are 6–8 mm long and enclosed in a tunic capsule. The siphons are close together. The body wall is thin with muscles regularly distributed over the entire body. Pigment flecks are found everywhere. There are 20–40 stout, curved oral tentacles arranged irregularly in 3–4 orders. The prepharyngeal band has two parallel rims and forms a low dorsal 'V'. The dorsal tubercle is button-shaped and opens in a simple hole. The dorsal lamina is high but rather short. The endostyle does not extend beyond the postero-ventral side of the body and turns into a long retropharyngeal band where most of the longitudinal vessels end. The oesophagus entrance is two-thirds of the way down the branchial sac.

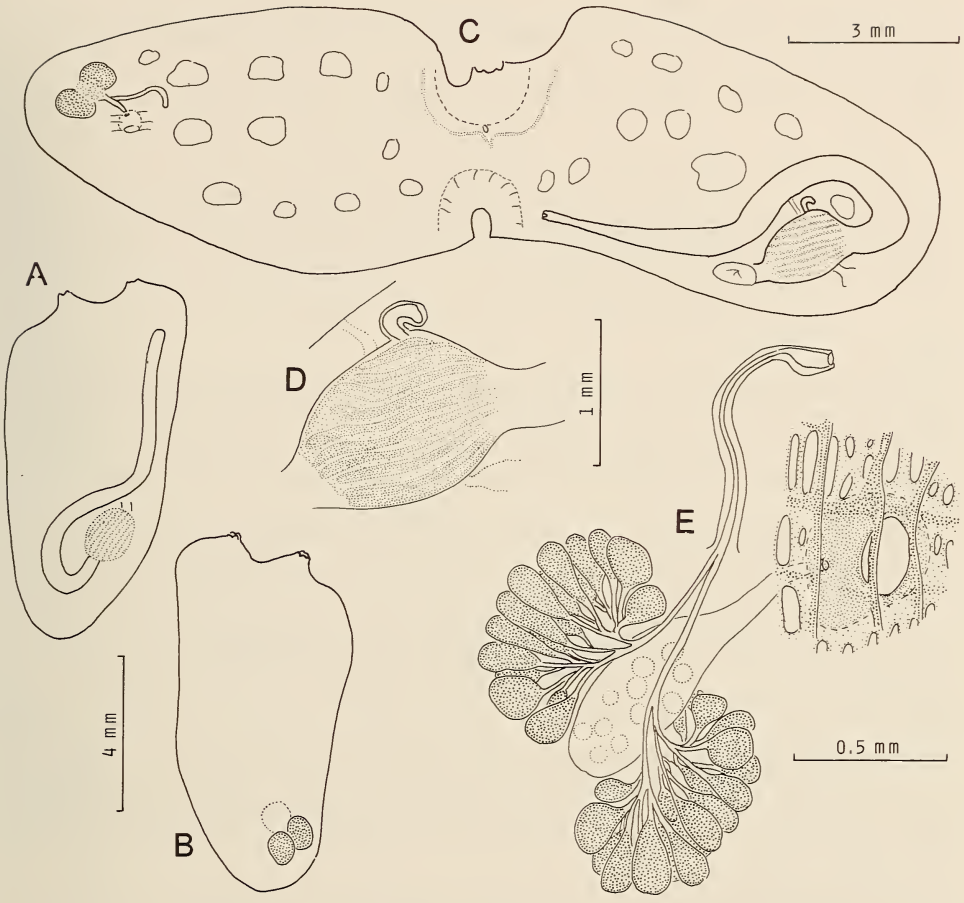

Fig. 44. *Gynandrocarpa placenta*. A. Left side of a zooid. B. Right side of a zooid. C. Zooid opened along the ventral line. D. Stomach. E. Gonad with the oviduct leading into the incubatory pouch.

The branchial sac has three folds on each side. The third fold on the left side is always smaller than the others, variable between the individuals, and does not reach the posterior part of the branchial sac. The branchial formula is:
R.E. 2 (4) 3 (5) 6 (6) 1 D.L. 2 (6) 3 (5) 3 (2) 2 E. L.

The first vessel on the left side remains parallel with the dorsal lamina down to the oesophagus entrance. The stigmata are short and without parastigmatic vessels. There are, on average, five stigmata in a mesh between the folds and 2–3 on the folds.

The gut (Fig. 44C, D) is linked to the body wall only by trabeculae. The ovoid stomach has about 20 longitudinal grooves. The caecum (Fig. 44D) is hook-shaped and arises at a point two-thirds down the stomach. The secondary intestinal curve is not accentuated. The rectum is long; the anus has four lobes or a plain edge.

The gonad (Fig. 44E) is characteristic of the genus. It lies at the bottom of the cloacal cavity on the left side of the body (Fig. 44B) and is partially enclosed in the body wall. The ovary is centrally placed between two long testis masses. The sperm ducts join to form a very long papilla ending in an ampulla (Fig. 44E).

The oviduct opens against a peculiar structure of the branchial tissue forming an incubatory pouch (Fig. 44E). This pouch is hemispherical and opens between two longitudinal vessels. No larvae are present in the colonies. The body wall bears large endocarps. About 15 cloacal tentacles are particularly long.

Remarks

Sometimes a dromiid crab digs its hole in the peduncle of the colony and then carries it on its carapace like a 'cloak'. It would be interesting to know at which stage of development this association begins, and whether the crab removes a piece from a mature colony or a young colony from the substratum to clothe itself.

The nomenclature for this species is complex. We have examined the type specimen from the British Museum. Herdman (1886) described the species from Simon's Bay. The single gonad is precisely figured in his cross-section figure (pl. 44 (figs 4, 8, 9)) but in the text Herdman used the plural when referring to the gonads and this has caused numerous confusions. He did not mention that the gonad lies on the right side of the body. Herdman also described the variety *G. placenta fusca* in the same publication. It only differs in the shape of the colony, which is less elongated and wider than in the type specimen.

Michaelsen (1900) redescribed the type and created the genus *Gynandrocarpa* based on the gonad disposition. He recognized Herdman's variety *G. placenta fusca* and designated *Gynandrocarpa placenta unilateralis* as the type of the species.

Stebbing (1902: 26) found colonies associated with Dromiidae and correctly identified them as *Goodsiria placenta*.

Michaelsen (1902), in a publication about symbiosis, cited Stebbing's specimens under the name *Gynandrocarpa domuncula*, *nomen nudum*, a name that he formally created later (1904*a*: 247, pl. 10 (fig. 14), pl. 13 (fig. 58)). He recorded this species from the Agulhas Bank at 100 m depth and from Dar es Salaam at 400 m. The same year, Michaelsen (1904*b*) described *Gynandrocarpa placenta* and *Gynandrocarpa domuncula*, differing in colony shape only, one of them being free-living on the bottom, the other settling on a crab. He abandoned the distinction between *G. placenta fusca* and *G. placenta unilateralis*. In an appendix to the same paper (p. 114) he noted the presence of this species in KwaZulu-Natal.

Herdman (1912) recorded *Goodsiria (Gynandrocarpa) placenta* from the Falkland Islands without giving further details.

Millar (1955) upset everything by describing a true *Polyandrocarpa* that he named *Polyandrocarpa placenta*. In 1962, having found the 'elephant ear', he referred it to *Gynandrocarpa unilateralis* Michaelsen, 1900, and compiled the correct description of Herdman's species.

Kott (1969) assigned the name *Polyandrocarpa placenta* sensu Millar (1955) to Herdman's specimens from the Falkland Islands without seeing the specimens.

We have not been able to find Millar's specimens (1955) in museums; apparently they correspond to a new species.

Remarks on the genus Dextrocarpa *Millar, 1955*

In 1955, Millar described the genus *Dextrocarpa*, which has a gonad similar to that of *Gynandrocarpa*. He considered (p. 203) that the genus *Dextrocarpa* issued from the genus *Gynandrocarpa* by the 'loss of budding power and may be regarded as one of the most specialized genera of the Polyzoinae'.

Later (1962, 1988) he found aggregated zooids and assumed that they were budding.

Another species of the genus, always solitary, was recorded at Kerguelen (Monniot, C. 1978). More recent data about the budding of colonial Styelidae and the possible existence of budding in the genus *Polycarpa*, are persuasive evidence that *Dextrocarpa* is a synonym of *Gynandrocarpa*.

Polyandrocarpa griffithsi C. Monniot sp. nov.

Fig. 45

Material

Holotype. SAM–A25860, Isipingo, KwaZulu-Natal (30°00'S 30°57'E), from rock pools. Collected by C. L. Griffiths, 10 July 1996. Unique.

Description

Live specimens are reddish and entirely covered with sand, making compact blocks to which many other ascidians, such as *Polyclinum*, *Molgula* and *Botryllus gregalis* are attached. The tunic is embedded with sand and thus stiff and brittle. It is possible to separate the individuals almost to their base. They vary in size within a block. The reflex tunic within the long protruding siphons is not coloured.

The body wall is thin, translucent (Fig. 45A, B) and easily torn. Musculature is limited to the siphons. Both siphons have a large velum. About 60 short and flat oral tentacles, in three orders, arise from a protruding crest. There is a large space between the tentacles and the prepharyngeal band. The latter has only one high rim, with a slight dorsal curve. The protruding dorsal tubercle varies in shape, forming either a 'C' that opens to the anterior or a slit with a variable opening (Fig. 45D). The dorsal lamina is shorter than the endostyle, and rises progressively higher to end abruptly adjacent to the first branchial fold on the left at the oesophageal entrance.

The thin branchial sac has four folds on each side. Anteriorly we counted: R. E. 6 (10) 5 (10) 4 (12) 3 (10) 2 D. L. 2 (10) 3 (12) 4 (10) 5 (9) 1 E. L.

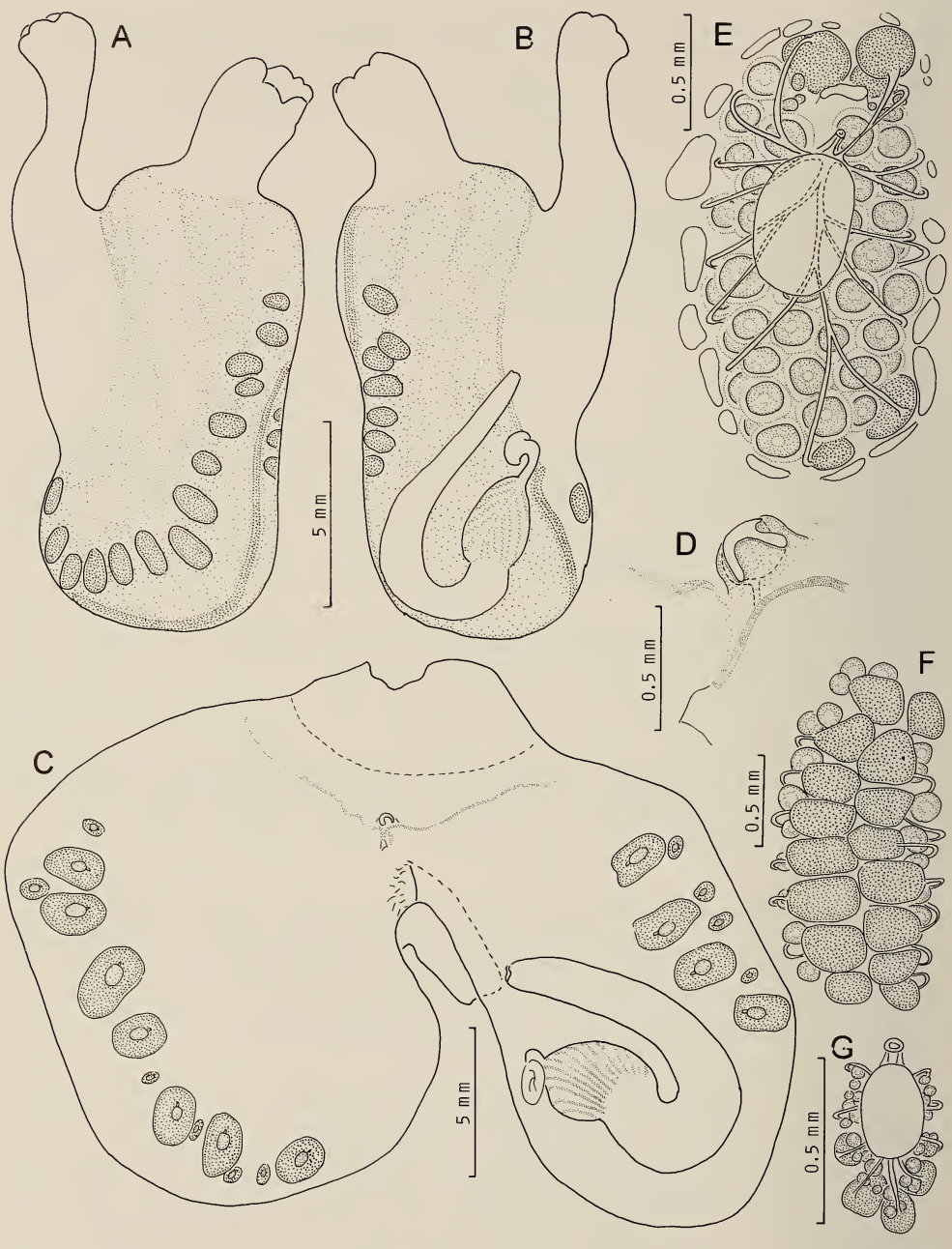

Fig. 45. *Polyandrocarpa griffithsi* sp. nov. A–B. Both sides of a zooid. C. Zooid opened along the ventral line. D. Dorsal tubercle. E. Internal side of a mature gonad. F. External side of a gonad. G. Young gonad with a large central gland.

The first fold on the right moves away posteriorly from the dorsal lamina. The first longitudinal vessel on the right side runs parallel to the dorsal lamina; in the posterior part 3–4 intercalated vessels arise between the first vessel and the first fold. The folds are sharply cut at the oesophagus entrance. There are 4–5 elongated stigmata in a mesh between the folds, and 2–3 on the folds. They are regularly crossed by parastigmatic vessels.

The digestive tract is short and has no secondary curve (Fig. 45B, C). The oval stomach has about 20 grooves, many of them ending at the ventral midline of the stomach. The anus has a plain edge or four low lobes.

The gonads, arranged in a row on each side of the endostyle (Fig. 45A-C), have a peculiar structure. They are enclosed in hollows in the body wall. In each polycarp the ovary lies over the testis lobes (Fig. 45E, F). The oocytes have a thick layer of clear follicular cells. The oviduct is short and wide. The ducts of the testis follicles join to form a protruding papilla (Fig. 45E). There is a round mass of clear tissue above each polycarp that is not related to the gonad ducts (Fig. 45C, E, G). Its role is unknown. A similar structure has only been found in *Polyandrocarpa glandulosa* Monniot, C., 1987, from New Caledonia. This tissue appears as soon as the gonads develop (Fig. 45G).

There are no endocarps. The cloacal tentacles are arranged in a ring at the base of the siphon.

Remarks

This species could possibly be confused with *Polycarpa anguinea* or *Polyandrocarpa anguinea* (Sluiter, 1898*a*), recorded from Knysna but not found during this collection. In both cases, the agglomerated zooids are covered with sand and their tunics are fused. The siphons are long and the body wall is thin without endocarps. The gut has an oval stomach and forms an open loop. The gonads alone are different.

We have examined the type specimen of *Polycarpa anguinea* in which the gonads are poorly developed. They are elongated polycarps that protrude into the cloacal cavity without any evidence of a central vesicle. Samples of *Polycarpa anguinea* according to Millar (1955) and of *Polyandrocarpa anguinea* according to Millar (1962) probably belong to Sluiter's species, as Millar's illustrations suggest.

Polycarpa insulsa (Sluiter, 1898*b*)

Figs 4H, 46

Styela (Polycarpa) insulsa Sluiter, 1898*b*: 14, pl. 3 (fig. 43).
Synonymy and distribution see Monniot, C., 1987: 296, fig. 9.

Material

One specimen. Isipingo, in rock pools (Griffiths coll.).

Description

This species is covered with algae and sponges. Some sand is embedded in the tunic. Live specimens have eight white bands in the interior of both siphons

which disappear after preservation. When fixed the cloacal siphon becomes reddish with eight black external bands that do not exist on the oral siphon. The tunic is hard and about 1 mm thick.

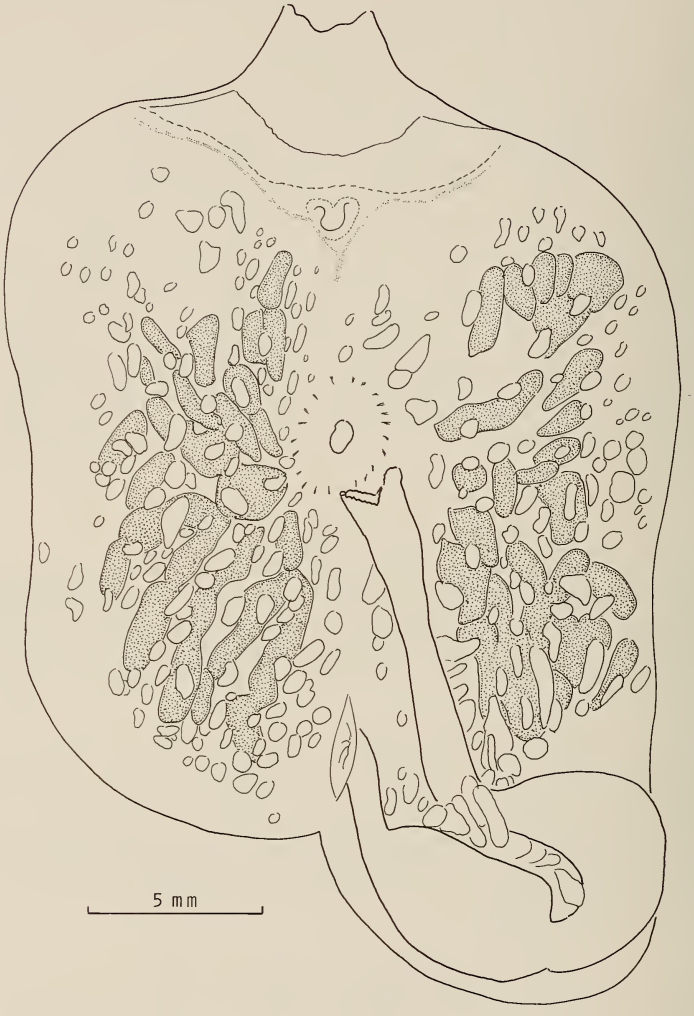

Fig. 46. *Polycarpa insulsa*. Internal anatomy.

The body wall is thick and opaque. About 50 oral tentacles are arranged in no clear order and with some smaller ones between them. The prepharyngeal band has two rims and a pronounced dorsal indentation. It is prolonged by a small groove (Fig. 46). The dorsal tubercle is large, protruberant, and opens as a 'U' with the sides curved to the exterior (Fig. 46). The dorsal lamina is long and low.

The branchial sac has four low folds on each side that do not cover each other. The branchial formula is:

R. E. 2 (10) 3 (14) 3 (13) 2 (20) 2 D. L. 1 (14) 4 (11) 4 (13) 3 (8) 2 E. L.

The exterior of the branchial sac is lined with fibrous tissue. The first vessel on the right side runs parallel to the dorsal lamina. The vessels are tightly compressed on to the folds.

The gut begins in the posterior part of the branchial sac. The enlarged stomach is long and has no obvious grooves. There is no caecum. The long rectum has a large diameter and ends with an anus that has two slightly undulated lobes.

The body wall is lined with a layer of fibrous and resistant tissue in which the protruding polycarps are wrapped. The polycarps are so close to each other that they seem attached to each other (Fig. 46). The genital ducts are short. There are numerous endocarps covering the whole surface of the body wall (Fig. 46). They are thin and brittle and not covered by the fibrous layer that they cross through small openings. There are very few, rather stout, cloacal tentacles arranged in a circle.

Remarks and distribution

Polycarpa insulsa is often characterized by black stripes on the exterior side of the siphons, but its most peculiar feature is the presence of a layer of extremely resistant, whitish, fibrous tissue that covers the internal body wall and extends slightly on to the exterior of the branchial sac. The specimen from Isipingo is very similar to samples from Martinique and New Caledonia. Small differences, such as the greater length of the intestine, may be due to the disposition of the animal on the substratum.

Polycarpa insulsa is widely distributed, extending from the western tropical Atlantic Ocean to KwaZulu-Natal, and New Caledonia.

Polycarpa mytiligera (Savigny, 1816)

Fig. 47A

Cynthia mytiligera Savigny, 1816: 98, pl. 8 (fig. 2).

For synonymy and distribution see *Polycarpa mytiligera*: Monniot, F. & Monniot, C., 1999: 29, text-fig. 17, pl. 3F. Additional synonymy: *Polycarpa seychellensis*: Monniot, C. & Monniot, F., 1976: 373, fig. 3A.

Material

Three specimens. Sodwana Bay, 15–35 m (Schleyer coll.).

Description

This large species may reach 100 mm across. It is characterized by a dorsal tubercle with numerous openings, at least in older specimens. There are four branchial folds on each side and the first on the right side runs parallel to the dorsal lamina. The gut occupies the posterior third of the body (Fig. 47A). The stomach is oval, has internal folds, and lacks a caecum. The wide anus has a slightly dented margin. About 100 gonads are irregularly distributed on the body wall (Fig. 47A). This species is rarely found with active gonads and, even when these are functional, they never protrude but remain hidden in the body

wall. The cloacal siphon is encircled by fleshy crests and a row of very small cloacal tentacles.

Remarks and distribution

This species is abundant along the coasts of the Red Sea, Tanzania and Mozambique. It has affinities with a large group of tropical species that have gonads embedded in the body wall and bear endocarps only in the digestive loop.

Polycarpa rubida (Sluiter, 1898*a*)

Fig. 47B

Styela (Polycarpa) rubida Sluiter, 1898*a*: 53, pl. 7 (figs 1–4).
Polycarpa rubida: Millar, 1961: 11; 1988: 836. Monniot, C. & Monniot, F., 1976: 376, fig. 4.

Material

Several specimens, Sodwana Bay, KwaZulu-Natal, 15–21 m. (Schleyer coll.).

Description

This species is colloquially named 'the bloody tunicate' as it grows in irregular red masses. One finds among them individuals of all sizes from young buds to mature adults and pieces of wrinkled, hard tunic, the sole remnants of old specimens that have entirely regressed. The tunic is common to the whole mass. The zooids are either totally enclosed, with only the siphons protruding, or they are merely joined at their base, forming a small peduncle above a tunic mass. All levels of attachment may be observed in a single sample. The tunic is thick and leathery.

The body wall is opaque and has evenly distributed musculature. Both siphons possess a large velum. About 50 long, thin oral tentacles are arranged in 4–5 orders, and occasionally there are smaller ones between them. The prepharyngeal band has two rims forming a pronounced dorsal curve. The dorsal tubercle protrudes and occupies the whole dorsal curve. Its opening is variable in shape but usually S-shaped. The long dorsal lamina ends at the middle of the entrance to the oesophagus.

The branchial sac has four folds on each side:
R.E. 2 (11) 3 (16) 3 (15) 7 (16) D.L. 1 (12) 3 (15) 3 (15) 3 (12) 2 E.L.

The first longitudinal vessel lies parallel to the dorsal lamina. There are 6–8 elongated stigmata in a mesh between the folds and 2–4 on the folds. They are often cut by parastigmatic vessels.

The digestive tract has a secondary curve that is only slightly pronounced (Fig. 47B). The stomach is spindle-shaped and has a thin wall with grooves, which are sometimes more pronounced at the anterior. There is no caecum. The intestine ends in a petal-edged anus.

There is one row of gonads in a semi-circle around the cloacal siphon (Fig. 47B). Each gonad is slightly elongated and protrudes into the cloacal

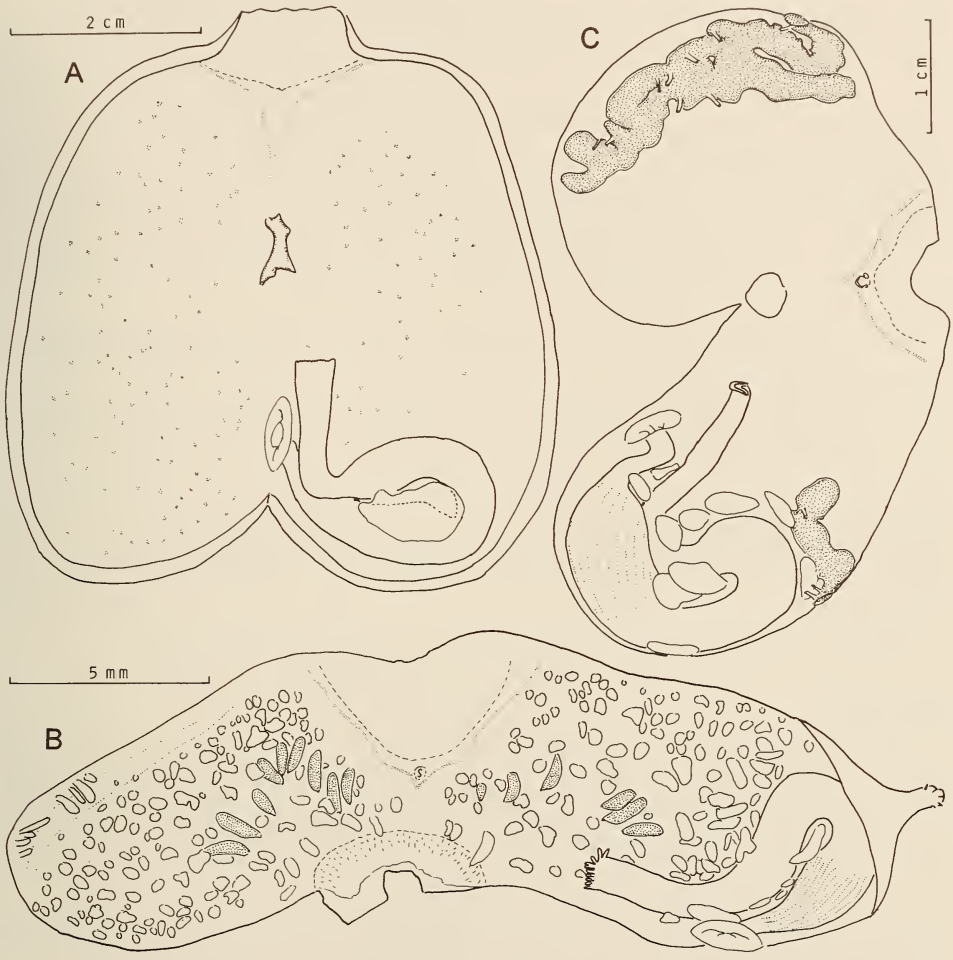

Fig. 47. A. *Polycarpa mytiligera*. B. *Polycarpa rubida*. C. *Cnemidocarpa humilis*.

cavity, but remains attached to the body wall along much of its length. The gonads were inactive in specimens collected in January and May.

Numerous endocarps are distributed over the entire body wall and between the two limbs of the gut (Fig. 47B). The cloacal tentacles arise from the velum.

There is a compact mass of undifferentiated tissue behind the gut that is used for regeneration and budding.

Remarks and distribution

It is with much hesitation that we ascribe this species to the genus *Polycarpa*, in spite of its colonial aspect. This species is mainly known from solitary individuals. It belongs to a species group that manifests regeneration and budding: *Polycarpa captiosa* (Sluiter, 1885), *P. papillata* (Sluiter, 1885), *P. olitoria* (Sluiter, 1890), and *P. madagascariensis* Michaelsen, 1912.

These species are characterized by closely spaced siphons, elongated gonads in a single row within the middle of the body wall, numerous endocarps, and a gut loosely attached to the body wall with a clearly striated stomach. All the species have the ability to shed and regenerate the branchial sac and gut. This phenomenon is more or less pronounced according to the species, from an accidental to obligatory evisceration. Generally, these species are only able to develop gonads after evisceration. After a zooid releases its genital products, it regenerates either into a new zooid or into several more or less separate cloned zooids, as in *P. papillata*, or an aggregation of cloned zooids, as in *P. rubida*.

No specimens with mature gonads were recorded in *P. rubida* and few in other species of the same group.

Polycarpa rubida has been recorded from Mozambique to KwaZulu-Natal.

Cnemidocarpa humilis (Heller, 1878)

Fig. 47C

Styela humilis Heller, 1878: 26.
For synonymy and distribution see *Asterocarpa humilis* in Kott, 1985: 141, fig. 65.

Material

Several specimens. Hout Bay Harbour, on ropes (Monniot coll.).

Description

The specimens are globular and attached to the substratum on their posterior left side. The siphons are slightly protruding and circled by papillae. When contracted, the siphons retract deeper than the papillae. The tunic is thin, soft but resistant. The largest individuals (60 mm) are covered with various epibionts, including even mussels.

Young specimens are slightly translucent and pink. Internal muscles are visible through their body wall and so is the diffuse circular musculature issuing in radial ribbons from both siphons. About 40 irregularly developed oral tentacles are distributed in four orders on a muscular rod. In one specimen, parasitic ciliates caused a ramification of the tentacles. Only a few of these ramifications have ciliates on their tips. The prepharyngeal band has two rims, the anterior one being irregular and the posterior more developed. There is a deep dorsal indentation without scalloping at the level of the branchial folds (Fig. 47C). The dorsal tubercle is a protruding button, open at the anterior in a simple 'C' in young individuals but having a double spiral rolled to the exterior side in old specimens. A plain dorsal lamina progressively tapers and ends at the oesophagus entrance. The endostyle is attached to the body wall by a raised and thin membrane or long trabeculae.

The thin branchial sac has four low folds per side. It is linked to the body wall by particularly numerous dermato-branchial bridges. We counted:
R.E. 4 (7) 3 (8) 3 (8) 3 (8) 0 D.L. 0 (9) 3 (8) 3 (6) 3 (5) E.L.

There is no sinus between the dorsal lamina and the first folds. There are 15–20 stigmata in a mesh between the folds and 3–10 on the folds. The stigmata are small and often intersected by parastigmatic vessels.

The stomach is dilated and soft with some internal grooves. There is no caecum. The intestinal wall is transparent and has a well-marked typhlosole. The horseshoe-shaped anus has a curled rim. The gut is surrounded by endocarps (Fig. 47C).

In young individuals the gonads are well separated with 4–6 on the right side and two on the left side. The gonads become ramified during growth and join to form a single mass (Fig. 47C) crossing the line of the endostyle. The number of sperm ducts increases as the gonads develop, opening through large papillae scattered over the gonads. The oviducts are less numerous and hardly visible.

Remarks and distribution

Kott (1985) illustrated Australian specimens as having ramified gonads that remained independent from each other. The samples from the Magellanic region have united gonads, as in the present collection. All other characteristics, the branchial sac, the gut, and the endocarp disposition, are identical. This species is common in natural habitats in New Zealand, southern Australia and the southern end of South America. It is surprising that a species of such large size has only been collected in harbours in South Africa. It may have been introduced.

Styela angularis (Stimpson, 1855)

Fig. 48

Cynthia angularis Stimpson, 1855: 387.
Tethyum costatum Hartmeyer, 1911: 564, pl. 47 (fig. 8), pl. 57 (figs 11–12).
Styela costata: Hartmeyer, 1913: 133. Michaelsen, 1915: 379. Millar, 1955: 204, fig. 29.
Styela angularis: Hartmeyer, 1927: 189. Millar, 1962: 190; 1964: 175.

Material

Several specimens, Oudekraal, Cape Peninsula, 10 m (Griffiths coll.).

Description

This pedunculate species has a characteristic hexagonal cross-section; it can exceed 100 mm in height. The cloacal siphon is terminal and the oral siphon opens a short distance to the ventro-posterior. Both have four lobes. The stiff tunic is often covered with epibionts, among them ascidians. The body without the tunic is cylindrical. The body wall is opaque and contains a strong musculature. A bunch of vascular processes emerges at the body extremity and enters the peduncle (Fig. 48). The body wall is not prolonged into the peduncle. There are about 60 oral tentacles that alternate in four orders of size, those of the fourth order being of variable size. The tentacles are triangular in cross-section and have sharp edges.

The prepharyngeal band has two raised blades that are close to each other; it describes curves with no relation to the branchial folds. There is no dorsal 'V'. The dorsal tubercle is large, protruberant and opens in a 'C'. The

Fig. 48. *Styela angularis*.

dorsal lamina is long and has a smooth margin; its height is clearly greater than that of the branchial folds. We counted on the right side:
R.E. 7 (9) 12 (17) 11 (18) 12 (25) 7 D.L.

The longitudinal vessels are closely spaced on the folds and almost joined at the top of the branchial sac. The branchial meshes are square or longitudinally extended. They contain 4–5 long stigmata near the endostyle and 2–3 between the folds.

It is impossible to see stigmata on the folds. Parastigmatic vessels are only apparent when a row is dividing and on the sides of the folds.

The oesophagus entrance is before the bottom of the branchial sac. The wide stomach has internal parallel ridges (Fig. 48). Half the length of the oesophagus and the stomach are located below the bottom of the branchial sac. There is no caecum, but a bridge of tissue unites the stomach and the intestine and contains the pyloric ducts. The intestine curves after the stomach and follows the dorsal lamina for a considerable distance towards the cloacal siphon (Fig. 48). The narrow rectum is not attached to the body wall, and ends in a funnel-like anus with a fringed margin.

There are two long, straight gonads on each side of the body (Fig. 48). The ovaries are cylindrical and attached to the body wall, with the minutely divided testis lobes located on either side. The sperm ducts run down the internal side of each ovary. The oviducts are deeper, lying next to the body wall.

Some testis lobes may be far from the extremity of the ovary in the posterior of the body. The protruding female genital papillae open near the cloacal siphon behind the anus.

The voluminous heart is adjacent to the endostyle. There are some endocarps between the gonads, numerous near the oral siphon and even much more numerous in the posterior extremity of the body, where they become elongated (Fig. 48). The cloacal siphon has a ring of small tentacles.

Distribution

This species extends from Lüderitzbucht, Namibia, to the Eastern Cape.

Styela canopus (Savigny, 1816)

Fig. 49A

Styela canopus Savigny, 1816: 45, 154.
Styela partita (Stimpson, 1852) aut. mult.
Styela canopus: Kott, 1985: 112, fig. 48, and distribution.
Styela pupa Heller, 1878: 107, pl. 2 (fig. 13). Millar, 1955: 204, fig. 30.
Tethyum pupa: Hartmeyer, 1911: 569, pl. 5 (figs 1–7).
Tethyum canopus malgalhaense: Hartmeyer, 1911: 522, pl. 57 (figs 18–20).
Styela marquesana: Millar, 1955: 207, fig. 32.
Styela stephensoni Michaelsen, 1934: 157, figs 4–7. Millar, 1964: 175, fig. 12.
?*Styela aequatorialis*: Millar, 1955: 201, fig. 33.

Material

Several specimens. False Bay; Kommetjie; Port Elizabeth (Monniot coll.).

Description

Ascidiologists have, for about 20 years, remarked on the great environment-dependent variability of this species. Large specimens, 20–30 mm in size, live

in sheltered environments such as mangrove swamps in the same geographic area as smaller specimens that live on rocky shores and have a tunic with ridges and tubercles. Very small individuals less than 10 mm in size and covered with sand inhabit sandy bottoms. All intermediates are found in the same area. The three principal variants were described by Millar (1955) under three different names.

All samples have in common a cylindrical elongated stomach with well-formed folds (Fig. 49A), a small caecum, a large intestine that is always curved, and two gonads on each side (Fig. 49A). One of the gonads may be missing on the left side in small specimens, and large specimens may have three gonads on the right side. Each gonad normally consists of a sinuous ovary with testis lobes adjacent but not adhering to it. In small specimens, there are often only a few testis lobes, whereas in larger animals they become numerous. The endocarps are rare in small specimens that are covered with sand.

Distribution

Styela canopus has a wide distribution, and occurs in natural habitats in shallow coastal regions, as well as extending into harbours and on to wrecks.

Styela materna Monniot & Monniot, 1983
Fig. 49B, C

Styela materna Monniot, C. & Monniot, F., 1983: 81, fig.17 c, d.

Material

Three specimens. Miller's Point, False Bay, 2 m (Monniot coll.).

Description

Three specimens (less than 10 mm across) were collected in a cavity in a calcareous seaweed. The tunic is wrinkled on the dorsal side and has some brown-ochre scales. The tunic is lighter and contains some sand on the ventral side. The siphons are close to each other and do not protrude. This species is very similar in external appearance to *Styela canopus*.

The muscles are strong but not gathered in bundles. There are about 20 stocky tightly-packed oral tentacles that do not alternate precisely. The prepharyngeal band is thin and consists of a single crest. It is only slightly indented dorsally. The dorsal tubercle protrudes and is urn-shaped. The dorsal lamina is thick, low and rather long. The branchial sac has four folds per side. We counted on the right side:
R.E. 0 (5) 1 (6) 1 (6) 2 (8) 2 D.L.

The longitudinal vessels on the right of the dorsal lamina run parallel with it. We counted 5–6 stigmata per mesh between the folds and 2–3 on the folds. The stigmata are rows regularly cut by a strong parastigmatic vessel. The digestive tract (Fig. 49B) is long. The cylindrical oesophagus opens into a wide and elongated stomach that has a thin wall with about 15 well-marked grooves. No caecum was found. The intestine ends in a narrow anus with small lobes.

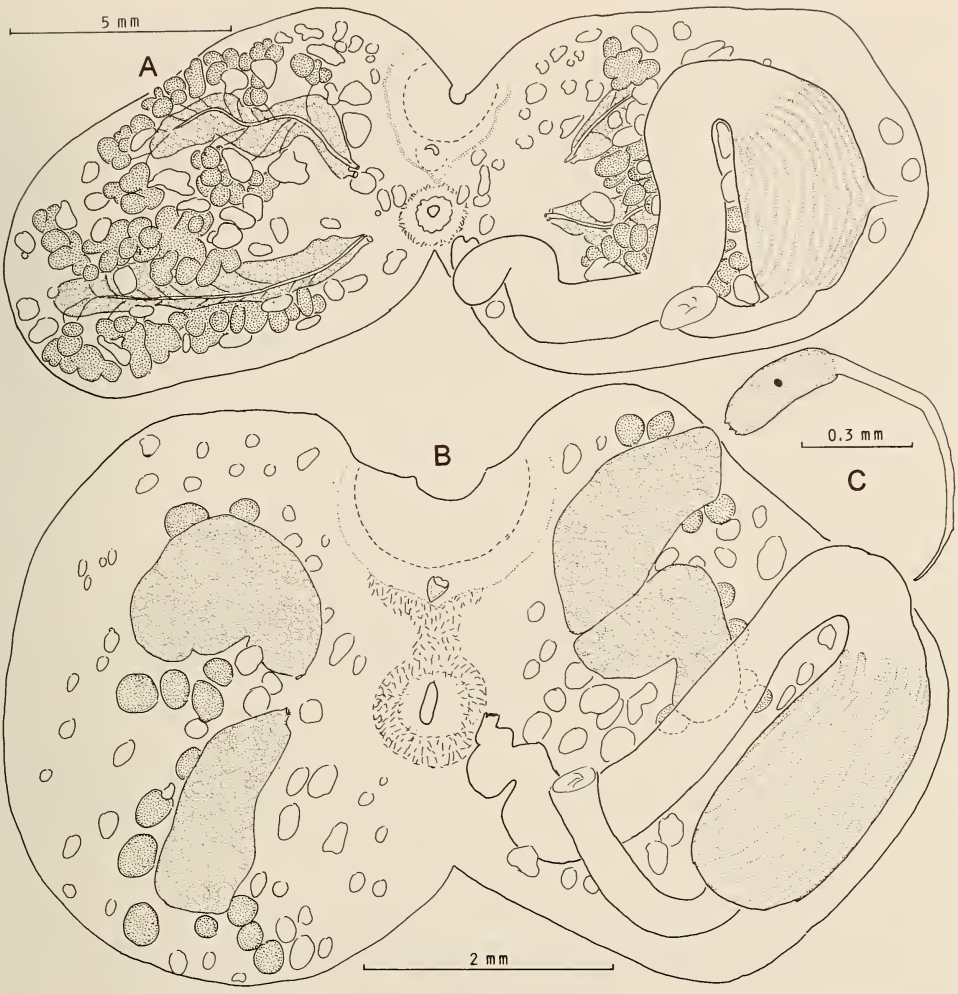

Fig. 49. A. *Styela canopus*. B. *Styela materna*. C. Tadpole of *Styela materna*.

There are two short, protruding ovaries on each side (Fig. 49B). The oocytes are compacted and have a polygonal shape. Some round testis lobes are loosely associated to each ovary (Fig. 49B). The sperm ducts are very thin and short and difficult to see even after staining. The genital ducts are very short.

There are numerous endocarps on the body wall (Fig. 49B). The cloacal siphon has a short velum and a dense circle of cloacal tentacles on a wide ring. This ring extends anteriorly as a dense tentacular field to reach the prepharyngeal band (Fig. 49B).

Styela materna has the rare attribute in the genus of brooding its eggs. Larvae (Fig. 49C) are numerous in the cloacal cavity. Their trunks measure 370 μm in length and 19 μm in width; the notochord is 760 μm long and only rarely is a membrane found around it. The larvae have three anterior adhesive papillae and one sensory organ.

Remarks and distribution

This species was previously recorded from South Georgia at 66–180 m depth. The type specimens are larger than the South African material, 12 mm instead of 6–7 mm, and thus have male gonads more developed. The testis lobes in those specimens are tightly compressed and clearly have genital ducts. The branchial sac in the South Georgian specimens have up to 20 vessels in a fold. These differences are insufficient to erect separate species.

On the other hand, the similarities with *Styela canopus* are disturbing and include the gut shape, gonads and branchial sac. Larval brooding in *S. materna* is the only characteristic that allows the separation of the species from the multiple forms of *S. canopus*. Brooding remains an exceptional feature in the genus *Styela*.

Family **Pyuridae**

Microcosmus oligophyllus Heller, 1878
Figs 50A, 51A

Microcosmus oligophyllus Heller, 1878: 101, pl. 3 (fig. 21). Hartmeyer, 1912: 247, pl. 41 (figs 1–3). Millar, 1955: 211, fig. 36; 1962: 196, fig. 38.
Microcosmus oligophyllus wahlbergi Michaelsen, 1921: 2, pl. 1 (figs 8–9). Michaelsen, 1934: 161.

Material

Two specimens. Miller's Point, False Bay, and Gerickespunt (Sedgefield), low tide (Monniot coll.).

Description

The specimens are 10–30 mm across and have a thick, hard tunic with a dark red, wrinkled surface partially covered with epibionts. The siphons protrude slightly and are close to each other. The body is often irregular in shape as the tunic penetrates rock crevices. The tunic, 1–2 mm thick, has a white interior surface. The siphon spines (Fig. 51A) are spaced far apart. They are sharply pointed and have enlarged bases. The musculature is strong, made of ribbons in an almost continuous layer except above the endostyle and under the gut. The siphon sphincters are particularly strong, and are up to 2 mm thick. Both siphons have an internal velum consisting of two layers, the outer one stiff and the inner one thin and bearing thin filaments. The internal velum forms four pockets in the oral siphon. There are 24 stout oral tentacles in three orders of size, with two sets of ramifications. The prepharyngeal area has raised papillae (Fig. 50A). The prepharyngeal band has two crests and curves in a dorsal 'U'. The dorsal tubercle is large, slightly protruding, with horns internally rolled. The dorsal lamina is long and low, encircling the oesophagus entrance.

The branchial sac has five high folds on each side. We counted:
R.E. 0 (9) 3 (15) 3 (18) 3 (17) 3 (22) D.L. 2 (22) 3 (17) 3 (19) 3 (17) 3 (11) 0 E.L.

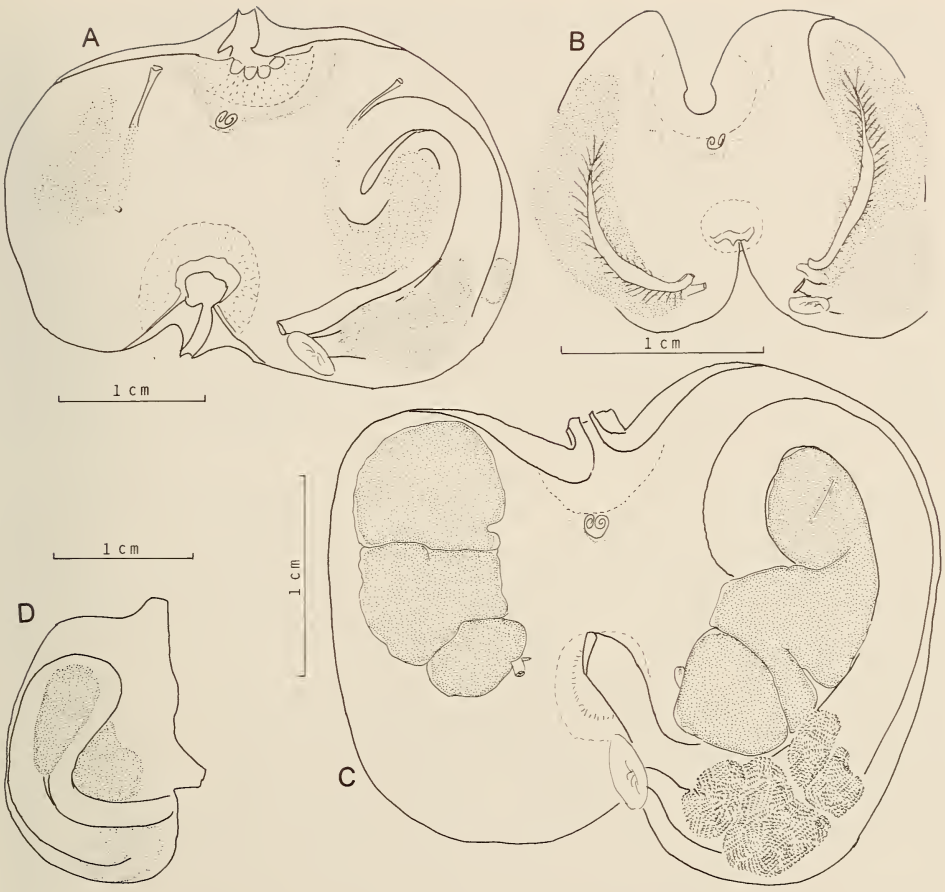

Fig. 50. A. *Microcosmus oligophyllus*. B. *Microcosmus psammophilus*. C–D. *Microcosmus squamiger*.

Most ventral folds do not reach the posterior of the branchial sac. The dorsal lamina has a wide unperforated band on the right side that is crossed by wide transverse vessels. On average there are seven longitudinal vessels in a mesh between the folds and 3–4 on the folds. They are sometimes intersected by parastigmatic vessels. The stigmata are short.

The gut and the gonads are wrapped in a loose tissue that obscures their outline. The stomach is wide and covered with two lobes of an hepatic gland (Fig. 50A). The one closest to the oesophagus is the largest, and it is also enclosed in the loose tissue. The hepatic lobes are wrinkled and lack protruding papillae. The intestine forms a loop in which the two limbs are closely apposed (Fig. 50A). The smooth anus is located at the oesophagus entrance.

The gonads were not fully developed and consisted of poorly defined masses inside the body wall. The gonad on the right side is in an anterior position; the one on the left side does not cross the gut (Fig. 50A) as in other *Microcosmus* species, as there is no room for it. The sperm ducts are directed towards the

cloacal siphon as is usual. The oviducts are curved along the ventral side of the ovary and reach the anterior part of the body, a unique arrangement in the family Pyuridae. In all specimens, a large brown inclusion was observed in the heart.

Microcosmus oligophyllus is characterized by its five branchial folds and gonad morphology. The subspecies described by Michaelsen (1921) was only based on a different number of longitudinal branchial vessels, and he later hesitated about its validity (Michaelsen 1934).

Distribution

Microcosmus oligophyllus has only been recorded from South Africa.

Microcosmus psammiferus C. Monniot sp. nov.

Figs 50B, 51B, C

Material

Holotype. SAM-A25861, from wreck on Mossel Bay beach (34°12'S 22°08'E), collected by C. and F. Monniot, Feb 1996.

Other material. Two specimens, locality data as above (Monniot coll.).

Description

The three aggregated specimens are entirely covered with sand. They may have been slightly attached to the substratum or were free-living in sand. On the contracted animals, the siphons reveal themselves only by reddish tunical papillae. The siphons have a purple exterior tunic and an internal lining with eight alternating red and yellow bands. The siphon spines (Fig. 51B, C) are of two types. Those at the edge of the siphon are sharp, 25 μm long and tightly packed (Fig. 51B). Those more internal are pedunculate, urn-shaped and 35 μm long (Fig. 51C). Both kinds of spines are usually separated (Fig. 51B) but may be intermixed where they meet. Over the body, the tunic is whitish, thin, and the outer layer is encrusted with sand and bears short rhizoids 0.5 mm long. Most of the digestive tract and the gonads are located on the ventral side (Fig. 50B). There are 16 large oral tentacles in three orders, with numerous ramifications.

The prepharyngeal band has a single crest and is dorsally indented. The dorsal tubercle is large and protruding, with an anterior aperture and internally rolled horns. The dorsal lamina is anteriorly low with a smooth edge, and posteriorly higher with an irregularly dented rim. It joins a smooth annular crest that encircles the oesophagus entrance.

Fig. 51 *(see facing page)*. A. Siphonal spinules of *Microcosmus oligophyllus*. Scale bar = 20 μm. B–C. Siphonal spinules of *Microcosmus psammophorus*. A. Limit between the sharp distal spines of the siphons and the most internal urns. Scale = 50 μm. C. Detail of the urns. Scale = 20 μm. D–E. *Microcosmus squamiger*. Scales, D = 50 μm, E = 10 μm. E. *Pyura stolonifera*. Scale bar = 20 μm.

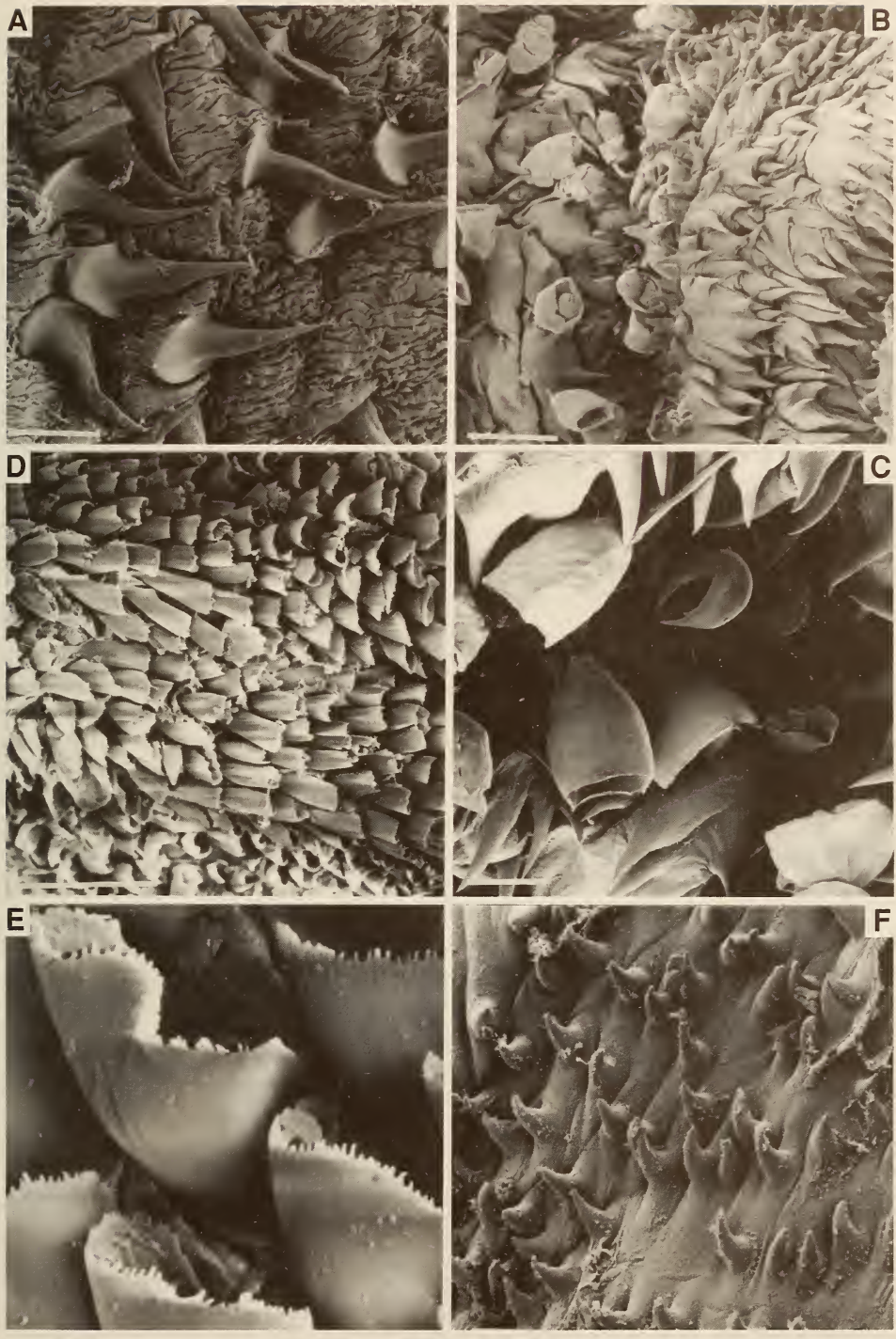

Fig. 51

The branchial sac is small relative to the body. The endostyle is obscured from the ventral side by the intestine and the right gonad that are close to each other, and only separated by a voluminous heart. The endostyle adheres to the stomach and the intestine.

The branchial sac has six folds. We counted:
R.E. 1 (12) 3 (18) 1 (18) 2 (15) 2 (12) 2 (18) 0 D.L. 0 (19) 2 (10) 1 (19) 1 (19) 0 (17) 2 (12) 1 E.L.

The branchial formula is rather irregular as the number of longitudinal vessels between the folds varies, some of them appearing irregularly. The stigmata are obviously coiled at the top of the branchial folds. A single coiled stigma occupies the area between the axial longitudinal vessel of the fold and the first or second vessel on the side of the fold. The stigmata are only cut at the level of the transverse vessels, from the third longitudinal vessel on the sides of each fold.

The gut loop is narrow with parallel limbs. The oesophagus is short. The large hepatic gland is not erect and consists of whitish tissue with low ridges. The rectum is short and the anus has a smooth edge and opens at the level of the oesophagus entrance.

There is one gonad on each side (Fig. 50B) with an unusual morphology for the genus *Microcosmus*. The cylindrical ovary is surrounded by a mass of testis lobes. Very numerous sperm ducts join a common sperm duct that lies against the ovary and almost conceals it at its terminal end. The left gonad crosses the intestine, and the testis internally covers a large part of the intestine, and the hepatic gland, in a thin layer.

There are no endocarps and no cloacal tentacles. The velum is higher dorsally.

Remarks

This species belongs to a group that is actually intermediate between the genera *Microcosmus* and *Hartmeyeria*. The genus *Hartmeyeria* Ritter, 1913, has few species: *H. triangularis,* the type species of the genus from Alaska; two Japanese species *H. orientalis* Oka, 1929, and *H. chinensis* Tokioka, 1967; the Atlantic *H. hupferi* (Hartmeyer, 1909); and *H. bouilloni* Monniot, C. & Monniot, F., 1976*a*, from Mozambique. The specimen described by Millar (1962) under the name *Microcosmus pedunculatus* Pérès, 1951, probably corresponds to *H. bouilloni*. These five species have in common: spiral stigmata at the top of the folds, the second fold being reduced to one vessel; muscles with a peculiar distribution; and a naked peduncle arising from the ventral side of the body wall through a 'button-hole'. This group is very homogeneous.

Hartmeyeria monarchica Hartmeyer, 1922, from Aden, is insufficiently known; it has a similar branchial sac.

Cynthia formosa Herdman, 1882 (and its synonym *Microcosmus spinifera* (Herdman, 1899)) does not belong to the genus *Hartmeyeria* as Kott (1985) suggested, but is closer to *Microcosmus psammiferus* sp. nov. Millar (1966), who had encountered the genus *Hartmeyeria* in western and southern Africa, considered this species to be a *Microcosmus*.

The two species *M. formosa* and *M. psammiferus* differ in their appearance, but have coiled stigmata at the top of the branchial folds, a second branchial fold that is not reduced to a single vessel, no characteristic peduncle, and the tunic is not embedded with sand, as it is in the true *Hartmeyeria* species. We consider that both species have somewhat peculiar characteristics for the genus *Microcosmus*, but our knowledge is not yet sufficient to justify their transfer to a new genus.

Microcosmus squamiger Hartmeyer & Michaelsen, 1928

Figs 50C, D, 51D, E

Microcosmus claudicans ssp. *squamifer* Hartmeyer & Michaelsen, 1928: 405.
see *Microcosmus squamiger* Kott, 1985: 356, figs 175e–f, 178.
Microcosmus exasperatus non Heller, 1878. Monniot, C. 1981: 59, fig. 1.
?Microcosmus exasperatus: Millar, 1955, fig. 35; 1962: 197.
Microcosmus squamiger: Lambert & Lambert, 1998.

Material

Two specimens. Knysna, on buoys (Monniot coll.).

Description

The specimens measure 30 × 20 mm and are attached on the left-posterior side. The siphons are closely spaced and protrude slightly. The colour is reddish brown. The tunic is leathery, often covered with epibionts, and nacreous on the interior. The siphonal spines (Fig. 51D, E), are 25 μm long and have the characteristic 'roof tile' shape of the species. They have spiny rims (Fig. 51E). The body wall is brownish and opaque. The musculature consists of ribbons in a layer that is continuous except under the gut.

There are 24 stout, very ramified oral tentacles distributed in four orders. The prepharyngeal area is narrow and covered with small papillae. The prepharyngeal band has two thick crests. It forms a dorsal 'U' entirely occupied by the large protruding dorsal tubercle, the opening of which forms two opposing spirals (Fig. 50C). The dorsal lamina is long and rises in height near the oesophagus entrance. It is not linked to any branchial fold. Its rim has small lobes. The sides of the endostyle are covered with small papillae.

The branchial sac has a different number of folds on each side. Thus, there may be eight complete and two incomplete folds on the right side, and six complete and two incomplete folds on the left side. There are generally 15–20 vessels on the complete folds and a single vessel between the folds. The vessel between the folds belongs to the dorsal part of the next fold. The number of stigmata varies in different parts of the branchial sac. Generally there are parastigmatic vessels. The transverse vessels do not bear papillae.

The stomach is covered by a large hepatic gland divided into several uniform lobes (Fig. 50C). The lobes consist of parallel lamellae, the rims of which are covered with small papillae. The rear intestine curves to join the middle part of the intestine forming a secondary loop (Fig. 50D) far less

accentuated than in *Microcosmus exasperatus*. The rectum is attached to the body wall and the branchial tissue. The anus has a smooth edge.

There is a gonad on each side more or less distinctly divided into three lobes (Fig. 50C). The right gonad is located far to the anterior, leaving a large empty area behind it (Fig. 50C). The ovary is central and the testes are placed around it. The gonoducts are very short and sometimes hidden under the testis mass.

In this species the endocarps are very reduced, surrounding the gonads and the posterior intestine in a kind of envelope. There are no independent endocarps. Both siphons have large velums. A ring of tentacles lies at the base of the cloacal siphon.

Remarks and distribution

This species has been confused with *M. exasperatus*. It differs from it in spinule shape (Fig. 50C, D) and the secondary bend of the gut. It is possible that the specimen named *M. exasperatus* by Millar belongs to this species; the description could correspond to either species.

The synonymy given by Kott (1985) is probably incomplete, as some descriptions of *M. exasperatus* not cited by Kott mention a gut without a pronounced secondary loop.

Microcosmus squamiger is a species of Australian origin, where it is encountered in natural habitats. It colonizes harbours and was recorded in the Mediterranean Sea from Italy and Tunisia in 1981. Lambert & Lambert (1998) reported its arrival in California. Since then it has become cosmopolitan. The South African populations were probably also imported.

Pyura capensis Hartmeyer, 1911

Fig. 52

Pyura capensis Hartmeyer, 1911: 561, pl. 47 (fig. 10), pl. 57 (fig. 8). Millar, 1962: 195, fig. 37.

Material

One specimen. False Bay (Griffiths coll.).

Description

The specimen was attached by the posterior part of the left side. The body (50 × 30 mm) is cylindrical. The siphons are terminal and protruding, 10 mm apart, with four lobes. The tunic is hard and covered with tubercles. The whole tunic is covered with brown, sclerified plates on a paler ground. We have not seen siphonal spines either in light microscopy or scanning electron microscopy. In formalin the colour turns ochre with a thin pink ring around the siphons.

The musculature is strong, continuous on the whole opaque body except below the gut. There are about 20 large oral tentacles and 10 smaller ones, irregularly distributed. All of them bear three orders of branchings, regularly arranged. The prepharyngeal band lies between two equal crests, draws a dorsal 'V', and is prolonged under the dorsal tubercle by a small groove. The dorsal

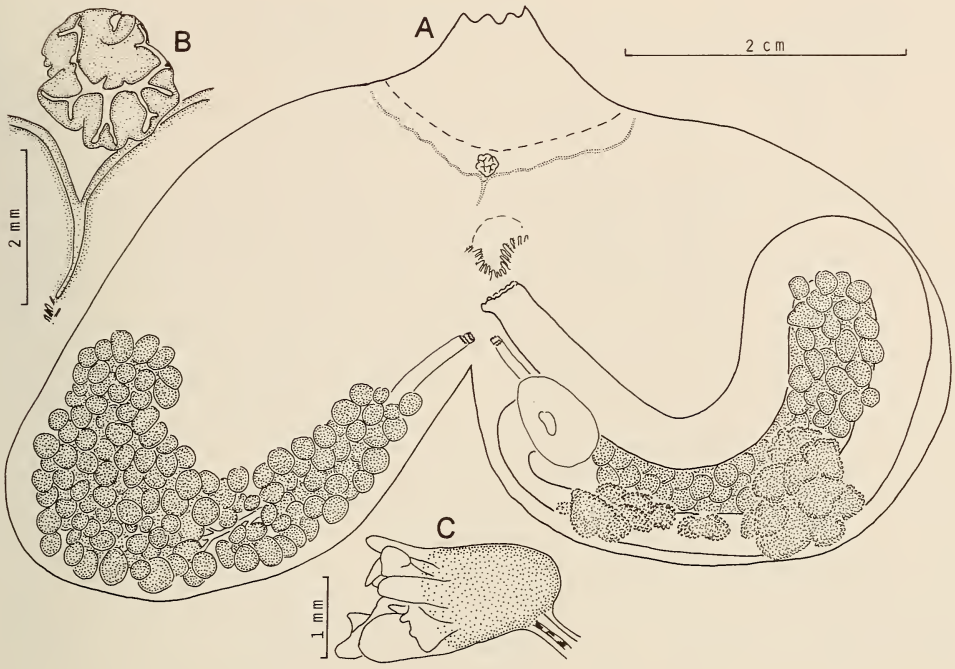

Fig. 52. *Pyura capensis*. A. Specimen opened along the ventral line, endocarps not figured. B. Dorsal tubercle. C. Pedunculate gonad lobe covered by endocarps.

tubercle is protruding with a characteristic shape (Fig. 52B) and a ramified aperture, already mentioned by previous authors.

The dorsal tubercle is hidden under the oral tentacles. The dorsal lamina forms short pointed languets on an unperforated band where the transverse vessels disappear. Consequently the dorsal languets do not correspond to the vessels and may be displaced on the right and chiefly on the left side. The dorsal lamina finishes at the anterior part of the protruding roll encircling the oesophagus entrance.

Seven branchial folds recover each other on each side. We counted on the right side:

R.E. 1 (8) 3 (12) 5 (16) 4 (17) 5 (19) 3 (16) 3 (15) 3 D.L.

The seven folds extend the whole length of the branchial sac. They converge and are abruptly cut at the oesophagus entrance, the longitudinal vessels ending in a sharp papilla. In addition, in the very posterior part, there is one fold on the right side and two on the left side. They are formed by 2–5 vessels and do not reach the oesophagus. The first vessel on the right of the dorsal lamina parts from it posteriorly. The space left is irregularly perforated.

The branchial vessels are high. The branchial meshes are transversely lengthened. We counted 8–12 oval stigmata in a mesh between the folds and 5–8 on the folds. At the top of the folds, indications of the generative spirals persist. There are parastigmatic vessels in some places.

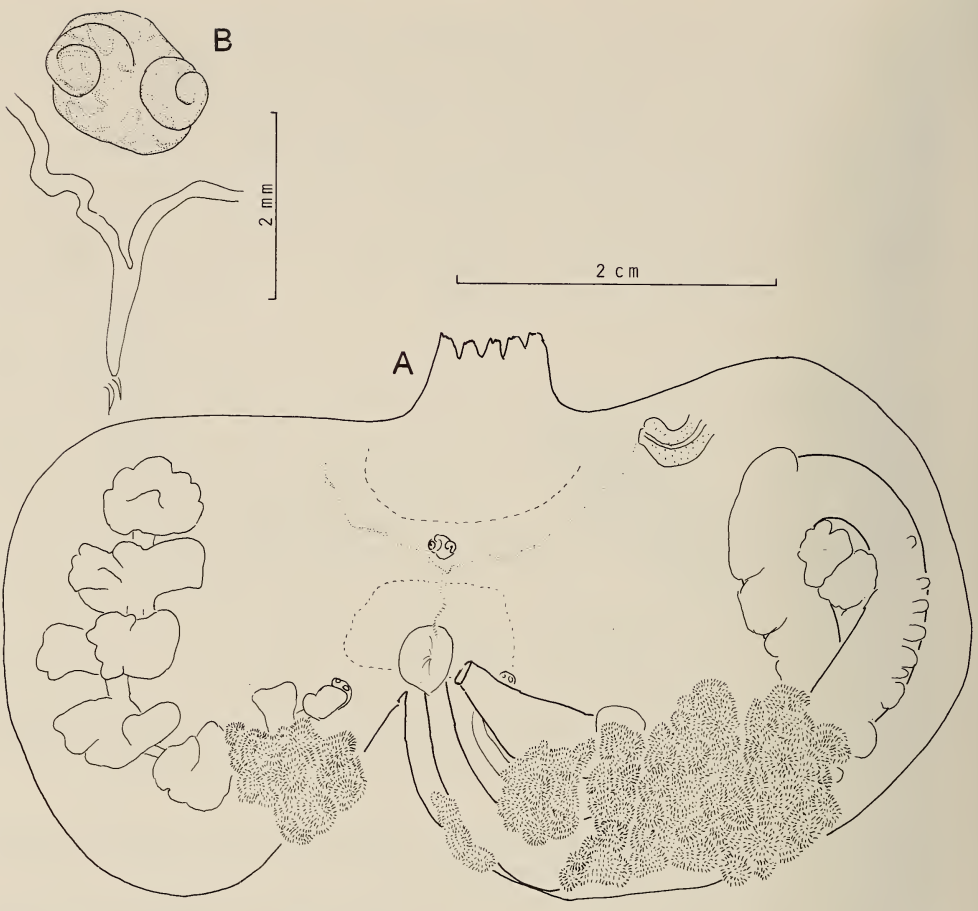

Fig. 53. *Pyura stolonifera*. A. Young specimen. B. Dorsal tubercle of the same.

The gut forms a closed loop in the posterior part of the body (Fig. 52A). A curved oesophagus enters a slightly enlarged stomach. The hepatic gland forms three swollen lobes (Fig. 52A). The long rectum ends in an anus with two scalloped lobes.

The gonads are also located in the posterior part of the body (Fig. 52A). The gonadal ducts constitute an axis with few ramifications, and around these branches are clusters of hermaphroditic lobules, often without any contact with the body wall. The genital ducts end in two wide papillae with dented rims, opening a short distance behind the anus (Fig. 52A). Each gonad lobule is covered on its cloacal side by about ten endocarps (Fig. 52C). The remainder of the body wall and the gut is covered with long, tight endocarps, more than a hundred per square centimetre. It was impossible to draw them. The cloacal siphon is internally encircled, mostly in the posterior part, by a line of elongated papillae, resembling endocarps but longer and with small ramifications that correspond to cloacal tentacles (Fig. 52A).

Distribution

Pyura capensis is geographically limited to the Western Cape Province.

Species of the *Pyura stolonifera*-group

Amongst material attributed to *Pyura stolonifera* several distinct species were described, two from South Africa and one from Australia. The Australian species has also been recorded on the Pacific coast of South America and along the west coast of Africa from Dakar to the Gibraltar Strait. Specimens from these locations were compared with South African samples and studied by Monniot & Bitar (1983). The most important difference concerns the arrangment of the right gonad lobes: in one line in *P. stolonifera* and in two lines in the Australian specimens. We now identify the Australian population as *Pyura praeputialis* (Heller, 1878) *sensu lato*. In that species, Kott (1985) pointed out differences, also noted by Dalby (1994) in his Ph.D. dissertation. In subsequent publications Dalby (1995, 1996) stated that both morphologies found in the Australian population are genetically controlled, and consequently represent two species, but no taxonomic decision has been published.

In South Africa, a similar case occurs as two forms can be recognized in the field. The internal differences are less obvious but nevertheless exist. They already appear in young specimens and they are described here from these specimens. They correspond to the two species *Pyura stolonifera* (Heller, 1878) and *Pyura herdmani* (Drasche, 1884). Both species may reach more than 10 cm in length when adult. The large specimens have a complex morphology difficult to interpret, so the drawings were made from small juvenile specimens, where the characteristics already appear.

Pyura lignosa Michaelsen, 1908 *sensu stricto* (Monniot, C. 1994), from the west coast of Panama is allied to this species group.

Pyura stolonifera (Heller, 1878)

Figs 51F, 53

Cynthia stolonifera Heller, 1878: 92, pl. 2 (fig. 10).
Microcosmus coalitus Sluiter, 1898*a*: 57, pl. 2 (fig. 8), pl. 7 (figs 9–10).
Halocynthia vanhoffeni Michaelsen, 1904: 197, pl. 10 (fig. 13), pl. 12 (fig. 44).
Cynthiopsis coalitus: Michaelsen, 1904: 210.
Pyura (Halocynthia) stolonifera: Hartmeyer, 1912: 246 (*part.*).
Pyura stolonifera: Millar, 1962: 193, fig. 36C (*part.*).

Material

Several specimens. False Bay, 0–2 m (Griffiths and Monniot coll.).

Description

From very shallow water, this species forms soft spheres, generally covered with epibionts. Both its siphons are large, close together, and most often with tubercles. The siphonal spines are 25–30 μm long (Fig. 51F), and are stout and originate from a slightly protruding base. They are cone-like with a blunt tip.

Out of the tunic the lobes of the siphons are toothed. The large tentacles are very ramified to make an efficient filter at the branchial sac entrance. The dorsal tubercle protrudes in two spiral cones. Its opening follows a curved line, even in small specimens; the opening has characteristic undulations (Fig. 53B). The dorsal lamina is very short, made of languets and connected to a wide circular area encircling the oesophagus entrance. The endostyle is very long, more than ten times that of the dorsal lamina.

The branchial sac has six folds in arcs. All the folds end at the oesophagus entrance by a series of papillae that correspond to the longitudinal vessels.

As the siphons are close together, the oesophagus is long. The stomach is not dilated and is covered by a voluminous hepatic gland with lobes in the shape of cauliflower (Fig. 53A). The anterior lobe (figured here cut in two parts) overflows on to the right of the body side. The intestine describes a marked loop, but its way is hidden by endocarps. The rectum is short. The anus has a smooth or slightly lobed rim.

There is one gonad on each side made of few lobes in only one line (Fig. 53A). These lobes are covered with large irregular endocarps. The gonadal ducts open near the cloacal siphon in a papilla uniting the oviduct and sperm duct. The figured specimen (Fig. 53A) is not adult and the endocarps covering the lobes may give the appearance of two rows of lobes. In large adult specimens the gonad lobes appear clearly in one row visible as such from the external side of the body once it has been removed from the tunic.

Distribution

This species occurs from Namibia, along the west coast of South Africa, and extends eastwards as far as Durban.

Pyura herdmani (Drasche, 1884)

Figs 54, 55A, B

Microcosmus herdmani Drasche, 1884: 370, pl. 2 (figs 3–7).
Cynthiopsis herdmani: Michaelsen, 1904*a*: 208, pl. 12 (figs 41–43).
Cynthiopsis valdiviae Michaelsen, 1904*a*: 201, pl. 12 (figs 35–40).
Pyura (Halocynthia) stolonifera: Hartmeyer, 1912: 246 (*part.*).
?*Pyura stolonifera*: Millar, 1955: 210, fig. 34.
Pyura stolonifera: Millar, 1962: 193, fig. 36D (*part.*).

Material

Several specimens. Miller's Point, False Bay, 2 m; Namibia, Langstrand, Swakopmund (Griffiths coll.)

Description

Pyura herdmani differs from *P. stolonifera* in its external appearance. Young specimens are orange in colour and have large pointed papillae of hard and naked tunic that make a collar around the siphons. When the animals grow, the tunic increases in thickness, becomes stiffer and includes sediment. The papillae around the siphons are less and less visible. The tunic is totally covered

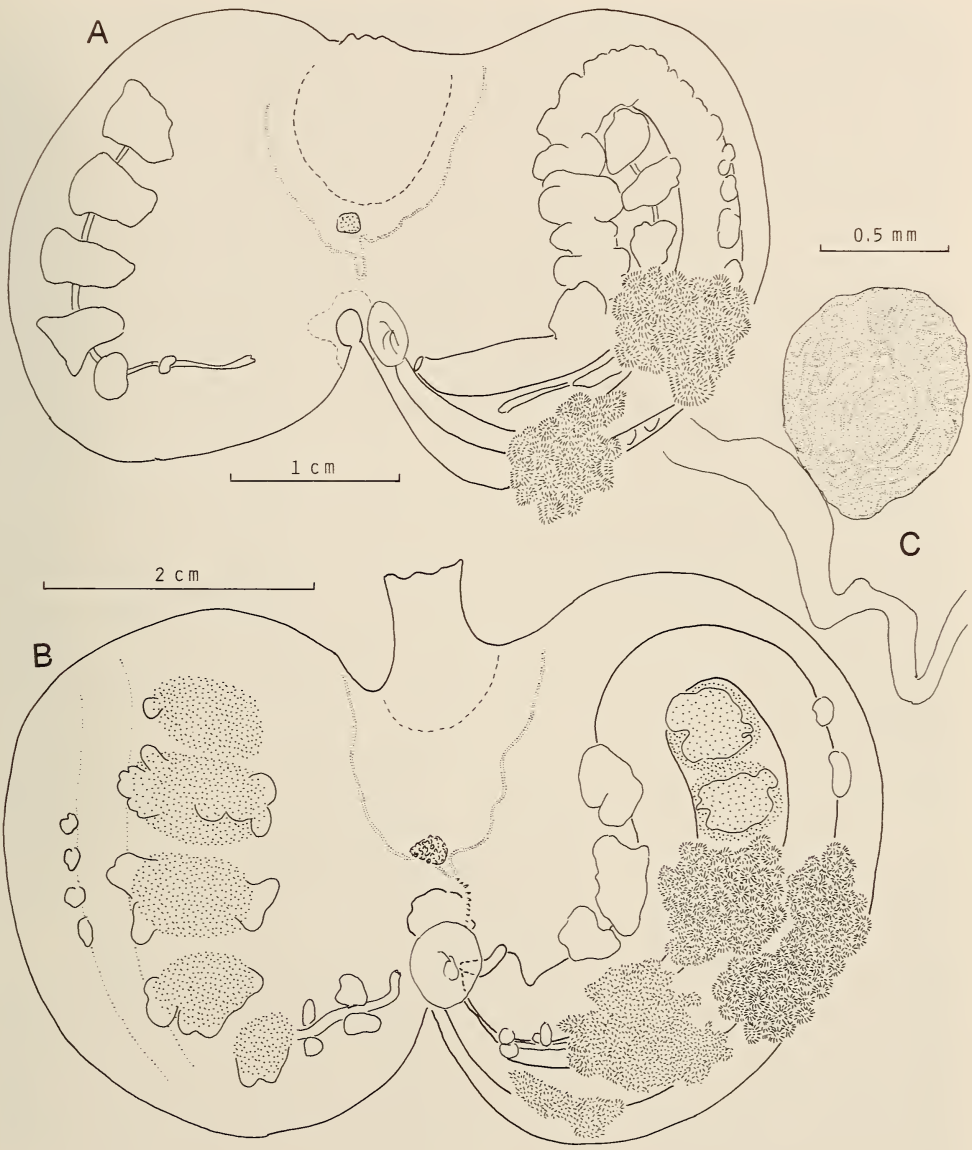

Fig. 54. *Pyura herdmani*. A–B. Two young specimens. C. Dorsal tubercle of a small specimen.

with epibionts and the toothed rims of the siphons disappear. The rare siphonal spines (Fig. 55A, B) only occur in places, separated by large irregular areas (Fig. 55A). They are stout, in shorter cones than in *Pyura stolonifera*, appearing in buttons. In other places on the internal side of the siphon the tunic is densely covered with digitiform papillae in the fashion of a velvet cloth (Fig. 55B). The role and nature of this structure remains unknown.

The oral tentacles are identical to those of *P. stolonifera*. The dorsal tubercle is very different, sponge-like in adult and even in young specimens. In very young specimens of only 20 mm, smaller than those shown in Figure 54A, B, a structure suggesting two spirals remains visible (Fig. 54C), but the opening is already cut in pieces and becomes irregular. Supplementary coils and supplementary independent perforations exist. In older but not yet adult specimens as figured (Fig. 54A), the dorsal tubercle has a spongy appearance.

The dorsal lamina and the branchial sac are similar in *P. stolonifera* and *P. herdmani*. In adult specimens the endocarps cover the whole surface of the digestive tract and of the gonads (Fig. 54A, B).

The distribution of this species extends from Namibia to KwaZulu-Natal.

Halocynthia spinosa Sluiter, 1905

Figs 55C–F, 56

Halocynthia spinosa Sluiter, 1905: 16, pl. 2 (fig. 8).
Halocynthia spinosa defectiva Millar, 1962: 201.
Halocynthia defectiva: Millar, 1964: 178, fig. 14.
Halocynthia spinosa Monniot, C., 1973: 60, fig. 4c.

Material

Several specimens. False Bay, 6 m (Griffiths coll.); Ibo Island, Mozambique (Monniot coll.)

Description

The largest specimen is 50 mm long. It was attached by the posterior part of the ventral side. Both siphons are long (10 and 15 mm) and close. In life the colour is pink, paler and yellowish on the siphons. The tunic is tough but flexible, entirely covered with small tubercles with a central spine or a branched spine circled by 4–6 smaller ones (Fig. 55D). Near the siphons the tubercles are more protruding, with lateral spines almost as long as the central one (Fig. 55C). Inside the siphons, in the deeper part, the siphonal spines are made of a central sharp point flanked by very small spines (Fig. 55F). More distally, the short spines surrounding the central one lengthen and reach a large size (Fig. 55E). The final structure results in a body that resembles a spiny ball with a crown of long points at the top. The spines on the siphons are not longer than those on the sides of the body.

The body wall is made opaque by a well-developed musculature. Twenty-five oral tentacles in 3–4 orders of size are laterally flattened and anteriorly curved, like sickle blades. The posterior sides of the tentacles bears two rows of

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Fig. 55 *(see facing page)*. A–B. *Pyura herdmani*. A. Siphonal spines. Scale bar = 20 μm. B. Internal siphonal papillae. Scale bar = 10 μm. C–F. *Halocynthia defectiva*. C. Spines of the siphonal rim. Scale bar = 200 μm. D. Spines of the external side of the siphons. Scale bar = 200 μm. E. Spines of the internal distal part of the siphons. Scale bar = 100 μm. F. Spines of the deep internal part of the siphons. Scale bar = 100 μm.

Fig. 55

digitiform branches themselves divided two times again. The branches are perpendicular to the primary tentacle. The prepharyngeal band has two equal crests. It makes undulations around the branchial folds and traces a dorsal 'V' (Fig. 56A). The dorsal tubercle is very protruding with two curled horns (Fig. 56B). The dorsal lamina is made of long languets corresponding to the right transverse vessels. The transverse vessels on the left also end in smaller papillae, and this gives the aspect of a doubled dorsal lamina. The dorsal lamina is interrupted before the oesophagus entrance.

The branchial sac is made of ten complete folds on each side, to which are added one ventral fold on the left and two on the right in the very anterior part. The folds are high, recovering each other. We counted 20–30 vessels on a fold and 2–4 between the folds. The meshes are tranversally elongated each with 10–14 stigmata between the folds and 4–6 on the folds. The stigmata are rather short, often cut by parastigmatic vessels. At the oesophagus entrance, the folds are suddenly interrupted and the longitudinal vessels end in papillae.

The gut forms a wide loop (Fig. 56A). The long oesophagus enters a wide stomach. The anterior part of the hepatic gland shows internal ridges in its longitudinal axis; the posterior part is raised in many papillae (Fig. 56A, C). The rectum is not attached to the body wall; it ends in a widely opened anus. The two gonads are located on the intestine. The most anterior one lies entirely over the intestine, the posterior one crosses the intestine and extends into the space between the two limbs of the gut (Fig. 56D). The ovary is central, not protruding. The testis lobes extend on each side of the ovary in a thin layer covering the whole free intestinal surface (Fig. 56A). The gonads open by two papillae on the intestine. The disposition of the gonads is totally masked in aged specimens and can only be deciphered in young individuals (Fig. 56D).

The right side of the body is covered with endocarps (Fig. 56A). Some of them also lie inside the gut loop, but none above the intestine.

Both siphons have a short velum, the cloacal one with round lobes at the base.

Remarks and distribution

Halocynthia defectiva is closely allied to *H. spinosa* Sluiter, 1905. Both species have in common the presence of only two gonads, located on the left side, above the intestinal loop. *Halocynthia spinosa*, living in the Red Sea, has large siphons with, on their edge, 2-mm long ramified spines, slightly ramified tentacles, a low dorsal tubercle, 7–9 complete branchial folds and only one supplementary fold on the right side, and both gonads located over the descending limb of the intestine.

The sample from Bahrain described by Millar (1975) under the name *Halocynthia arabica defectiva* corresponds, in our opinion, to a true *H. spinosa* with large ramified spines, poorly ramified tentacles and gonads crossing the intestine.

Halocynthia spinosa has been recorded from the Red Sea and Arabian Gulf and its distribution extends to False Bay, South Africa.

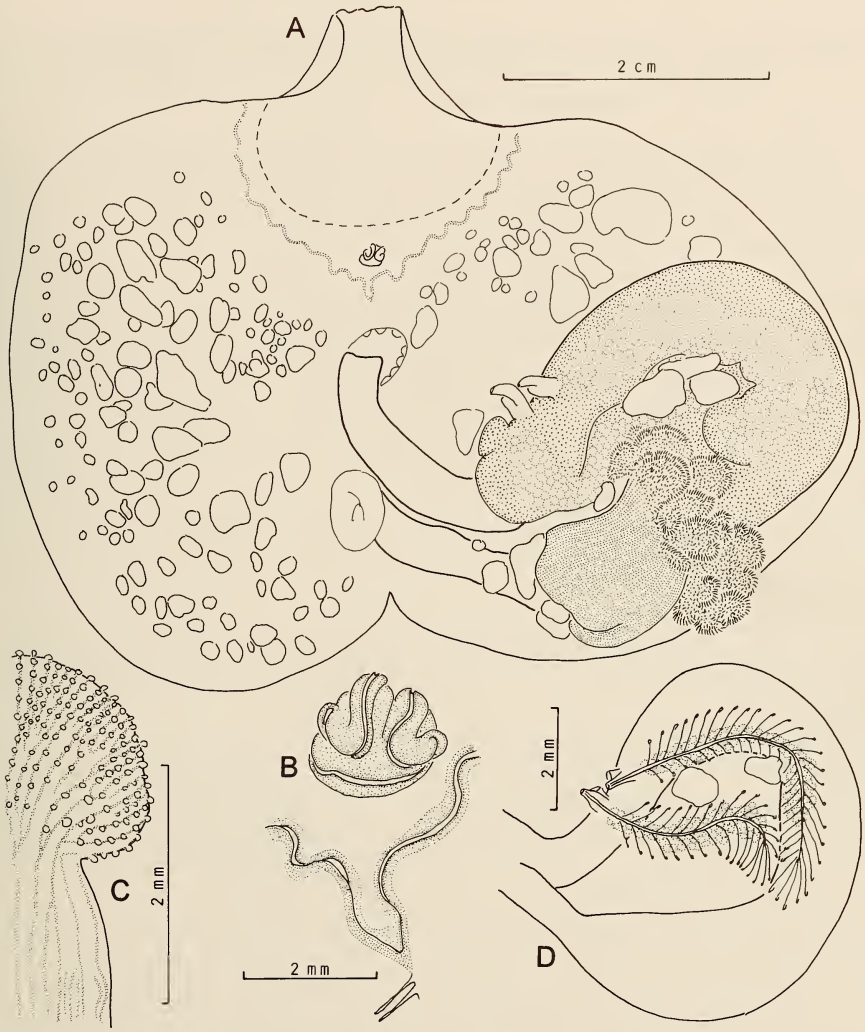

Fig. 56. *Halocynthia defectiva*. A. Large specimen. B. Dorsal tubercle. C. Detail of the hepatic gland of a young specimen. D. Gonads of a young specimen.

Family **Molgulidae**

Molgula conchata Sluiter, 1898*a*

Fig. 57

Molgula conchata, Sluiter, 1898*a*: 58, pl. 7 (figs 11,14). Millar, 1955: 214, fig. 38; 1962: 203, fig. 43.
Ctenicella conchata: Hartmeyer, 1914: 14, fig. 6.
Ctenicella natalensis Michaelsen, 1918: 2, figs 9–11.
Molgula natalensis Vasseur, 1967: 121, pl. 7 (figs 63–68).
non *Molgula conchata*: Monniot, C., 1969: 651, fig. 111.

Material

Several specimens. Port Elizabeth, intertidal; Knysna (Monniot coll.).

Description

This *Molgula* species has a large size, up to 40 mm. It was found on rocks in the littoral zone. The tunic is embedded with sediment throughout its thickness. The body is often covered with epibionts, mostly with hair-like bryozoans. The siphons are close together, in hollows and encircled by a ring of hard and thick tunic. A thickening of the body wall corresponds to this ring of tunic. The siphonal lobes are deeply cut. The musculature is only developed on the dorsal side of the body. It is made of short ribbons around each siphon and in the area between the siphons. The muscle arrangment exactly follows the pattern of the hollows of the tunic. The remainder of the thin body wall is devoid of muscular bundles. The oral tentacles are not numerous, only 16, in two orders of size, and some very small ones. The tentacles are thick with numerous regular branches in four orders. The tentacular ring closes the siphon aperture. The prepharyngeal band draws marked curves at the level of the branchial folds and has a deep dorsal 'V'. It is made of two irregular rims, the posterior higher.

The dorsal tubercle is protruding, its opening in the shape of a transverse 'S' (Fig. 57C). The dorsal lamina is short as the siphons are closely placed.

The branchial sac has seven folds on each side. On the right side we counted:

R.E. 0 (8) 0 (9) 0 (10) 0 (11) 0 (11) 0 (11) 0 (11) 0 D.L.

The folds are very asymmetrical and the most dorsal vessels, in variable number, are very thin. The longitudinal vessels of the folds fuse into a continuous band at the oesophagus entrance. The branchial sac has a uniform structure in all parts with longitudinal stigmata between the folds and infundibula under the folds.

The gut follows a double closed loop (Fig. 57B, C). The oesophagus is short, largely covered by the hepatic gland. There is no stomach dilatation. The anus, with a smooth rim, is attached to the side of the oesophagus entrance.

The gonads are made of a massive and protruding ovary, partly covered by the testis. The latter forms a crown around the blind extremity of the ovary. The oviduct and sperm duct are independent. The arc-shaped kidney is full of concretions. The cloacal siphon has a wide muscular velum, as does the oral siphon.

Remarks and distribution

Millar (1962: 204, figs 42, 43c) described *Molgula cryptica* from False Bay, a species very closely allied to *M. conchata*. Both species have the same kind of gonads, gut and siphons. These species differ by the tissues consistency, the length of the siphons, and the number of branchial vessels. The intestine of *M. cryptica* draws a less-closed loop and the gonad is applied on the bottom of the loop. In addition, *Molgula cryptica* is a brooding species. Millar (1962) has compared his species to the Antarctic *M. pulchra*. Monniot, C. (1969) described a population of *M. conchata* from Dakar. This synonymy is erroneous. The

specimens from Dakar have the same gut shape but the ducts of the gonad are different.

Molgula conchata is recorded from Mauritius and South Africa.

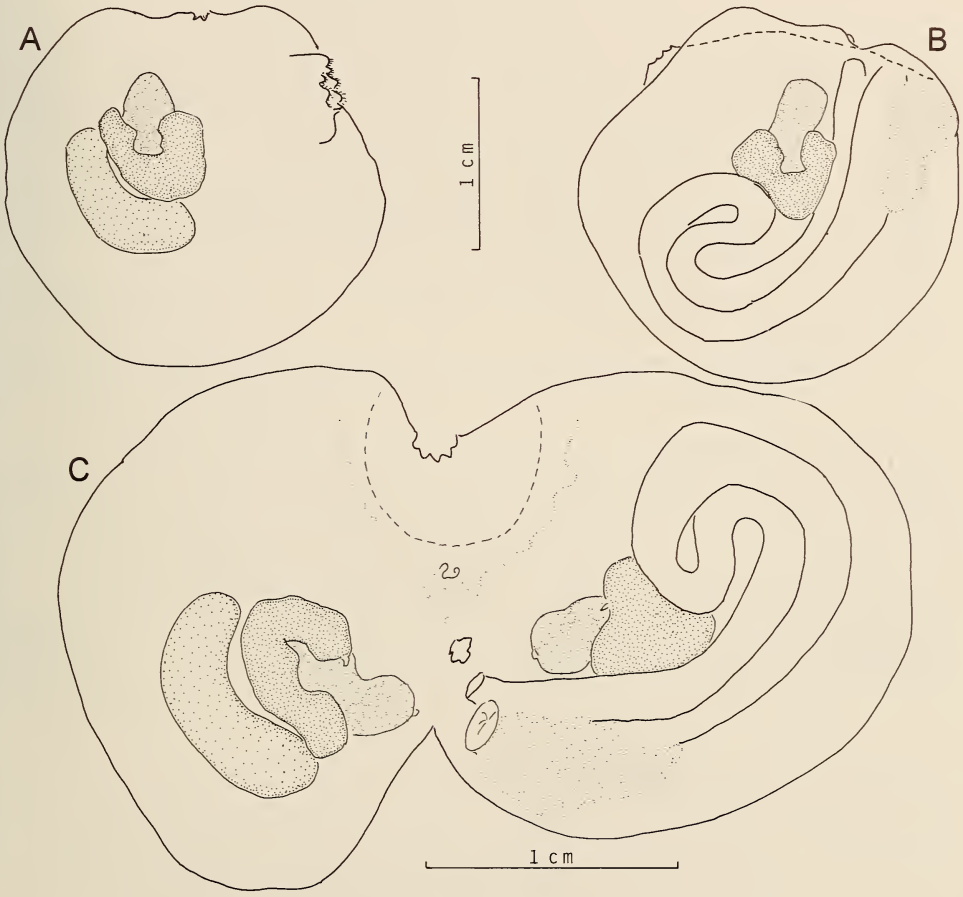

Fig. 57. *Molgula conchata*. A–B. Right and left sides of a specimen. C. Specimen opened along the ventral line.

Molgula falsensis Millar, 1955
Figs 58, 59

Molgula falsensis Millar, 1955: 217, fig. 40; 1960: 129, fig. 55; 1962: 203, fig. 43A; 1964: 179.

Material

One large specimen: Miller's Point, False Bay, 6 m (Griffiths coll.). Several small specimens: Saldanha Bay Harbour and Port Elizabeth Harbour (Monniot coll.).

Description

Brooding specimens with a soft tunic

The population is made of agglomerated spheres. The tunic is covered with short rhizoids that accumulate sediment particles and debris. The tunic is thin and soft. The slightly protruding siphons have sharp lobes on their rims. The muscles form about 30 short and thick bundles on each siphon; they are absent in the middle of the dorsal side between the siphons. Some short muscles lie along the ventral side. About 30 oral tentacles are distributed in three orders. They are long with three sets of finger-like ramifications.

The prepharyngeal band has two thick rims; it draws a low dorsal 'U'. The dorsal tubercle is large and protruding. Its opening is a 'U' with sides slightly inwardly curled. The dorsal lamina is short. The branchial wall has seven folds on each side; the branchial formula is:
R.E. 0 (2) 0 (4) 0 (5) 0 (6) 0 (5) 0 (5) 0 (3) 0 D.L. 0 (3) 0 (5) 0 (5) 0 (6) 0 (6) 0 (4) 0 (3) 0 E.L.

The longitudinal vessels are high and thin. On the ventral side of the folds they can recover each other. The six primary infundibula are cut up into

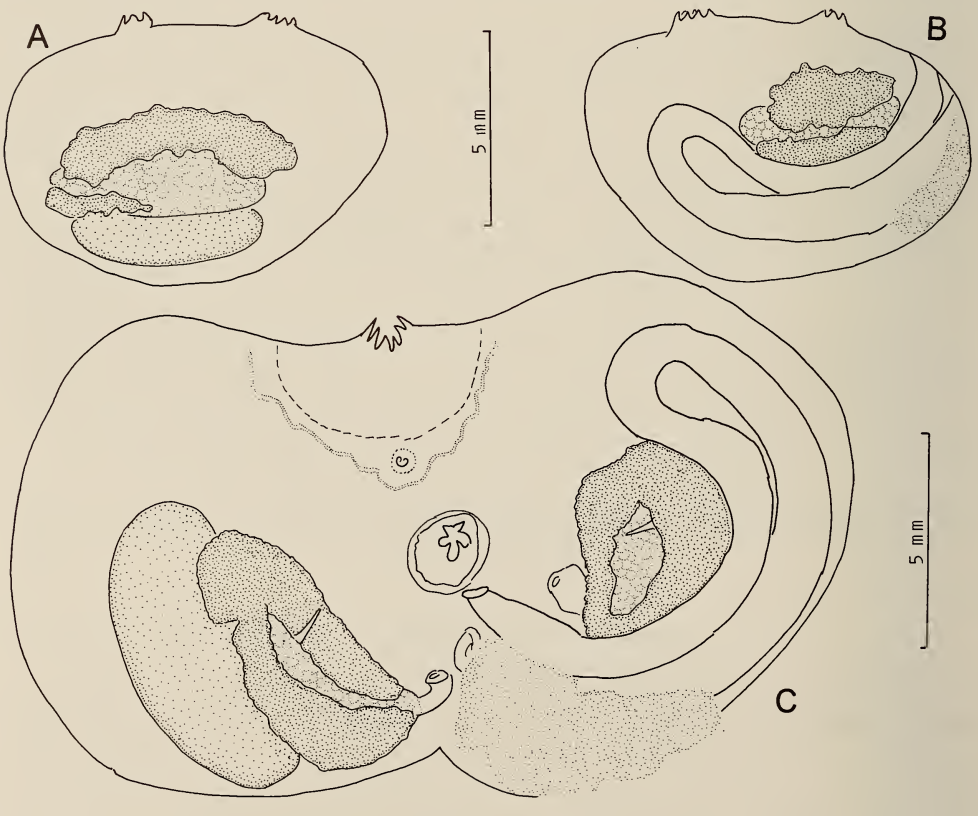

Fig. 58. *Molgula falsensis*. Brooding specimen. A–B. Right and left sides. C. Internal structure.

3–4 secondary infundibula along the fold axis. At this level, the branchial perforations are irregular with numerous exoinfundibula. Between the folds, the stigmata are longitudinal. They are short, cut in pieces, and sometimes make exoinfundibula. At the level of the oesophagus entrance the longitudinal vessels fuse to constitute a continuous membrane.

The gut (Fig. 58B, C) has a slightly curved secondary loop. The hepatic gland covers the whole anterior part of the gut. It is massive, made of irregularly distributed lamellae. The rectum is short with a smooth rim around the anus. The kidney is widely spread but only slightly protruding.

The gonads (Fig. 58A, B, C) have a central ovary circled by a ring of testis lobes that partially cover the ovary. The arrangement of the testis lobes on the ovary varies among the individuals. There is a single sperm duct in the middle of the gonad. The oviduct opens through a large papilla close to the cloacal siphon.

All the collected specimens contained a large number of segmented eggs, reaching the morula stage.

Specimen with hard tunic

The body forms a slightly flattened ball 30 × 25 × 21 mm. The oral siphon is terminal, the cloacal siphon is 13 mm away. The conical siphons have six and four sharp lobes at their top. The tunic is 1 mm in thickness, stiff and whitish. The anterior part of the body is naked or with few epibionts, the posterior part bears finger-like rhizoids accumulating debris and sediment.

The body wall is fleshy but translucent. The muscles are made of about 30 bundles radiating from each siphon, except between the siphons where they are absent. The muscular bundles are short and on both sides are interrupted before the level of the gonads and gut. The most dorsal muscles of each side join but do not fuse.

There are 12 oral tentacles arising from a protruding ring. They have large first-order ramifications covered with numerous ramifications of second and third orders. The prepharyngeal band is thick, undulated at the level of the branchial folds (Fig. 59C). It draws a pronounced dorsal 'V'. The dorsal tubercle protrudes with the two horns of the right-hand opening slightly curled.

The branchial sac has seven folds. The right-side formula is:
R.E. 0 (12) 1 (12) 1 (14) 1 (16) 1 (16) 1 (16) 1 (13) 1 D.L.

The vessel located between the folds represents the most dorsal vessel of the next fold. The vessels are thicker on the ventral side than on the dorsal side of the folds. At the level of the oesophagus entrance, the folds are interrupted, the vessels fuse to make a kind of protruding wide-mouthed funnel to the oesophagus. The six primary infundibula are cut out into 4–6 secondary bispiral infundibula. Between the folds, over the primary infundibula the longitudinal vessels are cut in short pieces. There are no exoinfundibula between the folds.

The intestine draws a slight secondary loop (Fig. 59B, C). After a very short oesophagus, the stomach is covered with a large hepatic gland made of irregular lamellae. The intestine is covered with a diffuse part of the hepatic gland that hides its shape. The rectum is short, the anus has a plain rim.

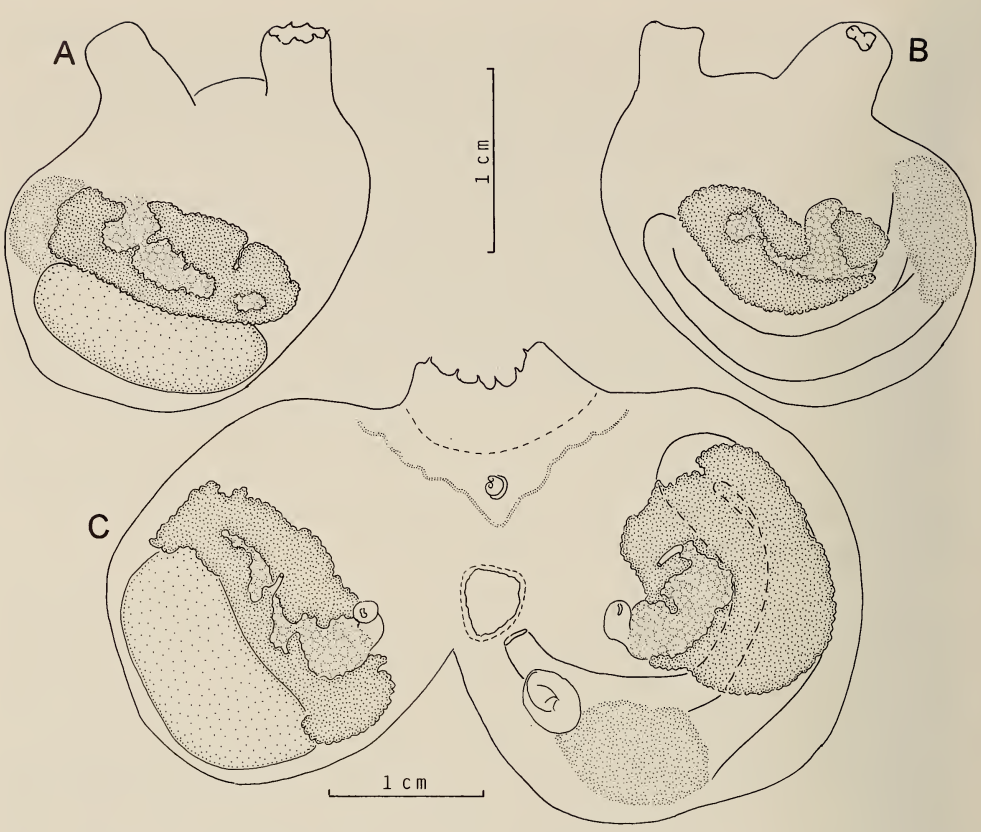

Fig. 59. *Molgula falsensis*. Specimen with a hard tunic. A–B. Right and left sides. C. Internal structure.

The gonads lack a definite outline (Fig. 59A, C). They are made of the central ovary covered by a mass of testis lobes. On the right side the testis lobes partly encircle the kidney. On the left side they spread on a large part of the gut (Fig. 55C). Each testis opens by a single papilla in the middle of the gonad. The female papilla is round and protruding. No segmented eggs were present in the cloacal cavity of this specimen.

The kidney is voluminous. The cloacal siphon is encircled by a short velum.

Remarks and distribution

Between 1955 and 1964, Millar described three forms of *Molgula falsensis*. In all three cases, the species are small, 15 mm maximum, with a thin tunic covered with hair. None of his descriptions mentions brooding.

In our collection we have identified two forms. One of them has a large size (30 mm), with a largely tunic, smooth, thick and rigid. The other is smaller (15 mm) with a soft tunic covered with hairs and sediment, and it is brooding. The large specimen was collected at False Bay in a natural site, the small specimens in harbours at Saldanha Bay and Port Elizabeth. Both forms are

closely allied and only differ by the larval brooding and the tunic structure. In the largest specimen the branchial structure is simpler than in smaller animals. A similar case occurs in Europe and distinguishes *Molgula occulta* from *Molgula oculata*.

Molgula falsensis is a South African species.

Molgula scutata Millar, 1955

Fig. 60

Molgula scutata Millar, 1955: 215, fig. 39; 1962: 202, fig. 34B. Monniot, C. & Monniot, F., 1976*b*: 672. Turon, 1988: 282, fig. 8.

Material

Large-size specimens. Sea Point, intertidal (Monniot coll.); Namibia (Gibbons coll.).

Small-size specimens (less than 10 mm). Isipingo, intertidal (Griffiths coll.); False Bay, Gerikespunt, Knysna, 1–2 m (Monniot coll.).

Description

This species was encountered in two different forms, one of a large size (20–40 mm), the other smaller (5–15 mm) and brooding.

Large form

The specimens from 20–40 mm are weakly attached to rocks. Their tunic, rather stiff, is covered with sediment, mostly in the siphonal area. The sediment particles adhere to the body surface, but are not included into the tunic as in *Molgula conchata*. Even in contracted animals, the siphons, close to each other, remain protruding. Their rim is not dentate, but slightly irregular.

The body wall has some strong muscles on the siphons (Fig. 60A, B). They are interrupted on the side of the body. These bundles are more or less elongated in varied samples, or they may be very short constituting a ring around the siphons. There are also some areas with transverse muscles (Fig. 60A, B). About 12 large oral tentacles in 2–3 orders have elongated branches of at least three orders. Some very small tentacles are irregularly intercalated. The prepharyngeal band has two unequal rims, the anterior more developed. The dorsal indentation is not well marked. The dorsal tubercle is protruding, of variable shape from a simple slit (Fig. 60C) to a double spiral. The dorsal lamina is short.

The branchial sac has a characteristic structure. The folds carry two vessels, both of them lying on the ventral side on the fold. The longitudinal vessels are wide and high as those observed in the Molgulidae, which have only one vessel per fold. The stigmata are short, most of them longitudinal. The digestive tract (Fig. 60B, C) describes a deep secondary curve. The stomach is not enlarged. The hepatic gland is voluminous. The intestine has a uniform diameter with a short rectum ending in a smooth-rimmed anus.

On the left side the gonad (Fig. 60C) occupies the whole space between the two curves of the gut. The ovary, obscure in outline is partly covered by

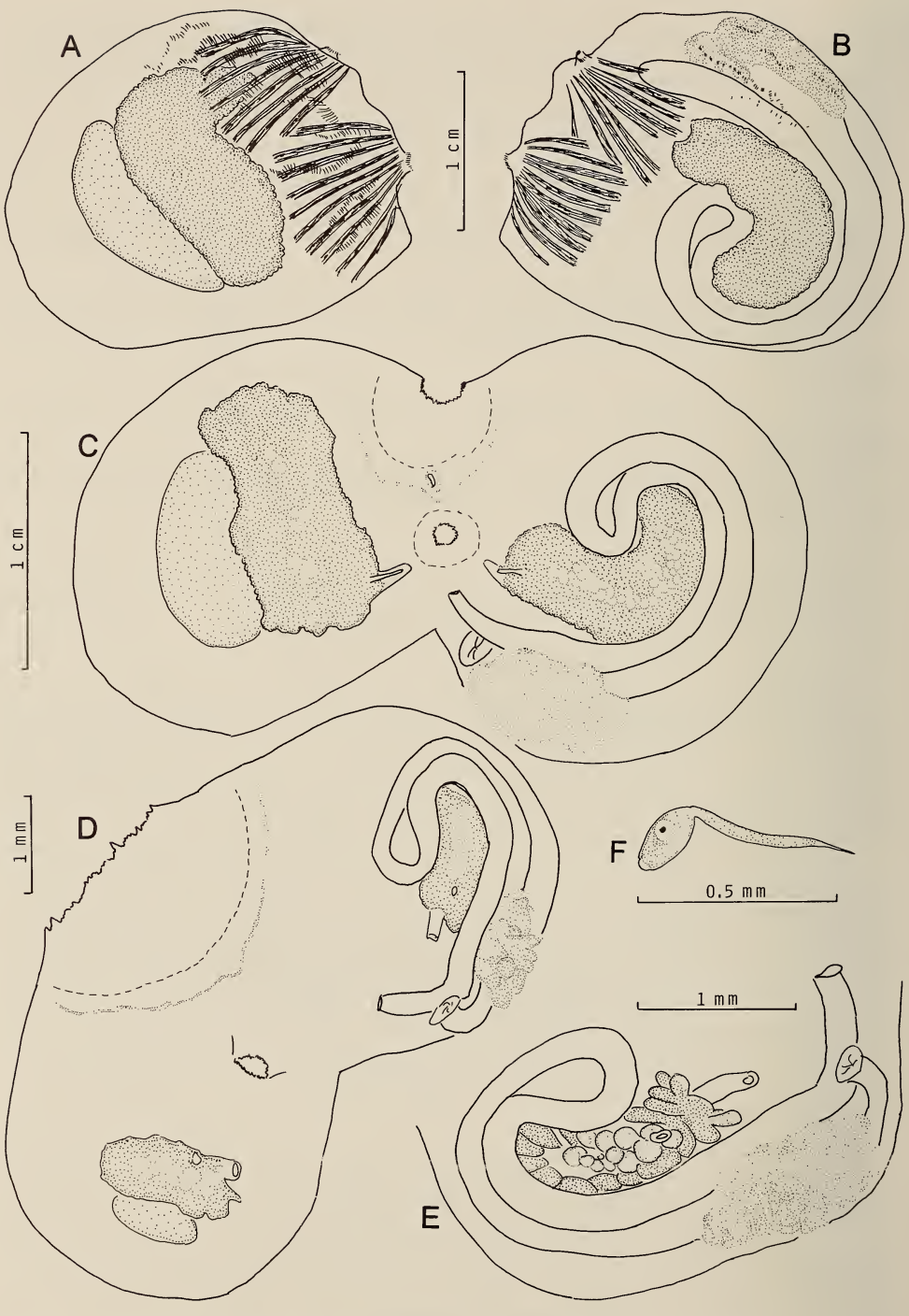

Fig. 60. *Molgula scutata*. Large specimen. A–B. Right and left sides. C. Internal structure, brooding specimen. D. Internal structure. E. Detail of the gonad and gut. F. Larva.

numerous and very small testis lobes. The gonads do not protrude into the cloacal cavity. Each opens by elongated sperm duct and oviduct, close to each other. The cloacal siphon has a muscular velum in a sphincter.

The specimens collected in deep waters off Namibia have a less strong musculature and a thinner branchial sac, a case often observed in deep habitats.

Small form

The small specimens (Fig. 60D) have the same kind of musculature as the large ones, but the bundles are thinner and never joined. The 12 tentacles are short with only ramifications of the first and second order. The dorsal tubercle has a single curve slightly concave to the right side. The branchial sac is even with curved stigmata and infundibula under the folds. The shape of the gut is the same as in a large specimen.

The main differences between these two forms concern the gonads. The sperm duct opens by a very short papilla far from the oviduct (Fig. 60D, E). The oviduct is attached to the body wall and opens in a flat papilla instead of an erect extremity. The small specimens are brooding. The small larvae (Fig. 60F) have a trunk 170 μm long and a notochord 420 μm long inside the tail.

Millar (1962) indicated that one of his specimens was brooding without providing further details.

Remarks

In South Africa the genus *Molgula* is represented by six different forms, which can be grouped in pairs: *Molgula conchata* and *M. cryptica*; two forms of *M. falsensis*; and two forms of *M. scutata*.

Each pair possesses an incubatory form. We do not have a large enough sample to estimate the variability within the different species, and the morphological characters are insufficient to solve the problem. Further biological studies of the brooding conditions, and molecular systematics are required to resolve the taxonomy of these forms.

OTHERS ASCIDIANS RECORDED IN SOUTH AFRICA BUT NOT PRESENT IN THIS COLLECTION

Family **Polyclinidae**

Aplidium agulhaense (Hartmeyer, 1912). *Amaroucium agulhaense* Hartmeyer, 1912 (p. 356, pl. 38 (fig. 4), pl. 44 (fig. 11)), from the Agulhas Bank (102 m depth) is pedunculate with only five rows of stigmata.

Aplidium claviforme (Hartmeyer, 1912). *Amaroucium claviforme* Hartmeyer, 1912: 348, pl. 39 (fig. 5), from Algoa Bay has club-shaped colonies, impregnated with sand, with very long zooids. It is insufficiently described.

Aplidium colelloides (Herdman, 1886). *Amaroucium colelloides* Herdman, 1886 (p. 233, pl. 27 (figs 9–12)), collected off the Cape of Good Hope at 250 m depth has stalked colonies with zooids in double rows in the head, having nine rows of stigmata and 12–13 stomach folds. Redescribed by Millar

(1962: 125, fig. 4) from the same location, it was also recorded in Namibia by Turon (1988: 276, fig. 2).

Aplidium exiguum (Herdman, 1886). *Psammaplidium exiguum* Herdman, 1886 (p. 245, pl. 31 (fig. 11)). This species was also collected at 170 m and at 318 m depth (Hartmeyer 1912: 338, pl. 39 (fig. 1), pl. 44 (fig. 7)) off the Cape of Good Hope. This species is lobed, embedded with sand. The zooids have 14 stigmata rows and 20 stomach folds, but are immature.

Aplidium galeritum (Hartmeyer, 1912). *Amaroucium galeritum* Hartmeyer, 1912 (p. 344, pl. 39 (fig. 4), pl. 44 (fig. 10)), from St Francis Bay, recorded again in False Bay (Millar 1962: 130; 1964: 172, fig. 10—Cape Province), has light grey pillar-like lobes, 9–12 stigmata rows and 12–14 stomach folds. The larvae are distinctive with a dense anterior fringe of small vesicles.

Aplidium lubricum (Sluiter, 1898*a*). *Amaroucium lubricum* Sluiter, 1898*a* (p. 31, pl. 1 (fig. 8), pl. 5 (fig. 1)). We have re-examined the type colony, ZMA TU 185 from Durban, which corresponds well to other records from Durban, Mozambique and Madagascar (Millar 1956: 915, fig. 2; Vasseur 1968; Monniot, C. & Monniot, F. 1976*a*: 362, fig. 1C–D). This species with nine stigmata rows, 15–20 stomach folds, long zooids and a larva with an anterior fringe of numerous vesicles, is restricted to the tropics.

Aplidium pantherium (Sluiter, 1898*a*). *Psammaplidium pantherinum* Sluiter, 1898*a* (p. 26, pl. 2 (fig. 3), pl. 4 (figs 8–9)). *Amaroucium unilarviferum* Millar, 1955 (p. 172, fig. 4; 1962: 123, fig. 3). Millar re-examined the type from Isipingo and a new collection from Cape Province, pointing out that the original description was erroneous. The zooids have only five stomach folds and a larva with an anterior fringe of round vesicles. The species was also recorded by Millar (1964: 172).

Aplidium retiforme (Herdman, 1886). The type specimen, *Psammaplidium retiforme* Herdman, 1886 (p. 248, pl. 32 (figs 8–10)), from Kerguelen, has been revised (Monniot, F. & Gaill 1978: 149, fig. 6C–F) with additional collections made in the same area. Millar (1962: 127, fig. 5) recorded this characteristic species from False Bay, with small slender lobes covered with sand.

Aplidium sarasinorum (Fielder, 1889). *Heterotrema sarasinorum* Fiedler, 1889 (p. 859, pl. 25 (figs 1–4)) from Ceylon was recorded again from False Bay and Mozambique (Millar 1962: 128, fig. 6). The zooids, with an average of ten stigmata rows and eight stomach folds, have a very short post-abdomen with a cluster of testis vesicles and a larva with a fringe of numerous anterior vesicles.

Aplidium schultzei Hartmeyer, 1913 (p. 141), from False Bay, was insufficiently described to be recognized.

Polyclinum constellatum Savigny, 1816 (p. 189, pl. 4 (fig. 2), pl. 18 (fig. 1)), is a widely distributed fouling species that was recorded by Millar (1955: 176, fig. 7) from Durban.

Polyclinum arenosum Sluiter, 1898*a* (p. 20, pl. 4 (fig. 12)), from Isipingo, was later recorded by Millar (1955: 174, fig. 5; 1962: 136, fig. 11) from Cape Province and Natal. It has a sandy colony divided in narrow lobes made of a single system each.

Polyclinum neptunium Hartmeyer, 1912 (p. 331, pl. 38 (fig. 9), pl. 44 (figs 2–4)), is very similar to *Polyclinum isipengense*, but the larva has different anterior ampullae. This species, described from the Cape of Good Hope in 106–318 m, was also recorded from equivalent depths in South Africa by Millar (1962: 136, fig. 11), 248–341 m depth. It is also present in Southern Australia (Kott 1963, 1972).

Synoicum australe Millar, 1962 (p. 133, fig. 8), from Mossel Bay (SAM–A25609), not recorded elsewhere.

Synoicum capense Millar, 1962 (p. 131, fig. 7), from False Bay (SAM–A25608), has not been recorded again.

Family **Polycitoridae**

Eudistoma mobiusi (Hartmeyer, 1905). *Colella mobiusi* Hartmeyer, 1905 (p. 396). *Polycitor mobiusi*: Hartmeyer, 1912 (p. 305), Cape Province and Madagascar. *Eudistoma mobiusi*: Millar, 1962 (p. 162), Cape Province. The species has a large larva 2-mm long but no other distinctive characters. It is also recorded from Mauritius and Mayotte (Comoros islands), but the identifications need to be revised.

Eudistoma renieri described as *Polycitor renieri* Hartmeyer, 1912 (p. 309), described from St Francis Bay, was recorded by Millar (1962: 160, fig. 23) from Durban. It has a twisted loop of the lower part of the rectum.

Eudistoma rhodopyge (Sluiter, 1898*a*). *Distoma rhodopyge* Sluiter, 1898*a* (p. 12, pl. 1 (fig. 2), pl. 3 (figs 5–6)); Michaelsen 1934 (p. 141, and synonymy). The colonies comprise several lobes arising from a common base. Without any distinctive character of the zooids, this species has been recorded from Cape Province to Durban, and from Madagascar, Mauritius and Mozambique.

Polycitor cuneatus Millar, 1964 (p. 160, fig. 1), has pedunculate colonies raised above ramified roots. It was only recorded once at 411–450 m depth, off Durban.

Polycitor nitidus (Sluiter, 1898*a*). *Distoma nitidum* Sluiter, 1898*a* (p. 17). This species from Durban is not sufficiently described and remains doubtful. It has not been recollected and Sluiter's descriptions are often erroneous.

Polycitor psammophorus Hartmeyer, 1912 (p. 300, pl. 38 (fig. 1), pl. 43 (figs 2–3)), off the Agulhas Bank, was described from immature colonies and was not recorded again. It has a doubtful generic position.

Cystodytes morifer Michaelsen, 1919 (p. 76, fig. 34), from Durban.

Cystodytes roseolus Hartmeyer, 1912 (p. 310, pl. 43 (figs 7–14)), Algoa Bay; Millar, 1962 (p. 141, fig. 13), Cape Province. The species, distributed from

Dakar to the Cape Province and the Seychelles, is characterized by the peculiar shape of the spicules.

Distaplia capensis Michaelsen, 1934 (p. 141), from the Cape Province, and found again by Millar (1962: 149, fig. 17; 1964: 168), has a folded stomach wall and gonads included in the gut loop. The colonies are purplish gelatinous lobes.

Distaplia durbanensis Millar, 1964 (p. 167, fig. 6), is only known from the type colony dredged at 411 m depth off Durban. The colony is stalked. The stomach wall has 40–50 narrow folds or lines of papillae.

Sigillina vasta Millar, 1962 (p. 153, fig. 19), from Cape Province, was dredged between 62 and 77 m depth.

Family **Clavelinidae**

Clavelina enormis Herdman, 1880 (p. 725), was described from a single specimen collected from Simon's Bay. Herdman's description is very short and could apply to any species of the genus. In this colony of only four zooids, two of them were united by their thoracic tunic, a feature that Herdman (1882) considered an 'abnormality'. Later, this same specimen was named *Stereoclavella enormis* by Herdman (1891) and *Chondrostachys enormis* by Hartmeyer (1909–1911). Some specimens of *Clavelina enormis* were described by Hartmeyer (1905) from Mauritius and Zanzibar, and by Millar (1956), and Monniot, C. & Monniot, F. (1976*a*) from Mozambique (Inhaca). Hartmeyer (1912) also described *Chondrostachys enormis* from Diego Garcia. All these references probably correspond to the tropical Indo-Pacific species *Clavelina moluccensis* (Sluiter, 1904) after Monniot, C. (1997: 208). A synonymy of *Clavelina steenbrasensis* Millar, 1955, and *C. enormis* remains possible.

Clavelina roseola Millar, 1955 (p. 183, fig. 13), is a species that now belongs to the genus *Stomozoa*.

Clavelina steenbrasensis Millar, 1955 (p. 185, fig. 14), known from False Bay and Mossel Bay, is a species with a colony made of lobes, each consisting of several zooids included in a common tunic.

Family **Didemnidae**

Trididemnum natalense Michaelsen, 1920*a* (p. 3). In the description of the single colony of this species, the larva is not mentioned. It seems difficult to distinguish this colony from *T. cerebriforme* without additional details.

Didemnum karlae Michaelsen, 1920*a*: 37. This species has never been recorded again since its collection in an aquarium at Isipingo. The larvae were not described and the zooids, which were not figured, have no distinctive character, so the species is hardly recognizable.

Didemnum speciosum asperum Herdman, 1886, is an Atlantic species. Sluiter (1898*a*) doubtfully assigned colonies from Durban to this species without any description. This identification cannot be retained.

Didemnum stilense Michaelsen, 1934 (p. 146), from Cape Province, was described as a cartilaginous species, thick and filled with spicules and bladder cells. The larvae were not described. Millar (1955: 176; 1962: 164) assigned to the same species didemnids from the same region that were rather different in shape with variable spicules, zooids and larva. He mentioned the possible confusion of several different species.

Didemnum velans Michaelsen, 1920*a* (p. 41). Described from Zanzibar, it was later recorded in Still Bay (Michaelsen 1934) without additional description. The species has thin colonies. The larva was not described.

Polysyncraton chuni Hartmeyer, 1912 (p. 326, pl. 43 (figs 22–23)), and *Polysyncraton spongioides* Hartmeyer, 1912 (p. 323, pl. 43 (figs 19–21)), were both collected at 318 m depth off the Cape of Good Hope and not recorded since.

Leptoclinides capensis Michaelsen, 1934 (p. 151), from Still Bay, was later recorded in the Cape Province by Millar (1962: 167) and Monniot, F. (1978) at Kerguelen. The main character of the species is the single testis vesicle.

Diplosomoides capense Hartmeyer, 1912 (p. 329, pl. 37 (fig. 4), pl. 43 (figs 15–18)), from 318 m depth off the Cape of Good Hope, may be a *Lissoclinum* species. As described it has two testis vesicles and a straight sperm duct, but the funnel-like cloacal siphon directed backwards is surprising. The species has not since been collected.

Lissoclinum cavum Millar, 1962: 168, fig. 26, from the Cape Province, was recorded with doubt from Namibia (Turon 1988) and from Madagascar (Monniot pers. obs.). This species has a rosette of testis lobes.

Family **Ascidiidae**

Ascidia arenosa Hartmeyer, 1909 (nom. nov. for *A. sabulosa* Sluiter, 1898*a*: 45, pl. 5 (figs 2–5)), was described from Durban from a single specimen. This species, covered with sand, was found again by Millar (1956) at Inhaca, Mozambique.

Ascidia compta Sluiter, 1898*a* (p. 43, pl. 5 (figs 19–21), pl. 6 (fig. 1)) was described from Knysna, from a single young specimen of 10 mm.

Ascidia krechi Michaelsen, 1904*a* (p. 253, pl. 10 (fig. 8), pl. 13 (figs 59–61)). A single specimen was dredged off Cape Town (34°33.3'S 18°21.2'E, 318 m).

Ascidia pygmaea sensu Millar, 1955 (p. 189, fig. 17) was recorded from Knysna. A small animal 1.5 mm long, not described. The figured digestive tract does not look like that of the type species figured by Michaelsen (1918: 56, fig. 9) from Mauritius. This identification seems doubtful.

Ascidia stenodes Millar, 1962 (p. 172, fig. 27) was recorded from False Bay. This species has an uncommon shape with a gut in a single loop.

Family **Agneziidae**

Agnezia capensis Millar, 1955 (p. 191, fig. 19) is known from a single specimen collected in False Bay.

Agnezia glaciata Millar, 1960 (p. 92, fig. 30B), is known from a single specimen from Table Bay. This small species (11 mm) lives free on sandy bottoms. Millar (1960), redescribing *Agnezia glaciata* Michaelsen, 1898, from Patagonia, considered *Agnezia capensis* and *A. glaciata* as synonyms. Monniot, C. & Monniot, F. (1976*b*) again recorded specimens of this species at Inhaca. The distinctions between the different *Agnezia* species have been detailed in Monniot, C. & Monniot, F. (1983).

Family **Styelidae**

Botrylloides nigrum giganteum (Pérès, 1949) was recorded by Millar (1955, 1962) from Durban Harbour, Knysna and Mozambique. *Botryllus giganteus* is distinct from *B. niger* and is known from Senegal and Brazil (Rio de Janeiro and San Sebastian harbours). This species, probably introduced into South Africa, is not present in this collection. It differs from all others by its numerous rows of stigmata (15–19), and a funnel-like stomach with a very small caecum. Unfortunately, its most original character, the position of the stomach in a prolongation of the branchial sac, was not indicated.

Alloeocarpa capensis Hartmeyer, 1912 (p. 261, pl. 38 (fig. 2), pl. 41 (figs 16–18)) was described from St Francis Bay (34°05'S 17°52'E, 267 m), and recorded by Millar (1962: 182, fig. 31) from Algoa Bay at 31 m, and off Lion's Head, Cape Peninsula at 248 m. This species is characterized by gonads on the right side only, and the ovary situated posterior to the testis.

Polyzoa falclandica Michaelsen, 1900. Hartmeyer (1912: 258, pl. 41 (figs 13–15) recorded this species from St Francis Bay. This species is considered a synonym of *Polyzoa opuntia* Lesson, 1830. Hartmeyer's description of the single specimen does not correspond to the definition of the genus. A confusion with *Alloeocarpa capensis* from the same station remains possible.

Metandrocarpa fascicularis Millar, 1962 (p. 183, fig. 32) described this species from 8 miles off Cape St. Blaize at 72 m. The characteristics of this species are discussed with regard to *M. asymmetra*.

Metandrocarpa tritonis Michaelsen, 1904*b* (p. 240, pl. 10 (fig. 2), pl. 13 (figs 55–57)) was described from Plettenberg Bay at 100 m. The only zooid collected is nevertheless like that of a colonial styelid genus. It is characterized by the presence of branchial folds and gonads made of a single testis covered by an ovary. All other species of the genus are tropical.

Oligocarpa skoogi Michaelsen, 1923*b* (p. 3, figs 1, 2). The species is known only by two specimens attached together. The external aspect is very similar to *Styela canopus*. The genus *Oligocarpa* is characterized by a single gonad on the left side; it is sometimes considered colonial but generally solitary individuals are found. Two species are known: one from South Africa, the other from Kerguelen.

Polyandrocarpa durbanensis Millar, 1952 (p. 197, fig. 25) was described from Durban. Plante & Vasseur (1966: 150, pl. 4 (figs 31–32)) recorded it from Madagascar, Tulear Harbour. The zooids are small, 6 mm, naked, and united by stolons. They have three well-formed branchial folds and a rudimentary fourth fold. Three to six gonads are aligned on the left side and 4–7 on the right side. A single endocarp lies in the gut loop.

Polyandrocarpa placenta (non Herdman) Millar, 1955 (p. 199, fig. 26) was recorded from False Bay in 28 m. In the single colony, the salmon-pink zooids are agglomerated in a common tunic. There are four branchial folds and 6–8 gonads in a line on each side.

Polycarpa (Sluiter, 1898*a*). *Styela (Polycarpa) anguinea*: Sluiter, 1898*a* (p. 52 pl. 6 (figs 15–19)) was recorded from Knysna; and *Polycarpa anguinea*: Millar, 1952 (p. 203, fig. 28) from False Bay and Knysna.

Polyandrocarpa anguinea: Millar, 1962 (p. 186) was recorded from Mossel Bay, Algoa Bay, and Mozambique. This species is said to be present in all warm seas worldwide. Generally it has aggregated individuals with an extremely brittle body wall, without endocarps. The gonads in a line on each side are suspended between the body wall and the branchial sac.

Styela (Polycarpa) natalensis Sluiter, 1898*a* (p. 50, pl. 6 (figs 11–14)) was described from Isipingo. *Polycarpa natalensis* has also been recorded by Millar (1961: 14, fig. 2) from Mozambique, and by Monniot, C. & Monniot, F. (1976*a*: 374, fig. 3B) from Inhaca, Mozambique. This small species, 5–15 mm across, differs from other South African species of *Polycarpa* by numerous endocarps distributed on the entire internal surface of the body wall.

Cnemidocarpa psammophora Millar, 1962 (p. 188, fig. 34) was described from Algoa Bay, 25–39 m. This small species is covered with sand, with tunic hairs anchoring it on the sandy bottom. It has 5–8 gonads on the left and 10–11 on the right side.

Cnemidocarpa radicata (Millar, 1962). *Styela radicata* Millar, 1962 (p. 191, fig. 35) was described from Mozambique, 2 m, and also recorded by Millar (1964: 174) from the same region. As *Cnemidocarpa radicata*, the species was also recorded by Monniot, C. & Monniot, F. (1976*a*: 368, fig. 2A) from Inhaca Island, Mozambique. The holotype is the only specimen of this species recorded in southern Africa. It has a single small endocarp on the left side of the body. The type specimen is a juvenile and the proximity of male and female gonads, which is a characteristic of the genus *Cnemidocarpa*, becomes visible in large specimens only.

Family **Pyuridae**

Boltenia africana Millar, 1962 (p. 198, fig. 40) is known from Mossel Bay and Algoa Bay in 9–22 m. This species is easy to identify, with its transverse stigmata. It is the only shallow-water species of the genus in the Southern Hemisphere.

Hartmeyeria bouilloni Monniot, C. & Monniot, F., 1976*a* (p. 390, text-fig. 5B, D, pl. 6) was described from Mozambique. This species was erroneously identified as *Microcosmus pedunculatus* Pérès, 1951, by Millar (1962: 197, fig. 39) from Mossel Bay (12 m) and Mozambique (2 m). This sandy species has a peculiar aspect with the body slightly laterally flattened, and encircled by a tunic crest extending along the dorsal and ventral line. There is a long naked peduncle arising from the middle of the ventral side.

Microcosmus albidus Michaelsen, 1904*a* (p. 213, pl. 10 (fig. 4), pl. 11 (figs 25, 26)). This species is known by a single specimen 11 × 8 mm across from 100 m depth off St Francis Bay. The gut and gonads are not figured. This species has six branchial folds.

Microcosmus trigonimus Millar, 1955 (p. 212, fig. 37). This species with eight branchial folds was only recorded from Durban; the number of specimens was not stated. The main characteristic is the presence of two gonads on the left side of the body side, one of them exterior to the intestinal loop.

Family **Molgulidae**

Eugyrioides myodes (Millar, 1962). *Eugyra myodes* Millar, 1962 (p. 206, fig. 44) was described from two specimens from Algoa Bay, in 17–18 m. This species, 11 mm in diameter, is covered with sand, has seven longitudinal branchial vessels on each side, a secondary gut loop not well marked, and obvious transverse muscles. In the genus *Eugyrioides* there is a gonad on the left side that is absent in the genus *Eugyra*.

Pareugyrioides macrentera (Millar, 1962). *Eugyra macrentera* Millar, 1962 (p. 209, fig. 45) was described from a single specimen from Algoa Bay, in 8–10 m. *Pareugyrioides macrentera* Monniot, C. & Monniot, F., 1976*a* (p. 387, figs 6B, 8) was also recorded from Inhaca Island, Mozambique. This species, covered with sand, is characterized by a long digestive tract deeply curved on itself, enclosing the left gonad. According to Millar (1962), the holotype is a juvenile with a non-fully developed branchial sac, but the larger specimen from Mozambique has the same structure, which distinguishes the species as belonging to the genus *Pareugyrioides*.

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6. SYSTEMATIC papers must conform to the *International code of zoological nomenclature* (particularly Articles 22 and 51).

Names of new taxa, combinations, synonyms, etc., when used for the first time, must be followed by the appropriate Latin (not English) abbreviation, e.g. gen. nov., sp. nov., comb. nov., syn. nov., etc. The name of the taxon should be followed, without intervening punctuation, by the author's name (not abbreviated) and the year of publication; a comma must separate author's name and year. The author's name and date must be placed in parentheses if a species or subspecies is transferred from its original genus. The name of a subsequent user of a scientific name must be separated from the scientific name by a colon.

Synonymy arrangement should be either according to chronology of names, i.e. all published scientific names by which the species previously has been designated are listed in chronological order, with all references to that name following in chronological order (see example 1), or according to chronology of bibliographic references, whereby the year is placed in front of each entry, and the synonym repeated in full for each entry (see example 2). The author should adopt one style or the other throughout a paper.

Family **Nuculanidae**
Nuculana (Lembulus) bicuspidata (Gould, 1845)
Figs 14–15A

Example 1

Nucula (Leda) bicuspidata Gould, 1845: 37.
Leda plicifera A. Adams, 1856: 50.
Laeda bicuspidata (Gould) Hanley, 1859: 118, pl. 228 (fig. 73). Sowerby, 1871, pl. 2 (fig. 8a–b).
Nucula largillierti Philippi, 1861: 87.
Leda bicuspidata (Gould): Nicklès, 1950: 163, fig. 301; 1955: 110. Barnard, 1964: 234, figs 8–9.

Note punctuation in the above example: comma separates author's name and year; semicolon separates more than one reference by the same author; full stop separates references by different authors; figures of plates are enclosed in parentheses to distinguish them from text-figures; dash, not comma, separates consecutive numbers.

Example 2

1845 *Nucula (Leda) bicuspidata* Gould, p. 37.
1856 *Leda plicifera* A. Adams, p. 50.
1859 *Laeda bicuspidata* (Gould) Hanley, p. 118, pl. 228 (fig. 73).
1861 *Nucula largillierti* Philippi, p. 87.
1871 *Laeda bicuspidata* (Gould): Sowerby, pl. 2 (fig. 8a–b).
1950 *Leda bicuspidata* (Gould): Nicklès, p. 163, fig. 301.
1955 *Leda bicuspidata* (Gould): Nicklès, p. 110.
1964 *Leda bicuspidata* (Gould): Barnard, p. 234, figs 8–9.

In describing new species, one specimen must be designated as the holotype; other specimens mentioned in the original description are to be designated allotype (if applicable) and/or paratypes; additional material not regarded as paratypes should be listed separately. The complete data (registration number, depository, description of specimen, locality, collector, date) of the holotype and paratypes must be recorded, e.g.:

Holotype. SAM–A13535 in the South African Museum, Cape Town. Adult female from mid-tide region, King's Beach, Port Elizabeth (33°51'S 25°39'E), collected by A. Smith, 15 January 1973.

Note standard form of writing South African Museum registration numbers and date.

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ANNALS

OF THE SOUTH AFRICAN MUSEUM

CAPE TOWN

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THIELE, J. 1910. Mollusca. B. Polyplacophora, Gastropoda marina, Bivalvia. *In:* SCHULTZE, L. *Zoologische und anthropologische Ergebnisse einer Forschungreise im westlichen und zentralen Süd Afrika ausgeführt in den Jahren 1903–1905* **4** (15). *Denkschriften der medizinisch-naturwissenschaftlichen Gesellschaft zu Jena* **16**: 269–270.

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OIL-COLLECTING BEES OF THE WINTER RAINFALL AREA OF SOUTH AFRICA (MELITTIDAE, REDIVIVA)

By
V. B. WHITEHEAD
&
K. E. STEINER

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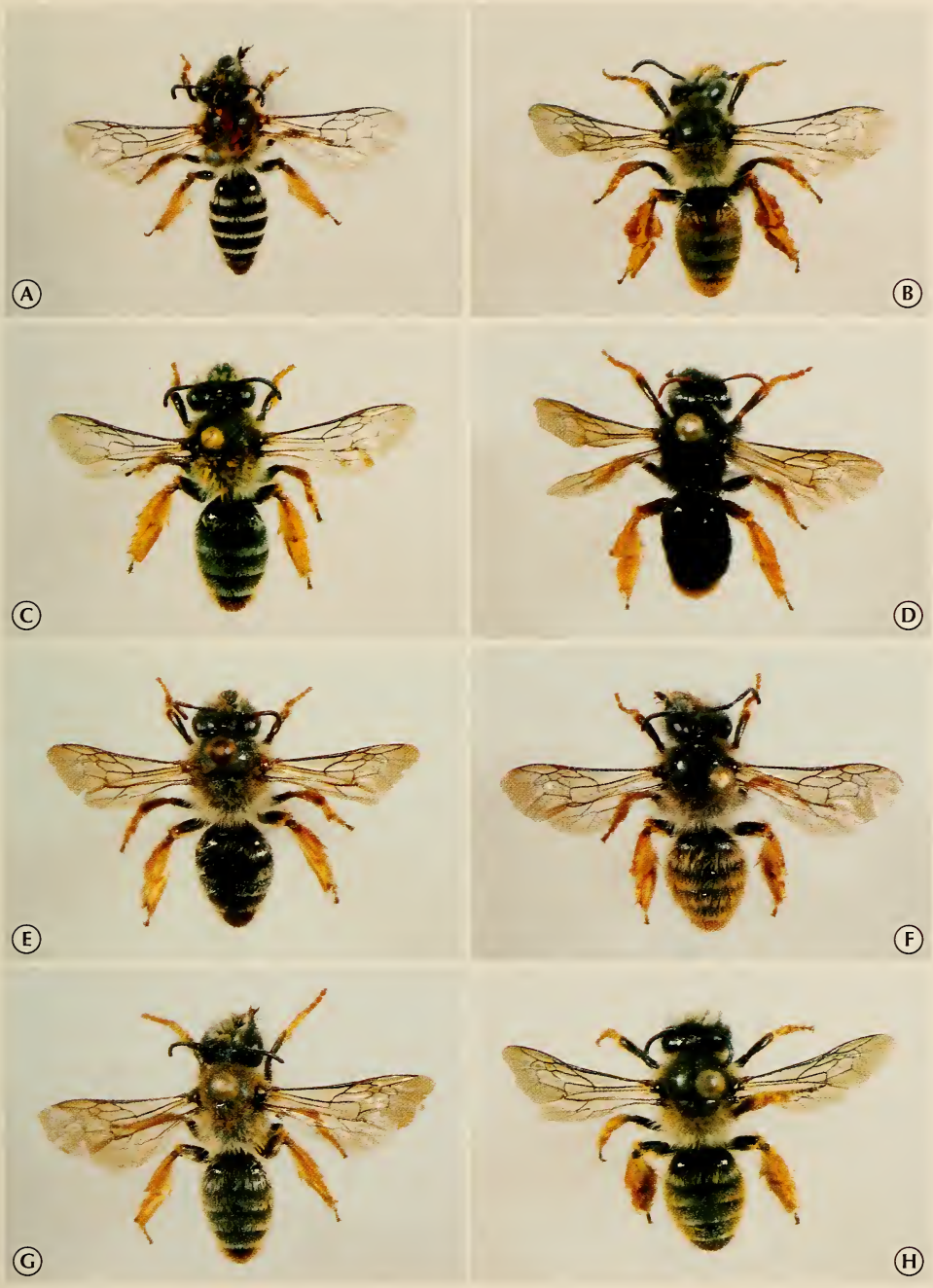

Fig. 1. Female oil-collecting bees of the winter rainfall area of southern Africa. Body length in brackets. A. *Rediviva albifasciata* (10.2 mm). B. *Rediviva aurata* sp. nov. (11.2 mm). C. *Rediviva parva* (12.8 mm). D. *Rediviva ruficornis* sp. nov. (11.1 mm). E. *Rediviva bicava* sp. nov. (10.0 mm). F. *Rediviva intermixta* (11.2 mm). G. *Rediviva intermedia* sp. nov. (12.1 mm). H. *Rediviva alonsoae* (10.9 mm).

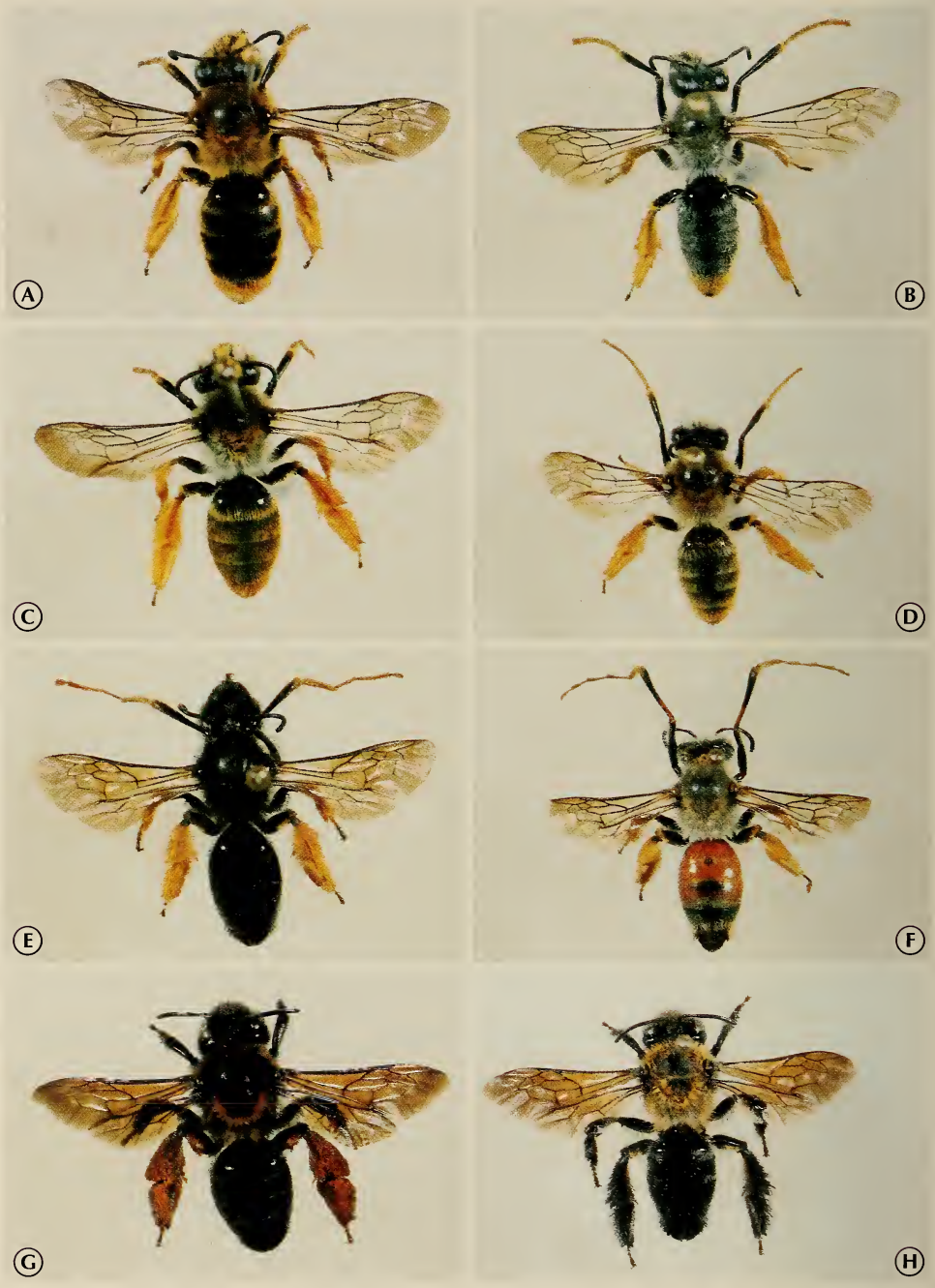

Fig. 2. Female oil-collecting bees of the winter rainfall area of southern Africa. Body length in brackets. A. *Rediviva nitida* sp. nov. (12.1 mm). B. *Rediviva micheneri* sp. nov. (11.2 mm). C. *Rediviva peringueyi* (12.0). D. *Rediviva macgregori* sp. nov. (12.0 mm). E. *Rediviva longimanus* (13.9 mm). F. *Rediviva emdeorum* (13.5 mm). G. *Rediviva gigas* (dark-haired form) (16.2 mm). H. *Rediviva gigas* (light-haired form) (15.0 mm).

OIL-COLLECTING BEES OF THE WINTER RAINFALL AREA OF SOUTH AFRICA (MELITTIDAE, REDIVIVA)

By

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(With 64 figures and 1 table)

[*MS accepted 7 September 2000*]

ABSTRACT

The species of *Rediviva* (Apoidea, Melittidae) occurring in the winter rainfall region of South Africa are reviewed. Fifteen species are recognized, with nine described as new. The new species include *R. bicava*, *R. intermedia*, *R. macgregori*, *R. micheneri*, *R. ruficornis*, *R. aurata*, *R. parva*, *R. alonsoae* and *R. nitida*. The six known species, *R. gigas* Whitehead & Steiner, *R. albifasciata* Whitehead & Steiner, *R. intermixta* (Cockerell), *R. emdeorum* Vogel & Michener, *R. longimanus* Michener and *R. peringueyi* (Friese), are redescribed. Distribution and host plants are given for all species and a key to males and females is presented. Mouth-parts, wings and male terminalia as well as front and hind legs of females are illustrated. Location of types is given and a lectotype for *R. peringueyi*, type species of the genus, is designated.

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INTRODUCTION

It has long been known that solitary bees visit flowers to collect pollen and nectar to use as a food source for their developing larvae. However, it was only relatively recently discovered that some solitary bees collected non-volatile floral oils as an additional food source for the nest (Vogel 1969, 1971). Although it has been suggested that these oils can serve both a nutritive and non-nutritive function (i.e. nest cell construction) (Cane *et al.* 1983), it seems likely that their role as an energy-rich food supplement is far more important than their role as construction material precursors for the nest cell lining (Simpson & Neff 1989, 1983; Vinson *et al.* 1997).

It was originally thought that oil collection occurred only among New World members of the former Anthophoridae (i.e. eight genera in the tribes Centridini, Examalopsini and Tertapedini) (Vogel 1974), but subsequent studies have revealed that oil collection occurs in two additional groups of bees, the Ctenoplectrini (formerly Ctenoplectridae) and Melittidae (Vogel 1976, 1981, 1984, 1990; Whitehead *et al.* 1984). *Ctenoplectra*, an Old World genus formerly placed in its own family and considered to be the sister group to all long-tongued bees, is now placed in a tribe nested within the Apinae, is more closely related to the New World oil-collecting bees (Roig-Alsina & Michener 1993). The Melittidae are more distantly related, being basal to all long-tongued bees (Roig-Alsina & Michener 1993). This indicates that oil-collection in the Melittidae must have evolved independently of oil-collection in the Apinae. Oil-collection in the Melittidae is known from two genera, the Holarctic *Macropis* and the southern African *Rediviva*. Relationships within the Melittidae are not well known, but the similarities that suggest a close relationship between *Rediviva* and *Macropis* are probably the result of convergent adaptation to oil-collecting rather than any true phylogenetic affinity (Michener 1981). If this is the case then oil collection has evolved twice within the Melittidae.

The genus *Rediviva* consists of approximately 24 species restricted to South Africa, Lesotho and Swaziland, although, based on the distribution of oil-secreting host plants, it probably extends east to Moçambique and possibly as far north as Tanzania (Steiner & Whitehead, unpubl.). In southern Africa, there are two centres of diversity, a summer rainfall, mostly Drakensberg centre and a winter rainfall western Cape centre. The greatest number of species and morphological diversity occurs in the winter rainfall zone. When we began our studies there were four recognized *Rediviva* species in this area: *R. intermixta* (Cockerell), *R. peringueyi* (Friese), *R. longimanus* Michener and *R. emdeorum* Vogel & Michener. We subsequently described two additional species, *R. albifasciata* and *R. gigas* (Whitehead & Steiner 1993, 1994). The purpose of this paper is to describe the remaining nine new species and to redescribe the remaining six species, four of which were described from one sex only, *R. longimanus* (female only), *R. emdeorum* (female only), *R. peringueyi* (female

only) and *R. intermixta* (male only). We also provide the first comprehensive information on their host plants and geographical distribution.

History of Rediviva

In 1911, Friese described *Andrena (Rediviva) peringueyi* from the Cape Colony, South Africa, but had some doubts about its placement; in a footnote he mentioned that it might fit better in *Melitta* or *Dasypoda*. Cockerell (1931) raised *Rediviva* to generic level and included two species, *R. peringueyi* and *R. neliana*. However, he still considered *Rediviva* to belong in the family Andrenidae. It was 50 years later that Michener (1981) moved *Rediviva* to the family Melittidae, subfamily Melittinae, together with *Macropis*, *Dolichochile*, *Redivivoides* and *Melitta*. *Macropis* is separated by having two submarginal cells in the front wing, males with yellow face-markings, a conspicuous pygideal plate and S8 that is not broadened distally. *Dolichochile* has reduced maxillary palps and flat blade-like mandibles in females. *Melitta* has a well-defined propodeal triangle with a granulate surface, a second submarginal cell that is wider than long and the male with the seventh metasomal sternum as a large plate with reduced lobes. *Rediviva* and *Redivivoides* have a small, less well-defined propodeal triangle with shallow punctures and a shiny surface and a second submarginal cell that is longer than wide. *Rediviva* differs in that the hind legs of females have both tibia and basitarsus broad, with fine scopal hairs on the outer surface and foretarsus with dense short vestiture. The hind tibia and basitarsus of *Redivivoides* are slender and the scopal hairs on the outer surface consist of simple bristles; the anterior tarsus is ordinary.

Oil-secreting plants and oil-collecting bees in southern Africa

Stefan Vogel (1969, 1974) was the first to discover the relationship between oil-secreting flowers and oil-collecting bees. Although most of the information he presented pertained to plants and bees from South America, he realized that at least two South African genera, *Diascia* and *Bowkeria*, also secreted oil. He was unable, however, to verify that these genera were pollinated by oil-collecting bees and was unaware of which bees might be involved in the interaction. Working independently on the taxonomy of melittid bees, Michener (1981) noticed that bees in the genus *Rediviva* had modified hairs on the forelegs similar to those of *Macropis*, a known oil-collector from northern temperate regions of Europe and North America (Vogel 1976; Cane *et al.* 1983; Simpson *et al.* 1983). He suggested that the unusually elongated forelegs of *Rediviva longimanus*, a bee from the Western Cape Province, might represent an adaptation to the collection of oil from some specific flower. He was apparently unaware that *Diascia*, with its long, paired, oil-containing spurs was a likely potential host for this bee. It was left to Whitehead *et al.* (1984) to demonstrate the association between *Rediviva longimanus* and a new long-spurred species of *Diascia* (incorrectly identified as *D. longicornis* (Thunb.) Druce (Steiner, unpubl.)). In the same period, Vogel (1984), Vogel & Michener (1985), described a new long-legged *Rediviva*, *R. emdeorum*, from Namaqualand that was collected on a long-spurred *Diascia tanyceras* E. Mey ex Benth. (incorrectly identified as *D. longicornis* (Steiner, unpubl.)). Also in

1984, Hilliard & Burtt reported the association of a *Rediviva* species with *Diascia anastrepta* in the Natal Drakensberg. Manning & Brothers (1986) discovered that *Bowkeria verticillata* was also pollinated by a *Rediviva* species, *R. rufocincta* and discussed the association of *R. politissima* with several *Diascia* species and nectar plants. A more complete analysis of the relationship between *Diascia* species from the Drakensberg mountains was provided by Steiner & Whitehead (1988). They determined that the co-occurring and synchronously flowering *Diascia* species often used the same *Rediviva* without incurring reproductive interference by placing pollen on different parts of the bee's body. Steiner (1990) presented evidence to show that the yellow translucent region at the base of the upper lip of the *Diascia* corolla functioned as an orientation cue for its *Rediviva* pollinators, while the strong correlation between *Rediviva* foreleg length and *Diascia* spur length was detailed for *R. neliana* and *R. pallidula* at about the same time (Steiner & Whitehead 1990, 1991). A major advance in knowledge about oil-secreting plants and their pollinators resulted when it was discovered that several orchid genera in South Africa secrete oil and are pollinated by *Rediviva* bees (Steiner 1987, 1989, 1993). More recently, we have explored the reproductive consequences for plants dependent on oil-collecting bees for pollination (Steiner 1993; Steiner & Whitehead 1996).

METHODS

Measurements

Measurements were made with a calibrated eye-piece graticule, using a dissecting microscope. Where more than one specimen was measured, means are given with the range in brackets.

Forelegs were removed from dried specimens and mounted on card. Segments were measured individually except for the tarsus where tarsomeres 2–5 were considered as a single unit separate from the basitarsus. Leg length is expressed as the sum of the individual segments (Steiner & Whitehead 1990). Foreleg length is a good diagnostic character for winter rainfall bees but is difficult to measure on pinned specimens. However the sum of the lengths of foretibia and forebasitarsus of females, strongly correlates with overall leg length and is easier to measure. Both measurements are given in descriptions and in the key to the species.

Body length was considered to be the distance from the anterior ocellus to the tip of the metasoma. This measurement was shown to correlate well with body mass (Steiner & Whitehead 1990). Forewings were measured from the outer edge of the tegula to the wing tip.

Dissection

Male genitalia and associated sterna are more easily removed from fresh specimens, but when these were not available dried material was relaxed for at least two days before removal. The desired parts were extracted with the bent tip of a fine needle and placed overnight in cold 10 per cent KOH after which they were rinsed in acidified water then pure water and dehydrated in 80 per

cent ethyl alcohol. The dissected parts were viewed and drawn in glycerol and stored in the same material in microvials attached to the relevant pinned specimen.

The shape of the terminal expanded part of S8 of males (apical plate) is diagnostic and may be distorted by KOH treatment and subsequent storage in glycerol. It is best restored by placing in 80 per cent ethyl alcohol for 15 minutes to remove the glycerol and dried under a desk lamp for the same period. In freshly killed or relaxed specimens S7 and S8 can be partially extracted so that the apical plate of S8 remains visible on the pinned specimen.

Terms used for the various structures are those of Michener (1944, 1981), Winston (1979), Michener & Greenberg (1980) and Roberts & Brooks (1987) with the exception that we have numbered the foretarsomeres (basitarsus plus 2, 3, 4, 5) to be able to distinguish those adapted for oil collection. The distal, expanded portion of S8 of males is termed the apical plate. Where both dorsal and ventral aspects are illustrated in the same composite figure, the dorsal view is placed on the left.

Type material

Holotype, allotype and other paratypes of new species are deposited in the Entomology collection of the Life Sciences Division of the South African Museum, Cape Town. Holotype and allotype have specific accession numbers; paratypes have collection batch numbers with an alphabetical suffix to indicate individuals.

The primary types of the previously known species were examined and their place of deposition noted.

Abbreviations and descriptive terms used for surface structure

The letters S or T with a numerical suffix indicate respectively a specific sternum or tergum of the metasoma. L : W is the length to width ratio of the malar space and FL : B is the foreleg to body ratio. The sum of the foretibia and forebasitarsus is abbreviated to Ft+bt. The designation of the various sclerites at the base of the labium are: c for cardo, f for fragmentum of the prementum, l for lorum, m for mentum, p for prementum and s for stipes.

Descriptive terms for surface sculpturing follow those of Harris (1979) and are as follows:

coriaceous—leather-like in texture, with minute cracks like the human skin
costulate—with fine longitudinal ridges or lines.
crenulate—margin finely notched with small rounded teeth.
strigate—having narrow transverse lines

Geographic locations

Collection localities have been given using a degree reference system that is a modification of the latitude-longitude system used for many years by zoologists and cartographers in South Africa (Edwards & Leistner 1971). The basic unit is a one-degree square of latitude and longitude which is sub-divided into half-degree squares labelled A, B, C and D from left to right and top to bottom. Each half-degree square is further divided into quarter-degree squares

and again numbered A, B, C and D. The locality is designated by the degree of latitude and longitude in the north-west or top left-hand corner and by a town or other feature of importance in the square and by the appropriate letter in the half- and quarter-degree squares.

Names of collectors

Most of the material examined was collected by the authors and Mrs M. Cochrane (née MacPherson), collections manager of the insect collection at the South African Museum. The collectors name has been given in full for holotypes and allotypes but for other material has been abbreviated: VBW for V. B. Whitehead, KES for K. E. Steiner and MM for Margie MacPherson. The names of occasional collectors have been given in full.

KEY TO THE OIL-COLLECTING BEES (MELITTIDAE: *REDIVIVA*) OF THE WINTER RAINFALL REGION

1A. Antenna with 10 flagellar segments (females) 2
1B. Antenna with 11 flagellar segments (males) 16

2A. Mandible tridentate ..... *R. gigas* Whitehead & Steiner
2B. Mandible bidentate 3

3A. Hind basitarsus with small shiny scale-like projection on distal dorsal angle 4
3B. Hind basitarsus with no scale-like projection on distal dorsal angle 7

4A. Front coxa with apical hairy spine 5
4B. Front coxa without apical hairy spine 6

5A. Labrum reddish-brown with shallow depression either side of midline, apical margin angulate ..... ***R. bicava* sp. nov.**
5B. Labrum black shiny with median depression, apical margin straight ..... ***R. intermedia* sp. nov.**

6A. Metasoma with white apical hair bands on T1 to T4, fimbriae of T5 brown. Scale on distal dorsal angle of hind basitarsus small and not always readily discernible. Front basitarsus straight in side view ..... *R. albifasciata* Whitehead & Steiner
6B. Metasoma with straw-coloured to light brown diffuse apical hair bands on T2 to T4, fimbriae of T5 of similar colour. Scale on distal dorsal angle of hind basitarsus large and conspicuous. Front basitarsus curved in side view ..... *R. intermixta* Cockerell

7A. Forelegs attenuate, length of foretibia plus forebasitarsus greater than 5 mm (total length of foreleg greater than 14 mm) 8
7B. Forelegs short, length of front tibia plus basitarsus less than 5 mm (total length of foreleg less than 13 mm) 11

8A. Metasomal terga with variable areas of black and light brown integument ..... *R. emdeorum* Vogel & Michener

8B. Metasomal terga with entirely black integument 9

9A. Body pubescence piceous to black, wings dusky, hairs on front, mid and hind tibia and tarsus and on fimbriae of T6 brown .... *R. longimanus* Michener

9B. Pubescence straw-coloured to light brown 10

10A. Metasomal terga T2–T4, with distinct apical hair bands .... ***R. macgregori* sp. nov.**

10B. Metasomal terga without definite hair bands ..... ***R. micheneri* sp. nov.**

11A. Front coxa with hairy apical spine 12

11B. Front coxa lacking apical spine 13

12A. Pubescence black ..... ***R. ruficornis* sp. nov.**

12B. Pubescence pale straw-coloured, golden brown on clypeus and supraclypeal area ..... ***R. aurata* sp. nov.**

13A. Scutum with surface between punctures on disc granular, dull .... *R. peringueyi* (Friese)

13B. Scutum with surface between punctures on disc shiny, smooth 14

14A. Tarsomeres 2–4 of front leg and 2–3 of middle leg with dense plumose oil-collecting hairs ..... ***R. parva* sp. nov.**

14B. Tarsi of front legs only with dense plumose oil-collecting hairs 15

15A. Front legs with dense oil-collecting hairs on tarsomeres 2–4 only. Metasoma with distinct straw-coloured apical hair bands on T2 to T4, short suberect straw-coloured hairs on basal two-thirds of T2–T3, T4 with some black hairs on basal two-thirds. Fimbriae of T5 black basally, brown apically, of T6 dark brown ..... ***R. alonsoae* sp. nov.**

15B. Front legs with oil-collecting hairs on tarsomeres 2–5. Metasoma black and shiny, no distinct apical hair bands. T2–T3 covered with sparse light brown pile, some black hairs basally on T4. Fimbriae of T5–T6 light brown ..... ***R. nitida* sp. nov.**

16A. Distal expanded part of S8 (apical plate) with apical margin straight, slightly concave or at most with shallow emarginations (Figs 63A–F, 64C) 17

16B. Apical plate of S8 with distal margin evenly rounded (Figs 63G–H, 64A–B, D) or with deep median emargination on distal margin, dorsal surface concave or flat (Fig. 64E–G) 22

17A. Distal margin of apical plate of S8 entire, straight or slightly concave (Fig. 63A, F) 18

17B. Distal margin of apical plate of S8 with one to three shallow emarginations (Figs 63B–E, 64C) 19

18A. T2–T5 of metasoma with white ducumbent apical hair bands, fimbriae of T6 light brown to white, some black hairs basally, fimbriae of T7 light brown, hind tibia light brown, darker central spot on anterior surface. Small bees, body less than 9 mm. S6–S8 and genitalia (Figs 17A–G, 63A) ..... *R. albifasciata* Whitehead & Steiner

18B. T2–T5 of metasoma with white to light brown sub-erect hairs, erect black hairs on basal half of T5. Fimbriae of S6 and S7 black to dark brown, hind tibia black. Larger bees, body longer than 10 mm. S6–S8 and genitalia (Figs 55F–G, 57A–E, 63F) ..... ***R. alonsoae* sp. nov.**

19A. Metasoma with integument of T1–T3 having varying amounts of light brown and black. T2–T5 with short erect white apical hair bands, fimbriae of T6 black basally, white apically. Fimbriae of S7 dark brown to black. Hind tibia brown. Large bees, body longer than 10 mm. S6–S8 and genitalia (Figs 25A–G, 63B) ..... *R. emdeorum* Vogel & Michener

19B. Metasoma with integument of T1–T4 black, apical hair bands on T2–T5 white to brown, diffuse and suberect or compact and decumbent. Hind tibia brown 20

20A. Metasoma with integument of apical third of T3–T4 translucent. Basal segments of front legs mostly black but tarsus and extremities of tibia brown. Pubescence of T1–T3 white to straw-coloured, fimbriae of T6 light brown. Small pygideal plate medially on apical margin of T7. S6–S8 and genitalia (Figs 44A–H, 63C–D) ..... ***R. aurata*, *R. ruficornis*** spp. nov.

20B. Metasoma with integument of T3–T4 entirely black. Tarsus of front leg brown, rest of leg dark brown to black. T1–T3 with hairs of basal half light straw-coloured or black. Fimbriae of T6 light brown to black. Pygideal plate absent 21

21A. Small bees, body 8–10 mm. Apical plate of S8 subtriangular, lateral margins diverging distally, apical margin shallowly crenulate or shallowly concave if worn (Fig. 63E). Distinct white apical hair bands on T2–T4, basal two-thirds of T3–T4 with short, black decumbent hair. Integument of hind tibia and basitarsus brown. S6–S8 and genitalia (Fig. 52A–G) ..... ***R. parva* sp. nov.**

21B. Larger bees 10–12 mm. Apical plate ovate, distal margin shallowly crenulate (Fig. 64C). Diffuse apical hairbands on T2–T4, basal half of T3–T4 with pale straw-coloured sub-erect hairs. Integument of hind tibia and basitarsus black. S6–S8 and genitalia (Figs 32A–E, 33D–E) ..... ***R. macgregori* sp. nov.**

22A. Distal margin of apical plate of S8 with deep median emargination (Fig. 64E–G) 23

22B. Distal margin of apical plate of S8 evenly rounded (Figs 63G–H, 64A–B, D) 25

23A. S8 expanded apically in the form of a fish tail, deeply cleft medially, (Figs 5A–G, 64G). Large bees, body greater than 13 mm. Pubescence

light to reddish-brown, apical hair bands with pale tips on T2–T5 .... *R. gigas* Whitehead & Steiner

23B. Apical plate of S8 ovoid to sub-circular with median emargination on distal margin (Fig. 64E–F) 24

24A. Apical plate of S8 ovoid, deep median emargination on distal margin (Fig. 64E). Small bees, body less than 9 mm. White apical hair bands on T2–T4, brown on T5, fimbriae on T6 and T7 light brown .... ***R. bicava* sp. nov.**

24B. Apical plate of S8 sub-circular, longer than wide with deep median emargination on distal margin (Fig. 64F). Medium-sized bees 8–11 mm. Erect straw-coloured hairs on metasoma, fimbriae of T6 light brown .... *R. intermixta* Cockerell

25A. Apical plate of S8 concave, elongate, width less than half of length (Fig. 63G–H, 64A) 26

25B. Apical plate of S8 concave, ovoid, width at least two-thirds of length (Fig. 64B, D) 28

26A. Scutum with surface between punctures granulate. Small median pygideal plate on apical margin of T7. Apical area of S6 concave without tuft of erect black hairs on proximal margin of concavity. Hind tibia lacking distal black patch of hair on outer surface ..... *R. longimanus* Michener

26B. Scutum with surface between punctures on disc smooth and shiny. T7 without median pygideal plate on apical margin. Apical area of S6 concave with or without tuft of erect black hairs on proximal margin of concavity. Hind tibia with or without distal black patch of hair on outer surface 27

27A. Pubescence of T5 black. Hind tibia with distal patch of black hairs on outer surface ..... ***R. nitida* sp. nov.**

27B. Pubescence of T5 black with apical fringe of white to silvery hair. No distal patch of dark hair on outer surface of hind tibia .... ***R. micheneri* sp. nov.**

28A. Scutum with surface between punctures granulate .... *R. peringueyi* (Friese)

28B. Scutum with surface between punctures smooth and shiny .... ***R. intermedia* sp. nov.**

DESCRIPTIONS

Rediviva gigas Whitehead & Steiner, 1993
Figs 2G–H, 3–6, 64G

Rediviva gigas Whitehead & Steiner, 1993: 159.

Diagnosis

Females. Large, 15–17 mm long, integument black, wings dusky, vestiture on head and mesosoma varies from pale straw-coloured to reddish-brown. Apical hair bands on metasomal terga not prominent, white on disc becoming black laterally, fimbriae black. Malar space short, mandible tridentate. Foreleg not attenuate, three-quarters length of body, oil-collecting hairs on distal part of front basitarsus. Scopal hairs on hind tibia and basitarsus black.

Males. Body 13–15 mm, integument black, wings dusky, hairs on head, mesosoma and epipleurae pale straw-coloured to reddish-brown. Apical hairbands on T1–T5 light brown basally, white apically, fimbriae on T6 light brown, on T7 black. Mandible bidentate, malar space short. S7 without lateral lobes, apex of S8 expanded, distal margin with deep median cleft.

Etymology

From Latin, *gigas*, a giant, referring to the large size of members of this species.

Material examined

Type material. *Holotype*: SAM-HYM-B000005, female, Western Cape Province, Franschhoek Pass, 560 m, 3119CC, K. E. Steiner, 30 Nov. 1990. *Allotype*: SAM-HYM-B000006, male, Western Cape Province, Franschhoek Pass, 3319CC, K. E. Steiner, 10 Dec. 1991. *Paratypes*: (14 ♀♀, 1 ♂)—*Western Cape Province*: 1 ♂, Bain's Kloof, 3119CA, KES, 11 Nov. 1986; 1 ♀, Bot River, farm Huisrivier, 3419AA, VBW, 11 Nov. 1990; 2 ♀♀, Franschhoek Pass, 560 m, 3319CC, KES, 18 Dec. 1989; 1 ♀, Franschhoek Pass, 3319CC, KES, 6 Dec. 1981; 5 ♀♀, Franschhoek Pass, 5 km north of Dutoit's River bridge, 3319CC, VBW, 13 Dec. 1989; 4 ♀♀, Franschhoek Pass, 5 km north of Dutoit's River bridge, 3319CC, VBW, 14 Dec. 1989; 1 ♀, Franschhoek Pass, 560 m, 3319CC, VBW, 6 Dec. 1991. *Other material* (10 ♀♀, 9 ♂♂): 4 ♀♀, Betty's Bay, 3418BD, VBW, 4 Nov. 1993; 2 ♀♀, Betty's Bay, 3418BD, VBW, 4 Nov. 1998; 1 ♀, Porterville, farm Grootfontein, 3219CC, KES, 19 Oct. 1994; 2 ♂♂, Porterville, farm Grootfontein, 3219CC, VBW, 19 Oct. 1994; 6 ♂♂, Porterville, farm Grootfontein, 3219CC, VBW, 17 Oct. 1995; 1 ♀, Porterville, farm Grootfontein, 3219CC, VBW, 23 Oct. 1995; 2 ♀♀, 1 ♂, Porterville, farm Grootfontein, 3219CC, VBW, 11 Nov. 1996.

Description

Female

Measurements. *Holotype*: body 16.8 mm, forewing 13.3 mm. *Other material* (n = 10). *Measurements and ranges*: body 16.4 mm (15.3–17.2 mm), foreleg 12.9 mm (12.5–13.3 mm), Ft+bt 4.9 mm (4.5–5.1 mm), forewing 13.1 mm (12.2–13.8 mm). *Ratios*: FL : B 0.79 (0.50–0.82), malar space L : W 0.14 (0.12–0.15).

Integumental colour. Black, tip of mandible, apical margins of T2–T4, distal part of front femur, outer margin of tegula piceous; tarsomeres 2–4, claws, tibial spurs and costal vein dark brown. Underside of flagellum dark brown, colour sometimes extending to upper surface.

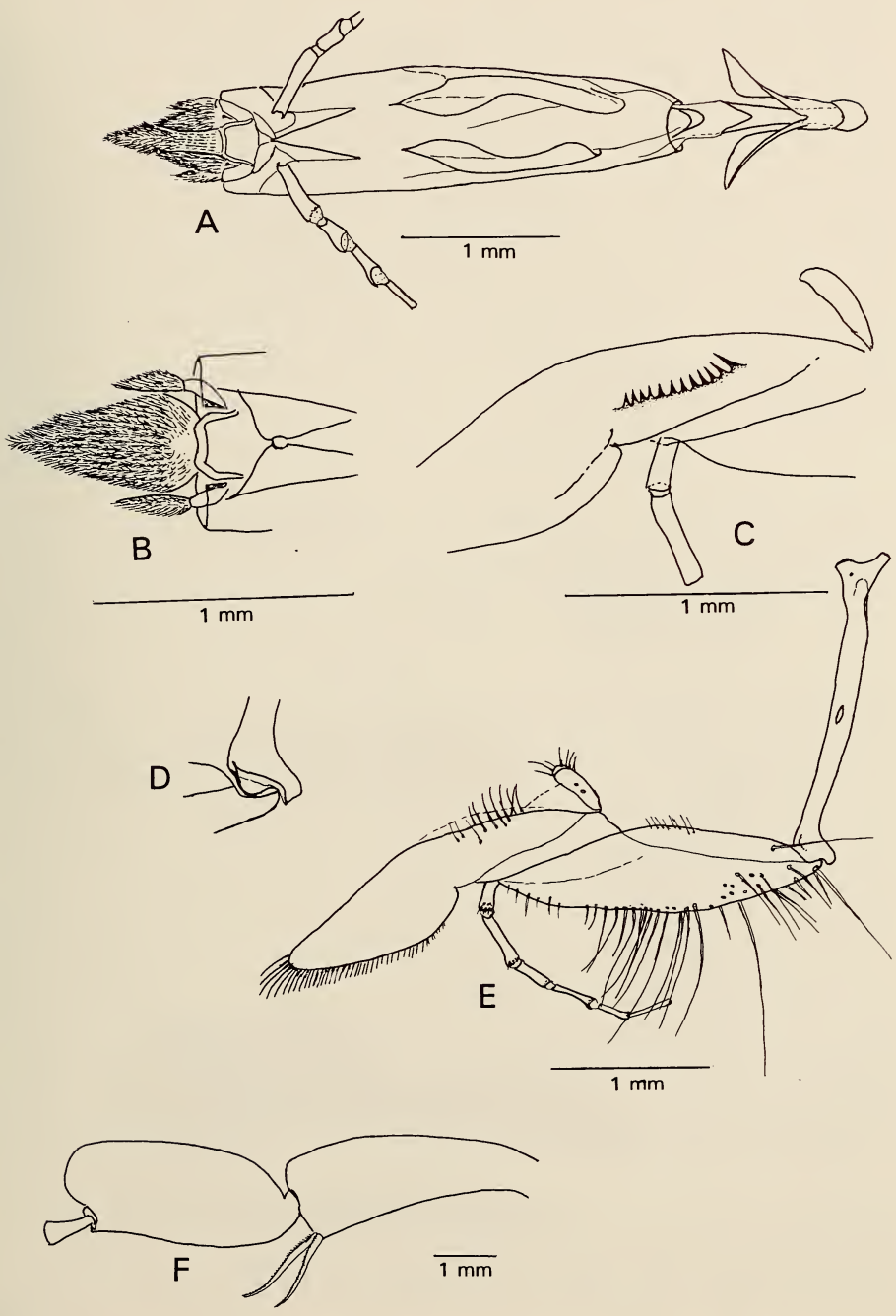

Fig. 3. *Rediviva gigas* Whitehead & Steiner, 1993. Female. A. Posterior view of labium. B. Anterior view of distal part of labium. C. Comb on inner side of galea. D. Basistipital process. E. Outer view of maxilla. F. Posterior view of hind tibia and basitarsus (pile removed).

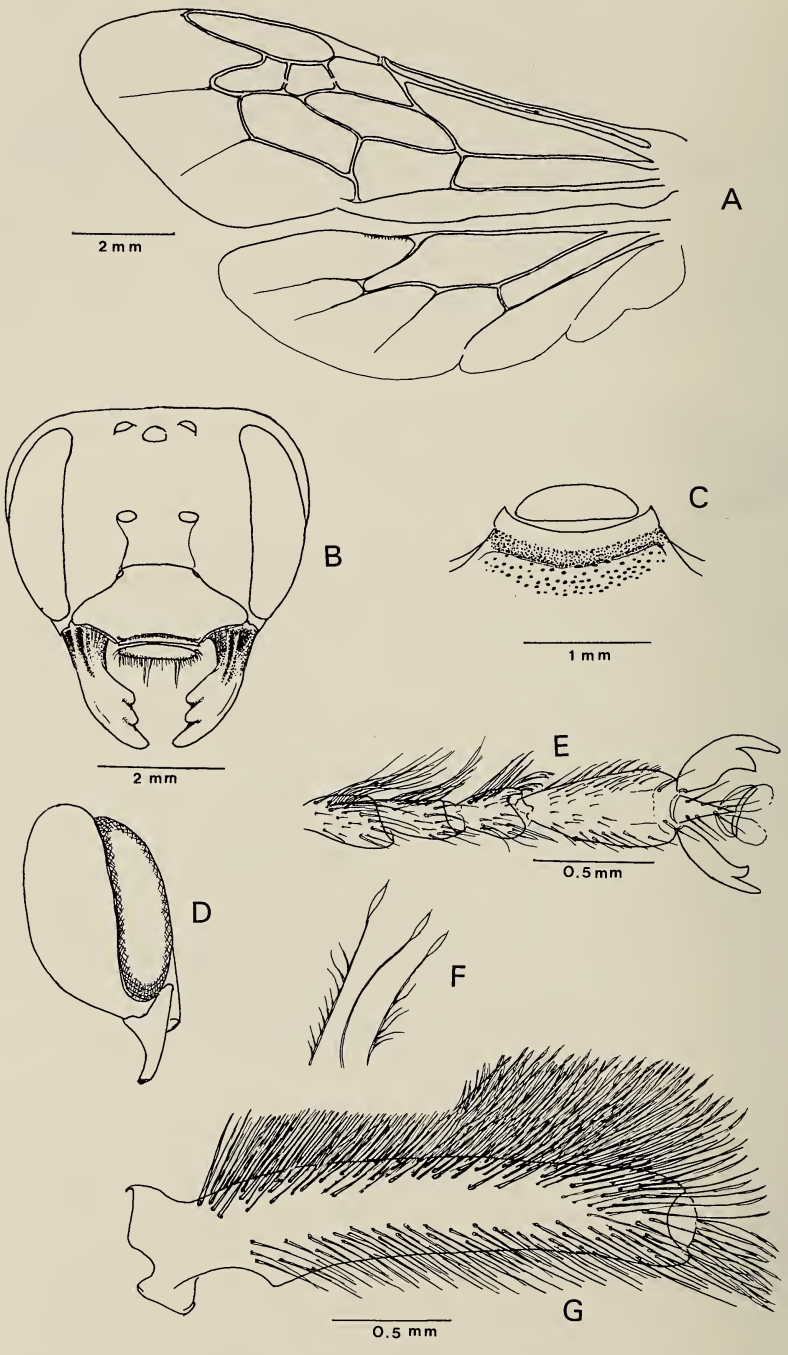

Fig. 4. *Rediviva gigas* Whitehead & Steiner, 1993. Female. A. Left front and hind wings. B. Anterior view of head. C. Labrum and distal region of clypeus. D. Side view of head. E. Dorsal view of tarsomeres 2–5 of front leg. F. Lanceolate-tipped plumose hairs of forebasitarsus. G. Anterior view of forebasitarsus (pile partially removed).

Structure. Head: ocelli well below horizon of vertex (Fig. 4B), clypeus coarsely and densely punctured, some smaller punctures interspersed among larger, surface between punctures shiny. Mouth-parts: glossa short, triangular, one-third length of prementum, paraglossa longer than suspensorium, reaching middle of glossa, labial palps extending beyond tip of glossa, ligular arms occupying basal two-thirds of prementum (Fig. 3A–B); cardo and stipes equal length, stipes three times as long as wide, posterior margin with long hairs, galea rounded at apex, stout hairs along apical and posterior margins (Fig. 3E); galeal comb of 12 teeth (Fig. 3C) (incorrectly referred to as stipital comb in Whitehead & Steiner 1993); mandible broad apically, tridentate (Fig. 4B); labrum three times as broad as long. Mesosoma: foreleg not attenuate, four-fifths length of body; hind tibia nearly as wide as basitarsus (9 : 10), basitarsus nearly half as wide as long (20 : 44), evenly rounded distally, without scale-like projection on distal dorsal angle (Fig. 3F); wings fuscous, jugal lobe of hind wing slightly longer than half vannal lobe (16 : 30) (Fig. 4A); scutellum with shallow median longitudinal depression; propodeal triangle small, ill defined, width at base one-fifth to one-sixth distance between metanotal pits.

Sculpture. Head: area between anterior margin and preapical ridge of clypeus finely roughened, rest of clypeus coarsely and densely punctured, punctures sometimes coalescing, surface between punctures shiny except on apical margin and paraocular areas adjacent to antennal sockets where surface is faintly coriaceous. Mesosoma: disc of scutum shiny, finely punctured, rest of scutal punctures more coarse and dense.

Vestiture. Head: labrum with stout unbranched dark brown to black hairs, longer and light brown distally; stout dark brown plumose hairs along clypeal lateral margins, rest of clypeus and supraclypeal area sparsely covered with dark brown unbranched pubescence; genal area with mixture of branched and unbranched hairs, longer and more dense towards mandible. Mesosoma: erect black branched hairs on margin of scutum, shorter towards disc which is bare; scutellum and metanotum with white pubescence on margins, black shorter hairs towards center, disc of scutum and scutellum bare; episternum with long black vestiture, shorter and less dense towards sternal midline; hairs on legs black except anterior brush of strong dark brown hair on basitarsus and tibia of foreleg; front leg with stout curved blade-like hairs on lateral margins of tarsomeres 2–4, some slender straight hairs with lanceolate tip and fine basal branching on tarsomere 2; apical third of forebasitarsus with long slender branched lanceolate tipped hairs (Fig. 4E–G); scopal hairs on tibia and basitarsus of hind leg black. Metasoma: white to pale brown sparse apical hairbands on T1–T4, often worn on dorsal midline, fimbriae of T5–T6 black.

Male

Measurements and ranges (n = 10). Body 14.0 mm (12.0–15.2 mm), foreleg 10.4 mm (8.8–10.8 mm), forewing 11.1 mm (10.7–11.5 mm), Ft+bt 3.5 mm (2.9–3.8 mm). *Ratios*: FL : B 0.75 (0.68–0.80), malar space L : W 0.09 (0.08–0.11).

Integumental colour. Body black, legs black except hind tibia which is dark brown on dorsal and ventral margins, tarsi light brown; antennae black, junctions of flagellomeres 1 and 2 brown on dorsal surface, colour sometimes

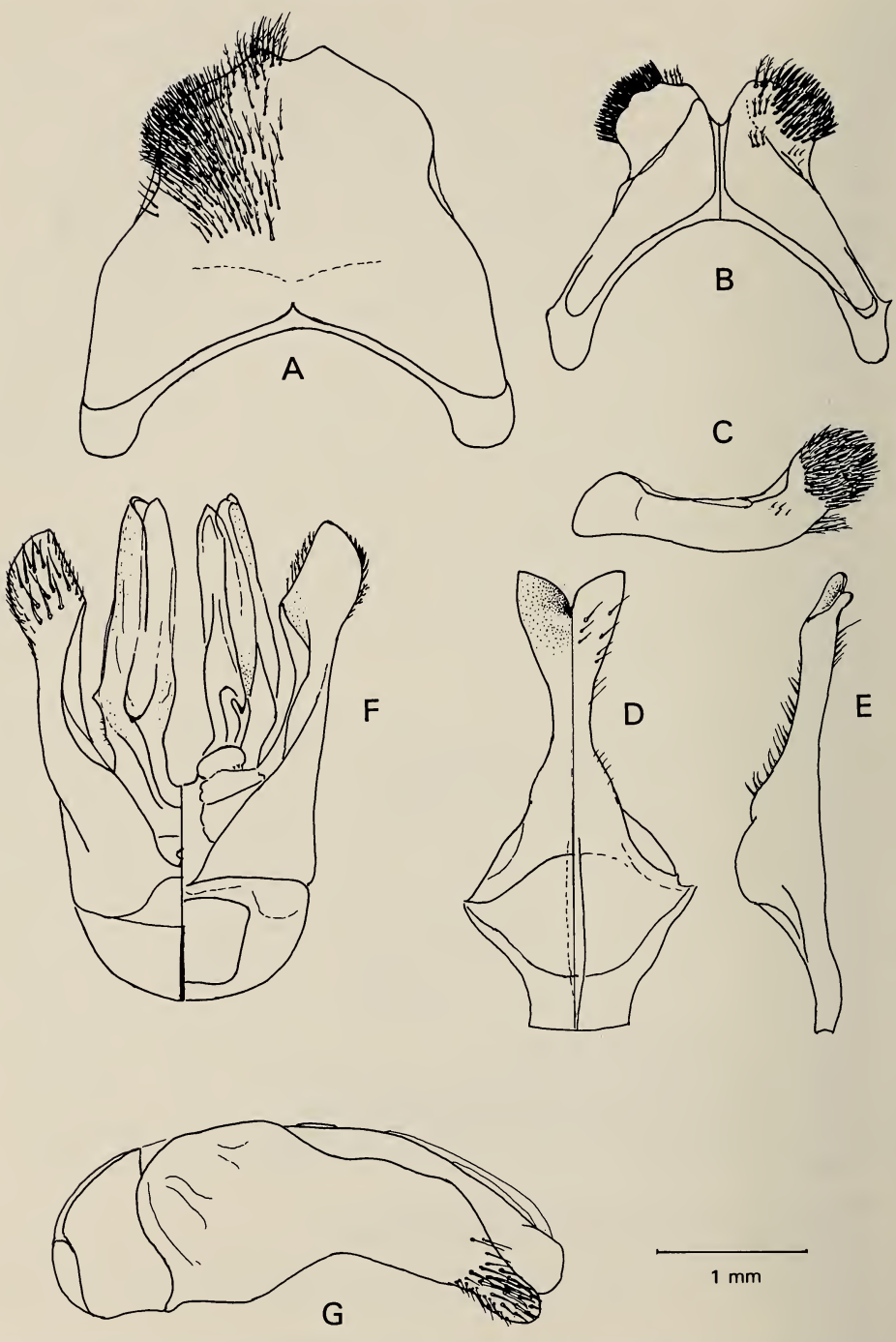

Fig. 5. *Rediviva gigas* Whitehead & Steiner, 1993. Male. Genitalia and associated sterna. A. S6, ventral view. B. S7, dorsal view left, ventral right. C. S7, lateral view. D. S8, dorsal view left, ventral right. E. S8, lateral view. F. Genitalia, dorsal view left, ventral view right. G. Genital capsule, lateral view.

extending to whole of two on underside, underside of terminal flagellomeres reddish-brown to black.

Structure. Head: wider than long, mandible bidentate. Mesosoma: foreleg not attenuate, three-quarters length of body, hind tibia wider than basitarsus (26 : 15), wing venation as in female. Metasoma: S3–S5 with apical margin biconcave forming a median point, S6 apical margin raised (Fig. 5A), emarginate, forming small median lobes, lateral lobes poorly developed; S7 (Fig. 5B–C) deeply emarginate apically, large rounded median lobes directed dorsally, stout bristle-like hairs on outer surface, smooth and shiny on inner surface, lateral lobes absent; S8 (Fig. 5D–E) expanded apically, apical margin deeply cleft (Fig. 64G); genital capsule (Fig. 5F–G) with gonoforceps slightly shorter than penis valve, former having stout finely branched apical hairs.

Sculpture. Head: base of labrum impunctate, shiny; anterior clypeal margin with large irregular punctures, rest of clypeus, supraclypeal and paraocular area coarsely punctate, surface between punctures smooth, shiny. Mesosoma: scutum densely punctured, distance between punctures less than diameter, surface between punctures shiny, smooth.

Vestiture. Head: dense unbranched pale brown hairs on labrum, pale straw-coloured plumose hairs on clypeus, paraocular and supraclypeal areas; short sparse hairs on vertex, tufts between lateral ocelli. Mesosoma: scutum, scutellum and metanotum covered with pale plumose pubescence, sparser on disc of scutum and scutellum, longer and sparse on propodeum, propodeal triangle bare; coxa, trochanter and femur with long straw-coloured hairs, shorter on tibia and tarsus. Metasoma: dense pale yellow apical hair bands on T1–T5, fimbriae on T6 and T7 black. S1–S5 with sparse light brown apical bands, dark brown to black tufts on lateral apical angles of S5, emargination on apical margin of S6 with dense plumose hairs.

Colour variations

Pubescence on mesosoma of females varies from pale straw-coloured to reddish-brown to black. Males have predominantly pale straw-coloured pubescence but reddish-brown specimens also occur.

Host flower records

Initially females were found to collect oil only from three terrestrial orchid species, namely *Pterygodium acutifolium*, *Ceratandra atrata* and *C. bicolor* (Whitehead & Steiner 1993). More recently a fourth orchid, *Satyrium rhynchanthum* at Betty's Bay, and *Ixianthes retzioides* (Scrophulariaceae), a rare shrub in the Porterville area, were found to be visited for oil (Steiner & Whitehead 1996).

Pollen is deposited passively on the scutum of females when they visit *I. retzioides* for oil collection and also obtain pollen from *Wachendorfia paniculata*, *Watsonia marginata* and *Moraea ramosissima* in the process of collecting nectar. At two localities we have observed females actively collecting pollen from *Watsonia borbonica* and *W. marginata* by scrubbing the anthers with their legs. Males take nectar from *Wachendorfia paniculata*, *Watsonia marginata* and *M. ramosissima*.

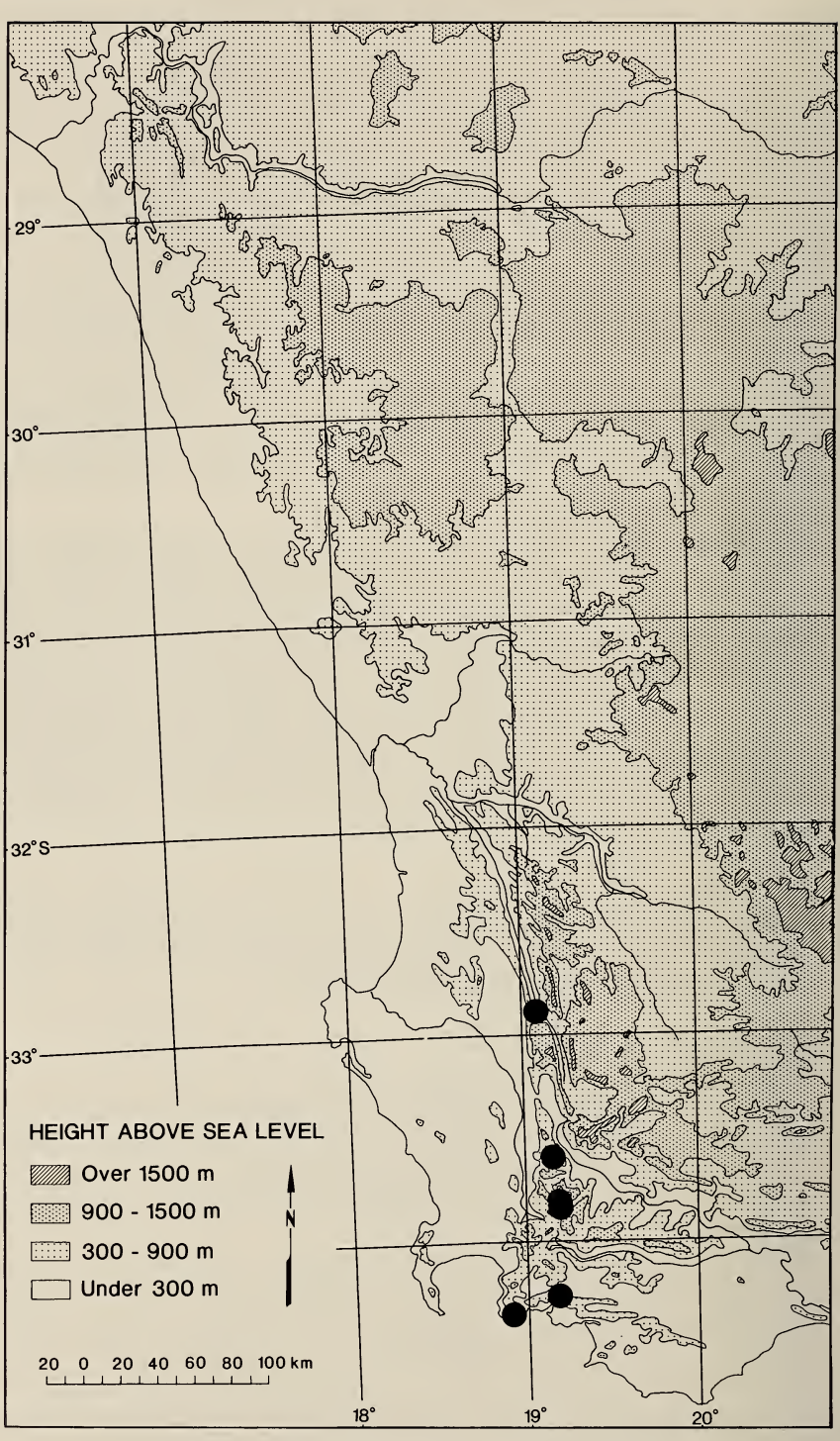

Fig. 6. Known distribution of *Rediviva gigas*.

Distribution (Fig. 6)

Rediviva gigas is known from a limited area in the mountainous south-western Cape Province, from Porterville in the north, southwards to Bain's Kloof and Franschhoek passes, and the coastal areas at Botrivier and Betty's Bay.

Rediviva bicava sp. nov.

Figs 1E, 7–10, 64E

Diagnosis

Female. Small dark brown to black bees 8–11 mm long, pubescence white to straw-coloured, apical hair bands on terga of metasoma. Labrum reddish-brown, shallow concavities either side of the midline. Conspicuous scale on distal dorsal angle of hind basitarsus, distal margin of hind basitarsus truncate, not extending beyond insertion of tarsomere 2.

Male. Small, 8–9 mm long, apical hair bands on metasoma not as distinct as in females, vestiture white. Labrum impunctate, black, shiny. Scutum with surface between punctures roughened. S6 reddish-brown, median lobes of S7 narrow, lateral lobes small, translucent.

Etymology

From Latin *bi* and *cavus*, concave or hollow, referring to two shallow depressions, one either side of the midline of the labrum of females.

Material examined

Type material. *Holotype*: SAM-HYM-B008066, female, Northern Cape Province, Nieuwoudtville Wild Flower Reserve, 3119AC, K. E. Steiner, 28 Aug. 1984. *Allotype*: SAM-HYM-B000068, male, Northern Cape Province, Nieuwoudtville Wild Flower Reserve, 3119AC, V. B. Whitehead, 2 Aug. 1984. *Paratypes*: (40 ♀♀, 8 ♂♂)—*Northern Cape Province*: 3 ♀♀, 1 ♂, Kamiesberg, farm Bakleikraal, 3018AA, KES, 19 Aug. 1988; 2 ♂♂, Kamieskroon, 4 km north on Gamoep road, 3018AA, MM & VBW, 28 Aug. 1985; 1 ♀, Nieuwoudtville Wild Flower Reserve, 3119AC, KES, 28 Aug. 1984; 1 ♂, same locality, MM & VBW, 28 Aug. 1985; 1 ♂, same locality, VBW, 2 Aug. 1984; 1 ♂, same locality, VBW, 19 Aug. 1986; 1 ♀, Richtersveld National Park, Hellskloof Pass, 2817AC, VBW, 27 Aug. 1986; 1 ♀, Sutherland, 4 km south, 3220BC, KES, 27 Sept. 1984; 2 ♀♀, Sutherland, farm Rooikloof, 3220BC, KES, 1 Oct. 1986. *Western Cape Province*; 3 ♀♀, Amalienstein, Seweweekspoort, 3321AD, KES, 10 Sept. 1985; 1 ♀, Bitterfontein, 3118AB, KES, 26 Aug. 1986; 3 ♀♀, 1 ♂, same locality, VBW, 26 Aug. 1986; 1 ♀, Calitzdorp, Rooiberg Pass, 3221DA, KES, 15 Aug. 1985; 2 ♀♀, same locality, VBW, 2 Aug. 1987; 4 ♀♀, Cape Town, Tygerberg Hills, 3318DC, KES, 26 Sept. 1987; 2 ♀♀, Clanwilliam 7 km south, 3218BB, MM, 3 Sept. 1986; 1 ♀, Clanwilliam, Ramskop Camp Ground, 3218BB, VBW, 20 Aug. 1985; 1 ♀, Darling, farm Oudebos, 3318AD, KES, 8 Sept. 1989; 2 ♀♀, Darling, farm Rondeberg, 3318AC, KES, 2 Sept. 1988; 3 ♀♀, De Doorns, farm Appaskop,

3319BC, VBW, 24 Sept. 1992; 3 ♀♀, Worcester, Karoo Gardens, 3319CD, KES, 18 Aug. 1989; 4 ♀♀, Montagu, farm Rietvlei No. 1, 3320CC, VBW, 28 Aug. 1987; 1 ♀, Moorreesburg, farm Neulfonteinskop, 3318BA, VBW, 7 July 1985; 1 ♀, same locality, 23 Aug. 1988; 1 ♀, Nuwerus, 3118AB, KES, 8 Aug. 1985; 1 ♀, same locality, VBW, 8 Aug. 1985; 1 ♀, Oudtshoorn, 7 km south, 3322CA, VBW, 2 Sept. 1992; 1 ♀, Oudtshoorn, Schoemanspoort, 3322AD, KES, 11 Sept. 1985; 1 ♀, same locality, VBW, 11 Sept. 1985; 2 ♀♀, Swellendam, Bontebok National Park, 3420AC, VBW, 30 Sept. 1987; 3 ♀♀, Yzerfontien, 12 km south-east, 3318AD, VBW, 22 Sept. 1988. *Other material—Northern Cape Province* (64 ♀♀): 2 ♀♀, Gargams, 7.7 km north-east, 3321DA, KES, 15 Aug. 1985; 1 ♀, Garies, Wallekraal, 3017BA, VBW, 3 Aug. 1988; 4 ♀♀, Kamiesberg, farm Bakleikraal, 3018AA, KES, 19 Aug. 1988; 3 ♀♀, same locality, VBW, 19 Aug. 1988; 1 ♀, Kamiesberg, farm Dassiefontein, 3017BB, KES, 8 Sept. 1986; 2 ♀♀, Kamieskroon, 4 km north on Gamoep road, 3018AA, MM & VBW, 24 Aug. 1985; 2 ♀♀, same locality, MM & VBW, 28 Aug. 1985; 1 ♀, Karkams, 3017BD, VBW, 8 Aug. 1985; 2 ♀♀, Karkams, 6 km east, 3017BD, VBW, 28 July 1985; 1 ♀, Karkams, 8 km east, 3017BD, 28 July, 1985; 1 ♀, Karkams, 3017BD, MM & VBW, 22 Aug. 1985; 1 ♀, Middelpos, 35 km north-west, 3119DD, VBW, 25 Sept. 1984; 1 ♀, Nieuwoudtville Wild Flower Reserve, 3119AC, KES, 27 Aug. 1984; 5 ♀♀, same locality, KES, 28 Aug. 1984; 2 ♀♀, same locality, KES, 11 Sept. 1984; 3 ♀♀, same locality, KES, 31 July 1985; 6 ♀♀, same locality, KES, 27 Aug. 1985; 6 ♀♀, same locality, KES, 28 Aug. 1985; 4 ♀♀, same locality, KES, 9 Sept. 1986; 1 ♀, same locality, MM & VBW, 28 Aug. 1985; 2 ♀♀, Springbok, 20 km south, 2917DB, VBW, 10 Aug. 1985; 1 ♀, Springbok, Goegab Reserve, 2918DB, KES, 13 Aug. 1993; 1 ♀, same locality, VBW, 24 Aug. 1993; 1 ♀, Springbok, Hester Malan Reserve, 2917DB, M. Struck, 13 Sept. 1987; 1 ♀, same locality, VBW, 23 Aug. 1990; 1 ♀, Springbok, Spektakel Pass, 2917DA, VBW, 9 Aug. 1985; 1 ♀, Sutherland, Kanolfontein, 3220AD, KES, 22 Sept. 1985; 7 ♀♀, Sutherland, Ouberg Pass road, 3220AA, VBW, 1 Oct. 1986. *Western Cape Province* (229 ♀♀): 8 ♀♀, Amalienstein, Seweweekspoort, 3321AD, KES, 10 Sept. 1985; 4 ♀♀, same locality, VBW, 10 Sept. 1985; 6 ♀♀, Calitzdorp, Rooiberg Pass, 3321DA, KES, 15 Aug. 1985; 4 ♀♀, same locality, VBW, 15 Aug. 1985; 2 ♀♀, same locality, VBW, 2 Aug. 1987; 1 ♀, Bitterfontein, 3118AB, KES, 26 Aug. 1986; 1 ♀, same locality, VBW, 26 Aug. 1986; 8 ♀♀, Cape Town, Tygerberg Hills, 3318DC, KES, 26 Sept. 1989; 2 ♀♀, same locality, KES, 14 Sept. 1990; 1 ♀, same locality, KES, 1 Oct. 1990; 1 ♀, same locality, VBW, 1 Oct. 1990; 1 ♀, Clanwilliam, farm Klawervlei, 3218DD, VBW, 20 Aug. 1984; 2 ♀♀, Clanwilliam, Pakhuis Pass, 3219AA, KES, 22 Sept. 1990; 2 ♀♀, De Doorns, farm Appaskop, 3319BC, VBW, 24 Sept. 1992; 2 ♀♀, Hex River Pass, 3319BD, KES, 1 Oct. 1985; 2 ♀♀, Hex River Pass, 3319BD, VBW, 1 Oct. 1985; 3 ♀♀, same locality, VBW, 18 Oct. 1989; 1 ♀, same locality, KES, 18 Oct. 1989; 2 ♀♀, Klawer, 7 km north-east, 3118DA, VBW, 11 Aug. 1989; 1 ♀, Klawer, farm Zypherfontein, 3118DC, KES, 11 Aug. 1989; 2 ♀♀, same locality, KES, 12 Aug. 1989; 3 ♀♀, same locality, KES, 22 Aug. 1989; 1 ♀, Ladismith, junction R626 and R323, 3321CA, KES, 16 Aug. 1995; 1 ♀, Langebaan, 3318AA, VBW, 20, Aug. 1986; 1 ♀, Middelpos, farm Hartbeestfontein,

3220CC, VBW, 25 Sept. 1984; 1 ♀, Montagu, 40 km north-east, 3320DA, VBW, 15 Sept. 1992; 1 ♀, Montagu, Kogmanskloof, 3320CC, VBW, 1 Sept. 1992; 2 ♀♀, Montagu Nature Reserve, 3320CC, KES, 9 Aug. 1990; 11 ♀♀, Montagu, farm Rietvlei No. 1, 3320CC, VBW, 26 Aug. 1987; 1 ♀, Nuwerus, 3118AB, KES, 8 Aug. 1985; 2 ♀♀, same locality, VBW, 8 Aug. 1985; 1 ♀, Nuwerus, Meerhofkasteel road, 3118AA, VBW, 21 Aug. 1991; 4 ♀♀, Oudtshoorn, 7 km south, 3322CA, VBW, 2 Sept. 1992; 3 ♀♀, Oudtshoorn, Schoemanspoort, 3322AD, KES, 11 Sept. 1985; 2 ♀♀, same locality, VBW, 11 Sept. 1985; 1 ♀, Riebeek-Kasteel, Bothmaskloof Pass, 3318BD, KES, 17 Sept. 1987; 1 ♀, Riebeek-Kasteel, Bothmaskloof Pass, 3318BD, VBW, 17 Sept. 1987; 2 ♀♀, Stellenbosch, Bothmaskop, 3318DD, VBW, 6 Oct. 1985; 1 ♀, same locality, VBW, 4 Oct. 1987; 1 ♀, Stellenbosch, farm Joostenbergkloof, 3318DD, KES, 16 Sept. 1987; 2 ♀♀, same locality, VBW, 16, Aug. 1988; 1 ♀, Swellendam, Bontebok National Park, 3420AC,KES, 29 Sept. 1987; 1 ♀, same locality, VBW, 29 Sept. 1987; 1 ♀, Vanrhyns Pass, 3118AC, KES, 7 Aug. 1986; 1 ♀, Vanrhynsdorp, Wiedows River, 3318DA, VBW, 11 Aug. 1985; 1 ♀, same locality, VBW, 13 Aug. 1986; 1 ♀, West Coast National Park, 3318DA, VBW, 17 Sept. 1985; 1 ♀, same locality, KES, 5 Sept. 1990; 5 ♀♀, Worcester, Karoo Gardens, 3319CD, VBW, 9 Sept. 1985; 13 ♀♀, same locality, KES, 18 Aug. 1989; 3 ♀♀, same locality, KES, 3 Oct. 1989; 2 ♀♀, Yzterfontein, 12 km south-east, 3318AD, VBW, 29 Sept. 1988.

Description

Female

Measurements. *Holotype*: body 9.8 mm, forewing 7.5 mm, malar space L : W 0.35. *Other material* (n = 50)—*Measurements and ranges*: body 9.9 mm (8.8–11.0 mm), foreleg 8.8 mm (8.1–9.8 mm), Ft+bt 2.9 mm (2.8–3.0 mm), forewing 7.8 mm (7.2- 8.2 mm). *Ratios*: FL : B 0.90 (0.77–1.03), malar space (n = 10) L : W 0.34 (0.30–0.38).

Integumental colour. Head: labrum, anterior margin of clypeus, flagellum reddish-brown, rest of head black. Mesosoma: black, legs, tegulae, veins brown, except R which is black; wings dusky. Metasoma black.

Structure. Head: wider than long (114: 80), (Fig. 8A); malar space relatively long, one-third width. Mouth-parts (Fig. 7A–G): labrum (Fig. 8B) triangular, twice as wide as long (44: 20), shallow concave depression either side of midline; glossa one-third length of prementum, not extending beyond labial palps; paraglossae small, half length of suspensorium; ligular arms occupying basal two-thirds of prementum (Fig. 7A–D); cardo slightly shorter than stipes, three and a half times as long as wide (Fig. 7E) ; galeal comb of 15 teeth (Fig. 7G). Mesosoma: front coxa with stout inner apical spine (Fig. 8E); hind tibia (Fig. 8C) as wide as basitarsus; basitarsus twice as long as wide, truncated, not extending beyond insertion of tarsomere 2, conspicuous scale on distal dorsal angle.

Sculpture. Head: basal two-thirds of labrum impunctate, shiny; clypeus with apical margin impunctate, rest of clypeus with contiguous coarse punctures, irregularly shaped median impunctate area, surface between punctures lightly roughened. Mesosoma: scutum with scattered large punctures among finer

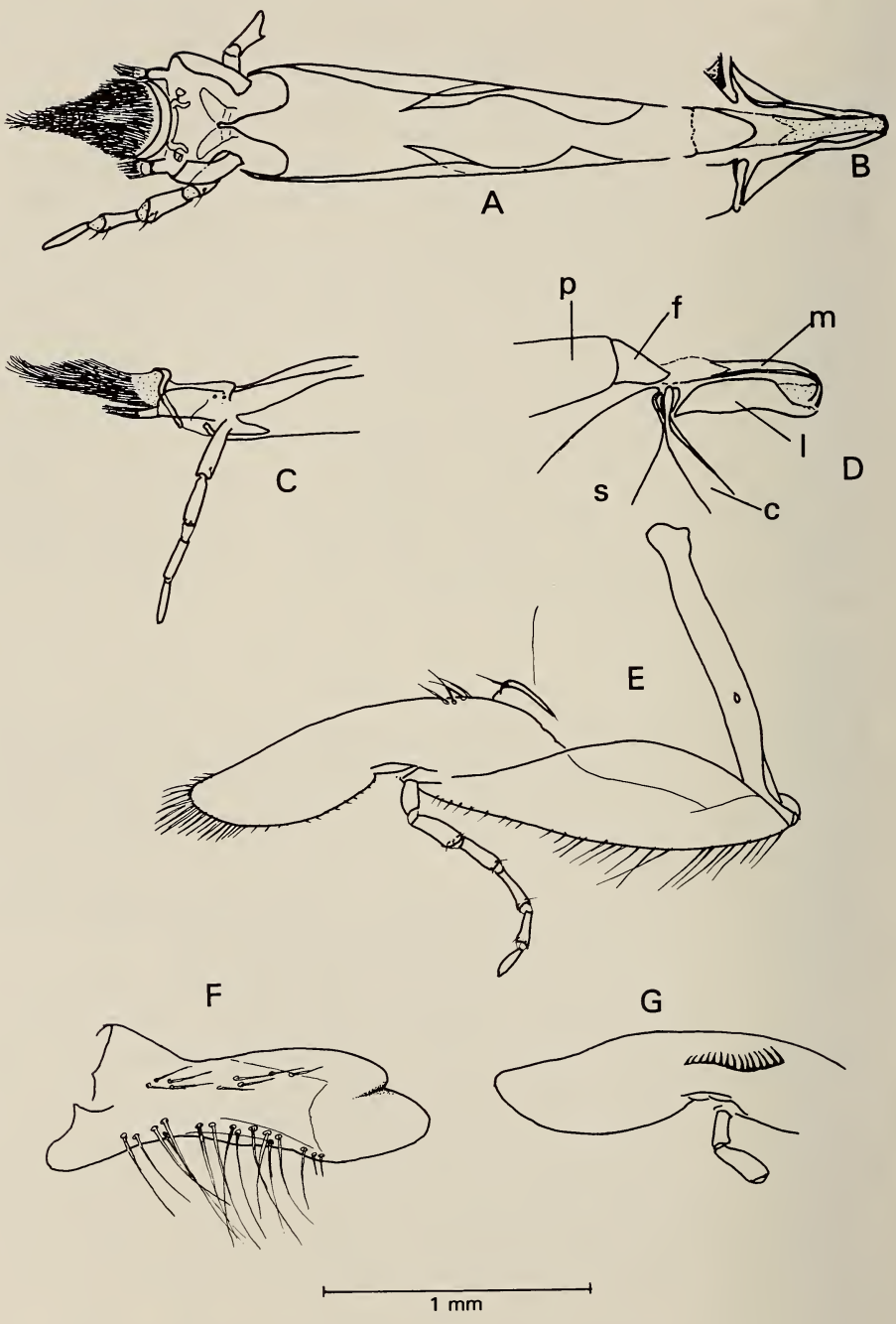

Fig. 7. *Rediviva bicava* sp. nov. Female. A. Labium, anterior view. B. Posterior aspect of base of prementum. C. Lateral aspect of apex of labium. D. Lateral view of base of prementum, mentum, lorum and associated sclerites. E. Left maxilla. F. Right mandible. G. Inner view of galea to show comb.

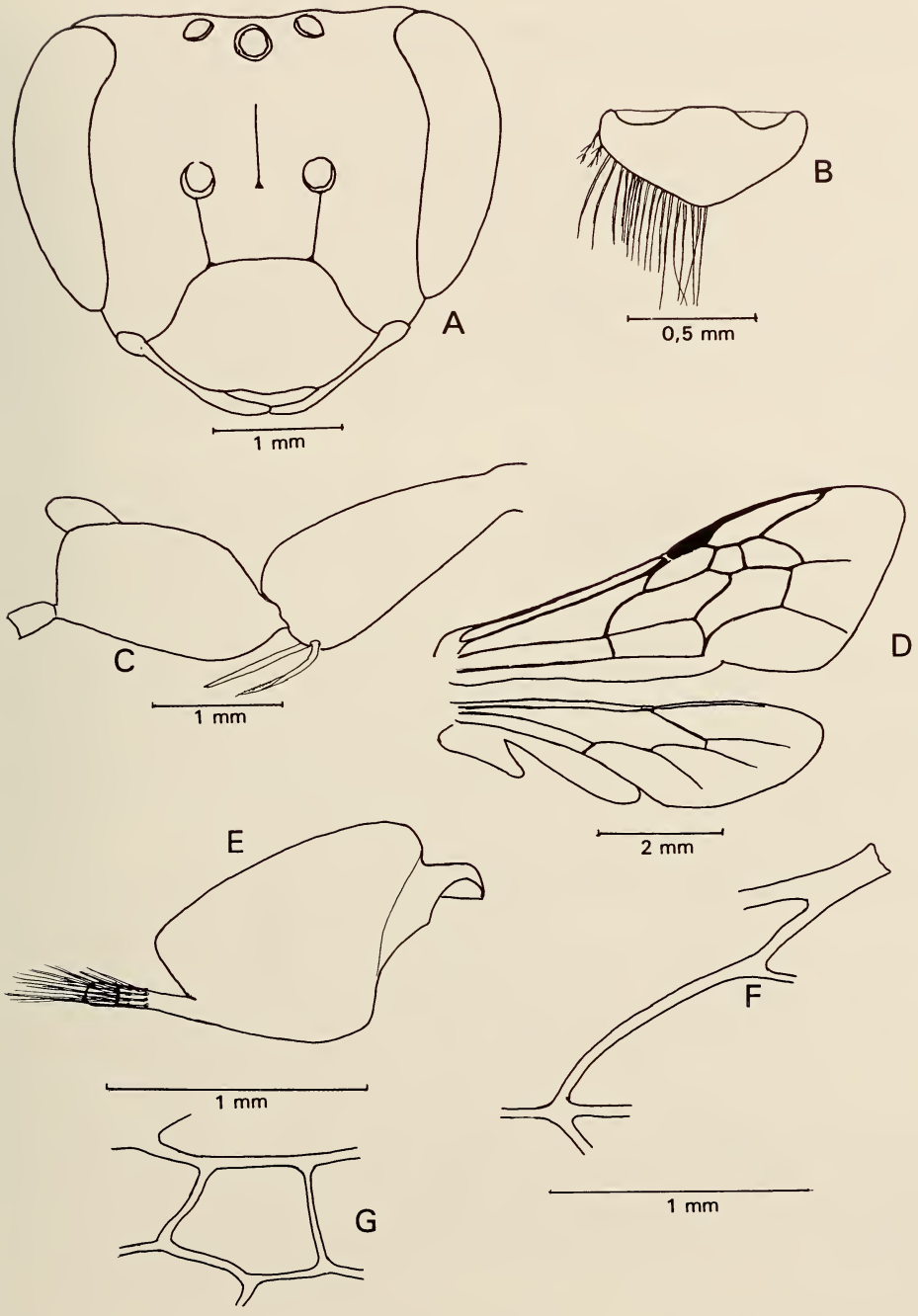

Fig. 8. *Rediviva bicava* sp. nov. Female. A. Front view of head. B. Labrum. C. Hind tibia and basitarsus. D. Right wings. E. Right front coxa. F. Basal vein and first abscissa of Rs of front wing. G. Second submarginal cell of right front wing.

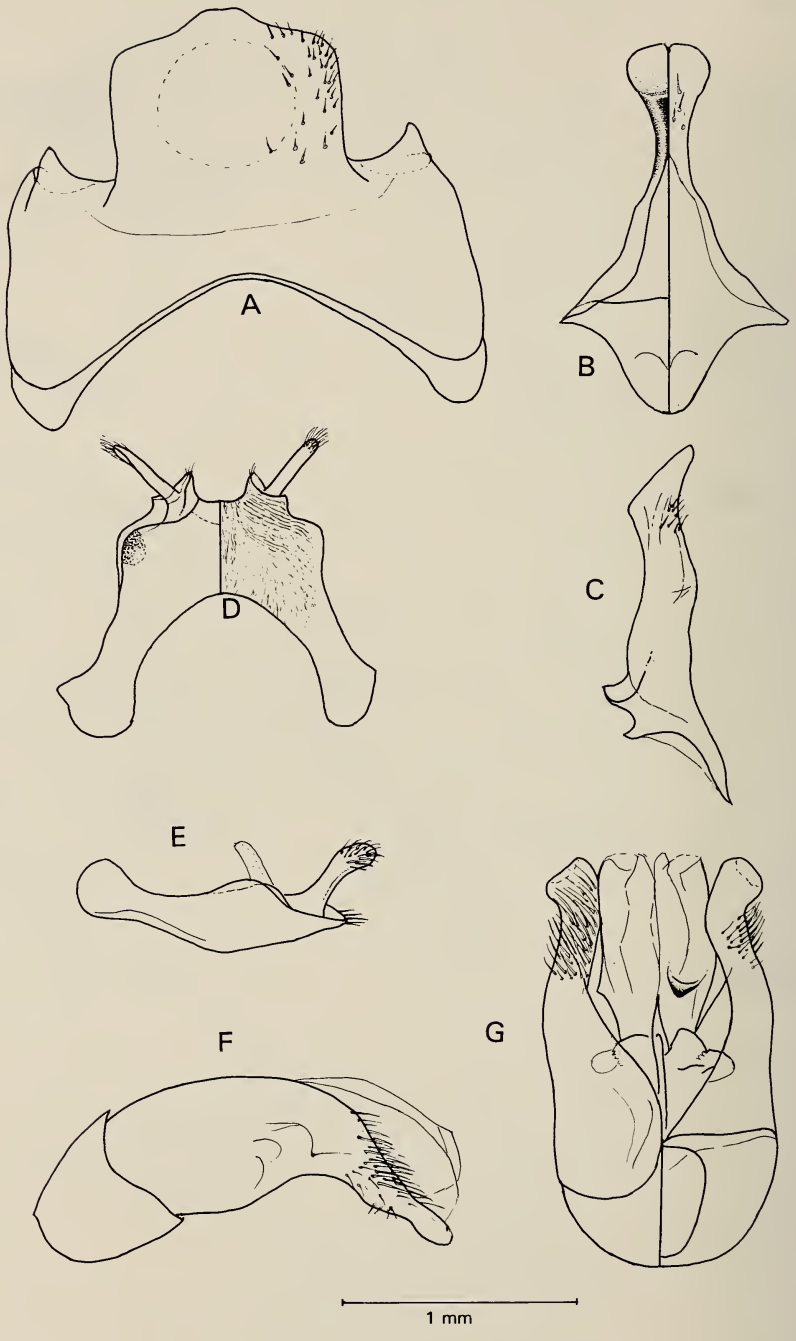

Fig. 9. *Rediviva bicava* sp. nov. Male. A. S6, ventral aspect. B. S8, dorsal and ventral view. C. S8, lateral view. D. S7, dorsal and ventral view. E. S7, lateral aspect. F. Genital capsule, lateral view. G. Genitalia, dorsal and ventral aspects.

punctation, finer on disc, punctures approximately diameter apart, area between smooth, shiny. Propodeal triangle small, well defined, surface wrinkled, rest of propodeum coriaceous.

Vestiture. Head: labrum with fringe of long brown hair on apical margin; clypeus having mixture of long dark sparsely branched and short white plumose hairs; similar but more dense on paraocular areas, frons and vertex. Mesosoma: scutum with short light brown pubescence, some black branched hairs on margin, longer on scutellum and metanotum, dark hairs absent from propodeum; coxa, trochanter and femur of all legs with white plumose hairs, light brown shorter hairs on tibia and tarsus; oil-collecting hairs on tarsomeres 2, 3 and 4 of front and middle legs. Metasoma: white apical hair bands on T2–T4, black sub-erect hairs on base of T4, fimbriae of T5 brown basally, white laterally, fimbriae of T6 brown.

Male

Measurements. *Allotype*: male, body 8.3 mm, forewing 7.7 mm, malar space L : W 0.36. *Other material* (n = 2)—*Measurements and ranges*: body 8.7 mm (8.5–8.8 mm), forewing 7.8 mm (7.7–8.0 mm), foreleg 7.8 mm (7.6–8.0 mm). *Ratios*: FL : B 0.9 (8.6–9.4), malar space L : W 0.43 (0.42–0.43).

Integumental colour. Head: antennae black, except flagellum which is dark brown underneath, mouth-parts piceous. Mesosoma: black, coxa, trochanter and femur brown. Metasoma: black except S6 which is brown.

Structure. Head: anterior margin of labrum evenly convex. Mesosoma: hind tibia wider than basitarsus (4: 3). Metasoma: S6 (Fig. 9A) with median and lateral lobes poorly developed, S7 (Fig. 9D–E) short narrow median lobes, short hairs on apical quarter, lateral lobes small, translucent, ventral surface of disc coriaceous; apical plate of S8 sub-circular, distal margin with median emargination (Fig. 64E); genital capsule (Fig. 9F–G) gonostylus truncate apically, short unbranched hairs on apical half.

Sculpture. Head: labrum shiny, impunctate except on apical margin at base of hairs; clypeus apical quarter impunctate, rest of clypeus densely punctate, surface between punctures shiny, smooth. Mesosoma: scutum and scutellum with shallow punctures, surface granulate; propodeal triangular small, granulate, rest of propodeum coriaceous.

Vestiture. Head: long pale brown hairs on apical margin of labrum; long white plumose hairs on lateral margin of clypeus, paraocular areas and frons. Mesosoma: pubescence short and sparse on disc of scutum, mixture of black and pale straw-coloured hairs on scutellum and metanotum; hair on legs white to pale straw-coloured. Metasoma: white apical hair bands on T2–T4, brown on T5, fimbriae on T6–T7 light brown.

Host flower records

A sample of 212 females was collected on oil-producing flowers, the majority (60.8%) were on *Hemimeris racemosa*, 21.7 per cent on *Diascia parviflora* and the rest on *D. patens* (7.1%), *D. veronicoides* (6.6%), *Hemimeris gracilis* (2.8%) and *D. macrophylla* (0.9%).

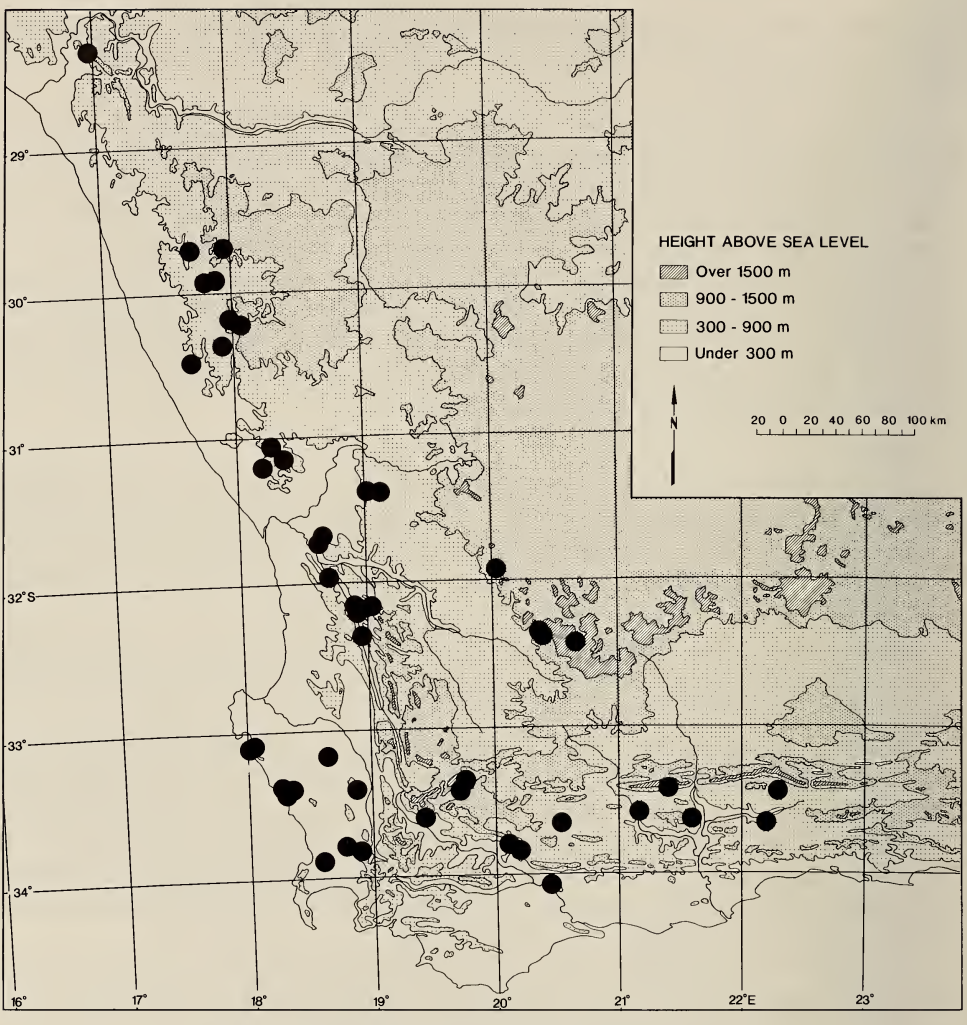

Fig. 10. Known distribution of *Rediviva bicava* sp. nov.

Only 28 females were collected on nectar plants, the majority on *Cysticapnos vesicaria* (42.9%), *Oxalis pes-caprae* (14.3%) and a prostrate yellow legume (10.7%). Single females were taken on eight other plant genera, *Lachenalia*, *Bulbine*, *Polygala*, *Senecio*, *Nemesia*, *Moraea*, *Hermannia* and *Stachys*.

Of the nine males collected, the majority were taking nectar from *Cysticapnos versicaria* and the rest on *Lotononis hirsuta*, *Oxalis pes-caprae* and a *Senecio* sp.

Distribution (Fig. 10)

Rediviva bicava is the most widely distributed of all the winter rainfall oil-bees, being collected from the Richtersveld in the north to Ladismith in the

south. This species has been found on the sandy coastal plains at sea level, the mountainous areas of the Richtersveld, the granite koppies of Namaqualand and moister gullies in the dry plains of the Little Karoo.

Rediviva intermedia sp. nov.

Figs 1G, 11–14, 64D

Diagnosis

Female. Medium-sized, 11–14 mm, black bodied, white to straw-coloured apical hair bands on T2–T4, black hairs on base of T5, fimbriae on T6 light brown. Basal half of labrum shiny, impunctate with shallow median grove. Foreleg three-quarters length of body, oil-collecting hairs on tarsomeres 2–5. Small scale on distal dorsal angle of hind basitarsus.

Male. Medium-sized, 10–12 mm, black bodied with pale straw-coloured to reddish-brown pubescence. Labrum as in female except median groove less conspicuous. Middle basitarsus sinuate in shape. Diffuse apical hair bands on T2–T4. Pubescence on T5 black, on T6 black basally, light brown apically. S6 ventrally with lateral vertical ridge fringed by short stiff hairs, S7 with median lobes covered in a mass of long hairs, lateral lobes translucent with fine spicules.

Etymology

From Latin *inter* and *medius*, referring to the size of this bee which is larger than *Rediviva intermixta* and smaller than *R. macgregori*, two superficially similar species that occur with it on the Nieuwoudtville Wild Flower Reserve.

Material examined

Type material. *Holotype*: SAM-HYM-B007569, female, Nieuwoudtville Wild Flower Reserve, 3119AC, V. B. Whitehead, 5 Sept. 1995. *Allotype*: SAM-HYM-B007570, male, Nieuwoudtville Wild Flower Reserve, 3119AC, V. B. Whitehead, 5 Sept. 1995. *Paratypes* (89 ♀♀, 10 ♂♂)—*Northern Cape Province*: 2 ♀♀, Calvinia, 14.2 km west on R27, 3119BC, KES, 2 Sept. 1989; 17 ♀♀, Calvinia, farm Vanrhynshoek, 3119BD, KES, 14 Oct. 1989; 8 ♀♀, Nieuwoudtville Wild Flower Reserve, 3119AC, KES, 28 Aug. 1984; 2 ♂♂, same locality, VBW, 21 July 1988; 1 ♂, same locality, VBW, 27 July 1986; 1 ♂, same locality, VBW, 7 Aug. 1986; 1 ♂, same locality, VBW, 4 Aug. 1988; 2 ♂♂, same locality, VBW, 24 Aug. 1988; 1 ♀, same locality, VBW, 27 Aug. 1994; 1 ♀, same locality, VBW, 29 Aug. 1995; 15 ♀♀, 1 ♂, same locality, VBW, 6 Sept. 1995; 4 ♀♀, same locality, VBW & MM, 26 Aug. 1984; 23 ♀♀, VBW & MM, 28 Aug. 1984; 7 ♀♀, Sutherland, 4 km south, farm Rooikloof, 3220BC, KES, 27 Sept. 1984; 1 ♀, same locality, KES, 1 Oct. 1986; 1 ♀, same locality, KES, 16 Sept. 1993; 7 ♀♀, Sutherland, same locality, VBW, 27 Sept. 1984; 1 ♀, same locality, VBW, 28 Sept. 1984; 1 ♀, same locality, VBW, 1 Oct. 1984; 1 ♀, Sutherland, 16 km west, farm Kanolfontein, 3220AD, KES, 22 Sept. 1985; 1 ♀, same locality, VBW, 27 Sept. 1984. *Western Cape Province*: 1 ♂, Botterkloof Pass, farm Piet se Hoek, 3119CD,

KES, 15 Sept. 1989; 1 ♀, De Doorns, Hex River Pass, 3319BD, KES, 3 Oct. 1989.

Description

Female

Measurements. *Holotype*: body 11.2 mm, forewing 10.3 mm, malar space L : W 0.06. *Other material* (n = 20)—*Measurements and ranges*: body 12.6 mm (11.0–13.7 mm), forewing 9.8 mm (9.0–10.3 mm), foreleg 11.0 mm (10.3–11.3 mm), Ft+bt 3.6 mm (3.5–3.7 mm). *Ratios*: FL : B 0.87 (0.79–0.96), malar space L : W 0.10 (0.06–0.12).

Integumental colour. Head: black, mandibles black, antenna black except underside of flagellum which is light brown. Mesosoma: black, coxa, trochanter, femur and tibia black, tarsi brown. Metasoma black.

Structure. Mouth-parts: labrum two and a half times wider than long (54 : 21), sub-quadrangular, apical margin straight with median shallow depression (Fig. 11E); glossa (Fig. 11A) one-third length of prementum, not extending beyond labial palps, paraglossae reaching to half length of glossa; ligular arms occupying basal two-thirds of prementum; cardo as long as stipes, stipes four times as long as wide (Fig. 11D); galeal comb of 18 teeth (Fig. 11C); mandible with small rounded subapical tooth (Fig. 12F). Mesosoma: front coxa with strong inner apical spine (Fig. 12E), hind tibia (at widest point) wider than basitarsus, trapezoidal in shape, three times longer than wide (60 : 22), small scale on distal dorsal angle (Fig. 12D).

Sculpture. Basal half of labrum impunctate, shiny, anterior half heavily punctured at bases of stiff unbranched hairs. Scattered punctures on anterior margin of clypeus, more heavily punctured on disc, punctures approximately one diameter apart, becoming finer towards base, areas between punctures shiny. Punctation on disc of scutum fine, widely spaced, two to three diameters apart, surface between punctures smooth, shiny. Propodeal triangle smooth, shiny, rest of propodeum shiny, finely wrinkled.

Vestiture. Head: long unbranched light brown hairs on apical half of labrum; clypeus and supraclypeal area with long plumose, white to pale straw-coloured hairs, some black hairs on paraocular area and vertex. Mesosoma: scutum with straw-coloured pubescence mixed with black on disc; long white plumose hairs on scutellum, metanotum, propodeum and episternal areas. Front and middle coxae with light brown plumose hairs, shorter and paler on trochanter and femur; tarsus of front leg, tibia and basitarsus of middle and hind leg with light brown vestiture. Foretarsus with dense oil-collecting hairs on tarsomeres 2–5 (Fig. 12B), middle tarsus with similar hairs on tarsomeres 2–4. Metasoma: apical hair bands on T2–T4, short black suberect hairs on basal half of T4, fimbriae on T5 black basally, light brown apically, fimbriae on T6 light brown. Long plumose light brown hairs on apical margin of S2–S6.

Male

Measurements. *Allotype*: male, body 11.7 mm, forewing 9.2 mm, malar space L : W 0.11. *Other material* (n = 9)—*Measurements and ranges*: body

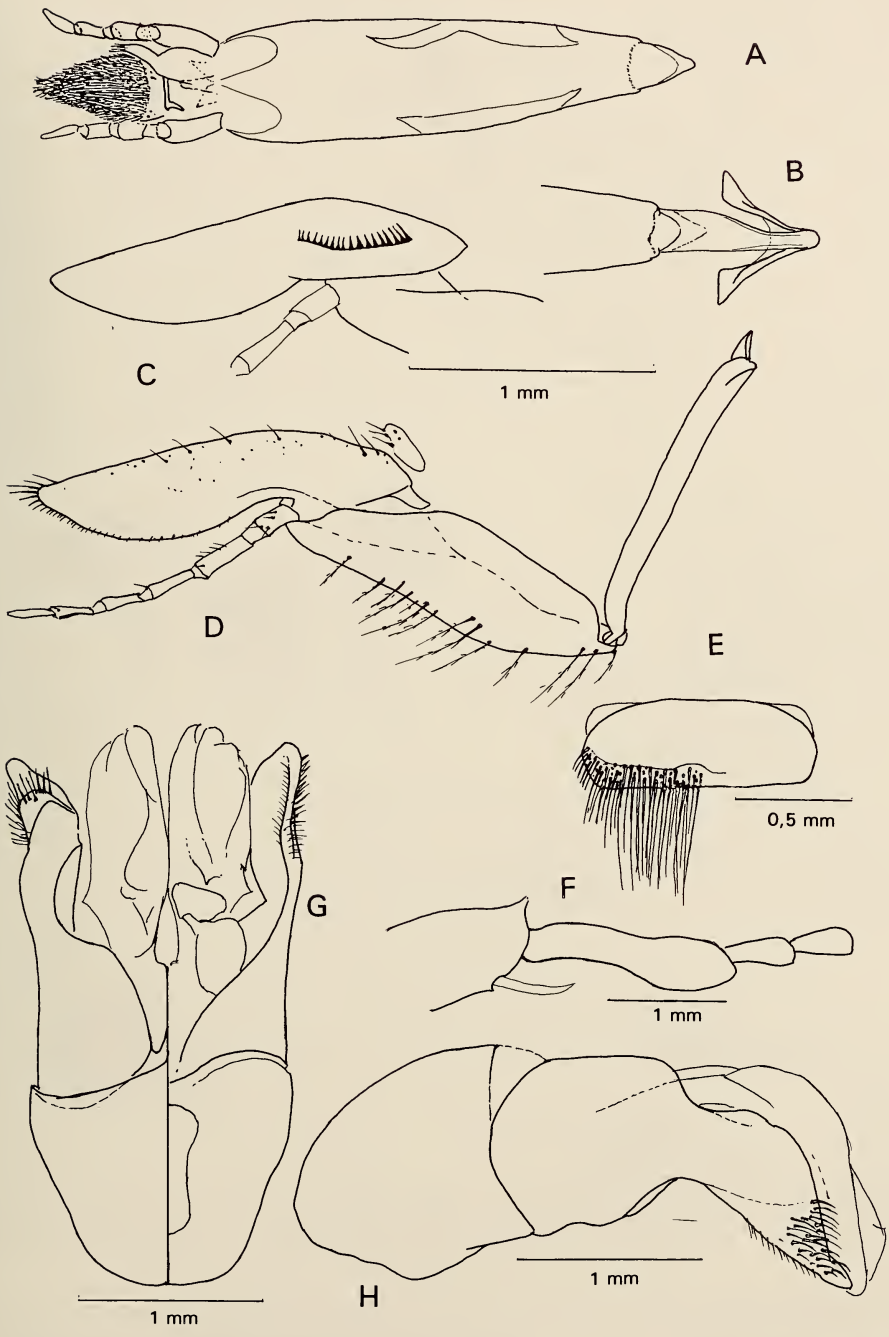

Fig. 11. *Rediviva intermedia* sp. nov. A–E. Female. A. Labium, anterior aspect. B. Base of prementum, mentum and lorum. C. Inner view of maxilla to show galeal comb. D. Left maxilla. E. Labrum. F–H. Male. F. Sinuate midbasitarsus. G. Dorsal and ventral view of genitalia. H. Lateral aspect of genital capsule.

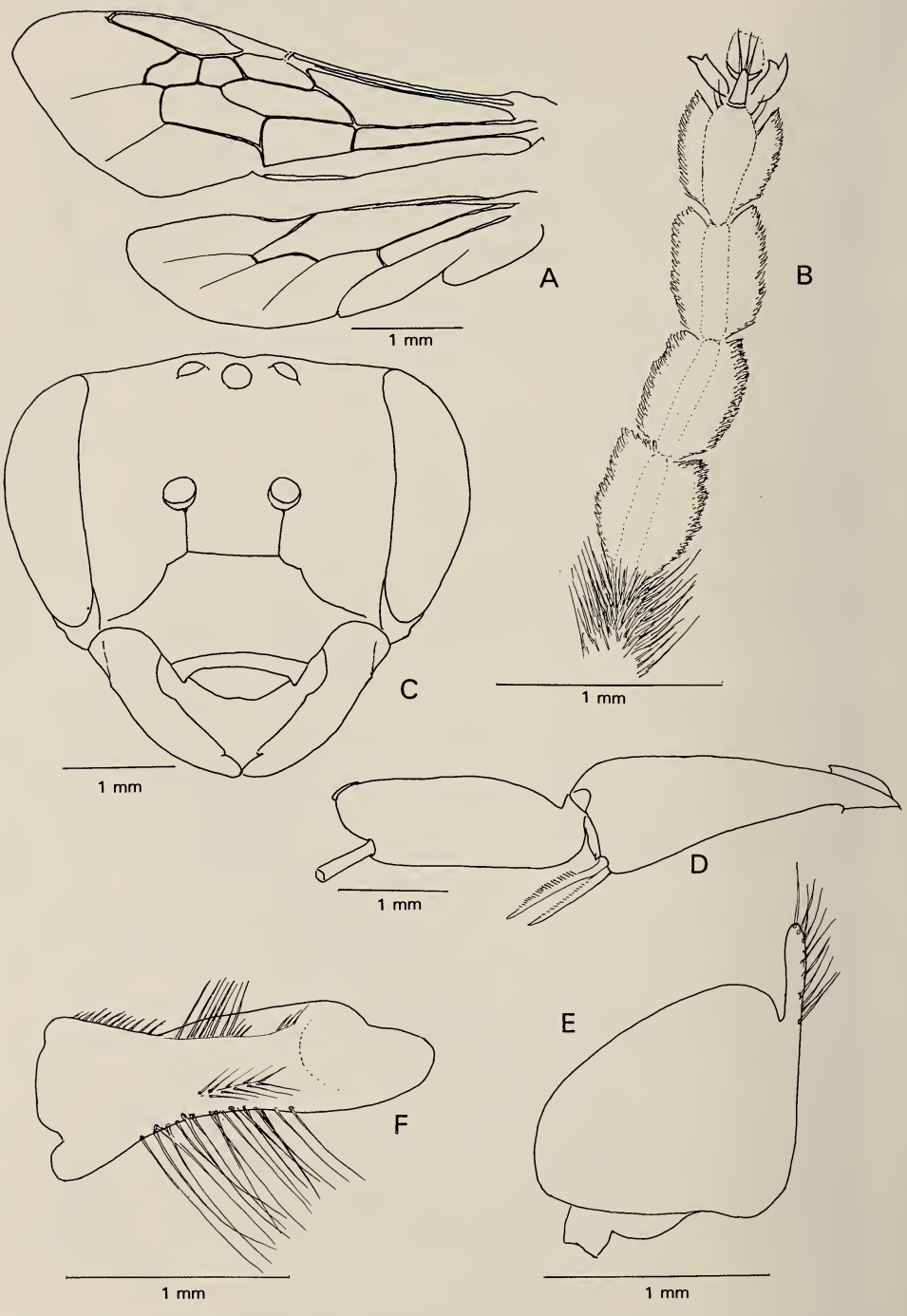

Fig. 12. *Rediviva intermedia* sp. nov. Female. A. Left wings. B. Tip of basitarsus plus tarsomeres 2–5 of foreleg. C. Anterior aspect of head. D. Tibia and basitarsus of hind leg. E. Front coxa. F. Right mandible.

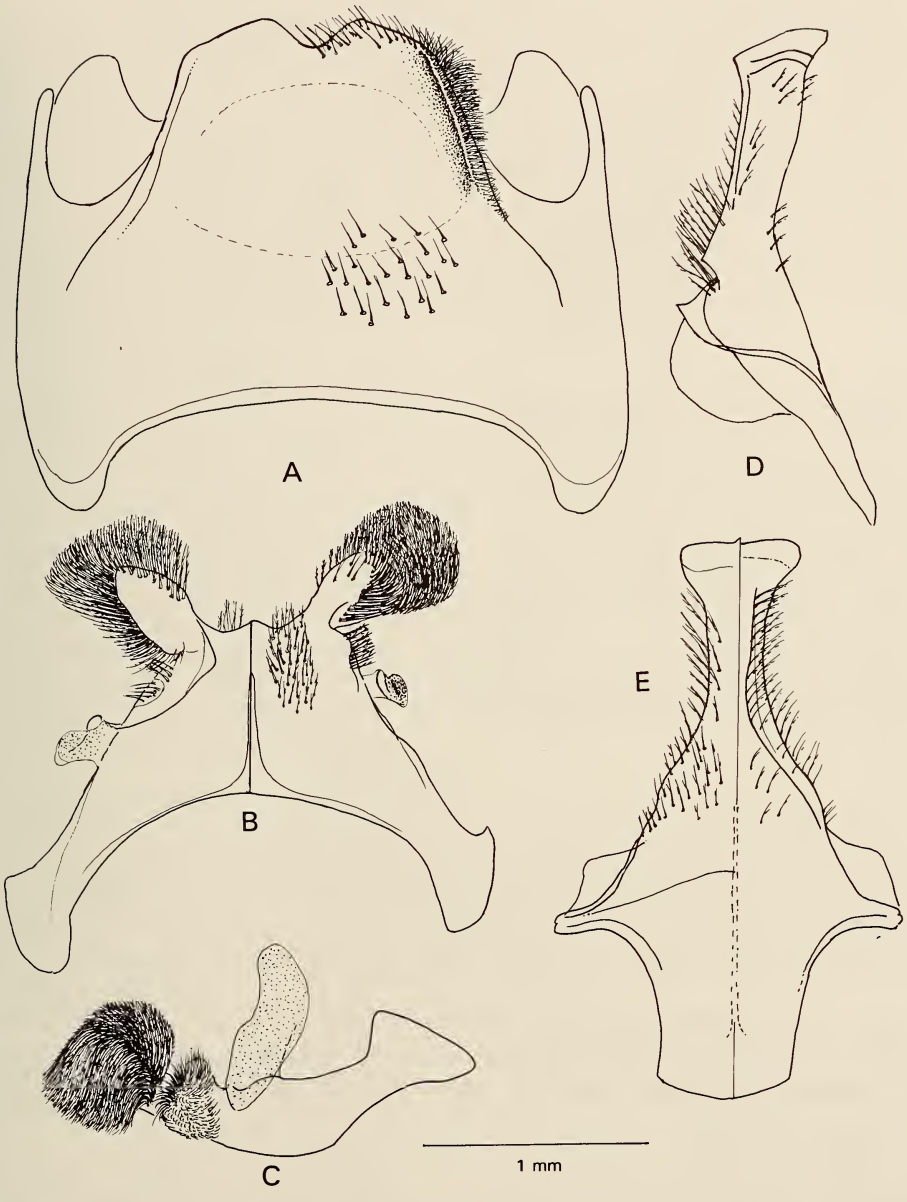

Fig. 13. *Rediviva intermedia* sp. nov. Male. A. Ventral view of S6. B. Dorsal and ventral view of S7. C. Lateral view of S7. D. Lateral aspect of S8. E. Dorsal and ventral view of S8.

11.6 mm (10.5–12.3 mm), foreleg 9.0 mm (8.8–9.2 mm), forewing 9.9 mm (9.5–10.5 mm). *Ratios*: FL : B 0.78 (0.72–0.85).

Integumental colour. Head: black, flagellum black above, brown below, brown more extensive apically. Mesosoma: legs black except front tarsus, middle and hind tibia and tarsus light brown.

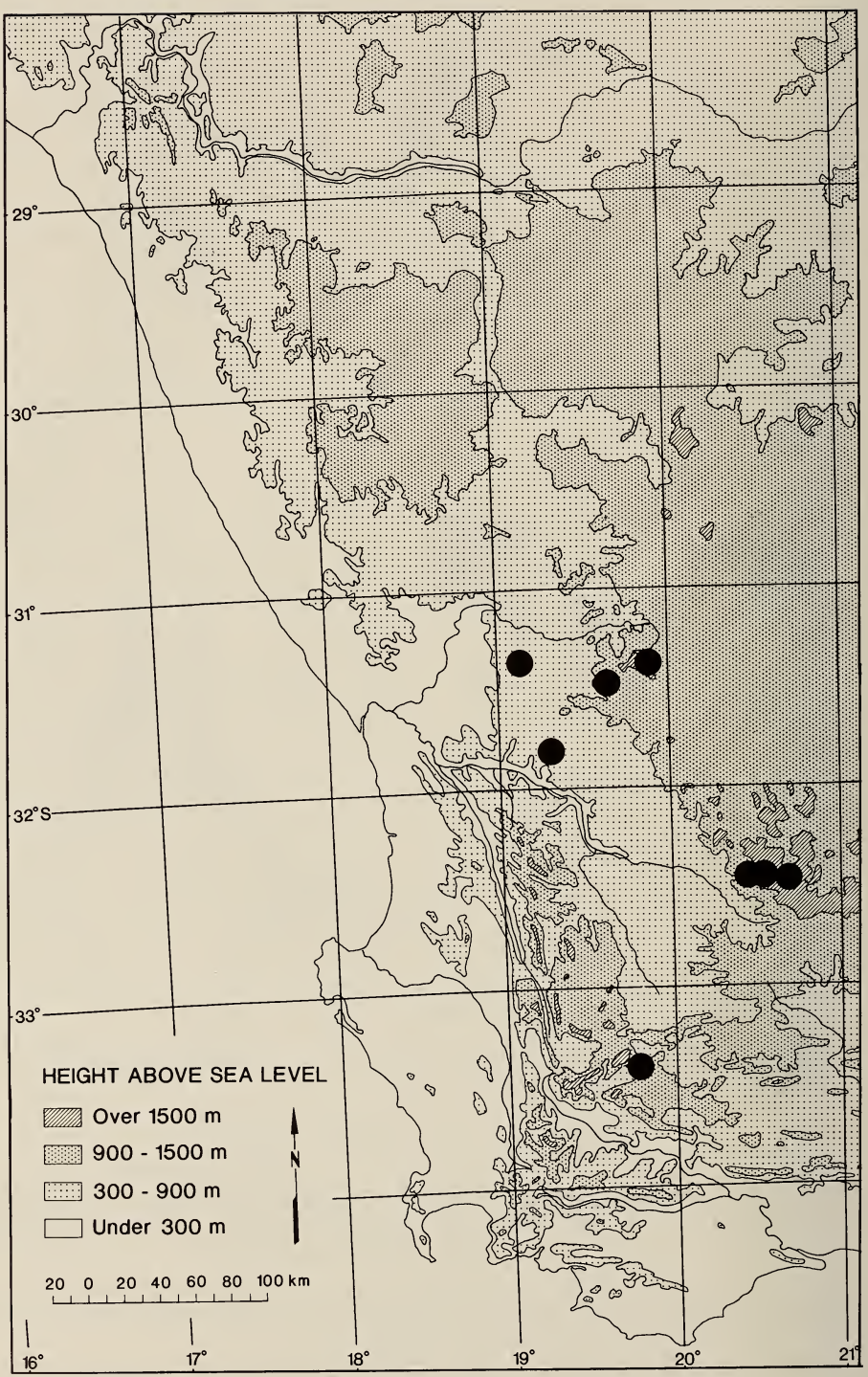

Fig. 14. Known distribution of *Rediviva intermedia* sp. nov.

Structure. Head: labrum as in female but median groove shallower and less discernible. Mesosoma: foreleg three-quarters length of body; middle basitarsus shallowly sinuate (Fig. 11F). Metasoma: S6 with poorly developed median lobes, lateral lobes in form of shallow vertical ridge fringed with short stiff branched hairs (Fig. 13A), S7 (Fig. 13B–C) with large circular median lobes covered in mass of long plumose vestiture both on dorsal and ventral surfaces, tuft of strong unbranched hairs at base, lateral lobes long and translucent with fine spicules. S8 (Fig. 13D–E, 64D) apical plate subcircular, slightly longer than wide, concave, distal margin entire (Fig. 64D). Penis valves slightly longer than gonostylus; apex of gonoforceps pointed with short stout spines on apical half (Fig. 11G–H).

Sculpture. As in female.

Vestiture. Head: long straw-coloured plumose hairs covering clypeus, supraclypeal, paraocular areas and frons; shorter black pubescence on vertex. Mesosoma: light brown pubescence covering scutum, shorter and sparser black hairs on disc; scutellum, metanotum and propodeum similarly clothed except absence of black hairs on propodeum; hairs on legs pale straw-coloured becoming light brown on tibia and tarsus, extremely long on dorsal surface of basitarsus of middle legs. Metasoma: T2–T4 with pubescence pale straw-coloured to reddish-brown; black on T5; fimbriae on T6 black basally light brown apically; diffuse apical hair bands on T2–T4.

There is some variation of pubescence colour of males, those collected early in the season, July to early August, are a rich reddish-brown in contrast to the pale straw-colour of bees caught later.

Host flower records

Eight species of oil-producing plants were visited by females. The greatest number was collected visiting *Diascia cardiosepala* (46.2%), followed by *Hemimeris centrodes* (18.7%), *D. macrophylla* (12.1%) and *D. 'floribunda'* (10.9%). The remaining 12.1 per cent were taken on *Alonsoa unilabiata*, *Diascia nana* and *Hemimeris racemosa*. The only nectar plant visited was *Arctotheca calendula*.

The small sample (n = 10) of males was collected mainly taking nectar from *A. calendula* and an *Othonna* species, with a single specimen on *Heliophila*. One male was collected patrolling the oil plant *Diascia cardiosepala*.

Distribution (Fig. 14)

Rediviva intermedia has been found only at five sites, namely, Nieuwoudtville, Calvinia, Sutherland, the Hex River Pass near De Doorns, and the Botterkloof Pass south of Nieuwoudtville. These localities are all situated on the western rim of the Karoo escarpment.

Rediviva albifasciata Whitehead & Steiner, 1994

Figs 1A, 15–18, 63A

Rediviva albifasciata Whitehead & Steiner, 1994: 2.

Diagnosis

Female. Small, 8–10 mm, body black to dark brown. Forelegs not attenuate, three-quarters length of body. Tarsi of fore- and middle legs with flattened scrapers on anterior and posterior surfaces; shiny scale-like projection on dorsal distal angle on hind basitarsus. Apical margins of metasomal terga 1–4 with white hairbands.

Male. Small, 7–9 mm, body black. Legs black except tarsus of middle leg and tibia and tarsus of hind legs light brown. White hairbands on apical margins of T1–T5, fimbriae of T6 light brown. Gonostylus of male with apical half flattened. Apical margin of S8 entire.

Etymology

The name refers to the prominent white hair bands on the apical margin of the metasomal terga.

Material examined

Type material. *Holotype*: SAM-HYM-B000384, female, Northern Cape Province, 23 km south of Springbok, farm Mesklip, 2917DD, K. E. Steiner, 10 Aug. 1985. *Allotype*: SAM-HYM-B000385, male, Northern Cape Province, Goegab (Hester Malan) Nature Reserve, 2917DB, M. Struck, 30 July 1986. *Paratypes* (64 ♀♀, 14 ♂♂) collected from Springbok to south of Nieuwoudtville and Clanwilliam from July to September.

Description

Female

Measurements. *Holotype*: body 8.8 mm, forewing 7.7 mm, malar space L : W 0.29. *Other material* (n = 30)—*Measurements and ratios*: body 9.0 mm (8.2–10.3 mm), foreleg 6.9 mm (6.5–7.3 mm), forewing 7.6 mm (7.2–8.0 mm). *Ratios*: FL : B 0.77 (0.66–0.83), malar space L : W 0.28 (0.24–0.32).

Integumental colour. Body black to dark brown, tegula, tibiae, tarsi and flagellum on underside, light brown.

Structure. Mouth-parts (Fig. 15A–G): glossa one-third length of prementum, labial palp extending beyond tip of glossa, paraglossa reaching a little beyond half length of glossa; apex of galea rounded, galeal comb with 20 teeth; labrum sub-triangular, wider than long (7 : 4). Mesosoma: median mesoscutal line extending three-quarters length of segment, lying in slight depression; front legs not attenuate, three-quarters length of body; hind tibia as wide as basitarsus; hind basitarsus length 2.4 times width, with small scale-like projection on distal dorsal angle, distal margin oblique (Fig. 16D).

Sculpture. Head: clypeus coarsely punctate, punctures sparser apically, area between punctures shiny; supraclypeal area coarsely punctate, surface between punctures roughened. Mesosoma: scutum finely and densely punctate, punctures less dense in median longitudinal depression where surface between punctures more shiny.

Vestiture. Pubescence on underside of head, mesonotum and metanotum as well as coxa, trochanter and femur pale straw-coloured; hairs on tibia and tarsus

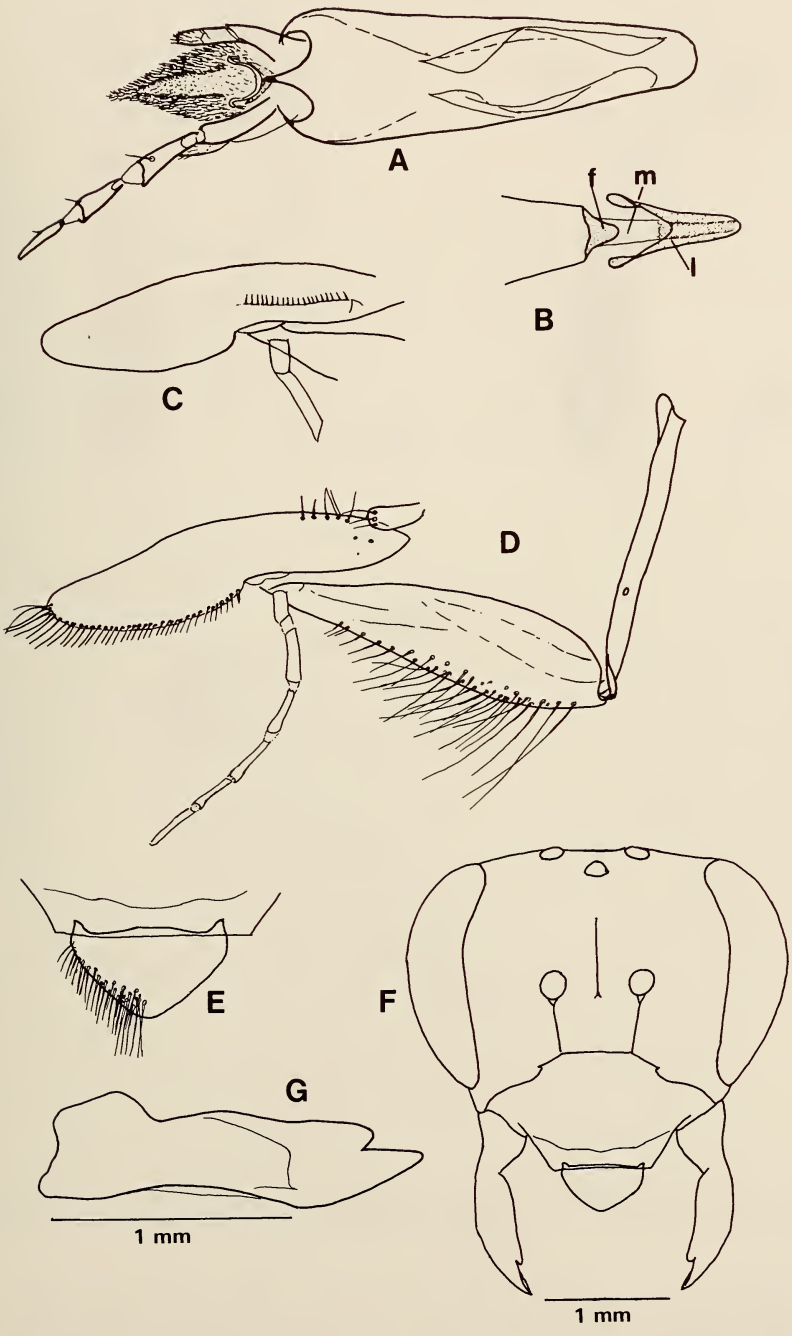

Fig. 15. *Rediviva albifasciata* Whitehead & Steiner, 1994. Female. A. Labium, posterior view. B. Base of prementum with mentum and lorum, posterior aspect. C. Inner view of galea to show galeal comb. D. Left maxilla. E. Labrum. F. Anterior aspect of head. G. Right mandible.

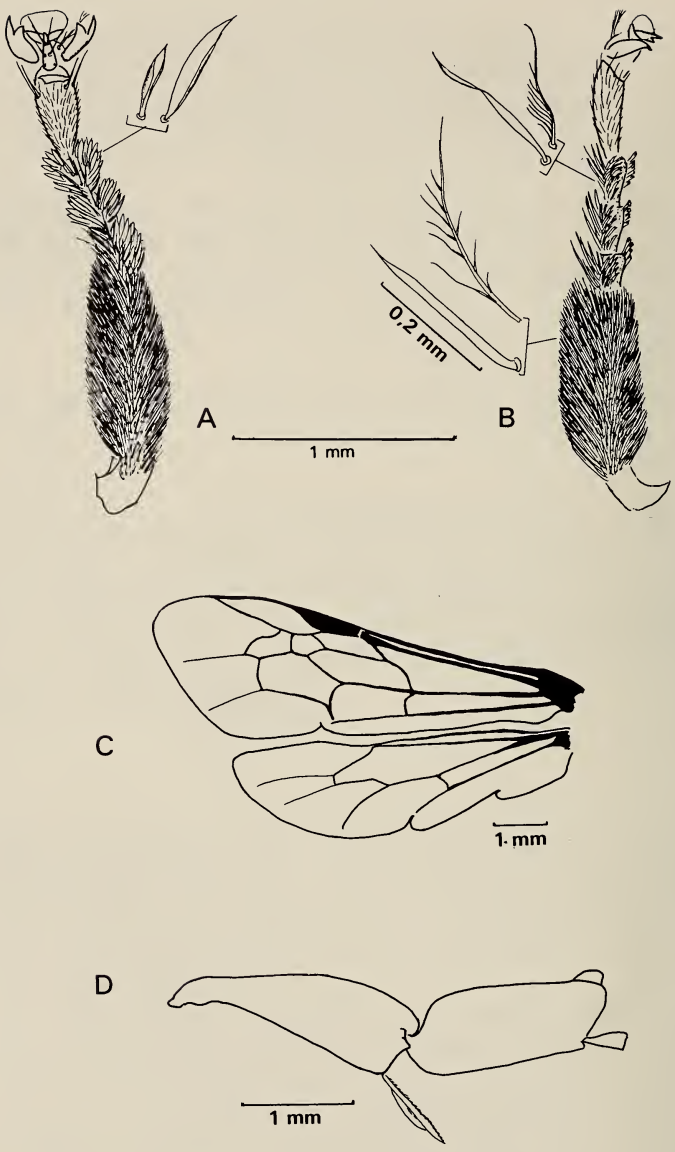

Fig. 16. *Rediviva albifasciata* Whitehead & Steiner, 1994. Female. A. Foreleg, dorsal view. B. Foreleg, lateral view. C. Left fore- and hind wings. D. Hind tibia and basitarsus.

of all legs, scutum, scutellum and metanotum, light brown with some black hairs; prominent white apical hair bands on T1–T4; short decumbent black hairs on basal two-thirds of T2–T5, fimbriae of T5 brown dorsally, white laterally; front and middle legs with finely branched oil-collecting hairs on basitarsus and oil-collecting hairs and curved flattened scrapers on anterior and posterior surfaces of tarsomeres 2–4 (Fig. 16A–B).

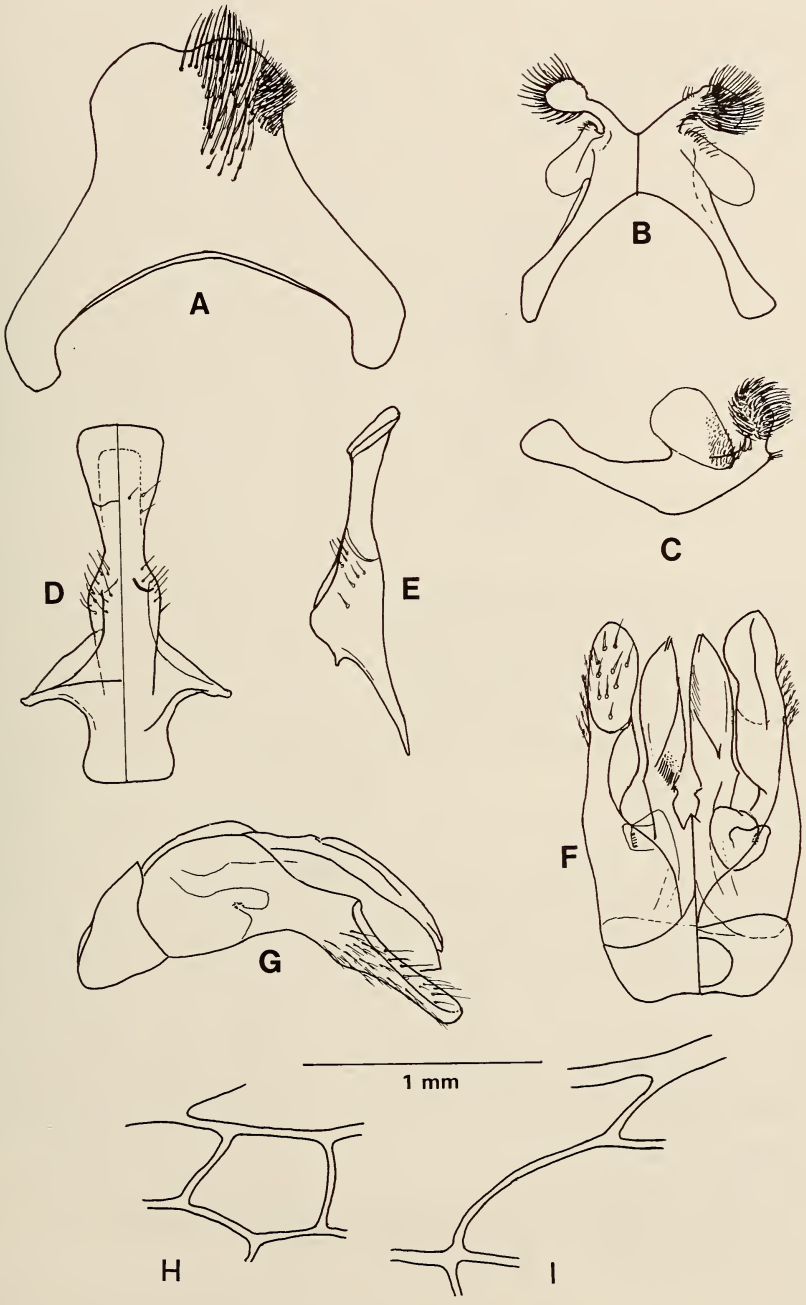

Fig. 17. *Rediviva albifasciata* Whitehead & Steiner, 1994. A–G. Male. A. S6, ventral view. B. S7, dorsal and ventral view. C. S7, lateral aspect. D. S8, dorsal and ventral view. E. S8, lateral view. F. Dorsal and ventral aspect of genitalia. G. Genital capsule, lateral view. H–I. Female. H. Second submarginal cell of right forewing. I. Basal vein plus first abscissa of Rs of right forewing.

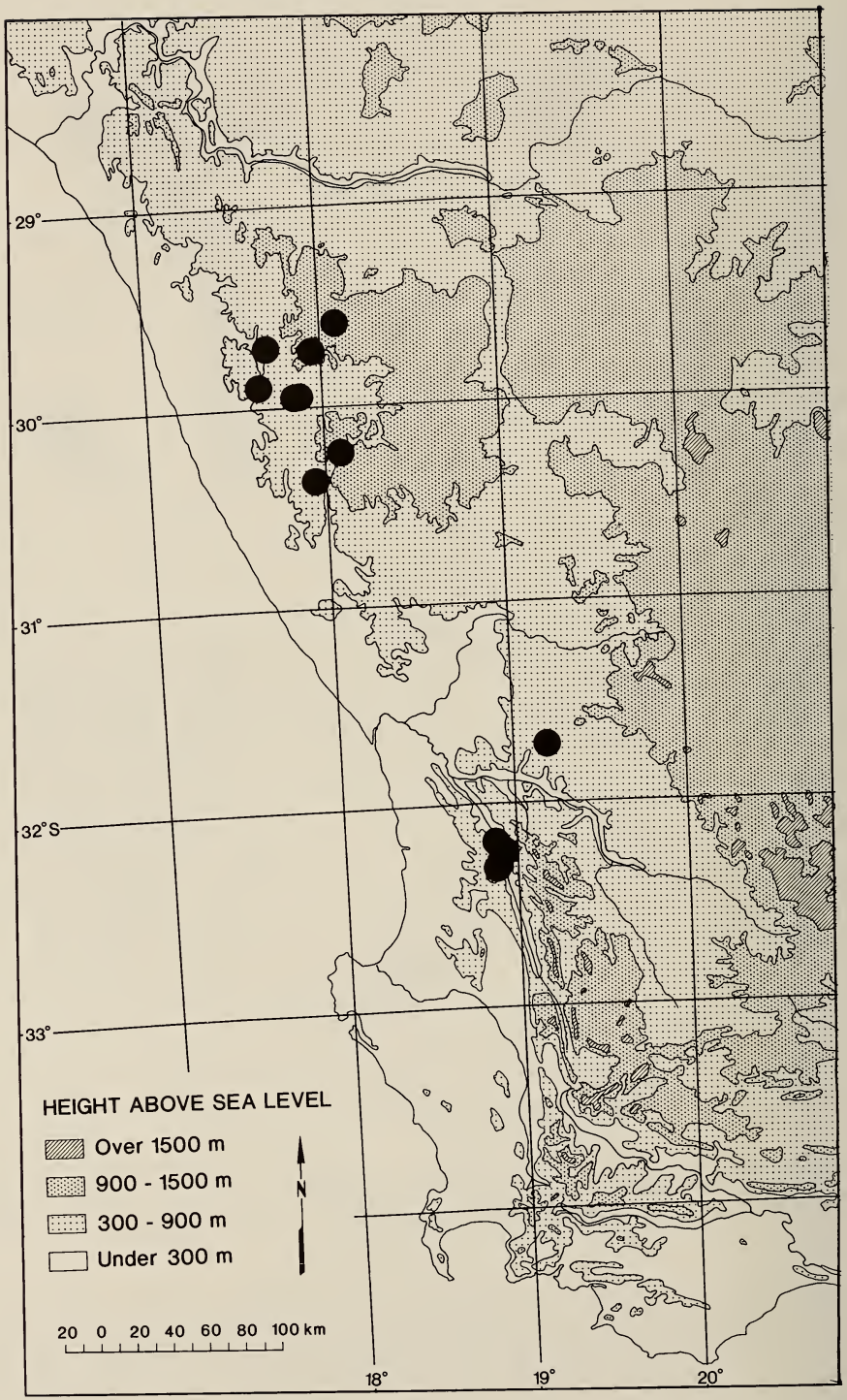

Fig. 18. Known distribution of *Rediviva albifasciata*.

Male

Measurements. Allotype: body 7.8 mm, forewing 6.8 mm. *Other material* (n = 6)—*Measurements and ranges*: body 8.2 mm (6.9–8.5 mm), foreleg 6.3 mm (5.9–6.6 mm), Ft+bt 2.4 mm (2.3–2.4 mm), forewing 7.1 (6.9–7.4 mm). *Ratios*: FL : B 0.77 (0.67–0.90), malar space L : W 0.38 (0.32–0.42).

Integumental colour. Body black, ventral surface of antennae, tarsi of front and middle legs light brown, tibiae and tarsi of hind legs darker brown.

Structure. Foreleg three-quarters length of body, mean FL : B as in female, hind tibia slightly wider than basitarsus; S6 (Fig. 17A) with median and lateral lobes poorly developed, translucent area on disc; S7 (Fig. 17B–C) with deeply emarginate apical margin, conspicuous median lobes, large oval translucent lateral lobes, papillate on basal third; S8 (Fig. 17D–E, 63A) with apical margin entire. Genitalia (Fig. 17F–G): gonostylus extending a little beyond apex of penis valve, apical half dorsally flattened.

Sculpture. Clypeus, paraocular and supraclypeal areas coarsely punctured, surface between punctures shiny; scutum finely punctate, more coarsely punctured on scutellum and metanotum.

Vestiture. Head: light brown unbranched hair on labrum, rest of head covered in long silky white pubescence, black hairs along inner margin of eye, epistomal suture and vertex. Mesosoma: covered in pale brown plumose hairs, some black hairs on disc of scutellum. Metasoma: white apical hair bands on T1–T6, S6 having branched pale straw-coloured hairs and tuft of short black hairs on lateral lobe, S7 with strong recurved branched hairs on outer surface of median lobe.

Host flower records

Females collect oil from *Colpias mollis* and *Hemimeris racemosa* and nectar from *Oxalis pes-caprae*, *Oxalis* sp. and *Cysticapnos versicaria*. Males take nectar from *Othonna arbuscula*, *Oxalis pes-caprae* and *O. comosa*. Males also patrol the two oil-producing plants presumably in search of receptive females.

Distribution (Fig. 18)

Rediviva albifasciata occurs mainly in the mountainous region of northern Namaqualand, but also has disjunct populations 300 km south in the Nieuwoudtville and Clanwilliam areas.

Rediviva intermixta (Cockerell, 1934)

Figs 1F, 19–22, 64F

Notomelitta intermixta Cockerell, 1934: 450.
Rediviva intermixta (Cockerell) Michener, 1981: 47.

Diagnosis

Female. Medium-sized, black-bodied bees, 10–12 mm long. Front legs four-fifths length of body, hind basitarsus light brown with large shiny brown scale

on distal dorsal angle. Finely divided oil-collecting hairs on tarsomeres 2–4 of front and middle legs. Light straw-coloured apical hair bands on T2–T4, pubescence on T5–T6 light brown.

Male. Length 9–10 mm, integument black, covered in long white to straw-coloured pubescence. Apical hair bands less distinct than in females but visible on T2–T5, pubescence on T6 light brown, black erect hairs at bases of T4–T5. Hind tibia and basitarsus light brown. S5 having latero-apical tubercles with stout apical hairs, S6 with narrow, shallowly emarginate apex, distinctive median and lateral lobes on S7.

Material examined

Type material. Holotype: B. M. Type Hym. 17a 1831, male, Worcester. Cape Province. R. E. Turner, 17–31 Aug. 1928. Natural History Museum, London.

Other material (657 ♀♀, 221 ♂♂)—*Northern Cape Province*: 4 ♀♀, Botterkloof Pass, 3119CD, KES, 15 Sept. 1989; 1 ♀, Bowesdorp, 3012BB, VBW, 28 Aug. 1980; 1 ♂, Calvinia, farm Toren, 3119BC, KES, 26 Aug. 1985; 1 ♀, 4 ♂♂, same locality, VBW & MM, 25 Aug. 1985; 4 ♀♀, 8 ♂♂, same locality, VBW & MM, 26 Aug. 1985; 2 ♂♂, Garagams, 3017BD, VBW, 28 July 1985; 2 ♂♂, Kamieskroon, farm Bakleikraal, 3018AA, KES, 19 Aug. 1988; 1 ♀, Kamieskroon, farm Dassiefontein, 3017DB, MM, 4 Sept. 1986; 3 ♂♂, same locality, VBW, 4 Sept. 1986; 2 ♂♂, same locality, VBW, 7 Sept. 1986; 1 ♂, VBW, 8 Sept. 1986; 2 ♀♀, Karkams, 3017BD, KES, 10 Aug. 1985; 8 ♀♀, same locality, KES, 23 Aug. 1985; 1 ♂, same locality, KES, 4 Sept. 1986; 3 ♀♀, same locality, KES, 6 Sept. 1986; 3 ♀♀, 13 ♂♂, same locality, KES, 18 Aug. 1988; 1 ♂, same locality, KES, 19 Aug. 1988; 1 ♂, same locality, VBW, 8 Aug. 1985; 2 ♂♂, same locality, VBW, 10 Aug. 1985; 13 ♀♀, 10 ♂♂, same locality, VBW, 28 Aug. 1985; 4 ♀♀, 3 ♂♂, same locality, VBW, 18 Aug. 1988; 2 ♀♀, Middelpos, farm Blomfontein, 3219BB, KES, 23 Sept. 1985; 3 ♀♀, 16 ♂♂, same locality, KES, 3 Oct. 1985; 8 ♀♀, Middelpos, farm Blomfontein, 3220CC, KES, 1 Oct. 1992; 10 ♀♀, Middelpos, farm Blomfontein, 3219BB, VBW, 28 Aug. 1984; 2 ♀♀, same locality, VBW, 24 Sept. 1985; 29 ♀♀, same locality, VBW, 3 Oct. 1985; 11 ♂♂, Middelpos, farm Hartbeestfontein, 3120CC, KES, 27 Aug. 1990; 2 ♀♀, 5 ♂♂, same locality, VBW, 2 Oct. 1986; 3 ♀♀, 7 ♂♂, same locality, VBW, 27 Aug. 1990; 2 ♀♀, same locality, VBW, 16 Sept. 1993; 6 ♀♀, Nieuwoudtville, 3119AC, KES, 26 Aug. 1984; 1 ♀, same locality, VBW, 20 Aug. 1990; 3 ♀♀, Nieuwoudtville, 5 km south, 3119AC, KES, 24 Sept. 1986; 1 ♀, same locality, KES, 2 Sept. 1989; 1 ♀, same locality, KES, 25 Sept. 1989; 1 ♀, same locality, KES, 28 Sept. 1989; 2 ♀♀, 1 ♂, same locality, VBW & MM, 31 Aug. 1985; 3 ♀♀, same locality, VBW, 11 Sept. 1987; 2 ♀♀, same locality, VBW, 25 Aug. 1988; 1 ♂, Nieuwoudtville, Botterkloof road, 3119CD, VBW, 6 Sept. 1994; 68 ♀♀, Nieuwoudtville Wild Flower Reserve, 3119AC, KES, 28 Aug. 1984; 1 ♀, same locality, KES, 11 Sept. 1984; 26 ♀♀, same locality, KES, 27 Aug. 1985; 6 ♂♂, same locality, KES, 8 Aug. 1986; 4 ♂♂, same locality, KES, 28 Aug. 1986; 16 ♀♀, same locality,KES, 6 Sept. 1986; 32 ♀♀, same locality, KES, 9 Sept. 1986; 3 ♀♀, same locality, KES, 25 Sept. 1986; 1 ♂, same

locality, 3119AC, KES, 29 Sept. 1986; 14 ♀♀, same locality, MM, 9 Sept. 1986; 3 ♂♂, same locality, MM, 31 Aug. 1987; 19 ♀♀, 9 ♂♂, same locality, VBW & MM, 26 Aug. 1984; 3 ♀♀, 5 ♂♂, same locality, VBW & MM, 27 Aug. 1984; 49 ♀♀, 9 ♂♂, same locality, VBW & MM, 28 Aug. 1984; 7 ♀♀, 10 ♂♂, same locality, VBW & MM, 29 Aug. 1984; 2 ♀♀, 2 ♂♂, same locality, VBW & MM, 10 Sept. 1984; 23 ♀♀, 2 ♂♂, same locality, VBW & MM, 11 Sept. 1984; 6 ♀♀, same locality, VBW & MM, 23 Aug. 1985; 31 ♀♀, same locality, VBW & MM, 27 Aug. 1895; 3 ♂♂, same locality, VBW, & MM, 28 Aug. 1985; 1 ♀, 19 ♂♂, same locality, VBW, 2 Aug. 1984; 4 ♀♀, same locality, VBW, 8 Aug. 1986; 9 ♀♀, 1 ♂, same locality, VBW, 14 Aug. 1986; 2 ♀♀, 1 ♂, same locality, VBW, 25 Aug. 1986; 5 ♂♂, same locality, VBW, 4 Aug. 1988; 3 ♀♀, same locality, VBW, 27 Aug. 1994; 3 ♀♀, same locality, VBW, 29 Aug. 1994; 1 ♀, same locality, VBW, 6 Sept. 1994; 3 ♀♀, Nieuwoudtville, farm Glenlyon, 3119AC, 24 Aug. 1990; 6 ♀♀, same locality, VBW & MM, 29 Aug. 1985; 23 ♀♀, same locality, VBW, 10 Sept. 1986; 1 ♀, same locality, VBW, 11 Sept. 1987; 6 ♀♀, Nieuwoudtville, Grasberg road, 3219AC, KES, 10 .Sept. 1986; 2 ♂♂, Nieuwoudtville, farm Lokenberg, 3119CA, VBW, 26 Sept. 1986; 3 ♀♀, Nieuwoudtville, Oorlogskloof road, 3119AC, VBW, 24 Sept. 1986; 1 ♀, 1 ♂, same locality; VBW, 28 Aug. 1994; 1 ♀, 5 ♂♂, Nieuwoudtville, farm Willemsrivier, 3119AA, VBW, 28 Aug. 1994; 5 ♀♀, Sutherland, 4 km south, 3220BC, KES, 27 Sept. 1984; 6 ♀♀, Sutherland, farm Tweeriviere, 3220AD, KES, 1 Oct. 1986; 1 ♀, same locality, KES, 29 Aug. 1994; 3 ♀♀, same locality, VBW, 1 Sept. 1986. *Western Cape Province*: 2 ♀♀, Clanwilliam, Bidouw Valley, 3219AA, VBW, 30 Aug. 1990; 2 ♀♀, 2 ♂♂, Clanwilliam, 0.6 km south, 3218BB, VBW, 5 Aug. 1989; 2 ♀♀, 8 ♂♂, same locality, VBW, 11 Aug. 1989; 2 ♀♀, Clanwilliam 17.5 km south, 3218BD, KES, 24 Aug. 1984; 3 ♀♀, same locality, KES, 29 July 1984; 7 ♀♀, 1 ♂, same locality, VBW, 24 Aug. 1983; 8 ♀♀, same locality, VBW, 8 Aug. 1984; 2 ♀♀, same locality, VBW, 24 Aug. 1984; 1 ♀, same locality, VBW, 11 Sept. 1991; 3 ♀♀, Clanwilliam, 7 km south, 3218BB, VBW & MM, 30 Aug. 1985; 2 ♀♀, same locality, MM, 3 Sept. 1986; 4 ♀♀, same locality, 3 Sept. 1986; 2 ♀♀, 9 ♂♂, Clanwilliam, farm Koeglmanskloof, 3218BB, KES, 6 Aug. 1989; 1 ♀, Clanwilliam, Ramskop Camp, 3218BB, KES, 22 Aug. 1984; 1 ♀, same locality, MM, 23 Aug. 1984; 3 ♀♀, same locality, VBW, 24 Aug. 1984; 4,♀♀, De Doorns, farm Appaskop, 3319BC, KES, 18 Sept. 1992; 1 ♀, same locality, KES, 29 Sept. 1992; 5 ♀♀, same locality, VBW, 24 Sept. 1992; 2 ♀♀, Elandsbaai, farm Skerpheuwel, 3218AD, VBW, 27 Aug. 1987; 8 ♀♀, 12 ♂♂, Gouda, Voëlvlei Dam, 3319AC, KES, 7 Sept. 1988; 3 ♀♀, 8 ♂♂, same locality, VBW, 6 Sept. 1988; 7 ♀♀, same locality, VBW, 8 Sept. 1988; 2 ♂♂, Het Kruis, 3218DB, KES, 22 Aug. 1991; 1 ♂, Het Kruis, farm Groenrivier, 3218DB, VBW, 22 Aug. 1988; 1 ♀, Klawer, 4 km north on N7, 3118DA, VBW, 5 Aug. 1989; 3 ♀♀, Klawer, farm Zypherfontein, 3118DC, 22 Aug. 1989; 1 ♀, Malmesbury, road to old dump site, 3318BC, KES, 16 Sept. 1987; 2 ♀♀, same locality, KES, 14 Sept. 1994; 11 ♀♀, same locality, VBW, 14 Sept. 1994; 1 ♀, same locality, VBW, 20 Sept. 1944; 1 ♀, same locality, VBW, 14 Sept. 1995; 1 ♀, same locality, VBW, 24 Sept. 1995; 1 ♀, Moorreesburg, farm Neulfontein, 3318BA, VBW, 23 Aug. 1988; 4 ♀♀, same locality, VBW, 7 Sept. 1988; 1 ♀, Nuwerus, Meerhofkasteel road, 3018AD, VBW, 31 Aug. 1991; 1 ♀, Parow,

Tygerberg Hills, 3318DC, VBW, 1 Oct. 1990; 1 ♀, Piketberg, farm Spitskop, 3318BB, VBW, 22 Sept. 1995; 2 ♀♀, Piketberg, farm Dezehoek, 3218AC, 5 Sept. 1987; 1 ♀, Piketberg, farm Rondegat, 3219DB, KES, 16 Sept. 1989; 4 ♂♂, Porterville, Halfmanshof, 3318BB, VBW, 23 Aug. 1988; 4 ♀♀, Riebeek-Kasteel, Bothmaskloof Pass, 3318BD, KES, 17 Sept. 1987; 2 ♀♀, same locality, VBW, 25 Sept. 1987; 1 ♀, Sandberg Station, farm Droogerivier, 3218BC, KES, 8 Aug. 1987; 3 ♀♀, Stellenbosch, farm Joostenbergkloof, 3318DD, KES, 16 Sept. 1987; 4 ♀♀, same locality, VBW, 16 Sept. 1987; 5 ♀♀, same locality, VBW, 25 Sept. 1987; 2 ♀♀, 3 ♂♂, same locality, VBW, 4 Aug. 1988; 9 ♀♀, Worcester, Karoo Gardens, 3119CB, KES, 18 Aug. 1989; 2 ♀♀, Wupperthal, 3219AA, VBW, 29 Aug. 1990.

Description

Female

Measurements and ranges (n = 15). Body 10.7 mm, (10.0–12.2 mm), foreleg 9.4 mm (9.1–9.8 mm), Ft+bt 3.2 mm (3.1–3.5 mm), forewing 8.9 mm (8.2–9.3 mm). *Ratios*: FL : B 0.88 (0.77–0.94), malar space (n = 10) L : W 0.30 (0.28–0.33).

Integumental colour. Head: scape, funicle and first flagellar segment black, rest of flagellum black to dark brown, light brown underneath. Mesosoma: black, tegulae dark brown; coxa, trochanter and femur of legs black, tibia of front and middle legs dark brown to black, tibia of hind legs light brown, tarsi of all legs dark brown. Metasoma: dark brown to black.

Structure. Mouth-parts (Fig. 19A–G): glossa one-third length of prementum, labial palp not extended beyond tip of glossa, paraglossa short reaching basal third of glossa (Fig. 19A–B); cardo slightly shorter than length of stipes, apex of galea narrowly rounded (Fig. 19E), galeal comb of 16 teeth (Fig. 19D); mandible with small rounded subapical tooth (Fig. 19F); labrum with apical margin evenly convex, two and a half times as wide as long (Fig. 19G). Mesosoma: mesoscutal line depressed reaching middle of scutum; front legs not attenuate, four-fifths length of body, foretibia curved, hind tibia (at its greatest width) as wide as basitarsus, basitarsus width three-fifths its length, distal margin truncate, not extending beyond insertion of tarsomere 2, large scale on distal dorsal angle, length of scale three-quarters width of basitarsus (Fig. 20B); wing venation (Fig. 20A).

Sculpture. Head: labrum impunctate basally, coarsely punctured apically; clypeus and supraclypeal area coarsely punctured on disc, becoming finer laterally, surface between punctures roughened. Mesosoma: fine dense punctation on disc of scutum, area between punctures smooth, shiny; propodeal triangle small ill defined, finely strigate, rest of propodeum shiny with scattered wrinkles.

Vestiture. Head: labrum with stiff, unbranched light brown hairs at middle of apical margin, shorter branched hairs laterally; long black and pale straw-coloured hairs intermixed on paraocular areas; black hairs on vertex. Mesosoma: scutum, scutellum and metanotum with mixture of black and pale straw-coloured hairs, propodeum with pale straw-coloured hairs only; tibia and tarsus of all legs with light brown pubescence, dense oil-collecting hairs on

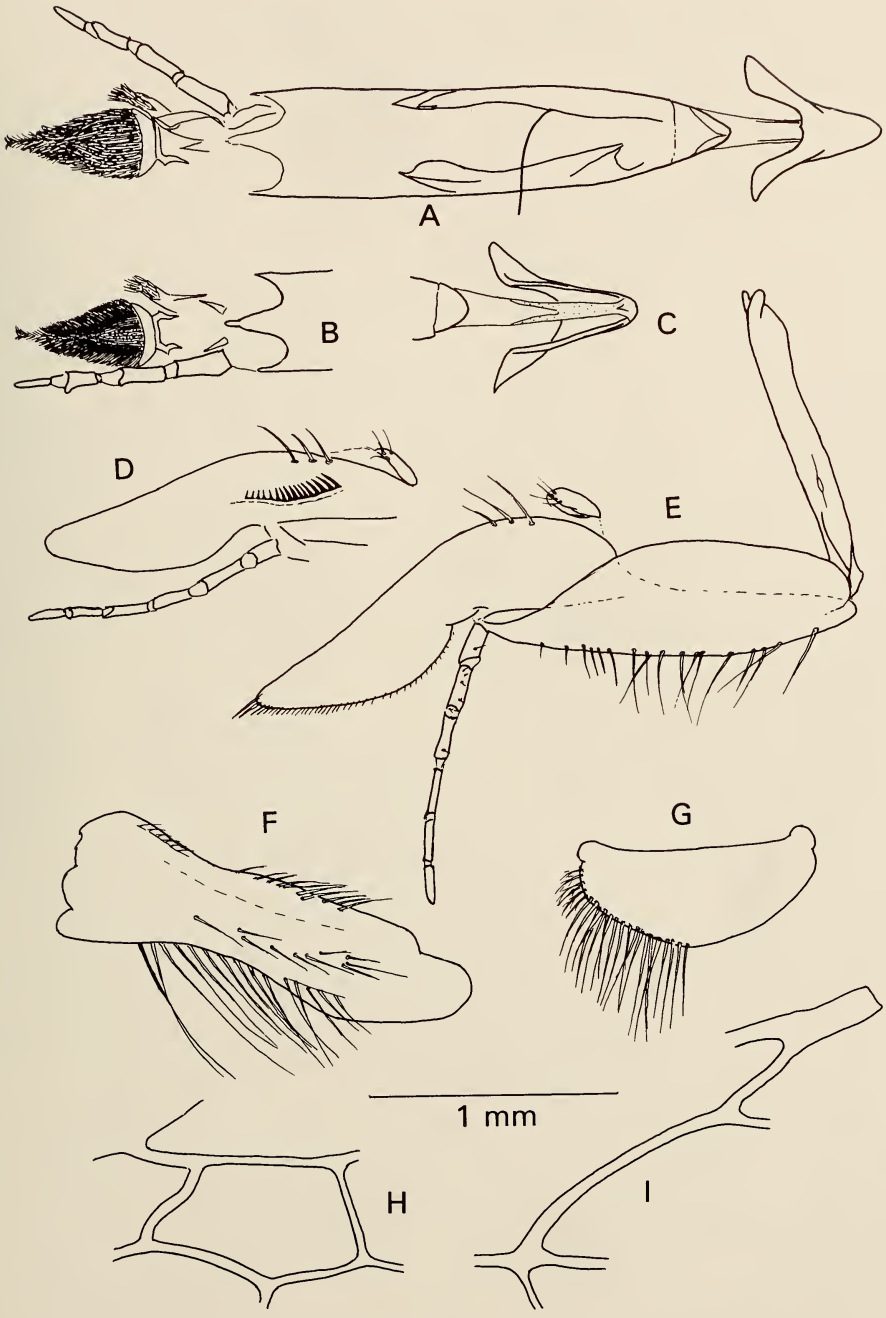

Fig. 19. *Rediviva intermixta* (Cockerell, 1934). Female. A. Labium, anterior view. B. Distal part of labium, ventral aspect. C. Base of prementum with mentum and lorum, posterior view. D. Inner view of right maxilla to show galeal comb. E. Left maxilla, outer view. F. Left mandible. G. Labrum. H. Second submarginal cell of right forewing. I. Basal vein and first abscissa of Rs of front right wing.

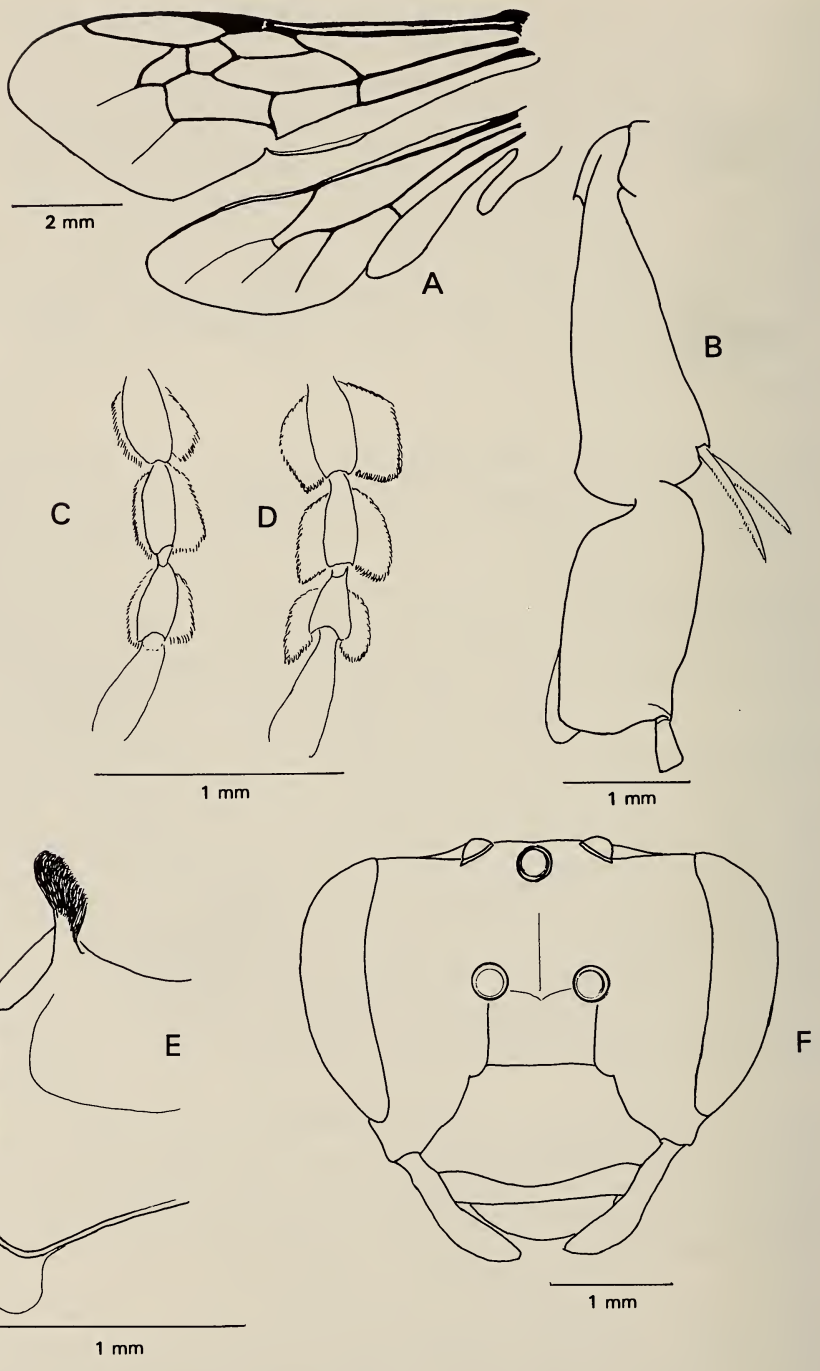

Fig. 20. *Rediviva intermixta* (Cockerell, 1934). A–D, F. Female. A. Wings. B. Hind tibia and basitarsus. C. Tarsomeres 2–4 of front leg. D. Tarsomeres 2–4 of middle leg. E. Male. Projection on anteriolateral area of S5. F. Head, anterior aspect.

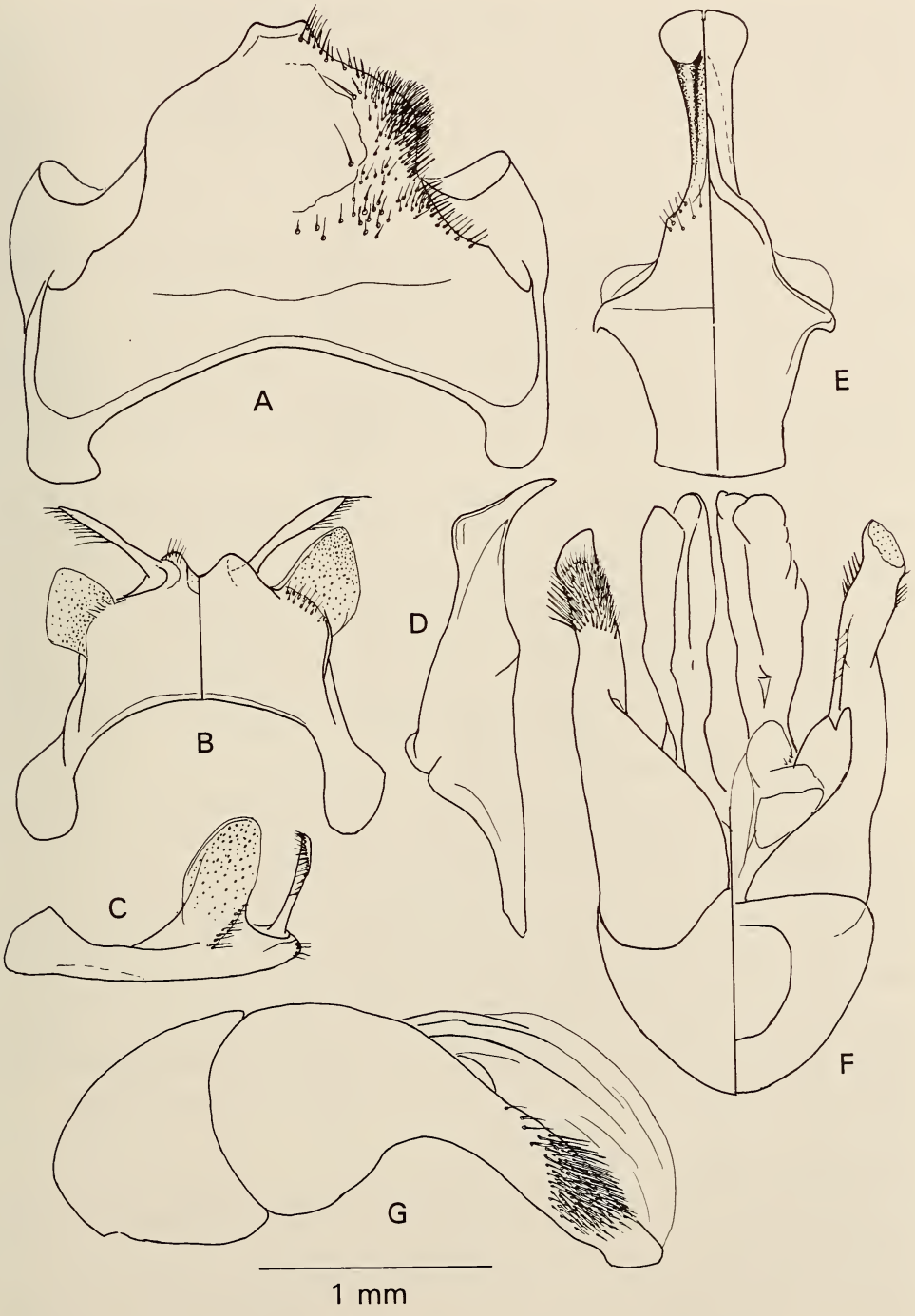

Fig. 21. *Rediviva intermixta* (Cockerell, 1934). Male. A. S6, ventral view. B. Dorsal and ventral view of S7. C. Lateral aspect of S7. D. Lateral aspect of S8. E. Dorsal and ventral view of S8. F. Dorsal and ventral view of genitalia. G. Lateral view of genital capsule.

distal quarter of basitarsus and tarsomeres 2, 3 and 4 of foreleg (Fig. 20C) and tarsomeres 2, 3 and 4 of middle leg (Fig. 20D). Metasoma: T1–T4 with long pale straw-coloured pubescence, forming hair bands on apical two-thirds of T2–T4, basal third of T3–T4 with short erect hairs sometimes intermixed with short black hairs on T4, T5 with light brown vestiture, fimbriae on T6 slightly darker brown.

Male

Measurements and ranges (n = 10): body 9.5 mm (8.5–10.8 mm), forewing 8.5 mm (7.8–10.0 mm), foreleg 7.9 mm (7.2–8.6 mm). *Ratios*: FL : B 0.84 (7.4–9.2), malar space L : W 0.33 (0.27–0.40).

Integumental colour. Head and antennae black. Mesosoma: scutum, scutellum, metanotum and propodeum black, tegulae dark brown, legs black except tarsus of middle legs and tibia and basitarsus of hind legs which are reddish brown. Metasoma black with narrow apical margin of terga and sterna dark brown.

Structure. Mesosoma: foreleg approximately three-quarters length of body, hind tibia one and a half times width of basitarsus. Metasoma: distal lateral angle of S5 with raised projection bearing tuft of stout unbranched hairs (Fig. 20E), S6 with median and lateral lobes poorly developed, median lobes forming narrow emarginate projection (Fig. 21A), S7 having narrow lanceolate median lobes with strong stout hairs on outer apical margin, lateral lobes broad, translucent, not strigate (Fig. 21B–C), S8 apical plate ovate, median emargination apically (Fig. 21D–E, 64F); gonoforceps slightly shorter than penis valves, strong unbranched hairs on apical half not reaching apex (Fig. 21F–G).

Sculpture. As in female.

Vestiture. Head: long white silky hairs on clypeus, supraclypeal and paraocular areas, strong black branched hairs on inner ocular margin. Mesosoma: scutum, scutellum, metanotum and propodeum with long straw-coloured hairs, scattered black hairs laterally on propodeum. Sternum, episternum, coxae, trochanters and femora with long white pubescence. Metasoma: T1–T5 with erect straw-coloured hairs, diffuse apical hair bands on T4–T5, some erect black hairs basally on latter terga, fimbriae on T6 light brown.

Cockerell (1934) described this species from a male collected by Turner in 1928 at Worcester; this is on the eastern edge of its distribution. For description of the female and re-description of the male we have used material from the Wild Flower Reserve at Nieuwoudtville which is more central in its range.

Host flower records

We have recorded females of this species collecting oil from 14 different oil-producing plants, two species of *Hemimeris*, 11 species of *Diascia* and one species of *Alonsoa*. The bulk of our material was collected on *Hemimeris racemosa* (55.1%) and *H. centrodes* (21.1%), with most of the remainder on *Diascia cardiosepala* (9.1%), *D. veronicoides* (6.4%) and *D. macrophylla* (2.6%). A small number (4.9%) were collected on *Alonsoa unilabiata*, *Diascia 'arenicola'*, *D. 'bicornuta'*, *D. 'whiteheadii'*, *D. 'floribunda'*, *D. lewisiae*, *D. longicornis*, *D. parviflora* and *D. tanyceras*.

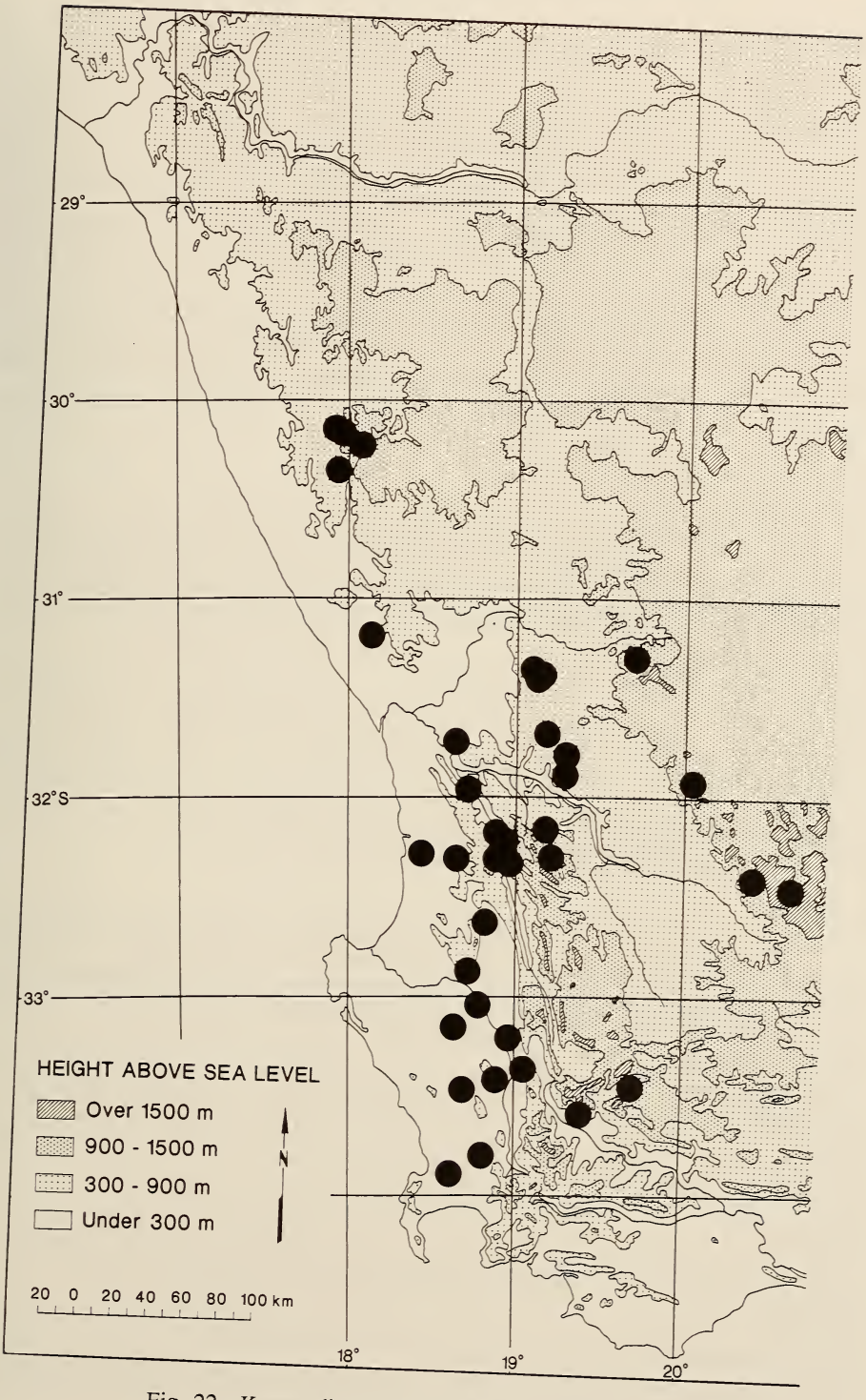

Fig. 22. Known distribution of *Rediviva intermixta*.

Nectar plants are visited by both males and females, the former not only for energy requirements but also to seek receptive females. The most commonly visited nectar plants by females were two *Moraea* species, namely *M. bifida* and *M. miniata* (39.2%). Other flowers commonly visited were *Oxalis pes-caprae*, *O. obscura* (22.3%) and *Arctotheca calendula* (16.1%). Visits of the remaining 22.4 per cent of females were divided among the following plants: *Bulbinella floribunda*, *Erodium circutarium*, *Geissorhiza aspera*, *Griellum humifusum*, *Nemesia cheiranthus*, *N. leipoldtii*, *Polycarena* sp., *Polygala* sp., *Raphanus raphanistrum*, *Romulea* sp., *Senecio arenarius*, *S. littoreus*, *Wachendorfia* sp., and a *Zygophyllum* sp.

The plant most visited by males was *Arctotheca calendula* (32.0%) followed by *Moraea bifida* and *M. miniata* (26.6%). *Oxalis pes-caprae* and *O. obtusa* accounted for 19.7 per cent of the visits and *Senecio arenarius* and *S. littoreus* for 12.2 per cent. The remaining males were collected on *Cysticapnos vesicaria*, *Lotononis hirsuta*, and on an *Othonna* sp.

Distribution (Fig. 22)

Rediviva intermixta is restricted to the western part of the Western Cape and Northern Cape provinces (Fig. 20). The most northerly collections have been made at Kamieskroon, the limits of the eastern distribution are at Sutherland, and the most southerly populations are found at Stellenbosch and the Tygerberg hills north of Bellville.

Rediviva emdeorum Vogel & Michener, 1984

Figs 2F, 23–26, 63B

Rediviva emdeorum Vogel & Michener, 1984, *in* Vogel, 1984: 515.
Rediviva emdeorum Vogel & Michener, 1985: 362.

Diagnosis

Female. Large bodied (13–16 mm) bees with extremely long (19–26 mm) forelegs. Head and mesosoma black, metasoma largely light brown with variable black areas on T1–T4, T5–T6 black. White to straw-coloured apical hair bands on T1–T4, fimbriae of T5 black, small area of white laterally, fimbriae of T6 black.

Male. Smaller (10–13 mm), legs nine-tenths of body length, white apical hair bands on T2–T5. Median lobes of S6 short, sub-truncate apically with long branched hairs, terminal hairs longer than lobe, lateral lobes well developed, strigate, translucent.

Etymology

Named for the Müller-Doblies family of Berlin whose son Uwe collected the holotype.

Material examined

Type material. *Holotype*: female, farm Grootvlei, west of Kamieskroon, 3017BB, U. Müller-Doblies, 15 Aug. 1979. Deposited in the Natural History

Museum, London. *Other material* (86 ♀♀, 7 ♂♂)—*Northern Cape Province*: 1 ♀, Calvinia, farm Toren, 3119BC, KES, 26 Aug. 1985; 1 ♀, Calvinia, farm Witputs, 3119DB, VBW, 28 Aug. 1990; 1 ♂, Garagams, 6.1 km east, 3017BD, KES, 28 Aug. 1985; 1 ♀, Garies, farm Doringkraal, 3018CA, VBW, 3 Sept. 1988; 2 ♀♀, 1 ♂, Garies, farm Skuinskraal, 3017DB, KES, 25 Aug. 1990; 2 ♀♀, Garies, farm Skuinskraal, 3017DB, VBW, 25 Aug. 1990; 3 ♀♀, Kamieskroon, farm Bakleikraal, 3018AA, MM, 8 Sept. 1986; 8 ♀♀, same locality, KES, 8 Sept. 1986; 11 ♀♀, same locality, VBW, 8 Sept. 1986; 3 ♀♀, Kamieskroon, farm Grootvlei, 3017BB, KES, 24 Aug. 1990; 6 ♀♀, 1 ♂, same locality, VBW, 24 Aug. 1990; 1 ♀, Kamieskroon, farm Outuin, 3017AA, KES, 7 Sept. 1986; 1 ♀, Kamieskroon, Leliefontein road, 3018AA, KES, 8 Sept. 1986; 1 ♀, same locality, MM, 8 Sept. 1986; 7 ♀♀, 2 ♂♂, Karkams, 3017BD, VBW & MM, 23 Aug. 1985; 1 ♀, same locality, MM, 4 Sept. 1986; 1 ♀, same locality, MM, 6 Sept. 1986; 2 ♀♀, 1 ♂, same locality, VBW, 18 Aug. 1988; 1 ♀, Karkams, 2 km north-east, 3017BD, MM, 7 Sept. 1986; 4 ♀♀, same locality, VBW, 4 Sept. 1986; 1 ♀, Karkams, 6 km north-east, 3017BD, KES, 18 Aug. 1988; 1 ♂, same locality, VBW, 18 Aug. 1988; 2 ♀♀, Karkams, 6.2 km north-east, KES, 4 Sept. 1986; 5 ♀♀, same locality, KES, 6 Sept. 1986; 1 ♀, Loeriesfontein, farm Koopmanskloof, 3019AB, KES, 13 Sept. 1989; 1 ♀, Nieuwoudtville, farm Glenlyon, 3119AC, VBW, 29 Aug. 1985; 1 ♀, same locality, KES, 26 Aug. 1990; 1 ♀, Nieuwoudtville, Grasberg road, 3119AC, KES, 10 Sept. 1986; 2 ♀♀, Springbok, Goegab Reserve, 2917CA, KES, 10 Aug. 1993; 2 ♀♀, Springbok, Hester Malan Reserve (=Goegab Reserve), 2917DB, KES, 25 Aug. 1989. *Western Cape Province*: 1 ♀, 3 ♀♀, Nuwerus, 15 km on Meerhofkasteel road, 3118AB, VBW, 22 Aug. 1993; 2 ♀♀, Nuwerus, 2.3 km west, 3118AB, KES, 21 Aug. 1990; 1 ♀, same locality, KES, 25 Aug. 1990; 1 ♀, Nuwerus, farm Middelputs, 3118AB, KES, 22 Aug. 1989; 2 ♀♀, Nuwerus, Meerhofkasteel road, 3118AB, VBW, 21 Aug. 1990; 3 ♀♀, same locality, VBW, 25 Aug. 1990; 3 ♀♀, Vanrhyn's Pass, foot, 3119AC, VBW, 23 Aug. 1995.

Description

Female

Measurements. *Holotype*: body 15 mm, foreleg 19 mm, forewing 10.5 mm (Vogel, 1984; Vogel & Michener, 1985). *Other material* (n = 39)—*Measurements and ranges*: body 13.7 mm (12.5–15.5 mm), foreleg 23.4 mm (19.3–26.3 mm), Ft+bt 8.0 mm (7.2–8.7 mm), forewing 10.3 mm (9.7–11, mm). *Ratios*: FL : B (n = 40) 1.7 (1.5–1.9), malar space (n = 20) L : W 0.20 (0.16–0.24).

Integumental colour. Head: mouth-parts, scape, pedicel and basal three-quarters of first flagellomere black, rest of flagellum dark brown. Mesosoma: black, wings dusky, veins dark brown to black, legs dark brown, basal third of front tibia light brown. Metasoma: terga with variable areas of black and light brown, T1 anterior surface with two lateral dark spots to all black, T2 black median spot on basal margin, sometimes absent, T3 dark brown to black on basal half of segment, sometimes entirely light brown, T4 entirely black to basal half black, T5 black. Basal sterna light brown becoming darker brown to black at apex of metasoma.

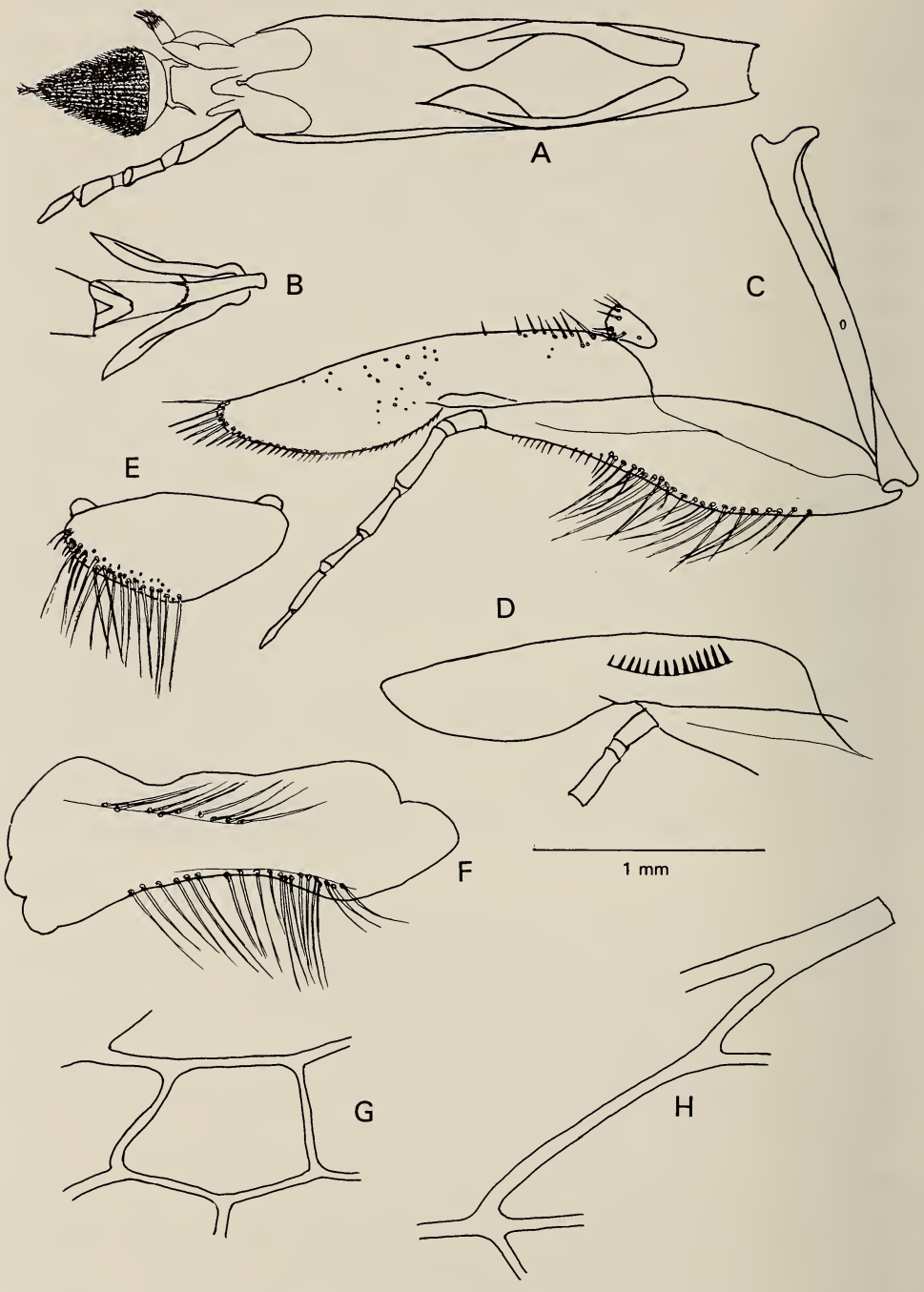

Fig. 23. *Rediviva emdeorum* Vogel & Michener, 1984. Female. A. Labium, anterior view. B. Base of prementum, mentum and lorum, posterior view. C. Left maxilla. D. Inner view of right galea to show galeal comb. E. Labrum. F. Right mandible. G. Second submarginal cell of right front wing. H. Basal vein and first abscissa of Rs of right front wing.

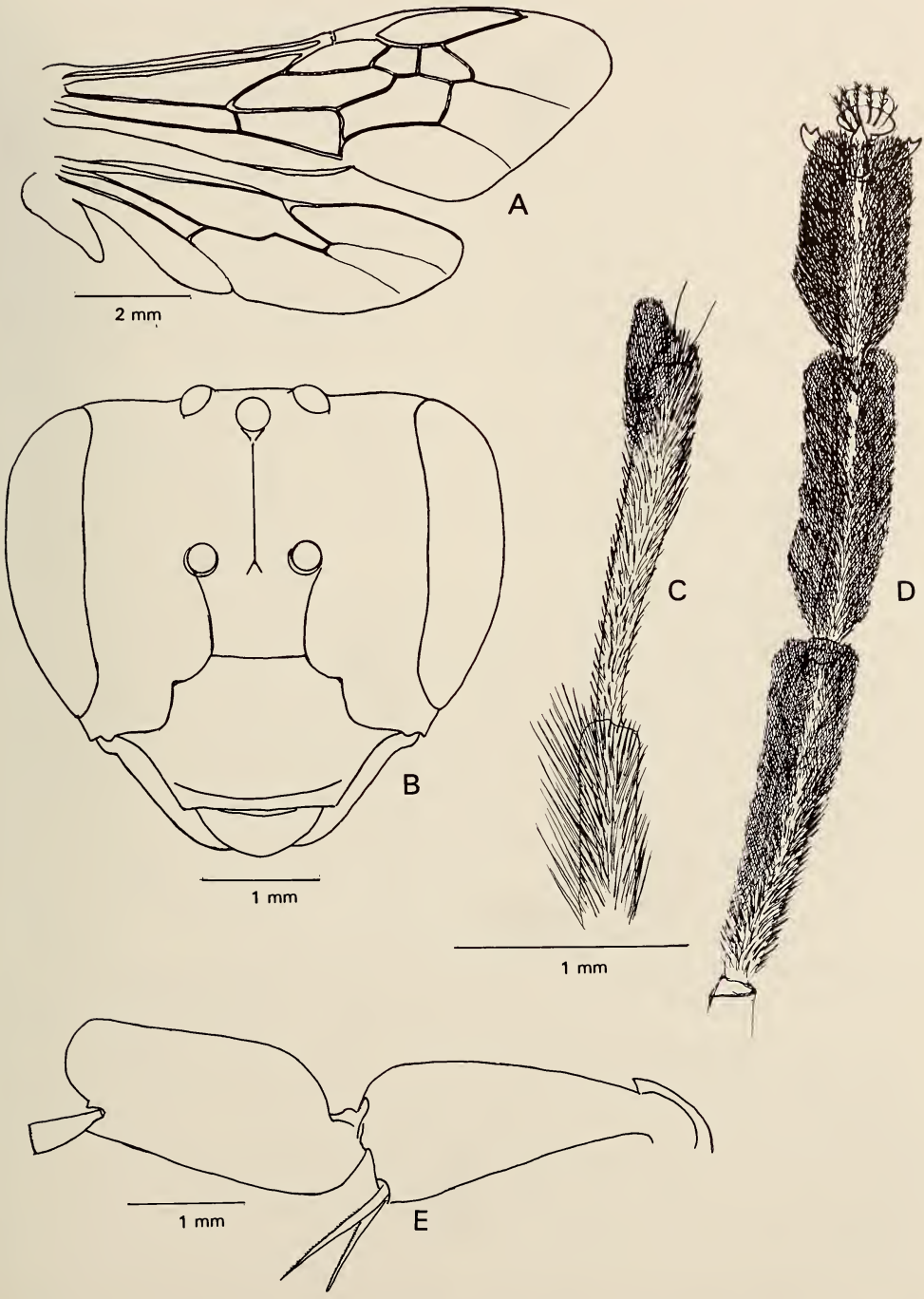

Fig. 24. *Rediviva emdeorum* Vogel & Michener, 1984. Female. A. Right wings. B. Head, anterior view. C. Foreleg, distal part of basitarsus plus tarsomere 2. D. Foreleg, tarsomeres 3–5. E. Hind tibia and basitarsus.

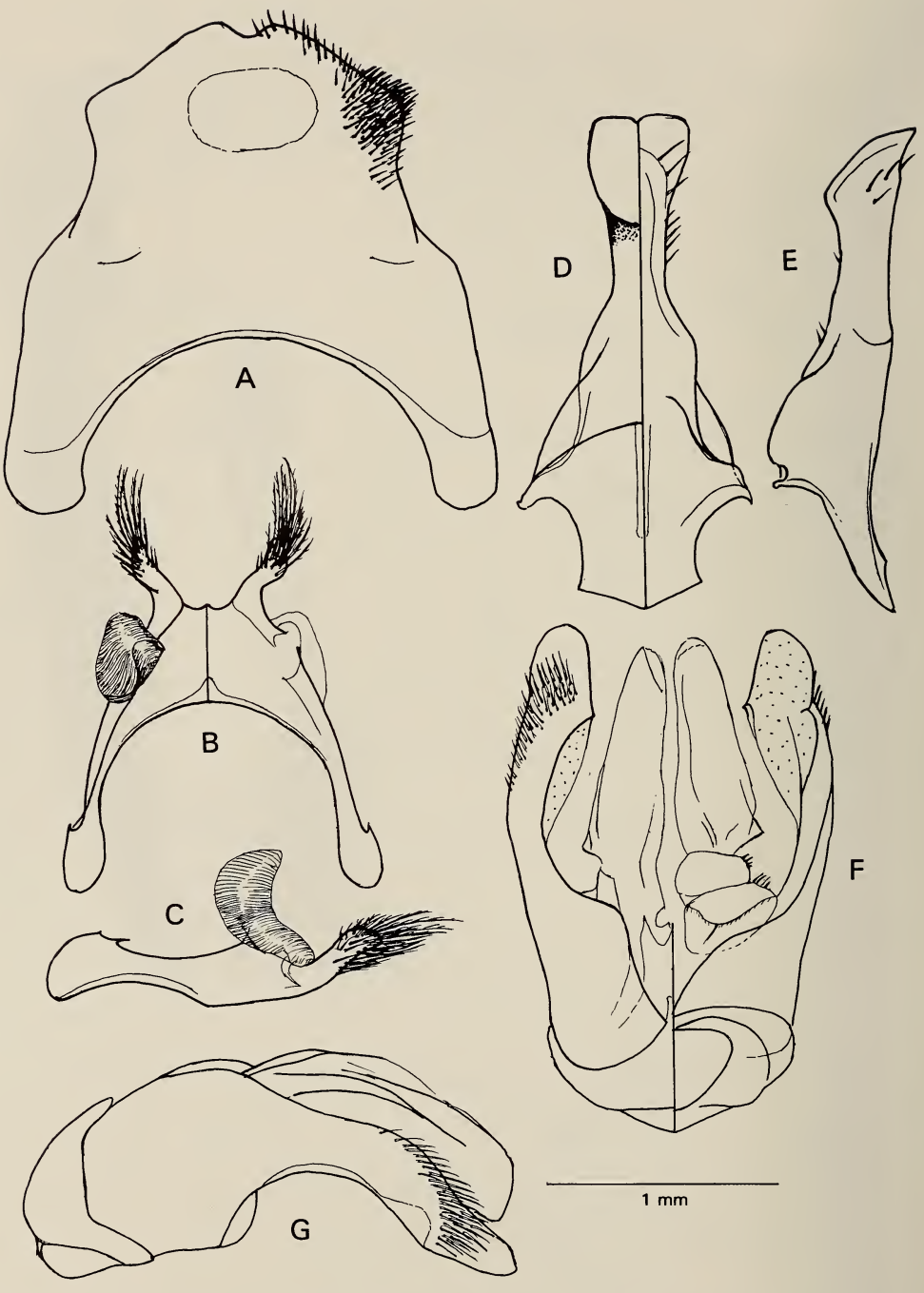

Fig. 25. *Rediviva emdeorum* Vogel & Michener, 1984. Male. A. Ventral aspect of S6. B. Dorsal and ventral view of S7. C. Lateral view of S7. D. S8, dorsal and ventral view. E. Lateral view of S8. F. Dorsal and ventral view of genitalia. G. Lateral view of genital capsule.

Structure. Head: wider than long (Fig. 24B); mouth-parts (Fig. 23A–F), glossa short, one-third length of prementum, paraglossae short, half length of suspensorium, reaching to basal third of glossa; labial palps extending to tip of glossa; ligular arms occupying basal half of prementum; cardo (Fig. 23C) as long as stipes, latter with fringe of long branched hairs on lower margin, apex of galea fringed with stout hairs becoming progressively shorter posteriorly, galeal comb of 14 teeth (Fig. 23D); labrum (Fig. 23E) subtriangular twice as wide as long; malar space narrow, length one-fifth of width. Mesosoma: front legs extremely long (19–26 mm), one and three-quarters length of body; hind tibia two and a half times as long as wide, as wide as basitarsus; basitarsus slightly longer than wide, rounded distally and projecting beyond attachment of segment two, distal dorsal scale-like projection absent (Fig. 24E); propodeal triangle well defined but area devoid of hairs, extremely small.

Sculpture. Head: basal third of labrum and distal margin of clypeus impunctate, shiny, rest of clypeus with large punctures, greater than their diameter apart, surface between punctures smooth, shiny. Mesosoma: disc of scutum finely punctured, punctures greater than diameter apart, area between punctures smooth, shiny; propodeal triangle faintly coriaceous rest of propodeum costulate, shiny.

Vestiture. Head: clypeus, supraclypeal, paraocular and genal areas, frons and scape covered in white plumose hairs, black hairs on inner eye margins and vertex. Mesosoma: shorter straw-coloured pubescence mixed with black hairs on scutum and scutellum, vestiture longer on metanotum and propodeum, similar pubescence on episternal areas; coxa, trochanter and femur of all legs covered in short pale straw-coloured hairs, becoming light brown on tibia and tarsus; oil-collecting hairs on apical quarter of tarsomere 2 (Fig. 24C), most of tarsomere 3 and all of tarsomeres 4–5 (Fig. 24D) of foreleg, no oil-collecting hairs on middle leg. Metasoma: apical hairbands present on T1–T4, white on T1, straw-coloured on T2–T4, T5 fimbriae mostly black, white laterally, T6 fimbriae black.

Male

Measurements and ranges (n = 7): body 11.8 mm (10.3–12.8 mm), foreleg 10.5 mm (10.2–10.9 mm), forewing 9.1 mm (8.8–9.7 mm). *Ratios*: FL : B 0.89 (0.80–1.0), malar space L : W 0.21 (0.18–0.25).

Integumental colour. Head, scape and pedicellus black, distal half of first flagellar segment and underside of rest of flagellum dark brown. Mesosoma: black, wings clear, veins dark brown; coxa and trochanter of all legs black, femur mostly black, brown at extremities, tibia of hind leg and tarsus of front and middle leg, light brown. Metasoma: variable areas of dark brown to black on tergum; T1 dark brown with small black area at junction with propodeum, to entirely black; T2 median black spot basally, to basal band of black; T3 basal two-thirds black rest of tergum brown, to completely black with lateral brown area; T4–T5 basal half black with lateral area brown, to all black with narrow strip of brown at junction of terga; T6–T7 black.

Structure. Forelegs not attenuate, nine-tenths of body length; S6 (Fig. 25A) with median and lateral lobes poorly developed, large translucent area on apical

third; S7 (Fig. 25B–C) median lobes short, sub-truncate apically, adorned with long branched hairs, terminal hairs longer than lobes; well-developed translucent strigate lateral lobes; S8 (Figs 25D–E, 63B) terminating in spade-shaped apical plate with crenulate apical margin. Genital capsule (Fig. 25F–G) with gonoforceps extending a little beyond penis valves, strong unbranched hairs on apical half, not reaching apex; volcellae conspicuous. Vestigial pygideal plate a narrow raised reddish-brown to black bare median area on apical margin of T7.

Sculpture. Head: labrum finely punctate except for narrow basal strip without punctures, coarse punctures on clypeus approximately one diameter apart, surface between punctures smooth, shiny. Mesosoma: punctation on disc of scutum fine, several punctures apart, surface between punctures shiny; propodeum with scattered fine punctures, surface costulate.

Vestiture. Head: silky white hairs on base and sides of clypeus, paraocular areas and anterior of scape, black hairs on inner eye margins, frons and vertex. Mesosoma: scutum and scutellum with pale straw-coloured hairs and some black hairs on disc; longer pale straw-coloured hairs on metanotum and propodeum; white pubescence on epipleural areas; patch of dark hairs sometimes present on apex of hind tibia and basitarsus. Metasoma: white apical hair bands on T2–T5.

Colour variations

The extent of black on the reddish-brown background of metasomal terga varies somewhat in females, with the loss of black maculation on the disc of T2 and reduction on the base of T3 in lighter specimens. There is also colour variation in males where the tendency is to be more melanic and the only brown markings on the metasomal terga are apico-lateral triangles on T2 and an apical rim on T1.

Host flower records

The main oil-host plant of *R. emdeorum* is the long-spurred *Diascia tanyceras*. The majority (80.3%) of females collected were visiting it for their oil requirements. The remaining females were on six other species of *Diascia*, namely, *D. 'whiteheadii'*, *D. namaquensis*, *D. 'tenuis'*, *D. insignis*, *D. macrophylla* and *D. 'floribunda'*. Only 20 females were captured on nectar plants, the majority being taken on *Arctotheca calendula*, *Trachyandra* sp. and *Moraea* sp. Single females were found taking nectar from *Oxalis* sp. and *Lachenalia* sp.

Of the seven males in our collection, six were taking nectar from *Arctotheca calendula* and one from *Moraea*.

Distribution (Fig. 26)

Rediviva emdeorum is restricted to the western parts of the Western Cape and Northern Cape provinces and is the only oil-collecting bee on long-spurred *Diascia* on the coastal plain in the vicinity of Garies and Kamieskroon. Specimens were also collected north of this area at Springbok, and south at Nuwerus. Isolated females have been found on long- and medium-spurred

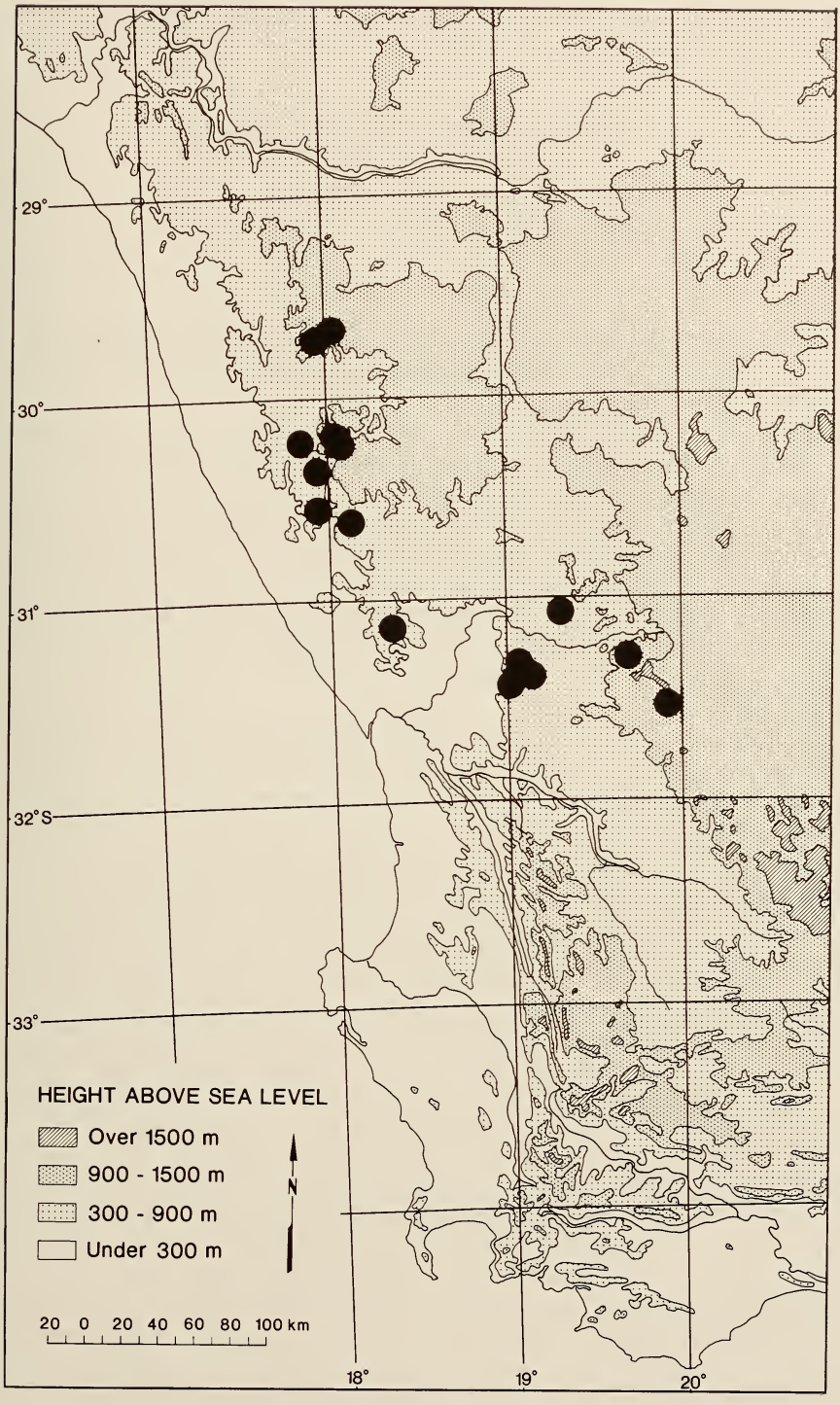

Fig. 26. Known distribution of *Rediviva emdeorum*.

Diascia outside the above areas, at Loeriesfontein, Nieuwoudtville, the foot of Vanrhyn's Pass and Calvinia.

Rediviva longimanus Michener, 1981
Figs 2E, 27–30, 64A

Rediviva longimanus Michener, 1981: 123.
Rediviva longimanus: Whitehead *et al.*, 1984: 286.

Diagnosis

Female. Large (12–16 mm) with black integument and vestiture, forelegs long (18–22 mm), 1.5 times body length, wings dusky. Hair bands not readily discernible on metasoma.

Males. Large (9–14 mm), black bodied, forelegs short, three-quarters length of body. Vestiture on T1–T5 black basally, white apically; basal area of black increasing progressively to T4 which is half black; T5 black with narrow apical white fringe, T6–T7 dark brown to black. Males of *R. longimanus*, *R. micheneri* and *R. nitida* are difficult to separate but *R. longimanus* can be recognized by the granular surface between punctures on the scutum. *R. longimanus* males lack the tuft of strong upright bristles on the proximal edge of the apical concavity on S6 and have a small vestigial pygideal plate on T7.

Material examined

Type material. *Holotype*: SAM-HYM-B002172, female, 5 miles (8 km) north of Nieuwoudtville, S.A.M., 9: 1961. (South African Museum collection.) *Other material* (186 ♀♀, 38 ♂♂)—*Northern Cape Province*: 3 ♀♀, Nieuwoudtville Wild Flower Reserve, 3119AC, KES, 29 Aug. 1985; 2 ♀♀, same locality, MM & VBW, 27 Aug. 1984; 1 ♀, same locality, MM & VBW, 28 Aug. 1984; 1 ♀, same locality, MM & VBW, 10 Sept. 1984; 5 ♀♀, same locality, MM & VBW, 27 Aug. 1985; 1 ♀, 4 ♂♂, same locality, MM & VBW, 28 Aug. 1985; 1 ♀, same locality, VBW, 19 Aug. 1986; 1 ♀, same locality, VBW, 5 Sept. 1986; 1 ♀, same locality, VBW, 24 Sept. 1986; 3 ♀♀, same locality, VBW, 28 Aug. 1995; 1 ♀, same locality, VBW, 20 Sept. 1996; 7 ♀♀, same locality, VBW, 10 Sept. 1996; 1 ♀, Nieuwoudtville, farm Glenlyon, 3119AC, KES, 26 Aug. 1990; 3 ♀♀, same locality, MM & VBW, 29 Aug. 1985; 4 ♀♀, same locality, MM, 10 Sept. 1986; 1 ♀, same locality, VBW, 17 Aug. 1986; 1 ♀, 1 ♂, same locality, VBW, 11 Sept. 1987; 7 ♀♀, same locality, VBW, 26 Aug. 1990; 7 ♀, 1 ♂, Nieuwoudtville, Grasberg road, 3119AC, KES, 10 Sept. 1986; 1 ♀, Nieuwoudtville, farm Lokenberg, 3119CA, KES, 25 Sept. 1986; 1 ♀, Nieuwoudtville, farm Teunisdrif, 3119AC, VBW, 25 Aug. 1988; 1 ♂, Nieuwoudtville, farm Willemsrivier, 3119AC, KES, 28 Aug. 1994; 11 ♂♂, same locality, VBW, 28 Aug. 1994; 1 ♀, Sutherland, farm Kanolfontein, 3220AD, VBW, 22 Sept. 1985. *Western Cape Province*: 1 ♀, 1 ♂, Bidouw Valley, 5 km south, 3219AA, KES, 28 Aug. 1990; 3 ♀♀, same locality, KES, 30 Aug. 1990; 1 ♀, Bidouw Valley, Uitkyk Pass, 3219AA, MM, 25 Aug. 1984; 1 ♀, same locality, VBW, 4 Sept. 1983; 1 ♀, same locality, VBW, 8 Sept. 1983; 2 ♀♀, same locality, VBW, 25 Aug. 1984; 2 ♀♀,

same locality, VBW, 30 Aug, 1990; 2 ♀♀, Botterkloof Pass, farm Piet se Hoek, 3119CD, KES, 30 Aug. 1985; 10 ♀♀, same locality, KES, 15 Sept. 1989; 1 ♀, same locality, VBW, 24 Aug. 1983; 7 ♀♀, Clanwilliam, 3218BB, VBW, 24 Aug. 1983; 3 ♀♀, Clanwilliam, 0.5 km south, 3218BB, VBW, 17 Aug. 1988; 1 ♀, 3 ♂♂, Clanwilliam, 0.6 km north, 3218BB, 11 Aug. 1989; 1 ♀, Clanwilliam, 1 km north, 3218BB, VBW, 12 Aug. 1994; 4 ♀♀, 1 ♂, Clanwilliam, 3 km south, 3218BB, VBW, 18 Aug. 1983; 10 ♀♀, Clanwilliam, 0.5 km north, 3218BB, VBW, 28 Aug. 1988; 1 ♀, 1 ♂, Clanwilliam 5 km south, 3218BB, VBW, 30 Aug. 1993; 3 ♀♀, Clanwilliam, 6.2 km south, 3218BB, VBW, 10 Sept. 1984; 1 ♀, Clanwilliam, 6.3 km south, 3218BB, KES, 20 Aug. 1985; 1 ♀, Clanwilliam, 7 km south, 3218BB, KES, 3 Sept. 1986; 1 ♀, same locality, MM, 3 Sept. 1986; 1 ♀, same locality, VBW, 3 Sept. 1986; 1 ♂, Clanwilliam, farm Holfontein, 3218BD, VBW, 11 Aug. 1981; 10 ♀♀, 4 ♂♂, same locality, VBW, 24 Aug. 1983; 1 ♀♀, same locality, VBW, 3 Sept. 1991; 12 ♀♀, same locality, VBW, 11 Sept. 1991; 1 ♀, Clanwilliam, farm Klawervlei, 3218BD, VBW, 20 Aug. 1984; 1 ♀, Clanwilliam, Pakhuis, 3219AA, MM, 25 Aug. 1984; 2 ♀♀, Clanwilliam, Ramskop Camp Ground, 3218BB, KES, 23 Aug. 1984; 1 ♀, 2 ♂, same locality, MM & VBW, 21 Aug. 1984; 2 ♂♂, same locality, MM & VBW, 22 Aug. 1984; 33 ♀♀, same locality, MM & VBW, 23 Aug. 1984; 2 ♀♀, same locality, VBW, 8 Aug. 1984; 1 ♀, Clanwilliam, farm Rondegat, 3218BD, KES, 24 Sept. 1989; 1 ♀, Sutherland, 64 km south-west, farm Thyskraal, 3220CC, VBW, 26 Sept. 1984; 3 ♀♀, 2 ♂♂, Vanrhyns Pass, 3119AC, VBW, 18 Aug. 1993; 1 ♀, Vanrhyns Pass, 3119AC, VBW, 16 Aug. 1994; 1 ♀, 1 ♂, Wupperthal, 3219AA, VBW, 29 Aug. 1990; 4 ♀♀, same locality, VBW, 30 Aug. 1990.

Description

Female

Measurements. *Holotype*: body 13.5 mm, forewing 10.3 mm (wing tips frayed), malar space L : W 0.21. *Other material* (n = 59)—*Measurements and ranges*: body 13.5 mm, (11.5–16.3 mm), forewing 10.7 mm, (9.7–11.7 mm), foreleg 20.7 mm (17.7–22.2 mm), Ft+bt 7.1 mm (6.8–7.5 mm). *Ratios*: FL : B 1.54, (1.36–1.75), malar space (n = 10) L : W 0.20 (0.19–0.23).

Integumental colour. Head, mandibles, scape, pedicellus and first flagellar segment black, rest of flagellum piceous to dark brown. Mesosoma black, legs and wing veins black to dark brown, wings dusky. Metasoma black.

Structure. Mouth-parts (Fig. 27A–F): glossa approximately one-fifth length of prementum, labial palps extending a little beyond tip of glossa, paraglossae reaching to half length of glossa, ligular processes occupying basal half of prementum (Fig. 27A); cardo equal length of stipes, apex of galea rounded (Fig. 27E), galeal comb of 16 teeth (Fig. 27B); labrum 2.5 times as wide as long, apical margin evenly rounded (Fig. 27D). Mesosoma: front legs attenuate 1.5 times length of body, hind tibia as wide as hind basitarsus (38 : 41), length of hind basitarsus 2.25 times width, no scale-like projection on distal dorsal angle (Fig. 28D).

Sculpture. Head: clypeus with apical margin largely impunctate, rest of clypeus coarsely punctured, diameter of punctures slightly less than distance

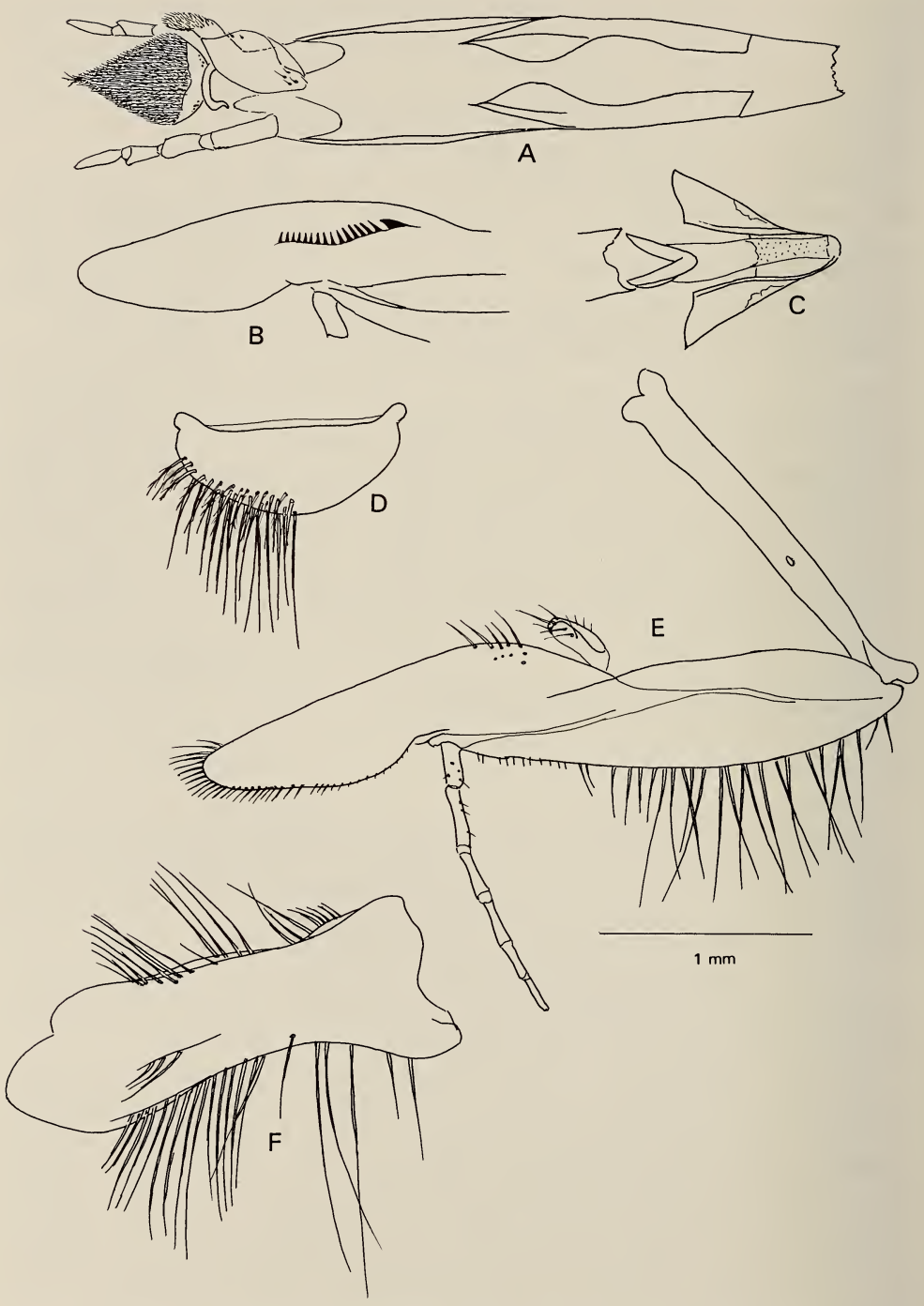

Fig. 27. *Rediviva longimanus* Michener, 1981. Female. A. Labium, anterior view. B. Inner view of galea to show comb. C. Base of prementum with mentum and lorum, posterior view. D. Labrum. E. Left maxilla. F. Left mandible.

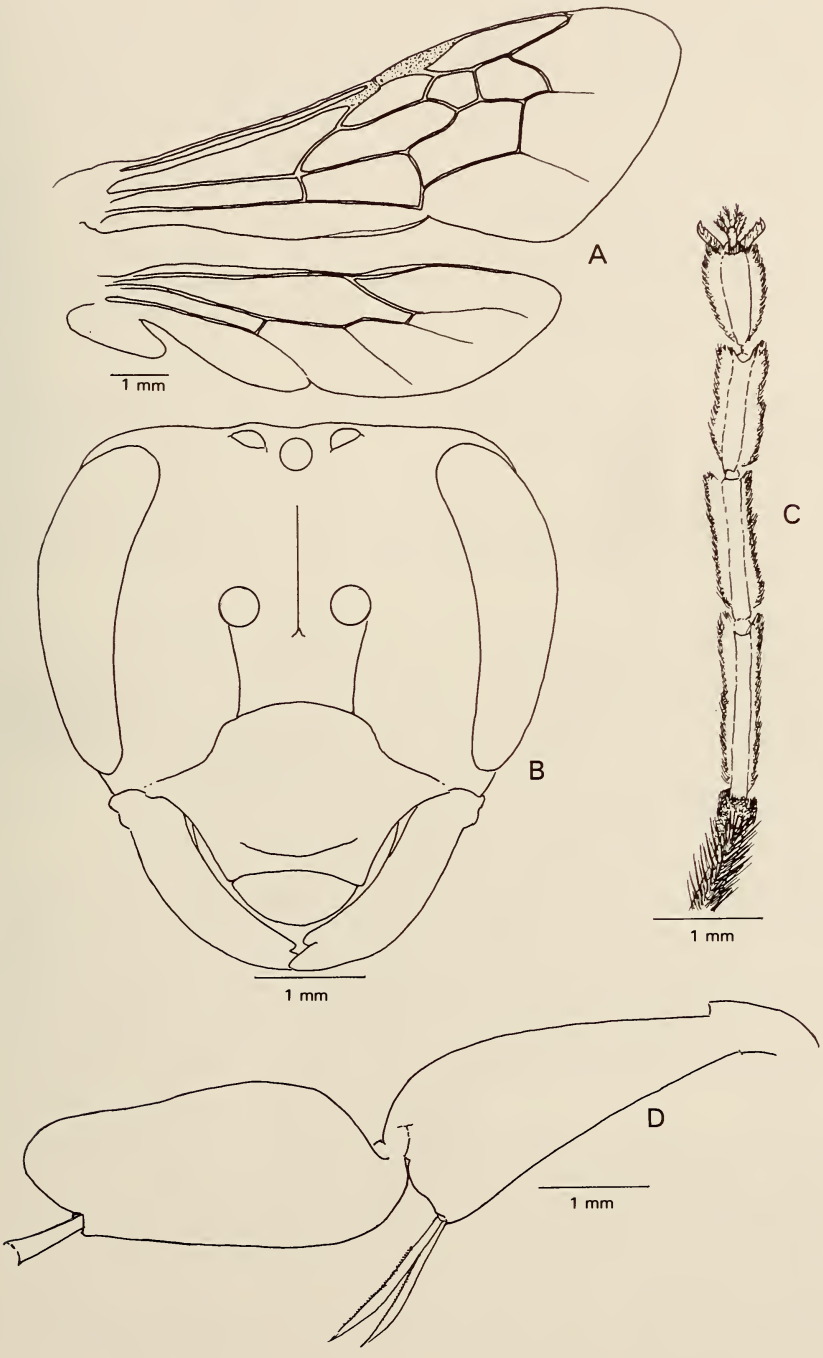

Fig. 28. *Rediviva longimanus* Michener, 1981. Female. A. Right wings. B. Head, anterior view. C. Distal part of basitarsus and tarsomeres 2–5 of front leg. D. Hind tibia and basitarsus.

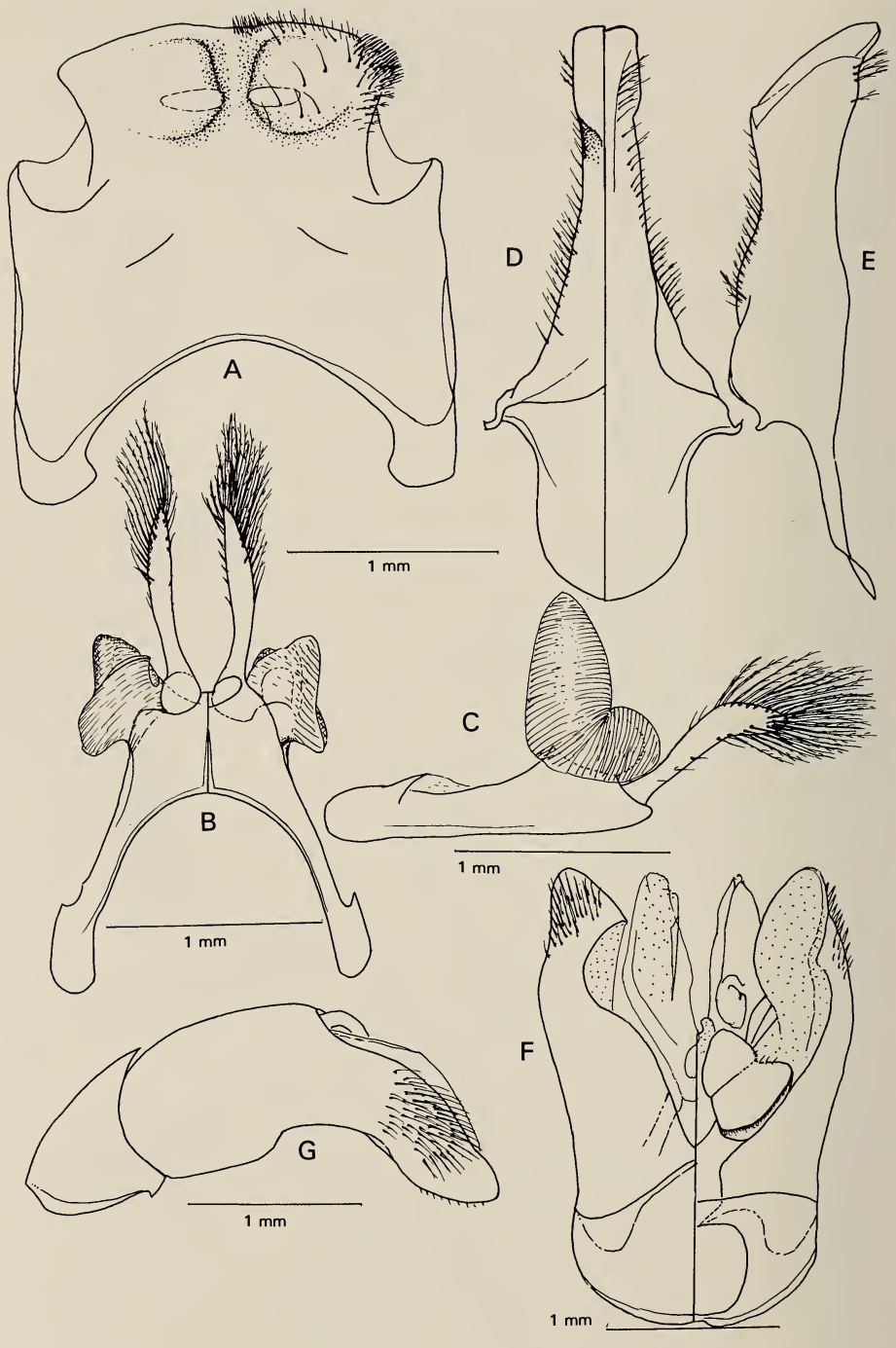

Fig. 29. *Rediviva longimanus* Michener, 1981. Male. A. S6, ventral view. B. S7, dorsal and ventral aspects. C. S7, lateral view. D. S8, dorsal and ventral view. E. S8, lateral view. F. Dorsal and ventral view of genitalia. G. Lateral view of genital capsule.

between them, surface between punctures roughened. Mesosoma: finely and densely punctured on disc, surface between punctures roughened, distance between punctures greater than their diameters; propodeal triangle small, distinct, surface shiny but wrinkled, rest of propodeum shiny with sparse fine punctation, punctures 3.5 times their diameters apart.

Vestiture. Head: pubescence black except on apical margin of labrum and mandibles where it is dark brown to piceous. Mesosoma: hairs black except tibia and tarsus of legs which are brown, oil-collecting hairs on apex of basitarsus and on tarsomeres 2–5 of front legs (Fig. 28C). Metasoma: short suberect black hairs on disc of T2–T4, longer laterally, on T5–T6 longer and more dense, fimbriae dark brown to black, light brown medially in some specimens.

Male

Measurements (n = 20). Body 12.5 mm (9.1–14.2 mm), forewing 9.4 mm (8.7–9.8 mm), foreleg 9.7 mm (8.9–10.6 mm). *Ratios*: FL : B 0.78 (0.74–0.84), malar space L : W 0.22 (0.19–0.25).

Integumental colour. Head black, scape and first flagellar segment black, rest of flagellum dark brown above black below. Mesosoma black, legs black, wings clear with veins dark brown. Metasoma black, terga with apical margins piceous.

Structure. Forelegs not attenuate, three-quarters to four-fifths length of body; S6 (Fig. 29A) with median lobes poorly developed, lateral lobes indicated by tuft of stiff short bristles; apical third of S6 concave, shiny with slightly raised median area without tuft of erect hairs on proximal part of ridge. S7 (Fig. 29B–C) with long spatulate median lobes, apical third adorned with long branched hairs, hairs at apex half length of lobe; large strigate translucent lateral lobes. S8 (Fig. 29D–E) with apical plate elongate oval, length twice width, evenly rounded distally (Fig. 64A). Genitalia (Fig. 29F–G): apex of gonoforceps not extending beyond ends of penis valves, stout unbranched bristles dorsally on apical third, not reaching apical margin. Vestigial pygideal plate a median narrow shiny raised area on apical margin of T7.

Sculpture. Head: labrum shiny, impunctate basally; strong dense punctures on clypeus, distance between punctures less than their diameter, surface between punctures smooth shiny. Mesosoma: scutum with fine punctures, approximately diameter apart, area between punctures dull, granulate; propodeal triangle shiny, faintly strigate.

Vestiture. Head: long silky white pubescence on clypeus, paraocular areas and scape. Mesosoma: pale straw-coloured hairs on most of scutum, scutellum and metanotum, some black hairs on disc of scutum and scutellum; similar hairs on propodeum with scattered black hairs on anterior margin; pubescence on legs shorter, pale straw-coloured to light brown, small patch of brown to black hairs on distal tip of basitarsus. Metasoma: T1–T5 covered in long erect, relatively sparse pubescence, black basally white apically, basal bands of black hairs on T1–T3 narrow and sometimes difficult to see, becoming progressively broader with half of T4 black and T5 with nearly all pubescence black on disc. Fringe of white hairs on whole of apical margin or sometimes only laterally, fimbriae on T6–T7 dark brown to black.

Remarks

Males of *R. longimanus*, *R. micheneri* and *R. nitida* have similar banding patterns on the terga of the metasoma and superficially similar appearance of S6, which make it difficult to separate them. The characters given in Table 1 will help to distinguish males of the three species.

TABLE 1

Distinguishing characters of the males of *Rediviva longimanus*, *R. micheneri* and *R. nitida*.

Character	*R. longimanus*	*R. micheneri*	*R. nitida*
White fringe on apical margin of T5	Present	Present	Absent
Surface between punctures on scutum	Granulate	Smooth, shiny	Smooth, shiny
Apical concavity on S6 with tuft of erect hairs on proximal margin	Absent	Present	Present
Apical patch of dark hair on hind tibia	Absent	Absent	Present

Host flower records

Of the 134 females collected on oil-producing plants, the majority were on *Diascia 'whiteheadii'* (85.1%) and *D. 'floribunda'* (12.7%). Single females were collected on *D. insignis*, *D. 'bicornuta'* and *D. parviflora*. Most of the 58 females taken on nectar plants were on several species of *Moraea*—65.5% on *M. miniata*, 12.1% on *M. bifida*, 12.1% on *M. fragrans*, 10.3% on *M. tripetala*, which is common in the area, as well as on an unidentified species of *Moraea*.

Males were mostly taken in flight while patrolling nectar plants for receptive females but 25.0% and 11.1% respectively were collected while taking nectar from *M. miniata* and *M. bifida*. Males were also found to visit *Cysticapnos vesicaria* (8.3%) and *M. tripetala* (2.7%) for nectar. Two males were collected on the Van Rhyn's Pass with pollinaria of *Holothrix aspera* attached, presumably while collecting nectar.

Distribution (Fig. 30)

Rediviva longimanus is concentrated around Clanwilliam in the Olifants River valley but extends eastward over the Pakhuis Pass into the Bidouw valley and northwards to the Nieuwoudtville area. Isolated specimens have also been found to the west and south of Sutherland. The type locality, 8 km north of Nieuwoudtville, is on the northern boundary of its range.

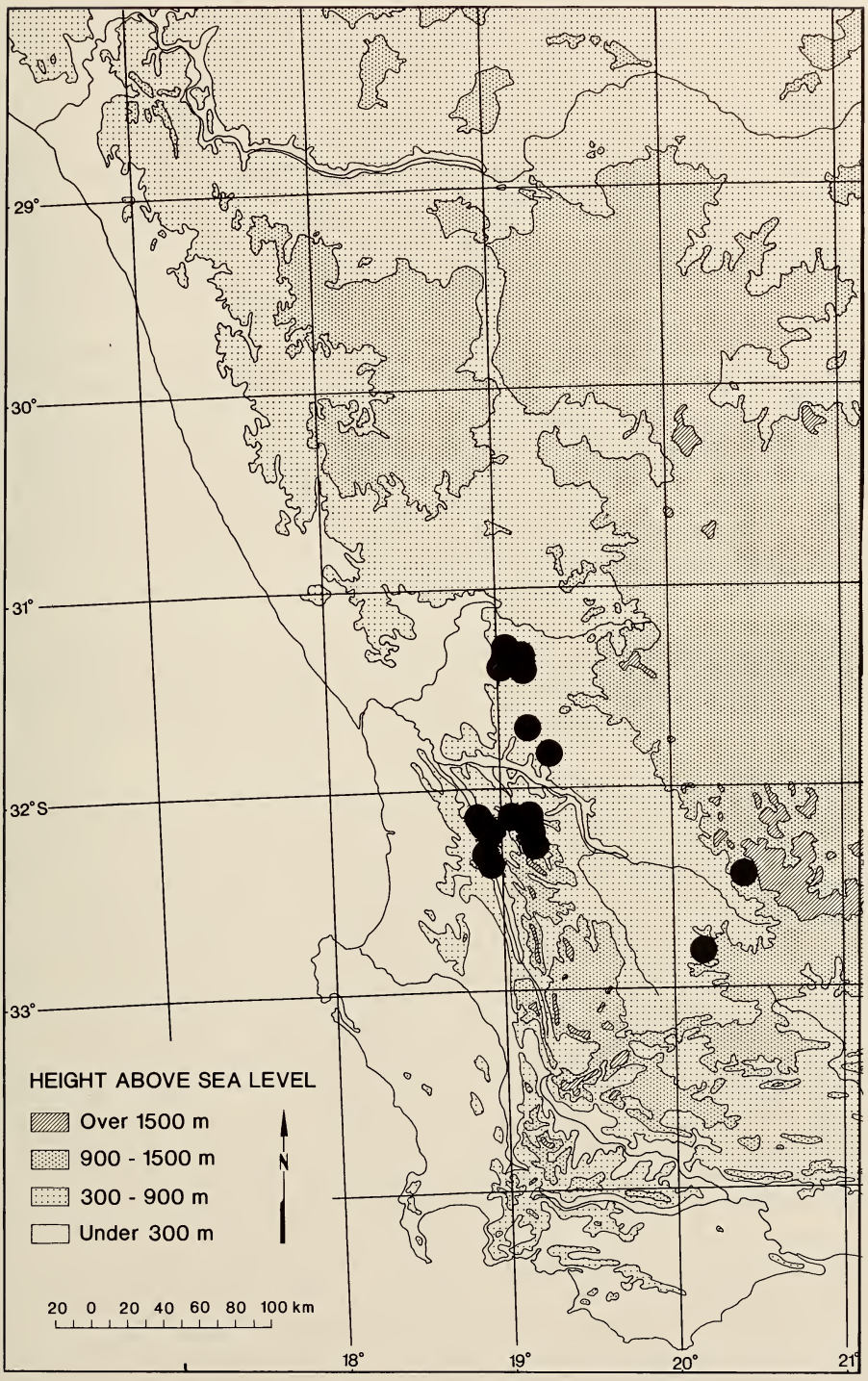

Fig. 30. Known distribution of *Rediviva longimanus*.

Rediviva macgregori sp. nov.

Figs 2D, 31–34, 64C

Diagnosis

Female. Black-bodied medium-sized, 12.5 to 13.5 mm, with front leg equal to or up to one and a quarter times length of body. Malar space narrow, length one sixth of width. Surface between punctures on disc of scutum shiny. Pubescence pale straw-coloured to light brown with diffuse hair bands on apical margin of T1–T4. Fimbriae of T5 and T6 white laterally, light brown medially. Oil-collecting hairs on tarsomeres 2–5 of front legs, absent on middle legs. No scale on dorsal distal angle of hind basitarsus.

Male. Black-bodied, 10–12.5 mm in length, malar space as in female. Diffuse straw-coloured apical hair bands on T1–T5, fimbriae of T6 black, of T7 brown. Sub-erect hairs on basal two-thirds of T3–T4 straw-coloured, on T5 with addition of black hairs, on T6–T7 dark brown to black. S6 with poorly developed median and lateral lobes, S7 with short spatulate median lobes densely covered with short plumose hairs, lateral lobes large, strigate and translucent. Short stout unbranched hairs on apical half of gonoforceps, penis valves heavily sclerotized and expanded apically.

Etymology

Named for Neil Macgregor of the farm Glenlyon at Nieuwoudtville, who introduced us to the Nieuwoudtville Wild Flower Reserve, allowed us access to his property and on many occasions provided us with accommodation.

Material examined

Type material. *Holotype*: SAM-HYM-B008048 female, Nieuwoudtville, farm Glenlyon, 3119AC, K. E. Steiner, 29 Aug. 1985. *Allotype*: SAM-HYM-B008049, male, Nieuwoudtville Wild Flower Reserve, 3119AC, V. B. Whitehead, 24 Aug. 1988. *Paratypes* (51 ♀♀, 38 ♂♂)—*Northern Cape Province*: 4 ♀♀, Calvinia, farm Toren, 3119BC, KES, 26 Aug. 1985; 5 ♀♀, same locality, VBW & MM, 26 Aug. 1985; 5 ♀♀, Kamieskroon, farm Bakleikraal, 3018AA, KES, 8 Sept. 1986; 1 ♀, 1 ♂, Kamieskroon, Leliefontein road, 36 km south-east of Gamoep turn off, 3018AA, VBW, 8 Sept. 1986; 2 ♀♀, Middelpos, farm Hartbeestfontein, 3220CC, KES, 28 Sept. 1984; 2 ♀♀, Nieuwoudtville, farm Glenlyon, 3119AC, KES, 29 Aug. 1985; 2 ♂♂, same locality, VBW, 25 Aug. 1988; 1 ♀, same locality, VBW, 26 Aug. 1990; 5 ♀♀, same locality, VBW & MM, 29 Aug. 1985; 3 ♀♀, Nieuwoudtville Wild Flower Reserve, KES, 26 Aug. 1984; 2 ♀♀, same locality, VBW, 24 Sept. 1986; 2 ♂♂, same locality, VBW, 4 Aug. 1988; 16 ♂♂, same locality, VBW, 28 Aug. 1988; 2 ♂♂, same locality, VBW, 20 Aug. 1990; 1 ♀, same locality, VBW, 28 Aug. 1990; 3 ♀♀,4 ♂♂, same locality, VBW, 21 Aug. 1996; 3 ♀♀, 1 ♂, same locality, VBW & MM, 26 Aug. 1984; 2 ♂♂, same locality, VBW & MM, 27 Aug. 1984; 4 ♀♀, same locality, VBW & MM, 28 Aug. 1984; 3 ♀♀, same locality, VBW & MM, 27 Aug. 1985; 5 ♂♂, same locality, VBW & MM, 7 Aug. 1986; 4 ♀♀, Sutherland, 4 km south, farm Rooikloof, 3220BC, KES, 27 Sept. 1984; 1 ♀, 1 ♂, same locality, VBW, 27 Sept. 1984; 1 ♂, same

locality, KES, 1 Oct. 1986; 1 ♀, Sutherland, farm Fransplaas, 3220AB, VBW, 4 Oct. 1996. *Other material* (502 ♀♀, 63 ♂♂)—*Northern Cape Province*: 8 ♀♀, Calvinia, farm Toren, 3119BC, KES, 26 Aug. 1985; 2 ♀♀, 3 ♂♂, same locality, MM, 26 Aug. 1985; 13 ♀♀, same locality, VBW & MM, 26 Aug. 1985; 1 ♀, same locality, VBW, 26 Aug. 1985; Calvinia, farm Vanrhynshoek, 3019BD, KES, 14 Aug. 1989; Garies, farm Welkom, 3018CA, KES, 8 Sept. 1986; 1 ♀, same locality, VBW, 30 Sept. 1988; 7 ♀♀, Kamieskroon, farm Bakleikraal, 3018AA, KES, 8 Sept. 1986; 3 ♀♀, same locality, MM, 8 Sept. 1986; 9 ♀♀, same locality, VBW, 7 Sept. 1986; 2 ♀♀, Kamieskroon, farm Dassiefontein, 3018AA, KES, 7 Sept. 1986; 1 ♀, same locality, VBW, 7 Sept. 1986; 1 ♀, Kamieskroon, farm Die Tuin, 3018AA, VBW, 7 Sept. 1986; 1 ♀, Kamieskroon, farm Koringlandkloof, 3018AC, VBW, 30 Sept. 1988; 3 ♀, 1 ♂, Kamieskroon, Leliefontein road, 36 km south-east of Gamoep turn off, 3018AA, VBW, 8 Sept. 1986; 2 ♀♀, Kamieskroon, farm Outuin, 3018AA, KES, 7 Sept. 1986; 2 ♀♀, same locality, VBW, 7 Sept. 1986; 3 ♀♀, Kamieskroon, farm Bakleikraal, 3018AA, MM, 8 Sept. 1986; 1 ♀, Middelpos, 19.6 km north-east, 3120CC, KES, 28 Sept. 1986; 1 ♀, Middelpos, 23 km west, 3120CC, VBW, 28 Sept. 1984; 3 ♀♀, Middelpos, 35 km north-west, 3120CC, VBW, 28 Sept. 1984; 1 ♀, Middelpos, 52 km south, VBW, 27 Aug. 1988; 2 ♀♀, Middelpos, farm Blomfontein, 3120CC, KES, 3 Oct. 1985; 7 ♀♀, same locality, KES, 1 Oct. 1992; 5 ♀♀, same locality, VBW, 3 Sept. 1985; 3 ♀♀, Middelpos, farm Hartbeestfontein, 3120CC, KES, 28 Sept. 1984; 2 ♂♂, same locality, VBW, 27 Aug. 1990; 1 ♀, same locality, VBW, 16 Sept. 1993; 1 ♀, Nieuwoudtville, 5 km south, 3119AC, KES, 11 Sept. 1987; 2 ♀♀, same locality, VBW, 11 Sept. 1987; 7 ♀♀, same locality, VBW, 25 Aug. 1988; 5 ♀♀, same locality, VBW, 27 Sept. 1988; 7 ♀♀, 2 ♂♂, Nieuwoudtville, farm Glenlyon, 3119AC, KES, 29 Aug. 1985; 2 ♀, same locality, KES, 11 Sept. 1987; 9 ♀♀, 2 ♂♂, same locality, VBW & MM, 29 Aug. 1985; 1 ♀, same locality, VBW & MM, 9 Sept. 1987; 3 ♀, 2 ♂♂, same locality, VBW, 11 Sept. 1987; 5 ♀♀, 4 ♂♂, same locality, VBW, 25 Aug. 1988; 8 ♀♀, same locality, VBW, 26 Aug. 1990; 1 ♀, 1 ♂, same locality, VBW, 2 Oct. 1996; 9 ♀♀, same locality, VBW, 3 Oct. 1996; 4 ♀♀, Nieuwoudtville Wild Flower Reserve, 3119AC, KES, 26 Aug. 1984; 1 ♀, same locality, KES, 27 Aug. 1984; 9 ♀♀, same locality, KES, 28 Aug. 1984; 1 ♂, same locality, KES, 27 Aug. 1985; 2 ♂♂, same locality, KES, 19 Aug. 1986; 1 ♀, 3 ♂♂, same locality, KES, 20 Aug. 1986; 1 ♂, same locality, KES, 23 Sept. 1996; 3 ♀♀, same locality, MM, 9 Sept. 1986; 5 ♀♀, same locality, VBW & MM, 24 Aug. 1984; 12 ♀♀, same locality, VBW & MM, 26 Aug. 1984; 4 ♂♂, same locality, VBW & MM, 27 Aug. 1984; 119 ♀♀, 4 ♂♂, same locality, VBW & MM, 27 Aug. 1984; 3 ♀♀, same locality, VBW & MM, 29 Aug. 1984; 2 ♀♀, 4 ♂♂, same locality, VBW & MM, 10 Sept. 1984; 2 ♀♀, same locality, VBW & MM, 11 Sept. 1984; 73 ♀♀, same locality, VBW & MM, 27 Aug. 1995; 9 ♀♀, same locality, VBW & MM, 28 Aug. 1985; 5 ♂♂, same locality, VBW, 2 Aug. 1984; 9 ♀♀, same locality, VBW, 28 Aug. 1984; 5 ♂♂, same locality, VBW, 7 Aug. 1986; 1 ♀, 1 ♂, same locality, VBW, 19 Aug. 1986; 2 ♀, same locality, VBW, 9 Sept. 1986; 9 ♀♀, same locality, VBW, 24 Sept. 1986; 5 ♂, same locality, VBW, 24 Aug. 1988; 3 ♀♀, 4 ♂♂, same locality, VBW, 20 Aug. 1990; 3 ♀♀, 2 ♂♂, same locality, VBW, 24 Aug. 1994; 10 ♀♀, 2 ♂♂, same locality, VBW,

29 Aug. 1995; 10 ♀♀, same locality, VBW, 31 Aug. 1995; 18 ♀♀, same locality, VBW, 5 Sept. 1995; 1 ♀, same locality, VBW, 6 Sept. 1995; 2 ♀♀, same locality, VBW, 28 Sept. 1995; 3 ♂♂, same locality, VBW, 30 Aug. 1996; 1 ♀, 2 ♂♂, same locality, VBW, 10 Sept. 1996; 1 ♂, same locality, VBW, 20 Sept. 1996; 1 ♂, same locality, VBW, 16 Oct. 1996; 1 ♀, Nieuwoudtville, farm Soetwater, on R27, 8.2 km east of R364 junction, 3119AD, KES, 15 Sept. 1989; 2 ♀♀, Sutherland, 4 km south, 3220BC, KES, 27 Sept. 1984; 1 ♀, same locality, VBW, 26 Sept. 1984; 11 ♀♀, same locality, VBW, 27 Sept. 1984; 3 ♀, Sutherland, 27 km west, 3220BA, VBW, 3 Sept. 1985; 5 ♀♀, Sutherland, 29.7 km north-west, 3220AD, VBW, 22 Sept. 1985; 1 ♀, Sutherland, farm Brandwacht, 3220BC, VBW, 14 Sept. 1993; 2 ♀♀, Sutherland, farm Kanolfontein, 3220AD, KES, 22 Sept. 1985; 3 ♀♀, same locality, KES, 1 Oct. 1986; 1 ♀, same locality, VBW, 27 Sept. 1984; 4 ♀♀, Sutherland, farm Kentucky, 3220DC, KES, 17 Sept. 1993; 1 ♀, same locality, VBW, 16 Sept. 1993; 1 ♀, 3 ♂♂, same locality, VBW, 17 Sept. 1993; 1 ♀, Sutherland, farm Rheeboksfontein, 3220DC, KES, 15 Sept. 1993; 1 ♂, Sutherland, farm Rooikloof, 3220BC, KES, 1 Oct. 1986; 2 ♀♀, same locality, KES, 16 Sept. 1993; 2 ♀♀, same locality, KES, 19 Sept. 1993; 9 ♀♀, same locality, VBW, 20 Sept. 1986; 1 ♀, same locality, VBW, 16 Sept. 1993; 2 ♀♀, Sutherland, Ouberg Pass road, farm Tweeriviere, 3220AD, KES, 1 Oct. 1986. *Western Cape Province*: 1 ♀, 1 ♂, Laingsberg, 30 km west, farm Matjiesfontein, 3320BA, VBW, 15 Sept. 1993; 1 ♀, Sutherland, 82 km south, farm Fortuin, 3220DC, VBW, 21 Sept. 1985; 1 ♀, 1 ♂, Sutherland, farm Thyskraal, 3220CC, VBW, 26 Sept. 1984.

Description

Female

Measurements. *Holotype*: body 13.5 mm, forewing 10.2 mm, malar space L : W 0.2. *Other material* (n = 15)—*Measurements and ranges*: body 12.8 mm (11.8–13.3 mm), forewing 10.3 mm (9.2–12.0 mm), foreleg 14.7 mm (13.0–15.1 mm), Ft+bt 5.5 mm (4.6–5.9 mm). *Ratios*: FL : B 1.14 (1.06–1.24), malar space L : W 0.17 (0.15–0.20).

Integumental colour. Head black, antennae, legs and body dark brown to black.

Structure. Mouth-parts (Fig. 31A–F): glossa short, one-third length of prementum, labial palps extending little beyond tip of glossa, ligular arms occupying basal half of prementum (Fig. 31A); maxilla (Fig. 31E) with stipes slightly longer than cardo, having long hairs on lower margin, basal segment of maxillary palp with long stout hairs; galea as long as stipes with short hairs on apical margin, galeal comb of 16 teeth (Fig. 31C); labrum (Fig. 31D) three times as broad as long (58 : 20), anterior margin shallowly convex with long unbranched hairs on apical third. Mesosoma: front legs longer than body, hind tibia (Fig. 31G) slightly narrower than basitarsus (3.3 : 3.4), hind basitarsus trapezoidal, a little more than twice as long as wide (7.5 : 3.5), no scale on distal dorsal angle.

Sculpture. Head: labrum with apical two-thirds punctate; clypeus and supraclypeal area coarsely punctate, distance between punctures less than their

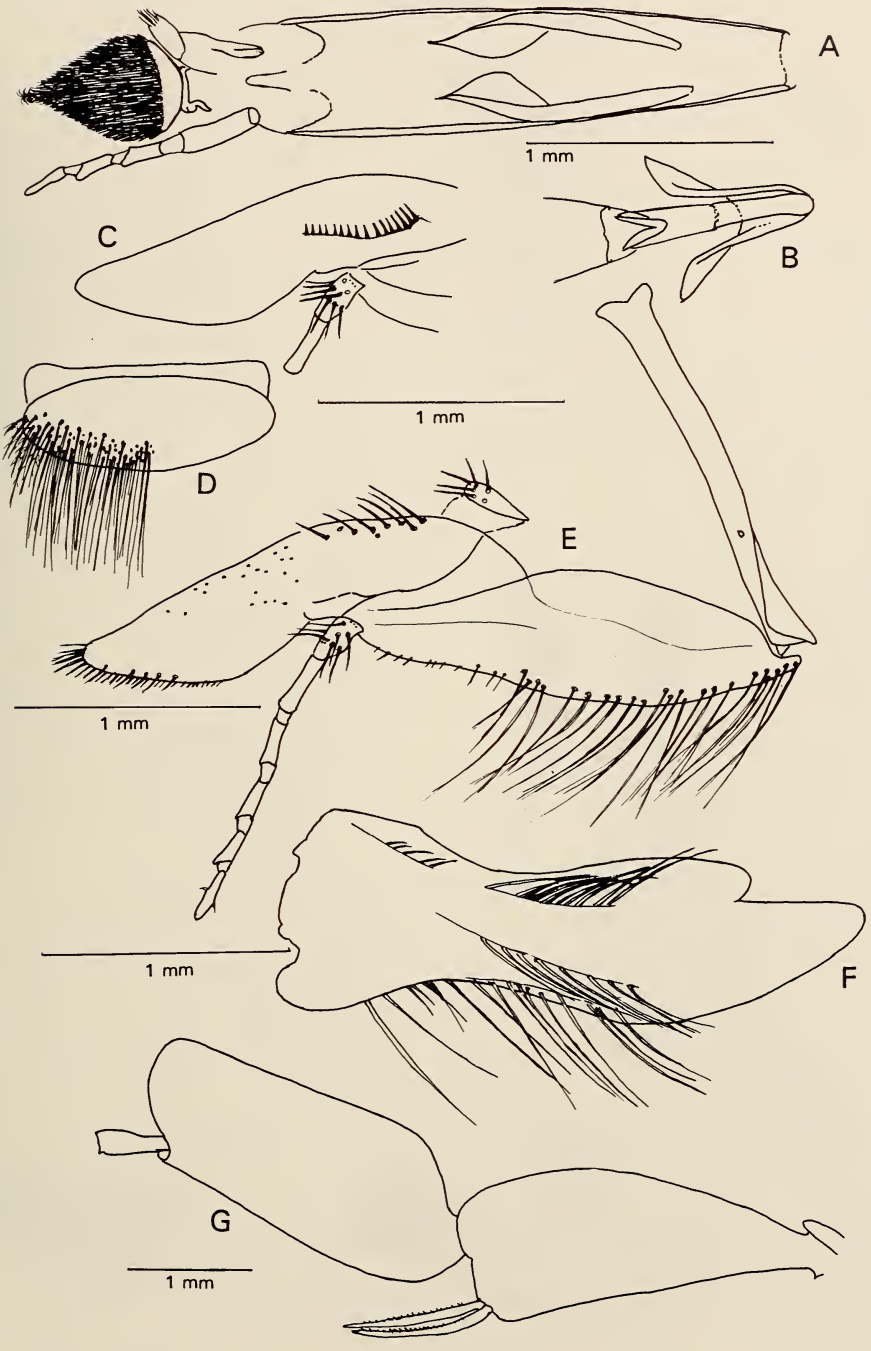

Fig. 31. *Rediviva macgregori* sp. nov. Female. A. Labium, posterior view. B. Base of labium, anterior view. C. Inner view of galea to show comb. D. Labrum. E. Left maxilla. F. Right mandible. G. Hind tibia and basitarsus.

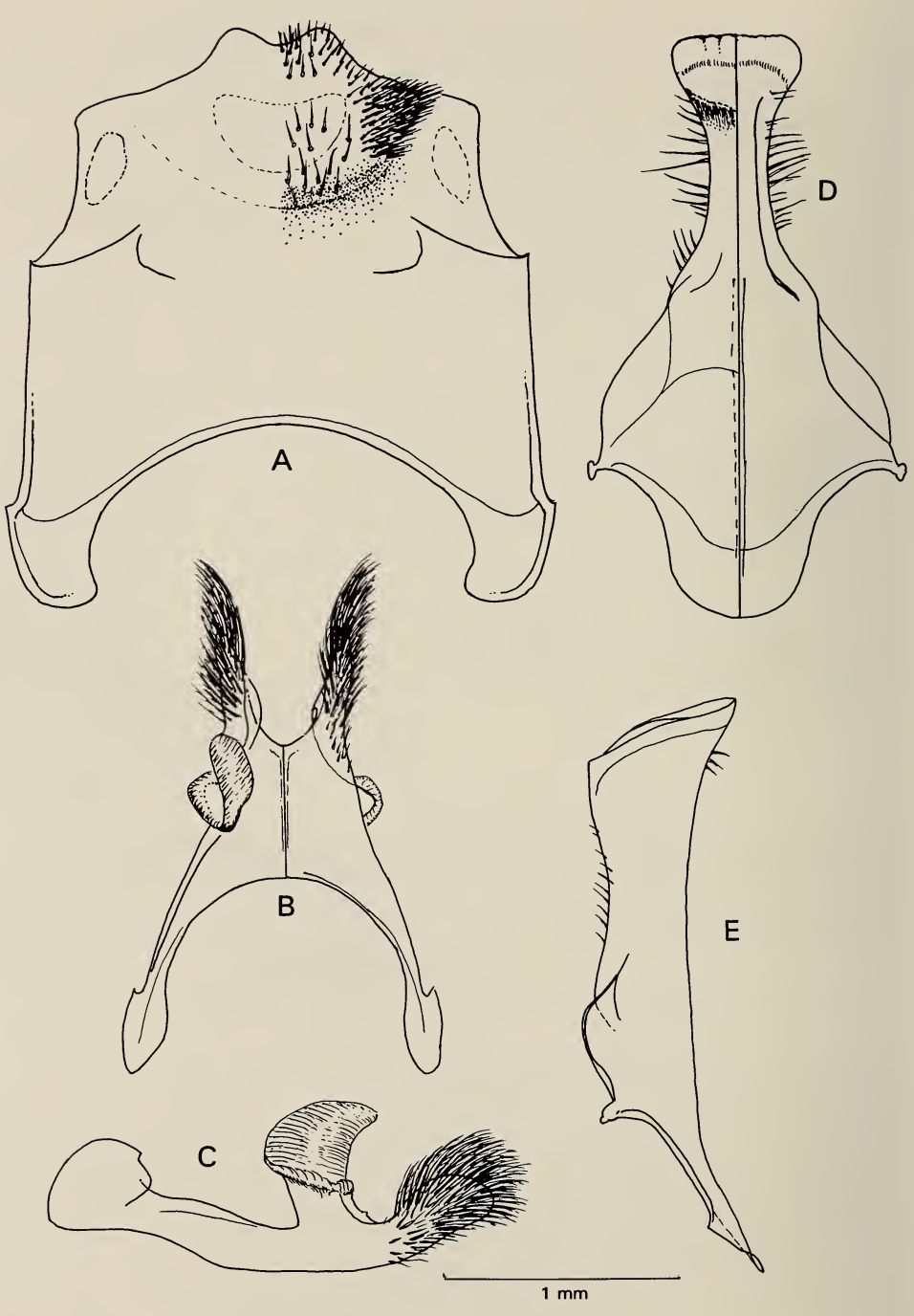

Fig. 32. *Rediviva macgregori* sp. nov. Male. A. S6, ventral view. B. Dorsal and ventral view of S7. C. Lateral view of S7. D. Dorsal and ventral aspects of S8. E. Lateral aspect of S8.

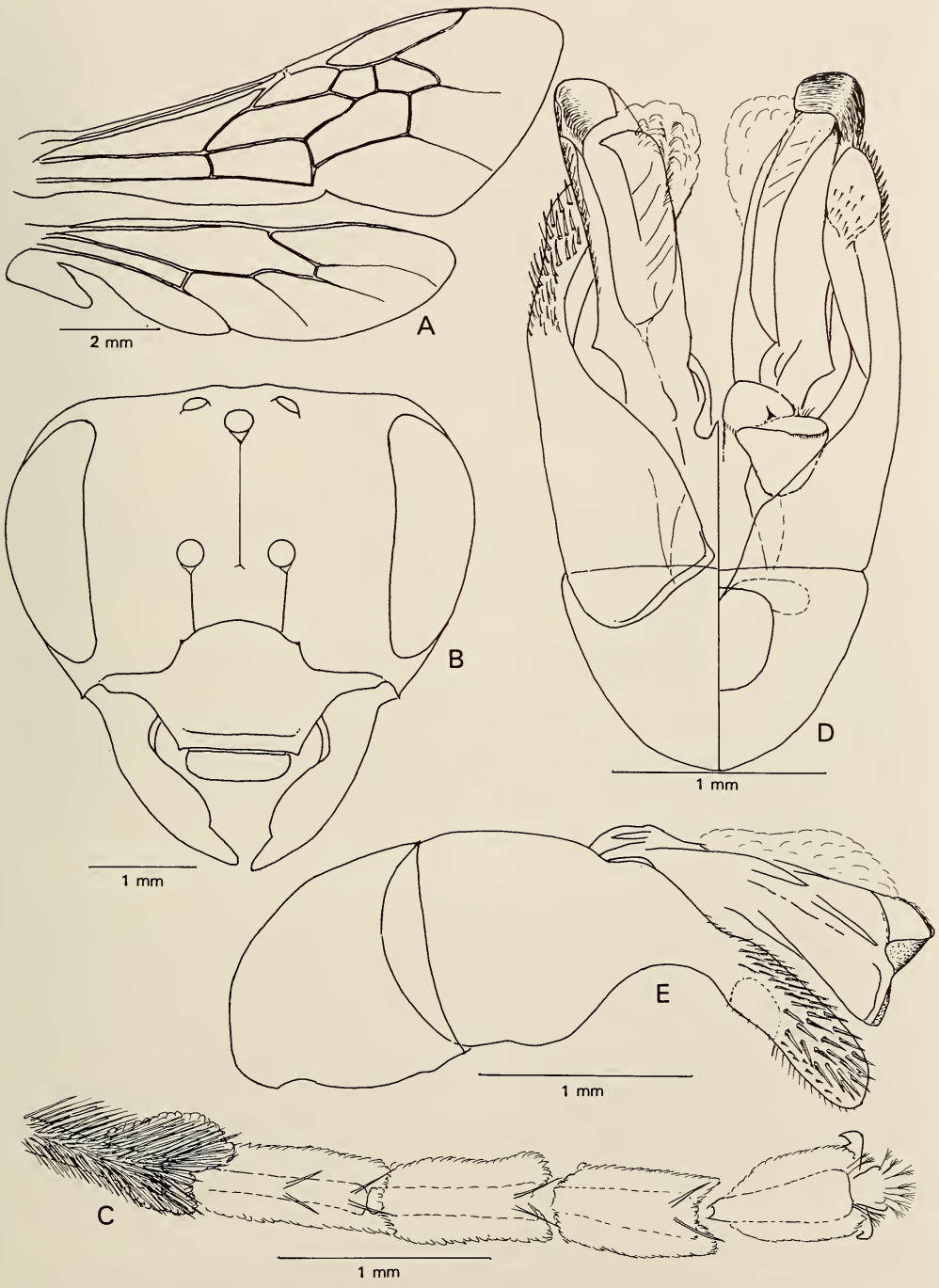

Fig. 33. *Rediviva macgregori* sp. nov. A–C. Female. A. Right wings. B. Anterior view of head. C. Distal part of front basitarsus plus tarsomeres 2–5. D–E. Male genitalia. D. Dorsal and ventral view of genitalia. E. Genital capsule, lateral view.

diameter, surface between punctures smooth, shiny. Mesosoma: punctation on disc of scutum finer than on clypeus and more widely spaced, distance between punctures greater than their diameters, surface between punctures shiny; propodeal triangle small, poorly defined, impunctate, shiny.

Vestiture. Head: long light brown unbranched hairs mixed with shorter plumose hairs on apical two-thirds of labrum, white to pale straw-coloured branched hairs on paraocular and supraclypeal area, shorter and less dense on clypeus; erect black branched hairs along ocular carinae. Mesosoma: pubescence on scutum, scutellum and metanotum light brown, longer and paler on propodeum and episternum; legs with similar vestiture, but hairs on tibiae and tarsi light brown; oil-collecting hairs on distal tip of basitarsus and on tarsomeres 2–5 of foreleg (Fig. 31C); no oil-collecting hairs on tarsus of middle legs. Metasoma: diffuse straw-coloured hair bands on apical margin of T1–T4, shorter pubescence of similar colour on basal two-thirds; fimbriae on T5 and T6 white laterally, light brown medially.

Male

Measurements. *Allotype*: body 11.8 mm, forewing 8.7 mm, malar space L : W 0.16. *Other material* (n = 10)—*Measurements and ranges*: body 11.4 mm (10.0–12.3 mm), forewing 9.1 mm (8.5–9.8 mm), foreleg 9.1 mm (8.7–9.7 mm). *Ratios*: FL : B 0.80 (0.76–0.86), malar space L : W 0.19 (0.17–0.22).

Structure. Front legs not attenuate, four-fifths length of body. S6 (Fig. 32A) with median and lateral lobes poorly developed, disc shallowly concave. S7 (Fig. 32B–C) having short apically rounded median lobes densely covered in short branched hairs; large translucent strigate lateral lobes. S8 (Fig. 32D–E, 64C) with broadly oval apical plate, distal margin shallowly crenulate. Genitalia (Fig. 33D–E): gonoforceps extending slightly beyond penis valves with short stout unbranched hairs on apical half; penis valves heavily sclerotized, apices slightly expanded.

Sculpture. As in female.

Vestiture. Head: long white plumose hairs on paraocular and supraocular areas, shorter and less dense on clypeus; light brown unbranched hairs on apical third of labrum. Mesosoma: scutum, scutellum, metanotum, propodeum and epipleural areas clothed in pale straw-coloured branched hairs (darker hairs on scutellum of more melanic individuals); legs with similar pubescence except being straw-coloured to light brown at extremities. Metasoma: T1–T5 with diffuse straw-coloured to light brown hair bands on apical margin, fimbriae of T6 black, of T7 brown; sub-erect hairs on basal two-thirds of disc on T3 and T4 straw-coloured, on T5 mixture of straw-coloured and black, on T6 black, on T7 dark brown to black.

Colour and banding of males of R. macgregori

The apical hair bands on the metasomal terga of males are not as distinct as on females. On the basal two-thirds of the disc of T2–T5 hair is erect whereas on the apical margin it is sub-erect forming a diffuse band. On T6 and T7 the pubescence is decumbent.

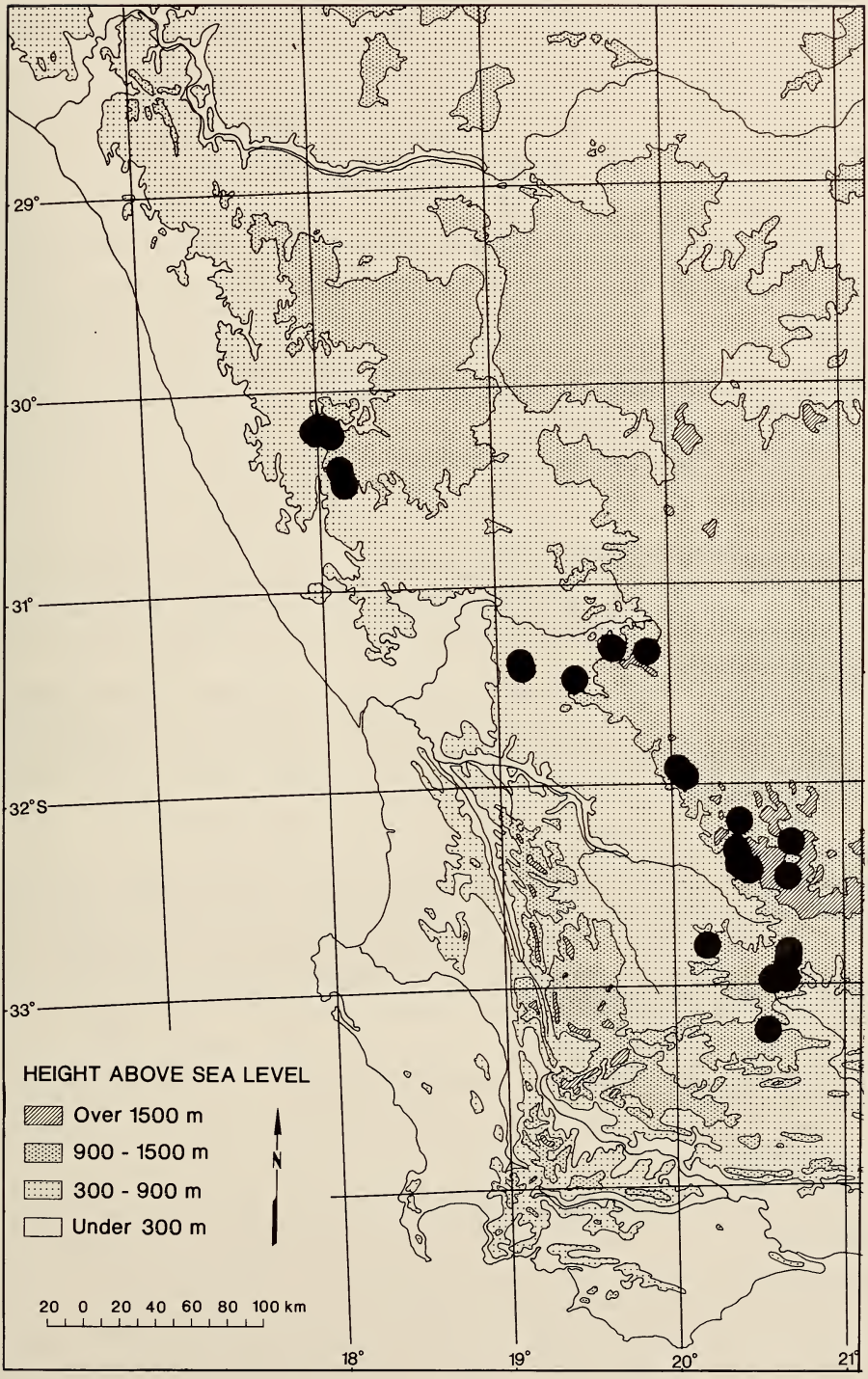

Fig. 34. Known distribution of *Rediviva macgregori* sp. nov.

The colour of the pubescence, particularly on the terminal segments, can be diagnostic. In this species hairs on the disc of T1–T4 are of the general body colour, pale straw-coloured, or a light reddish-brown in individuals that emerge early in the season. T5 has mostly pale straw-coloured hairs but there is a varying amount of black mixed in, whereas on T6 hairs are black and on T7 they are light brown.

Host flower records

Females of *R. macgregori* collect oil from a wide range of oil-producing plants including 10 *Diascia*, three *Hemimeris*, one *Alonsoa* and three terrestrial orchid species. The greatest number of bees collected were visiting *Diascia 'floribunda'* (35.6%), *D. macrophylla* (15.5%), *Hemimeris centrodes* (14.8%), *D. cardiosepala* (9.7%) and *D. tanyceras* (9.5%). The remaining 11% of bees were collected taking oil from *Alonsoa unilabiata*, *Diascia veronicoides*, *D. dissimulans*, *D. lewisiae*, *D. parviflora*, *D. insignis*, *D. 'whiteheadii'*, *Hemimeris racemosa* and *H. sabulosa*. Only 4 per cent visited three terrestrial orchids, *Pterygodium hallii*, *Corycium deflexum* and *Disperis purpurata*.

Moraea bifida and *M. tripetala* were the main nectar plants visited by females but several specimens were also collected on *Bulbinella nutans*, *Arctotheca calendula* and *Nemesia leipoldtii*. *Spiraxis elegans* and *Hesperantha cucullata* were also visited occasionally by females but probably more for pollen than nectar.

Males were found to visit mainly *Arctotheca calendula*, *Moraea bifida* and *Senecio littoreus* for nectar, but several were collected on *Dimorphotheca pluvialis*, *Lotononis hirsuta*, *Moraea tripetala*, *Gynandriris pritzeliana*, *Felicia* and *Othonna* sp.

Distribution (Fig. 34)

Rediviva macgregori is restricted mainly to the western edge of the Karoo erosion escarpment, from the high lying areas of the Kamiesberg through Nieuwoudtville, Calvinia and south-east to Sutherland. Only two collections have been made off the escarpment, at the farm Thyskraal south-west south of Sutherland, and at Matjiesfontein.

Rediviva micheneri sp. nov.

Figs 2B, 35–38, 63H

Diagnosis

Females. Black-bodied, large, 10–14 mm, forelegs long, 15–18 mm, 1.4 times length of body, oil-collecting hairs on tarsomeres 2–5 of forelegs only. Malar space relatively long, one-third of width. Hairs on metasomal terga straw-coloured, short, decumbent, no apical hair bands.

Males. Black-bodied, large, 11–12 mm, malar space relatively long, one-third width. White erect hairs on anterior two-thirds of T1–T4, black on T5–T6. S6 with anterior third concave, median cluster of erect black hairs on proximal

edge of concavity. S7 with well-developed spatulate anterior lobes, apical hairs about two-thirds length of lobe.

Etymology

Named for Dr C. D. Michener, Professor Emeritus in Entomology and Systematics at the University of Kansas, for his contribution to the understanding of South African bees and in particular for his revision of the Melittidae. He recognized a single female of this species in the collection of the South African Museum as a new species, possibly related to *R. longimanus*.

Material examined

Type material. Holotype: SAM-HYM-B008050, female, Western Cape, Sauer, farm Suurfontein, 3218DC, V. B. Whitehead, 9 Sept. 1994. *Allotype*: SAM-HYM-B008051, male, Western Cape, Sauer, farm Suurfontein, 3218DC, V. B. Whitehead, 1 Sept. 1994. *Paratypes* (121 ♀♀, 7 ♂♂)—*Western Cape Province*: 3 ♀♀, Citrusdal 13.4 km north, 3218BD, KES, 10 Sept. 1984; 1 ♀, Citrusdal 13.5 km north, 3218BD, VBW, 10 Sept. 1984; 1 ♀, Citrusdal, farm Korhaanshoogte, 3218BD, MM & VBW, 21 Aug. 1985; 1 ♀, Clanwilliam, 0.5 km north, 3218BB, VBW, 17 Aug. 1988; 1 ♀, Clanwilliam, 6.2 km south, 3218BB, KES, 30 Aug. 1986; 2 ♀♀, Clanwilliam, 7.0 km south, 3218BB, MM & VBW, 3 Sept. 1986; 1 ♀, same locality, VBW, 3 Sept. 1986; 2 ♀♀, Clanwilliam, Grey's Pass, 3218DB, KES, 9 Sept. 1989; 1 ♀, Clanwilliam, farm Holfontein, 3218DB, KES, 11 Sept. 1991; 1 ♀, Clanwilliam, Ramskop Campground, 3218BB, MM & VBW, 30 Aug. 1985; 1 ♀, Gouda, Voëlvlei, water purification works, 3319AC, VBW, 6 Sept. 1988; 1 ♀, Het Kruis, Eendekuil road, 3218DB, KES, 8 Sept. 1987; 7 ♀♀, Hetkruis, farm Groenfontein, 3218DC, KES, 10 Sept. 1990; 12 ♀♀, same locality, VBW, 30 Aug. 1986; 1 ♀, Hetkruis, farm Groenfontein, 3218DB, VBW, 30 Aug. 1987; 1 ♀, same locality, VBW, 8 Sept. 1987; 1 ♀, same locality, VBW, 22 Aug. 1988; 1 ♀, 1 ♂, same locality, VBW, 8 Sept. 1987; 1 ♀, same locality, VBW, 7 Sept. 1988; 4 ♂♂, same locality, VBW, 23 Aug. 1991; 1 ♀, same locality, VBW, 28 Aug. 1991; 3 ♀♀, Hetkruis, farm Kromrivier, 3218DB, KES, 22 Aug. 1991; 2 ♀♀, Hopefield, farm Jantjiesfontein, 3218CD, VBW, 12 Sept. 1991; 1 ♀, Malmesbury, road to dump, 3318BC, KES, 16 Sept. 1987; 1 ♀, same locality, KES, 20 Sept. 1994; 3 ♀♀, same locality, VBW, 16 Sept. 1992; 8 ♀♀, same locality, VBW, 14 Sept. 1994; 7 ♀♀, same locality, VBW, 20 Sept. 1994; 1 ♀, same locality, VBW, 14 Sept. 1995; 3 ♀♀, same locality, VBW, 22 Sept. 1995; 6 ♀♀, Piketberg, farm Dezehoek, 3218DC, VBW, 15 Sept. 1994; 1 ♀, same locality, KES, 13 Sept. 1994; 2 ♀♀, same locality, KES, 13 Sept. 1994; 1 ♀, Piketberg, Kromrivier, 3218DB, KES, 30 Aug. 1986; 1 ♀, Piketberg, Versveld Pass, 3218DD, VBW, 15 Sept. 11 ♀♀, Sauer, farm Groenfontein, 3218DC, VBW, 10 Sept. 1990; 5 ♀♀, Sauer, farm Hartebeestrivier, 3218DC, KES, 10 Sept. 1990; 3 ♀♀, same locality, VBW, 10 Sept. 1990; 2 ♀♀, same locality, VBW, 23 Aug. 1991; 1 ♀, same locality, VBW, 20 Sept. 1991; 1 ♀, same locality, VBW, 10 Sept. 1992; 4 ♀♀, Sauer, farm Suurfontein, 3218DC, KES, 20 Sept. 1991; 2 ♀♀, same locality, KES, 25 Sept. 1994; 1 ♀, same locality, VBW, 25 Aug. 1994; 1 ♀, 1 ♂, same locality, VBW, 1 Sept. 1994; 6 ♀♀, same locality, VBW, 9 Sept. 1994.

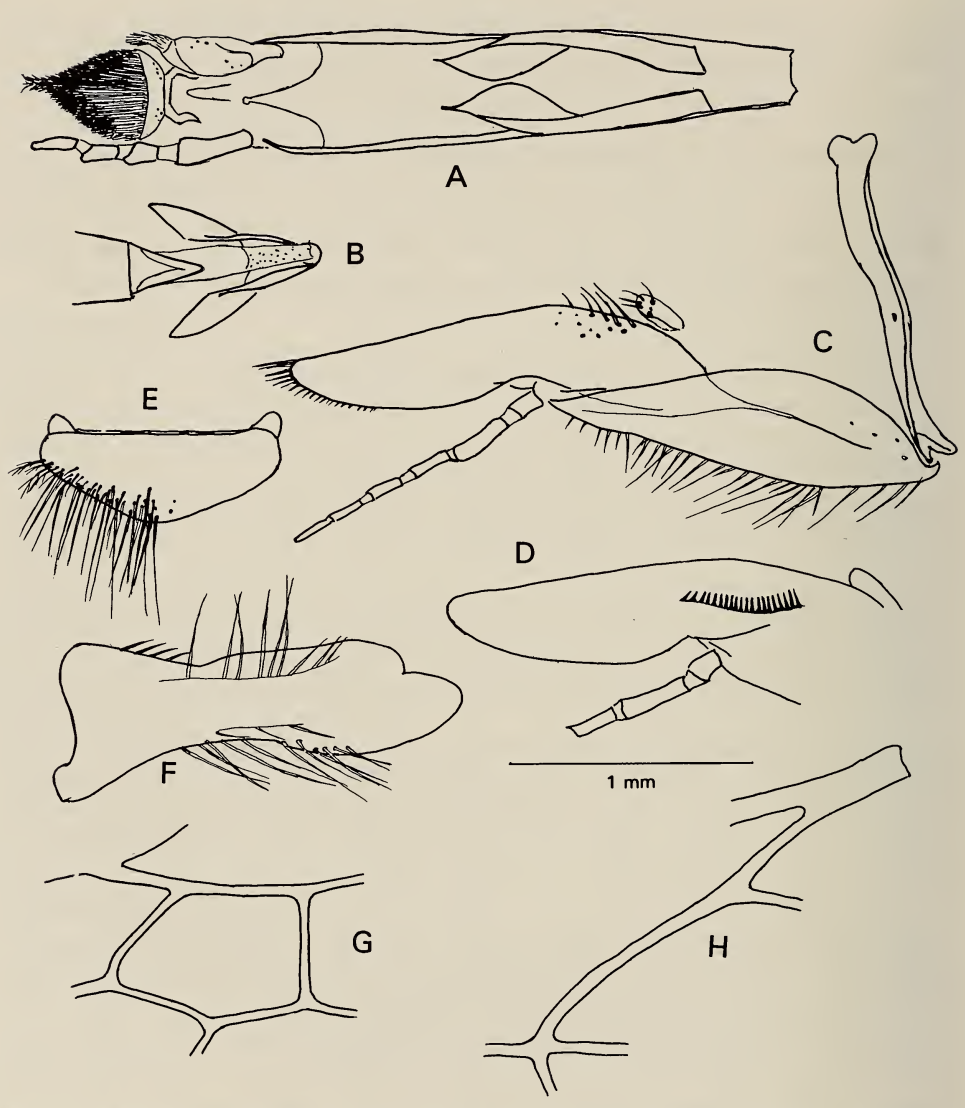

Fig. 35. *Rediviva micheneri* sp. nov. Female. A. Labium, anterior aspect. B. Base of prementum, mentum and lorum, posterior view. C. Maxilla. D. Inner aspect of galea to show comb. E. Labrum. F. Right mandible. G. Second submarginal cell of right wing. H. Basal vein and first abscissa of Rs of front right wing.

Description

Female

Measurements. *Holotype*: body 13.0 mm, forewing 10.0 mm, malar space L : W 0.32. *Other material* (n = 30)—*Measurements and ranges*: body 12.2 mm, (10.5–13.0 mm), forewing 10.1 mm, (9.3–10.7 mm), foreleg 16.7 mm (15.5–17.9 mm), Ft+bt 6.0 mm (5.6–6.3 mm). Ratios: FL : B 1.4, (1.4–1.5), malar space L : W 0.32 (0.29–0.38).

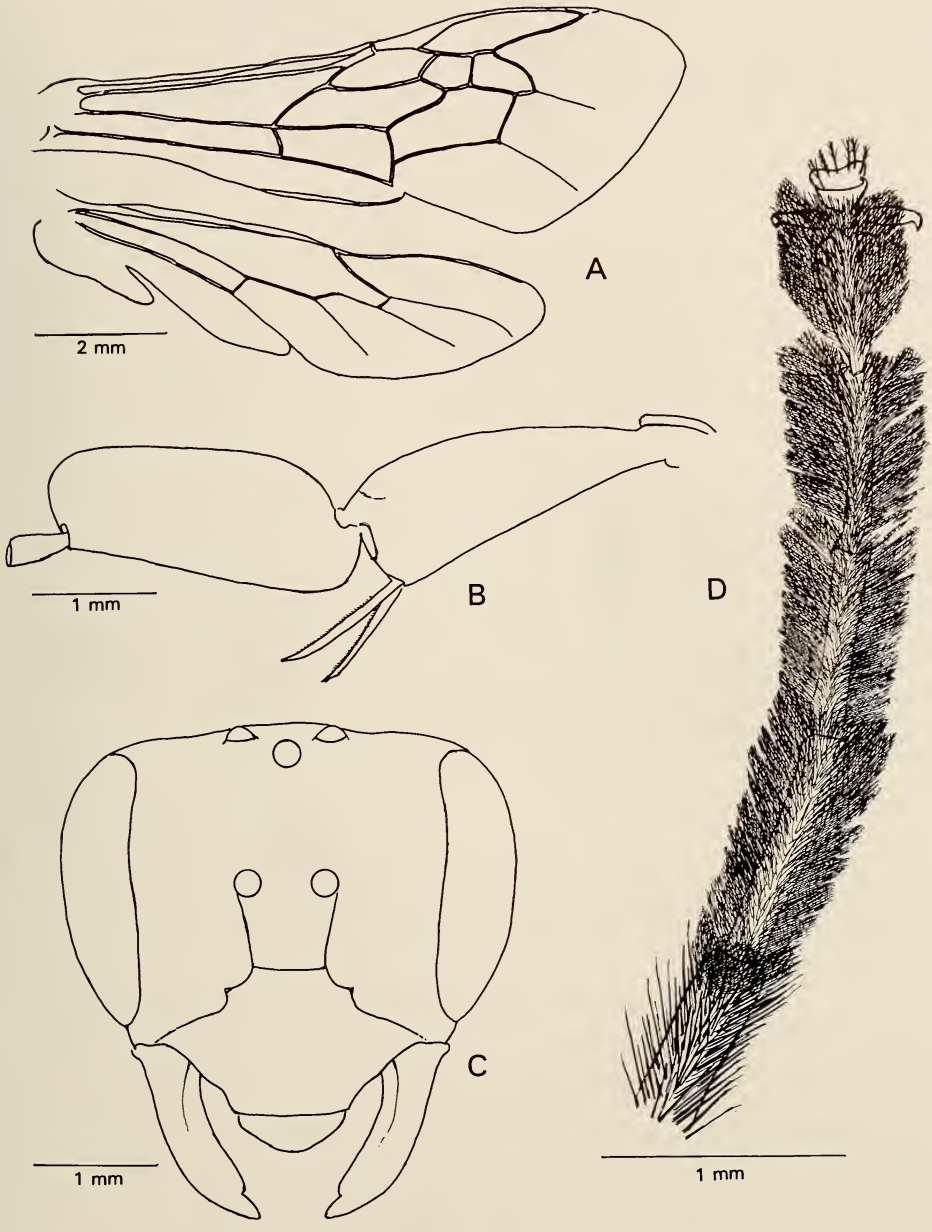

Fig. 36. *Rediviva micheneri* sp. nov. Female. A. Right wings. B. Hind tibia and basitarsus. C. Anterior view of head. D. Distal part of front basitarsus and tarsomeres 2–5.

Integumental colour. Head, antennae, mesosoma, legs and metasoma black, tegulae piceous.

Structure. Mouth-parts (Fig. 35A–F): glossa short one-quarter length of prementum, labial palps reaching tip of glossa, ligular arms occupying basal

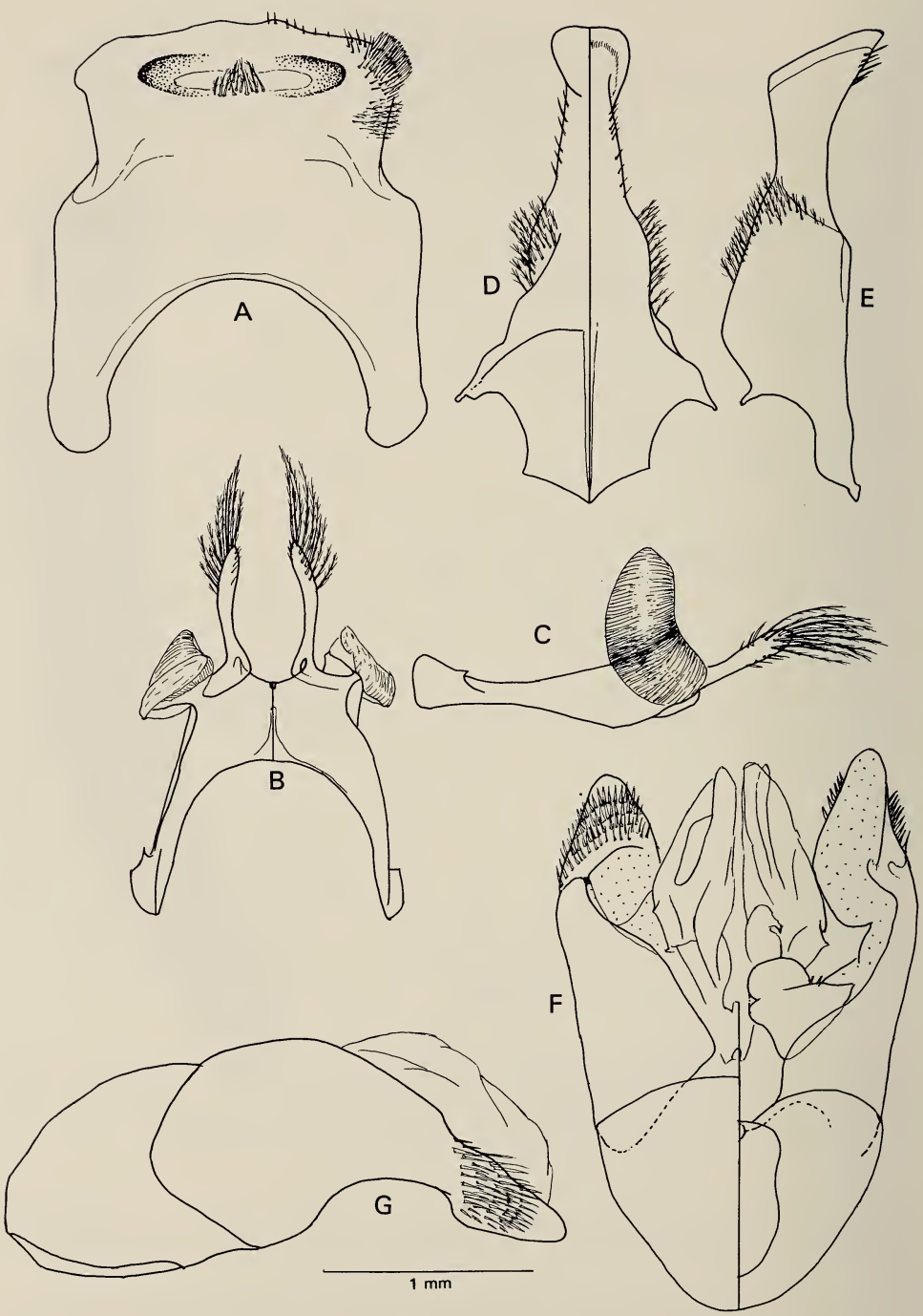

Fig. 37. *Rediviva micheneri* sp. nov. Male. A. Ventral aspect of S6. B. Dorsal and ventral view of S7. C. Lateral view of S7. D. Dorsal and ventral aspects of S8. E. Lateral view of S8. F. Dorsal and ventral view of genitalia. G. Genital capsule, lateral view.

half of prementum (Fig. 35A); maxilla with stipes slightly longer than cardo, galea with short fringe of hairs on apical third, galeal comb of 20 teeth (Fig. 35C–D); labrum broadly pointed 2.5 times as wide as long (55 : 22) (Fig. 35E); mandible with rounded subapical tooth (Fig. 33F). Mesosoma: median scutellar line narrow, not reaching middle of segment; front legs 1.3 to 1.5 times length of body, hind tibia narrower than basitarsus (26 : 30), basitarsus twice as long as wide (65 : 30), distal margin rounded, distal dorsal angle without scale (Fig. 36B).

Sculpture. Head: labrum with apical margin impunctate, disc coarsely punctured, less dense laterally, surface between punctures shiny, faintly coriaceous. Mesosoma: dense punctation on disc of scutum, distance between punctures less than their diameter, surface between punctures shiny; propodeal triangle small, well defined, surface wrinkled, rest of segment shiny, sparsely and finely punctured. Metasoma: T1 shiny with sparse fine punctures, T2–T4 densely and finely punctured.

Vestiture. Head: long light brown unbranched hairs on apical third of labrum, white plumose hairs on paraocular and frontal areas, sparser on clypeus and supraclypeal area, black along inner and outer eye margins. Mesosoma: white plumose hairs on scutum, scutellum, metanotum and propodeum, some black hairs on scutal margin; tibia and tarsus of all legs with light brown pubescence, oil-collecting hairs on apical quarter of basitarsus and on tarsomeres 2–5 of front legs (Fig. 36D), no oil-collecting hairs on tarsus of middle legs. Metasoma: T1 with sparse pale straw-coloured pubescence, T2–T4 with short decumbent similarly coloured hairs, slightly longer laterally, fimbriae on T5 light brown, darker on T6. No hair bands on apical margins of T2–T4.

Male

Measurements. *Allotype*, body 12.0 mm, forewing 9.3 mm, malar space L : W 0.29. *Other material* (n = 7)—*Measurements and ranges*: body 11.4 mm (10.8–12.0 mm), forewing 8.9 mm (8.7–9.3 mm), malar space L : W 0.30 (0.29–0.31).

Integumental colour. Head, antennae, body, and legs black.

Structure. Anterior third of S6 concave, bottom of concavity shiny, faintly coriaceous, prominent median tuft of black branched hairs on proximal edge of concavity, median and lateral lobes poorly developed (Fig. 37A); S7 (Fig. 37B–C) with well-developed spatulate median lobes, long branched hairs on distal third, apical hairs two-thirds length of lobe; lateral lobes large, crescentic and strigate. S8 (Fig. 37D–E, 63H), ovate, longer than wide, anterior margin rounded, entire. Genital capsule (Fig. 37F–G), gonoforceps with short stout unbranched hairs on apical third.

Sculpture. Head: labrum impunctate basally, black, shiny; scattered punctures on anterior margin of clypeus, densely punctured on disc, some punctures coalescing towards base, area between punctures smooth, shiny. Mesosoma: fine widely spaced punctures on disc of scutum, area between punctures shiny. Propodeal triangle small, clearly defined, surface shiny, coriaceous, rest of propodeum shiny with fine scattered punctures.

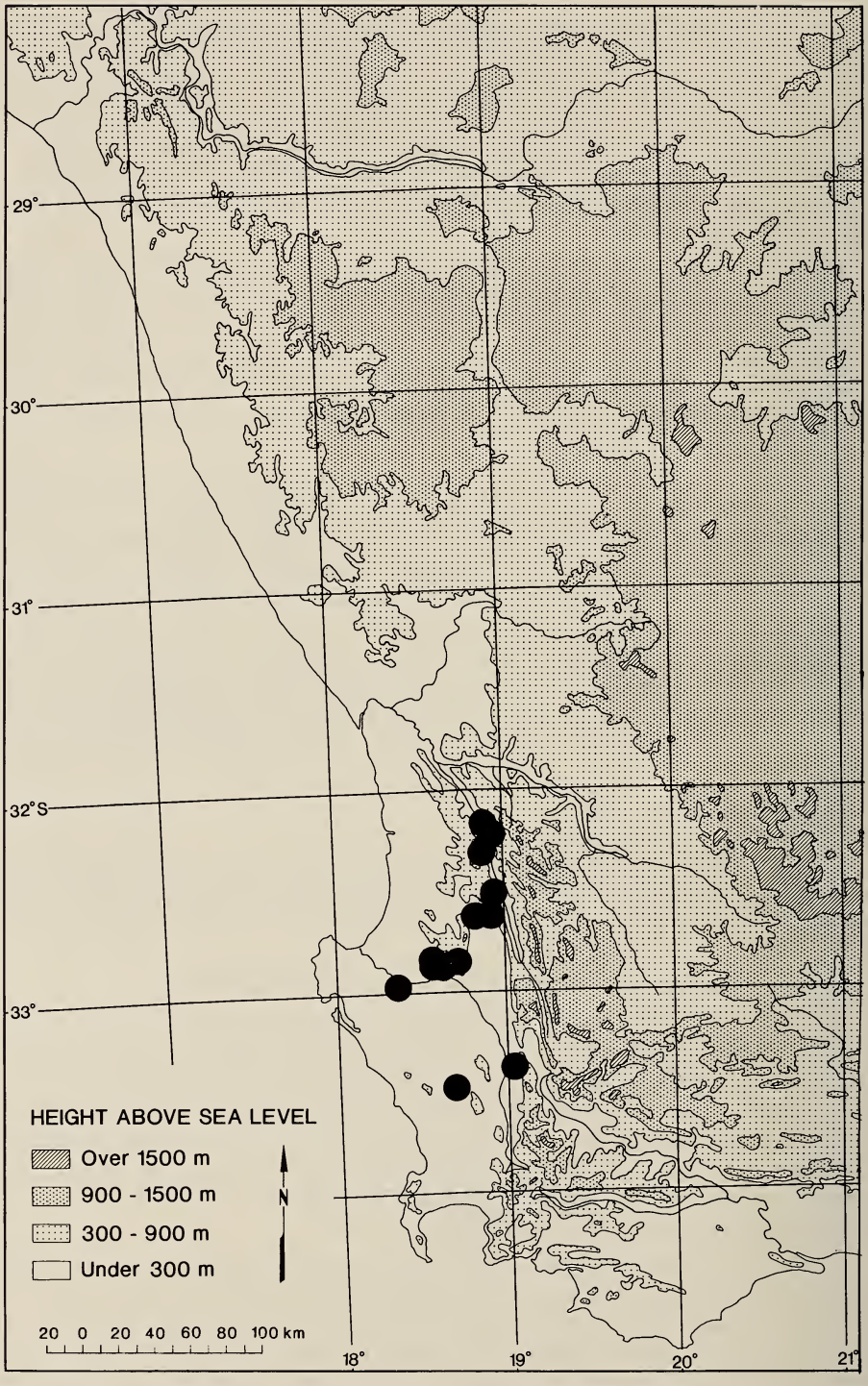

Fig. 38. Known distribution of *Rediviva micheneri* sp. nov.

Vestiture. Head: long silky white plumose hairs on anterior margin of clypeus and paraocular areas, shorter and sparser on disc of clypeus and supraclypeal area. Mesosoma: shorter straw-coloured branched hairs on scutum, scutellum, metanotum and propodeum, some black hairs on disc of scutellum and propodeum. Metasoma: long white erect plumose hairs on T1–T4 (sometimes with black hairs on basal area of T5 and T4), black on T5 and T6, T7 brown to black.

Host flower records

Rediviva micheneri females collect oil from eight species of *Diascia*, the majority being taken on the long-spurred *D. longicornis* (59.5%) and *D. 'whiteheadii'* (9.9%). The remainder visited six species of medium- to short-spurred *Diascia*. These included *D. 'arenicola'* ssp. *'arenicola'*, *D. 'arenicola'* ssp. *'bulbosa'*, *D. capensis*, *D. 'speciosa'*, *D. 'grantiana'* and *D. elongata*. Females were seen to collect nectar from *Moraea fugax*, *M. miniata*, *Oxalis pes-caprae* and a *Dimorphotheca* species.

Of the seven males collected, four were taking nectar from *M. miniata* and three were patrolling *D. longicornis* in search of females.

Distribution (Fig. 38)

Rediviva micheneri is restricted to the south-western part of the Western Cape Province and most specimens were collected in the vicinity of the Piketberg Range (Hetkruis, Piketberg and Sauer) and in a municipal reserve on the southern outskirts of Malmesbury. Isolated specimens have been collected at Clanwilliam and Citrusdal in the Olifants River valley, at the Voëlvlei water purification works near Gouda, and in the sandveld fynbos near Hopefield.

Wheat is extensively cultivated in the area in which this species occurs and natural vegetation is restricted to reserves, patches of non-arable land and road verges. The major oil host plant, *D. longicornis*, occurs abundantly in fallow lands in the first year after the cultivation of wheat, but the most dense stands of *D. longicornis* and the short-spurred diascias visited by this species occur in the first year after accidental burns of natural vegetation.

Rediviva ruficornis sp. nov.

Figs 1D, 39–41, 63D

Diagnosis

Female. Small- to medium-sized bees (10–13 mm), integument and pubescence black, flagellum reddish-brown. Forelegs not attenuate, equal length of body; front coxa with apical spine; dense oil-collecting hairs on front tarsomeres 2–4, finely divided hairs also present on tarsomere 5 but shorter and less dense. No oil-collecting hairs on tarsus of middle leg. No scale on distal dorsal angle of hind basitarsus. Spine on front coxa, separates this species from black forms of *R. parva*.

Male. Indistinguishable from males of *R. aurata*.

Etymology

Rufus and *cornu*, Latin for red and a horn, referring to the reddish-brown antennal flagellum of females.

Material examined

Type material. *Holotype*: SAM-HYM-B007549, female, Western Cape Province, Hopefield, farm Jantjiesfontein, 3218CD, V. B. Whitehead, 17 Sept. 1991. *Allotype*: SAM-HYM-B001148, male, Western Cape Province, Hopefield, farm Jantjiesfontein, 3218CD, V. B. Whitehead, 10 Sept. 1991. *Paratypes* (57 ♀♀, 4 ♂♂)—*Western Cape Province*: 2 ♀♀, Cape Town, Koeberg, farm Baasariesfontein, 3318DA, VBW, 25 Aug. 1994; 4 ♀♀, Elandsbaai, farm Skerpheuwel, 3318AD, KES, 28 Aug. 1987; 1 ♀, Elandsbaai, Leipoldtville road, 3218AD, VBW, 14 Sept. 1984; 2 ♀♀, 1 ♂, Elandsbaai, farm Skerpheuwel, 3218AD, VBW, 28 Aug. 1987; 1 ♀, Hopefield, farm Jantjiesfontein, 3218CD, KES, 12 Sept. 1991; 2 ♀♀, same locality, KES, 25 Sept. 1991; 1 ♀, same locality, KES, 2 Oct. 1991; 1 ♂, same locality, VBW, 10 Sept. 1991; 3 ♀♀, 1 ♂, same locality, VBW, 17 Sept. 1991; 7 ♀♀, same locality, VBW, 25 Sept. 1991; 2 ♀♀, Hopefield, farm Houmoed, 3218CD, VBW, 2 Oct. 1991; 3 ♀♀, Koperfontein, 3318AB, VBW, 19 Sept. 1986; 8 ♀♀, Paleisheuwel, farm Alexandershoek, 3218BC, KES, 11 Sept. 1991; 3 ♀♀, 1 ♂, same locality, KES, 12 Sept. 1991; 1 ♀, same locality, VBW, 12 Sept. 1991; 4 ♀♀, Sandberg Station, farm Droogerivier, 3218BC, KES, 8 Sept. 1987; 1 ♀, same locality, KES, 27 Aug. 1987; 2 ♀♀, same locality, VBW, 8 Aug. 1987; 6 ♀♀, same locality, VBW, 27 Aug. 1987; 2 ♀♀, same locality, VBW, 28 Sept. 1987; 2 ♀♀, Sauer, farm Suurfontein, 3218DC, VBW, 25 Aug. 1994.

Description

Female

Measurements. *Holotype*: body 11.50 mm, forewing 8.3 mm, malar space L : W 0.22. *Other material* (n = 27)—*Measurements and ranges*: body 10.8 mm (9.7–12.5 mm), foreleg 11.2 mm (10.5–11.6 mm), Ft+bt 3.7 mm (3.5–3.8 mm), forewing 8.7 mm (8.3–9.0 mm). *Ratios*: FL : B 1.04 (0.98–1.12), malar space (n = 14) L : W 0.20 (0.15–0.22).

Integumental colour. Body black, anterior margin of clypeus, basal three-quarters of mandible, flagellum (except basal two-thirds of first segment), middle and hind femur, proximal part of tibia and distal part of femur of front leg dark reddish-brown. Brown coloration variable and may be absent on legs and clypeus of darker individuals.

Structure. Mouth-parts (Fig. 39A–E): glossa one-quarter length of prementum, labial palp extending to tip of glossa, paraglossa one-third length of glossa, ligular arms occupying basal two-thirds of prementum (Fig. 39A); cardo (Fig. 39B) slightly longer than stipes (85 : 75); galeal tip acutely pointed, comb of 17–19 teeth (Fig. 39C); labrum (Fig. 39D) more than twice as wide as long (52 : 21), distal margin evenly rounded. Mesosoma: mesoscutal line extending to middle of segment, terminating in small tubercle; forelegs not attenuate, equal to length of body, apical spine present on forecoxa (Fig. 40B); hind tibia as wide as basitarsus (26 : 27), hind basitarsus nearly three times as long as wide

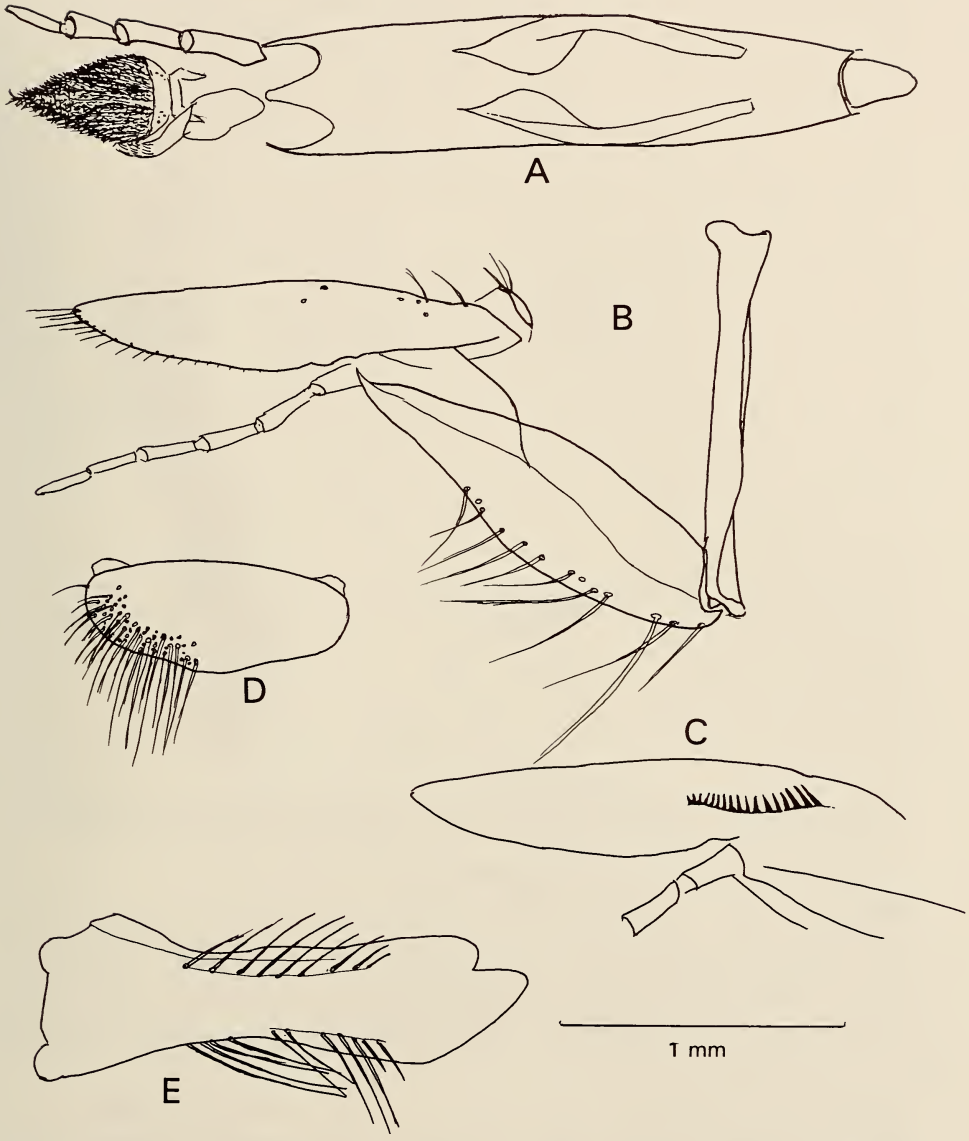

Fig. 39. *Rediviva ruficornis* sp. nov. Female. A. Labium, posterior view. B. Left maxilla. C. Inner view of galea to show comb. D. Labrum. E. Right mandible.

(62 : 27), without scale on distal dorsal angle, distal margin rounded, projecting beyond insertion of tarsomere 2 (Fig. 40A).

Sculpture. Clypeus with coarse punctures, approximately one diameter apart, area between punctures smooth and shiny; punctation on scutum fine becoming less dense on disc, area between punctures shiny; propodeal triangle with surface slightly wrinkled towards base, shiny, rest of segment shiny with larger wrinkles.

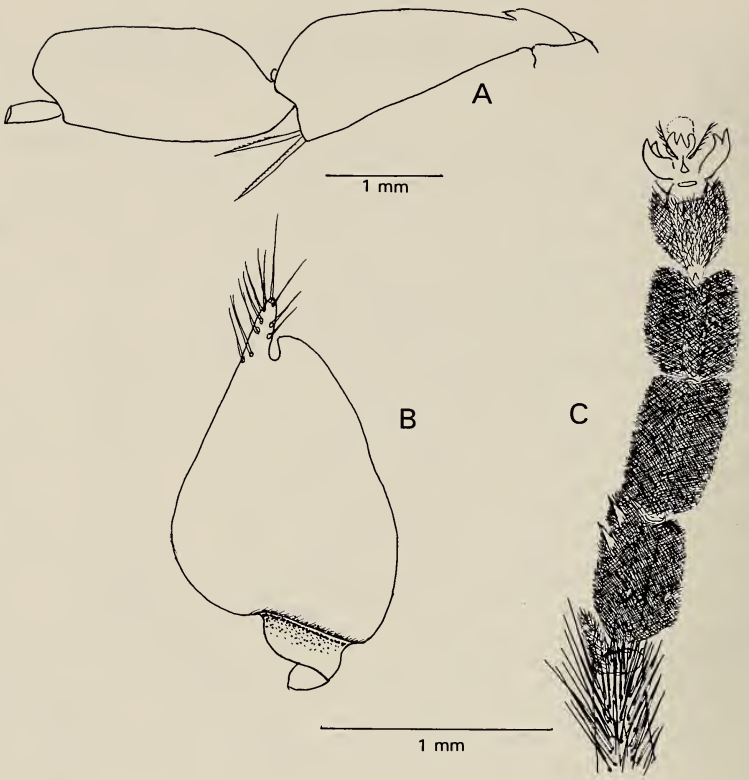

Fig. 40. *Rediviva ruficornis* sp. nov. Female. A. Tibia and basitarsus of hind leg. B. Left front coxa. C. Distal part of front basitarsus and tarsomeres 2–5.

Vestiture. Black except fimbriae on T5 and T6, hairs on distal margin of clypeus, apical margin of S4-S6 and tibia and tarsus of all legs, light brown. Finely divided oil-collecting hairs on tarsomeres 2–5 of forelegs, less dense and shorter on tarsomere 5, basitarsus with small patch of oil-collecting hairs distally (Fig. 40C). No oil-collecting hairs on tarsus of middle legs.

Male

Measurements. *Allotype*: male, body length 9.7 mm, forewing 7.7 mm. Only four males were collected in the area where females of this species were foraging. In size, body coloration, vestiture, genitalia and presence of a small pygideal plate, they are indistinguishable from males of *R. aurata*. Apical plate of S8 spade-shaped with crenulate distal margin (Fig. 63D) similar to *R. aurata*.

Host flower records

Females collect oil mainly from *Diascia 'arenicola'* and *D. capensis*, and to a lesser extent from *D. diffusa* and *Alonsoa unilabiata*. Nectar is obtained from *Moraea miniata*. Males patrol flowers of both *D. 'arenicola'* and *D. capensis* and take nectar from *Moraea miniata* and *Oxalis pes-caprae*.

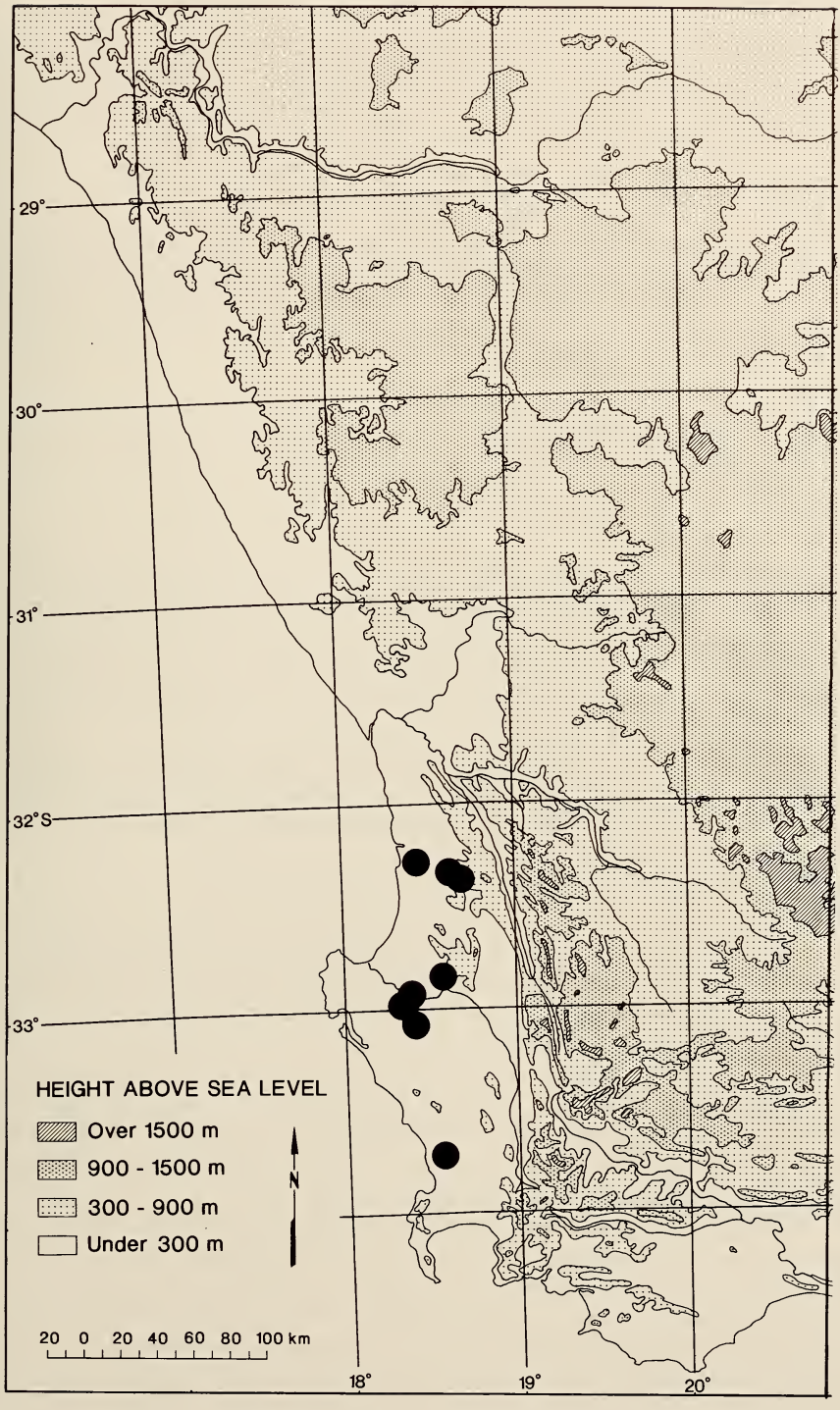

Fig. 41. Known distribution of *Rediviva ruficornis* sp. nov.

Distribution (Fig. 41)

This species has only been collected on the west coast of the Western Cape Province, from Paleisheuwel southwards to Piketberg, Hopefield and Koeberg Hill near Cape Town. It appears to be restricted to low-growing oil-bearing host plants on sandy substrates.

Discussion

Rediviva ruficornis and *R. aurata* females have many characters in common but can readily be separated by the black pubescence of *R. ruficornis*. They share some host plants but have never been collected on the same host plant at the same site as is the case with the two colour forms of *R. aurata* or the intergrading colour forms of *R. parva* females.

Rediviva aurata sp. nov.

Figs 1B, 42–45, 63C

Diagnosis

Females. Small- to medium-sized bees (9–12 mm). Head black, pubescence white except on clypeus where it is golden brown. Mesosoma: black, front coxa with hairy apical spine, oil-collecting hairs on tarsus of front leg only; hind basitarsus without scale on distal dorsal angle. Metasoma: terga entirely black or with varying amounts of light brown, pubescence light brown to golden, apical hair bands not pronounced.

Males. Small (9–10 mm). Body black, legs black except tibia of front and middle legs which have some light brown. Apical margin of terga with white hair bands, integument piceous to light brown; median vestigial pygideal plate on T7.

Etymology

Auratus, Latin for golden, refers to the light brown to golden hairs on the clypeus of females and light brown integument of the metasoma of most females from the type locality.

Material examined

Type material. Holotype: SAM-HYM-B007514, female, Western Cape Province, Piketberg, Groenvlei, 3218DD, V. B. Whitehead, 27 Aug. 1987. *Allotype*: SAM-HYM-B007515, male, Western Cape Province, Piketberg, Groenvlei, 3218DD, V. B. Whitehead, 27 Aug. 1987. *Paratypes* (42 ♀♀, 17 ♂♂)—*Western Cape Province*: 3 ♀♀, Darling, Waylands, 3318AD, KES, 8 Sept. 1989; 1 ♀, Darling, 3318AD, VBW, 18 Oct. 1986; 3 ♀♀, same locality, VBW, 19 Oct. 1986; 1 ♂, Hetkruis, Kromrivier, 3218DB, KES, 30 Aug. 1986; 5 ♀♀, 8 ♂♂, Hetkruis, Groenrivier, 3218DB, VBW, 22 Aug. 1988; 2 ♂♂, same locality, VBW, 25 Aug. 1994; 1 ♀, Langebaan, Postberg Reserve, 3318AA, KES, 14 Sept. 1988; 1 ♀, Langebaan, 3318AA, VBW, 20 Aug. 1986; 2 ♀♀, Malmesbury, road to municipal dump, 3318BC, KES, 16 Sept. 1987; 3 ♀♀, same locality, VBW, 16 Sept. 1987; 2 ♀♀, Piketberg, Banghoek, 3218DA,

KES, 20 Sept. 1991; 3 ♀♀, same locality, VBW, 20 Sept. 1991; 5 ♀♀, Piketberg, Groenvlei, 3218DD, KES, 27 Aug. 1987; 3 ♀♀, 1 ♂, same locality, VBW, 27 Aug. 1987; 1 ♂, same locality, VBW, 8 Oct. 1987; 2 ♀♀, 1 ♂, same locality, VBW, 22 Aug. 1988; 3 ♀♀, 3 ♂♂, Piketberg, Voorste Valley, 3218DC, K. S. Steiner, 5 Sept. 1987; 2 ♀♀, same locality, VBW, 19 Sept. 1987; 3 ♀♀, Saldanha, 3217BB, P. Goldblatt & J. Manning, 23 Aug. 1995. *Other material* (113 ♀♀)—*Western Cape Province*: 2 ♀♀, Darling, 3318AD; 30 ♀♀, Hetkruis, 3218DB; 23 ♀♀, Malmesbury, 3318BC; 9 ♀♀, Piketberg, Banghoek, 3218DA; 17 ♀♀, Piketberg, Groenvlei, 3318DD; 2 ♀♀, Piketberg, Moutonspad, 3218DA; 30 ♀♀, Piketberg, Voorste Valley, 3218DC.

Description

Female

Measurements. *Holotype*: body 10.7 mm, forewing 8.5 mm, malar space L : W 0.19. *Other material* (n = 30)—*Measurements and ranges*: body 10.6 mm (9.5–11.8 mm), forewing 8.7 mm (8.3–9.3 mm), foreleg 10.7 mm (9.8–11.5 mm), Ft+bt 3.4 mm (3.2–3.6 mm). *Ratios*: FL : B 1.03 (0.98–1.06), malar space (n = 10) L : W 0.23 (0.21–0.31).

Integumental colour. Head black, antennal scape, pedicellus and basal three-quarters of first flagellar segment black, rest of flagellum reddish-brown. Mesosoma black, legs dark brown to black. Metasoma with at least basal two-thirds of T1 black, other terga with varying amounts of black and light brown.

Structure. Mouth-parts (Fig. 42A–H): Glossa one-quarter length of prementum, labial palp extending slightly beyond tip of glossa, paraglossa one-third length of glossa; ligular process occupying basal half of prementum (Fig. 42A). Cardo slightly shorter than stipes, galea slightly longer than stipes, apex narrowly rounded, galeal comb of 17 teeth (Fig. 42E–F). Labrum evenly convex apically, 1.5 times as wide as long (Fig. 42G). Foreleg equal to length of body, forecoxa with inner margin extended into a stout spine (Fig. 43D). Hind basitarsus two-fifths as wide as long (26 : 61), slightly narrower than tibia (26 : 27), apex rounded without scale on distal dorsal angle (Fig. 43B).

Sculpture. Head: clypeus with large widely spaced punctures, area between punctures shiny, punctation finer and denser on supraclypeal area. Mesosoma: mesoscutal line distinct, slightly raised, extending to middle of segment terminating in small tubercle; punctures on scutal disc fine, area between coriaceous, inter-punctal distance greater than diameter of punctures; propodeal triangle small, shiny, minutely wrinkled, rest of propodeum shiny with well-spaced longitudinal wrinkles.

Vestiture. Head: hairs on labrum, clypeus and supraclypeal area sparsely branched, light brown to golden; white and densely plumose on paraocular area and frons. Mesosoma: episternum covered with long white pubescence; legs with shorter white hairs becoming light brown on tibia and tarsus; mixture of shorter white and black hairs on scutum, longer and straw-coloured on scutellum, metanotum and propodeum; dense finely divided oil-collecting hairs on tarsomeres 2–4 of foreleg, no flat scraper-like hairs visible, pubescence less dense on tarsomere 5; some finely divided oil-collecting hairs on distal part of front basitarsus (Fig. 43E); no oil-collecting hairs on tarsomeres of middle leg.

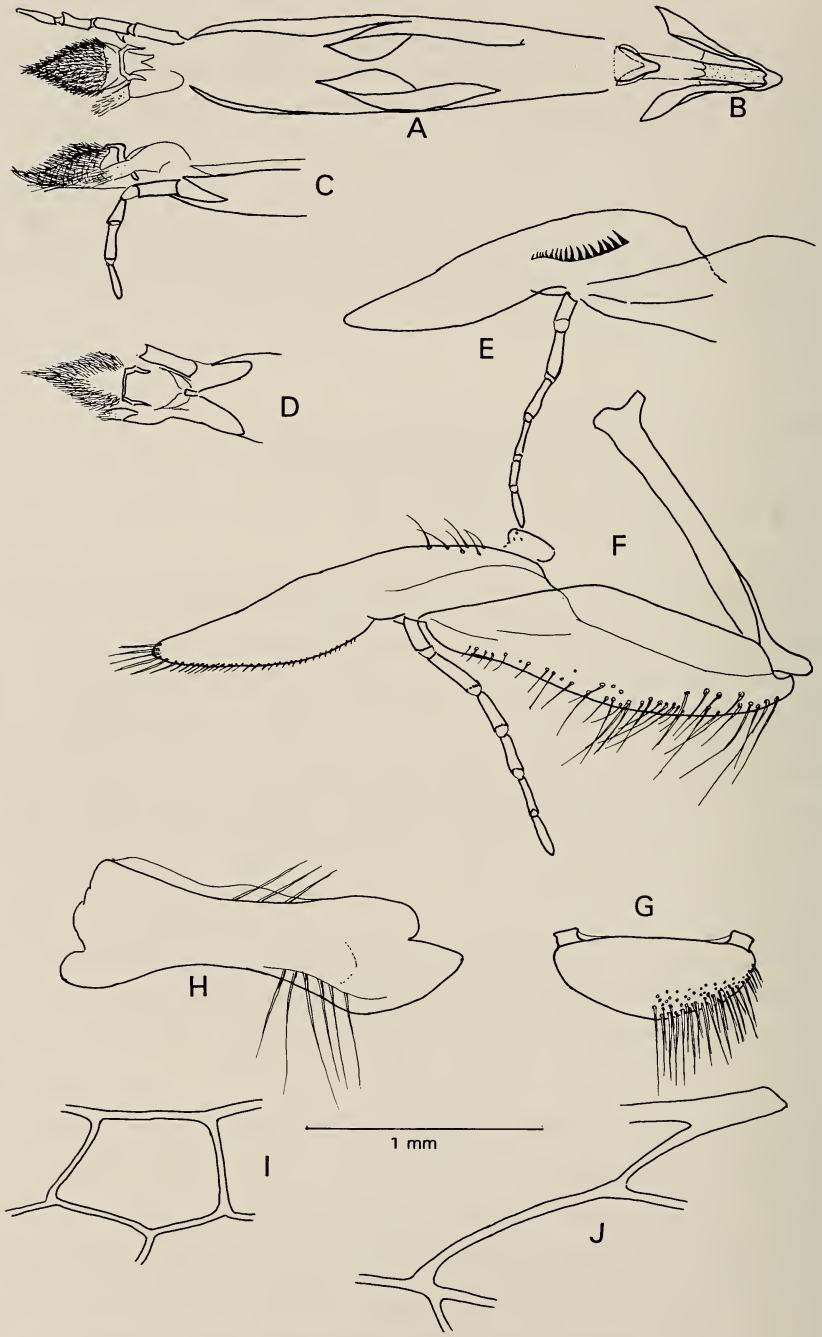

Fig. 42. *Rediviva aurata* sp. nov. Female. A. Labium, anterior view. B. Base of labium with associated sclerites, posterior view. C. Lateral view of distal part of labium. D. Posterior view of distal part of labium. E. Galea to show comb. F. Left maxilla. G. Labrum. H. Right mandible. I. Second submarginal cell of right wing. J. Basal vein and first abscissa of Rs of right front wing.

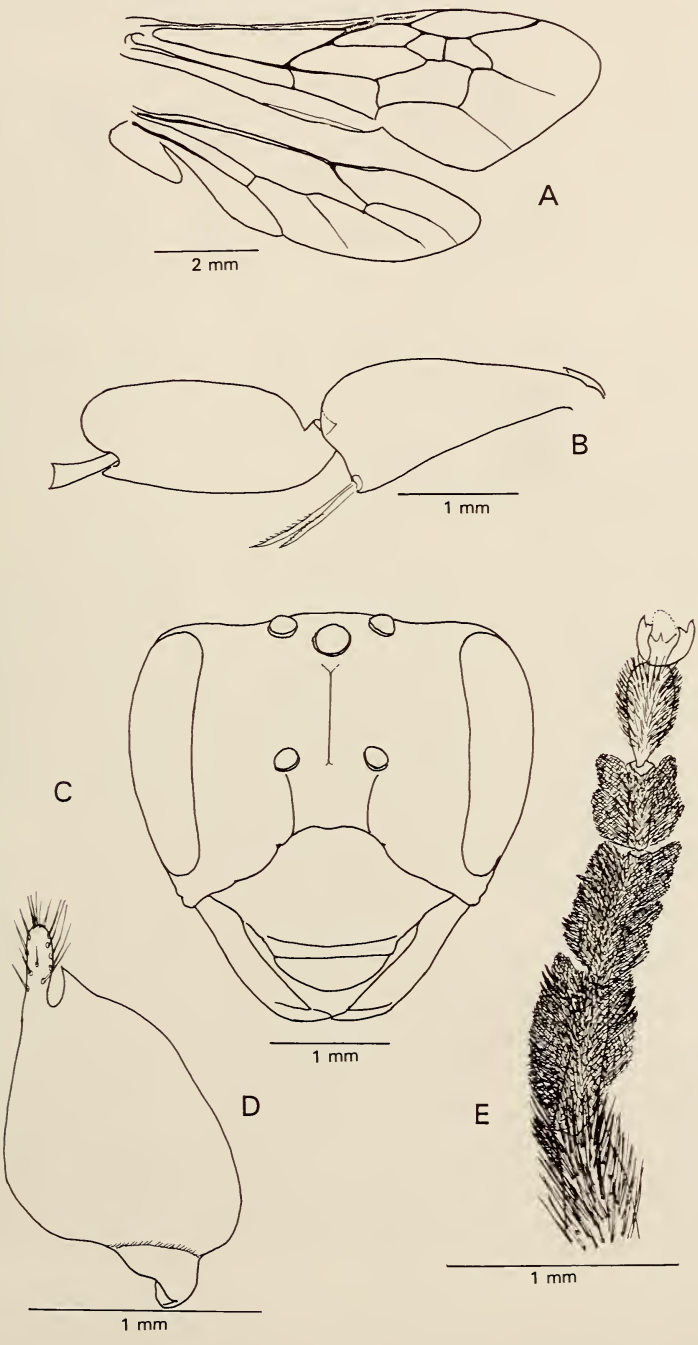

Fig. 43. *Rediviva aurata* sp. nov. Female. A. Right wings. B. Tibia and basitarsus of hind leg. C. Head, anterior aspect. D. Left front coxa. E. Distal part of front basitarsus plus tarsomeres 2–5.

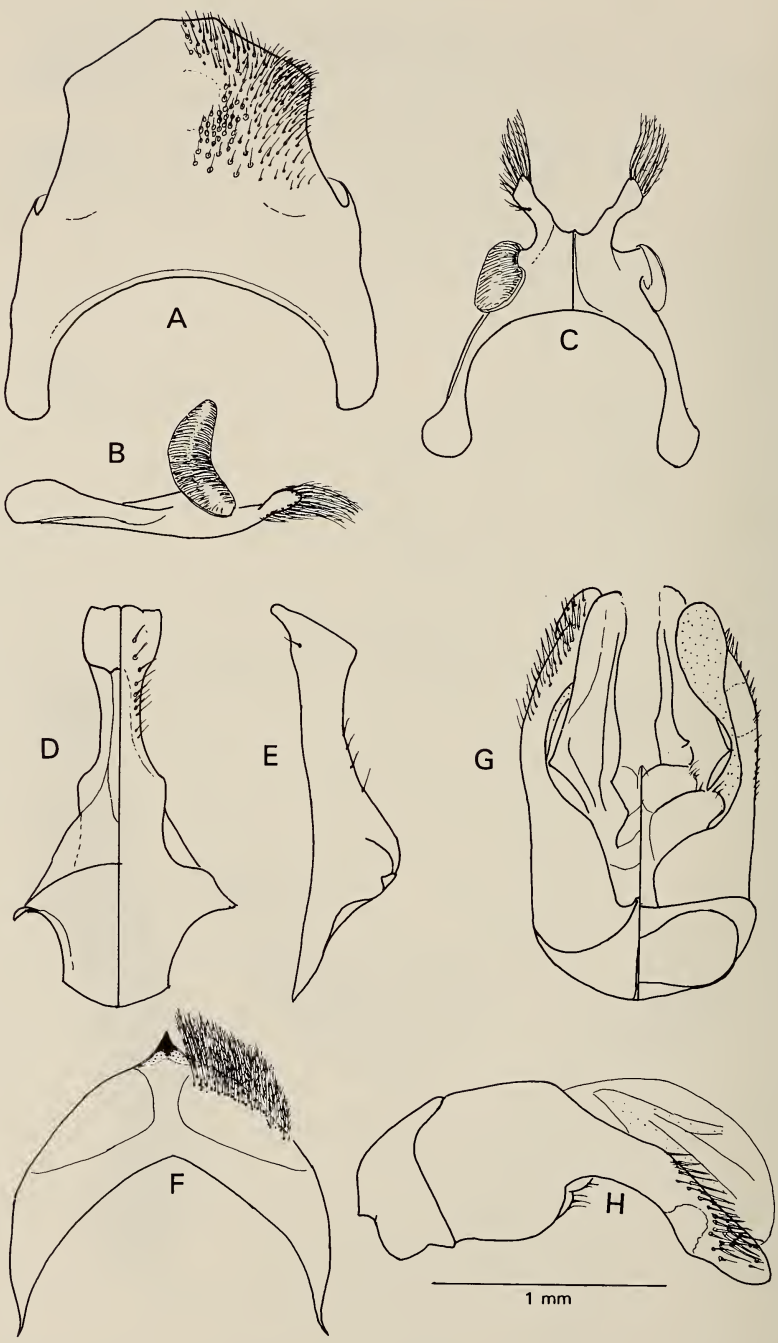

Fig. 44. *Rediviva aurata* sp. nov. Male. A. S6, ventral view. B. S7, lateral view. C. Dorsal and ventral views of S7. D. Dorsal and ventral views of S8. E. S8, lateral aspect. F. Tergum 7 with vestige of a pygideal plate. G. Genital capsule dorsal and ventral view. H. Genital capsule lateral view.

Metasoma: no distinct hair bands on apical margins of terga; white sub-erect hairs on T1, short decumbent yellow hairs on T2–T4, fimbriae on T5 longer, light brown.

Colour variation. There is some variation in colour of the integument of the metasoma of females, from completely black to varying amounts of light brown. There is also a difference in the number of individuals with light brown on the metasoma among the various collection areas. At Het Kruis 86 per cent (n = 36) and at Malmesbury 17 per cent (n = 36) of females collected had light brown on the metasoma. At all other sites the integument of the metasoma of females was entirely black.

Male

Measurements. *Allotype*: male, body 9.7 mm, forewing 7.5 mm, malar space L : W 0.17. *Other material* (n = 10)—*Measurements and ranges*: body 9.5 mm (9.2–10.2 mm), foreleg 7.8 mm (7.5–8.0 mm), forewing 8.0 mm (7.5–8.3 mm). *Ratios*: FL : B 0.82, malar space L : W 0.20 (0.16–0.23).

Integumental colour. Head: antenna black, dark brown on underside of proximal flagellomeres. Mesosoma: coxa, trochanter and femur of legs black, tibia of front and middle legs with variable areas of black and light brown, tarsus of front and middle legs, tibia and tarsus of hind leg light brown. Metasoma: apical margins of T1–T5 piceous to light brown.

Structure. Forelegs shorter than body. Metasoma: S6 having poorly distinguishable median and lateral lobes (Fig. 44A); median lobes well developed on S7, terminating obliquely with strong branched hairs equal to length of lobe; well-developed membraneous lateral lobes with distinct transverse striations (Fig. 44B–C); S8 with apical plate spade-shaped, lateral margins diverging distally, apical margin crenulate (Fig. 44D–E, 63C); gonoforceps slightly shorter than penis valve, with strong unbranched hairs on distal half, small translucent area two-thirds distance from base (Fig. 44G–H). Rudimentary genital plate present in form of small reddish-brown sclerotized median ridge on apical margin of T7 (Fig. 44F).

Sculpture. Clypeus strongly punctured anteriorly, finer basally, surface between punctures shiny; median mesoscutal line terminating in small tubercle; fine widely spaced punctures on disc of scutum, area between punctures shiny.

Vestiture. Head: labrum with light brown hair on apical margin; clypeus, supraclypeal and paraocular area and scape with long white plumose hairs; black branched hairs on ocular margin. Mesosoma: short black branched hairs on disc of scutum, white plumose hairs on episternum, propodeum and margin of scutum. Metasoma: long white erect plumose hairs on T1, T2 with erect black hairs on basal part of disc, area of black hairs increasing progressively to T3–T5, decumbent white hair bands on apical margin of T2–T5.

Host flower records

Rediviva aurata females collect oil from several prostrate *Diascia* species that include *D. elongata*, *D. 'speciosa'*, *D. 'grantiana'*, *Diascia 'arenicola'* ssp. *'bulbosa'*, *D. diffusa* and *D. capensis*. They have been observed taking nectar from *Oxalis pes-caprae* and *Moraea miniata*.

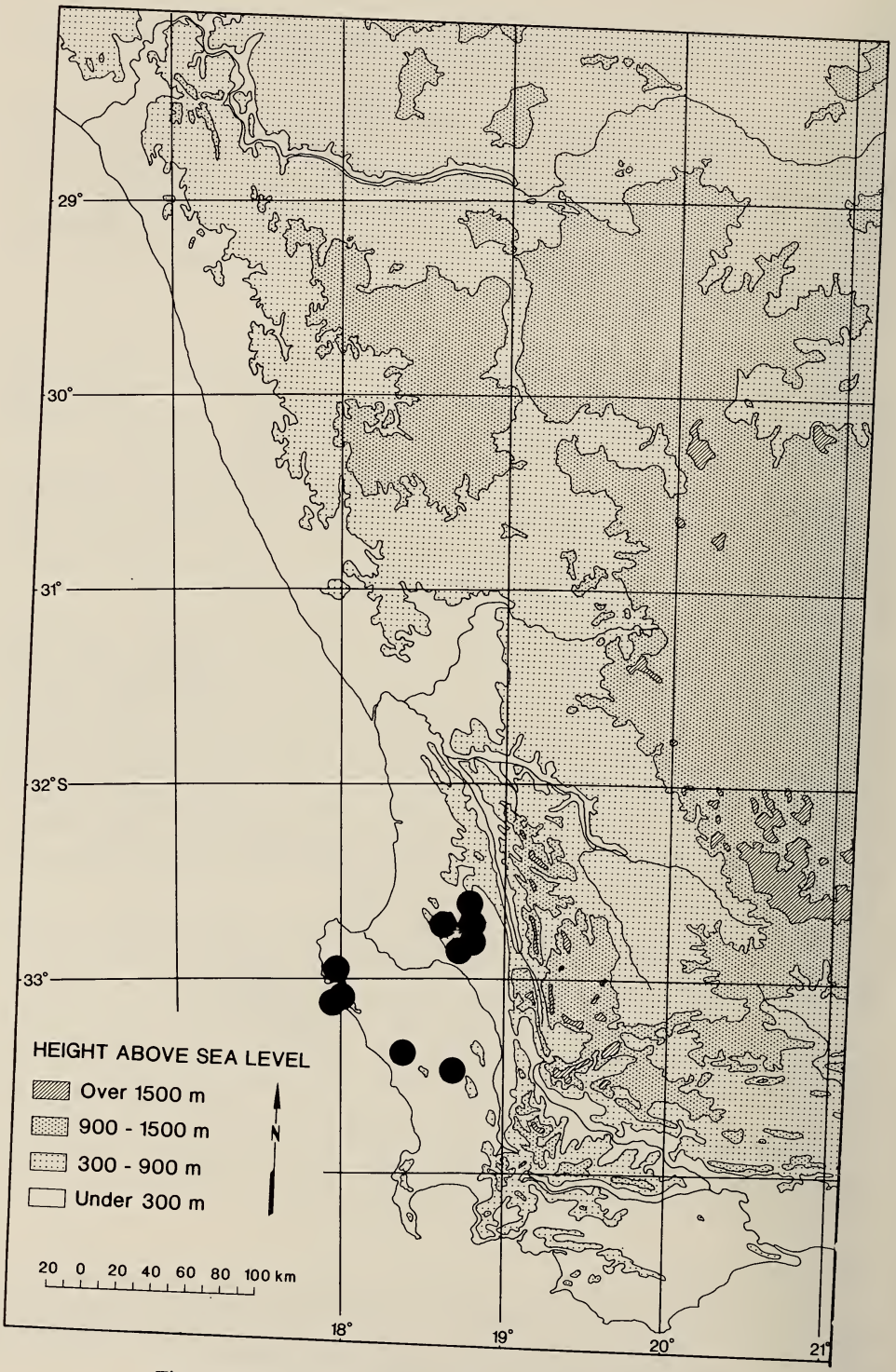

Fig. 45. Known distribution of *Rediviva aurata* sp. nov.

Males patrol the oil host plants in search of receptive females and also collect nectar from *Oxalis pes-caprae* and *Moraea miniata*.

Distribution (Fig. 45)

On the coast this species has been collected from Elandsbaai south to Saldanha Bay, and inland from Het Kruis to Piketberg and south to Malmesbury.

Rediviva peringueyi (Friese, 1911)

Figs 2C, 46–49, 64B

Andrena (Rediviva) peringueyi Friese, 1911: 671.
Rediviva peringueyi (Friese) Cockerell, 1931: 402.
Rediviva peringueyi (Friese) Michener, 1981: 123.

Diagnosis

Females. Body medium-sized, 11.0–13.2 mm, integument black. Head: clypeus coarsely punctured, surface between punctures shiny but faintly coriaceous. Mesosoma: punctures on scutum finer than on clypeus, less than one diameter apart, surface between punctures granular; forelegs not much elongated, slightly shorter than body, oil-collecting hairs on tarsomeres 2–5, no oil collecting hairs on tarsus of middle leg; basitarsus of hind leg without scale on distal dorsal angle. Metasoma: light brown to rufous pile, apical hair bands on T2–T4 of similar colour, fimbriae of T5–T6 slightly darker.

Males. Body medium-sized, 10.2–11.7 mm, integument black. Head: punctation and surface of clypeus similar to female. Metasoma: light brown to rufous apical hair bands on T1–T5, fimbriae of similar colour. S6 distal margin shallowly emarginate, S7 with prominent spatulate median lobes and large translucent strigate lateral lobes, gonoforceps with strong unbranched hairs on distal two-thirds.

Etymology

Named for Louis Albert Péringuey, self-taught naturalist, who laid the foundation for the classification of South African Coleoptera and subsequently became Director of the South African Museum from 1906 to 1924.

Material examined

Type material. Lectotype: Female, Paarl, 3318DB, R. M. L. (= R. L. Lightfoot), Oct. 1888. (Museum für Naturkunde, Humboldt-Universität, Berlin). *Paralectotype*: SAM-HYM-B002684, Female, Stellenbosch, 3318DD, R. M. L., (= R. M. Lightfoot), Oct. 1888 (South African Museum, Cape Town). *Other material* (130 ♀♀, 35 ♂♂)—*Western Cape Province*: 2 ♀♀, Bellville, Tygerberg Reserve, 3318DC, VBW, 19 Oct. 1990; 1 ♂, Cape Town, 3318CD (no date or collector); 1 ♀, Cape Town, Koeberg Hill, Baasarriesfontein, 3318DA, KES, 19 Sept. 1994; 1 ♀, Cape Town, Koeberg Hill, 3318DA, VBW, 21 Sept. 1996; 3 ♀♀, 1 ♂, Citrusdal, Grey's Pass, 3218DB,

KES, 9 Sept. 1989; 2 ♀♀, Darling, 3318AD, KES, 17 Sept. 1986; 4 ♀♀, Darling, farm Contraberg, 3318AD, KES, 26 Sept. 1989; 1 ♀, Darling, farm Slangkop, 3318AD, KES, 18 Sept. 1986; 2 ♀♀, Darling, farm Waylands, 3318AD, KES, 8 Sept. 1989; 1 ♀, Hetkruis, farm Groenrivier, 3218DB, VBW, 14 Aug. 1981; 1 ♂, same locality, VBW, 23 Aug. 1991; 4 ♀♀, Langebaan, Postberg Reserve, 3318AA, KES, 14 Sept. 1986; 2 ♀♀, same locality, KES, 14 Sept. 1988; 1 ♀, same locality, KES, 8 Sept. 1989; 4 ♀♀, same locality, KES, 5 Sept. 1990; 10 ♀♀, same locality, VBW, 17 Sept. 1988; 5 ♀♀, same locality, VBW, 21 Sept. 1988; 9 ♀♀, Malmesbury commonage, KES, 14 Sept. 1994; 6 ♀♀, same locality, KES, 12 Sept. 1994; 1 ♀, same locality, VBW, 16 Sept. 1987; 2 ♀♀, same locality, VBW, 25 Sept. 1987; 1 ♀, same locality, VBW, 26 Sept. 1987; 6 ♀♀, same locality, VBW, 14 Sept. 1994; 3 ♀♀, same locality, VBW, 14 Sept. 1995; 6 ♀♀, same locality, VBW, 20 Sept. 1995; 1 ♀, Moorreesburg, 3118BA, VBW, 9 Sept. 1994; 1 ♀, Paleisheuwel, Berg Valey, 3218BC, VBW, 12 Sept. 1981; 1 ♀, Piketberg, farm Dezehoek, 3218DC, KES, 13 Sept. 1984; 2 ♀♀, same locality, KES, 5 Sept. 1987; 1 ♀, Piketberg, Karookop, 3218DA, VBW, 17 Sept. 1985; 2 ♀♀, Piketberg, Versveld Pass, 3218DC, VBW, 22 Sept. 1994; 1 ♀, Porterville, farm Kleinbergrivier, 3318BB, KES, 17 Sept. 1987; 2 ♀♀, Riebeek-Kasteel, 3318BD, KES, 17 Sept. 1987; 1 ♂, Stellenbosch, 3318DD, H. Brauns, Sept. 1926; 2 ♂♂, Stellenbosch, 3318DD, A. Gagiano, 16 Sept. 1945; 11 ♀♀, Stellenbosch, farm Joostenbergkloof, 3318DD, KES, 16 Sept. 1987; 20 ♀♀, same locality, VBW, 16 Sept. 1987; 1 ♀, same locality, VBW, 25 Sept. 1987; 9 ♂♂, same locality, VBW, 18 Aug. 1988; 6 ♂♂, same locality, VBW, 16 Aug. 1988; 2 ♀♀, 1 ♂, same locality, VBW, 28 Aug. 1988; 1 ♀, same locality, VBW, 22 Sept. 1988; 4 ♀♀, same locality, VBW, 7 Oct. 1988; 2 ♀♀, Swellendam, Bontebok National Park, 3420AB, VBW, 30 Sept. 1987; 2 ♂♂, Worcester, Karoo Gardens, 3119CB, KES, 18 Aug. 1989.

Description

Female

Measurements. *Lectotype*: body 13.2 mm, forewing 10.3 mm, malar space L : W 0.21. *Paralectotype*: body 12.0 mm, forewing 10.2 mm, malar space L : W 0.25. *Other material* (n = 20)—*Measurements and ranges*: body 12.0 mm (10.0–12.5 mm), foreleg 11.2 mm (10.5–12.6 mm), forewing 9.8 mm (8.5–10.8 mm), Bt+ft 3.8 mm (3.7–3.9 mm). *Ratios*: FL : B 0.94 (0.88–1.01), malar space (n = 15) L : W 0.21 (0.17–0.23).

Integumental colour. Head black, antenna black, dark brown underneath. Mesosoma black, wings dusky, veins black to dark brown, legs mainly black, tarsi reddish-brown. Metasoma black.

Structure. Head: wider than long (12.7 : 10) (Fig. 47C); mouth-parts (Fig. 46A–F): glossa short subtriangular, one-quarter length of prementum, not extending beyond labial palps; paraglossae slightly longer than suspensorium, reaching basal third of glossa; ligular arms occupying basal half of prementum (Fig. 46A); cardo slightly shorter than stipes, three and a half times longer than wide, lower margin with long branched hairs; maxillary palp extending beyond tip of galea (Fig. 46D), galeal comb of 15 teeth (Fig. 46C); labrum (Fig. 46E)

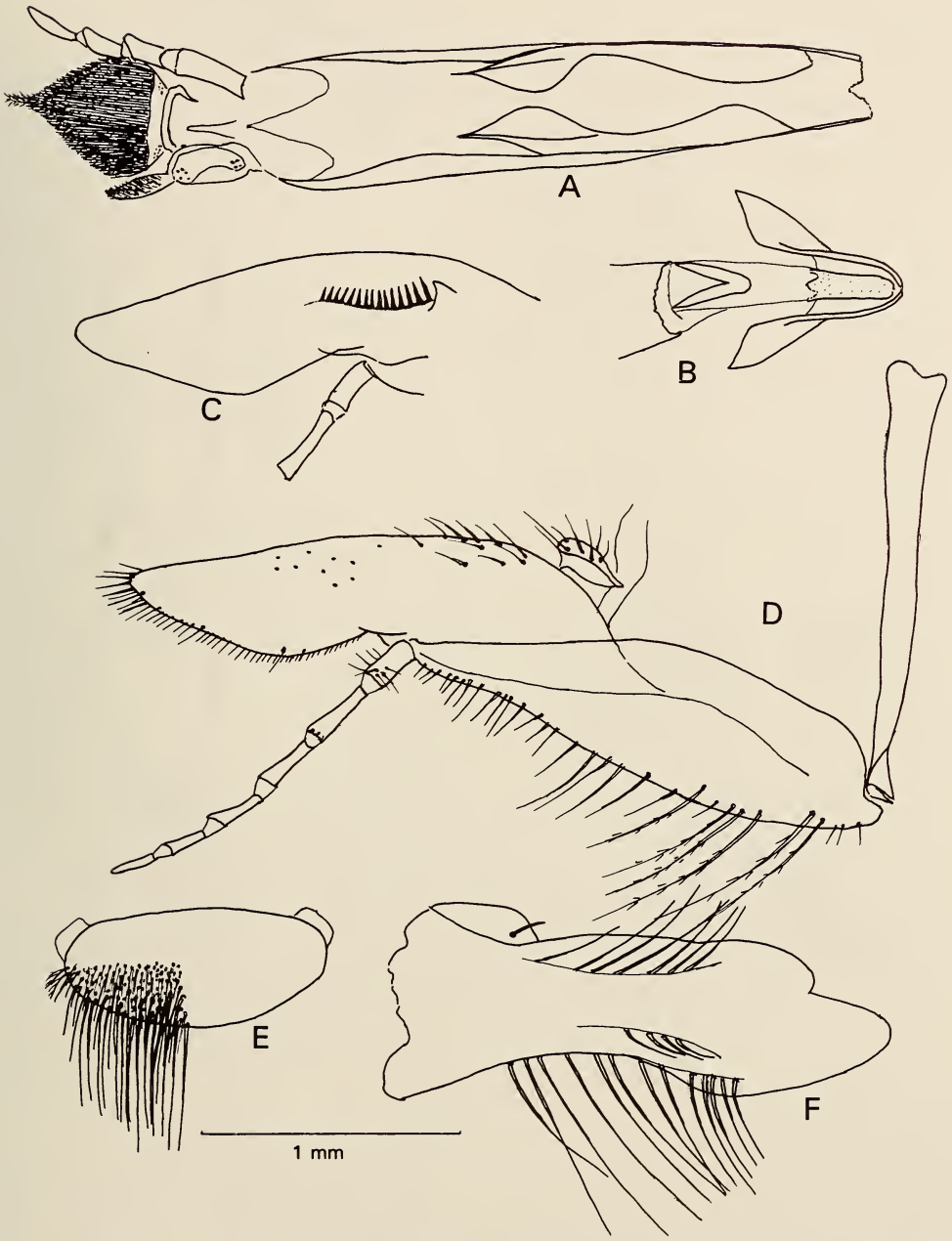

Fig. 46. *Rediviva peringueyi* (Friese, 1911). Female. A. Labium, anterior view. B. Base of prementum, mentum and lorum, posterior view. C. Inner view of galea to show comb. D. Left maxilla. E. Labrum. F. Right mandible.

twice as wide as long, anterior margin evenly convex. Mesosoma: wings dusky; front legs slightly shorter than body, hind legs with tibia nearly as wide as

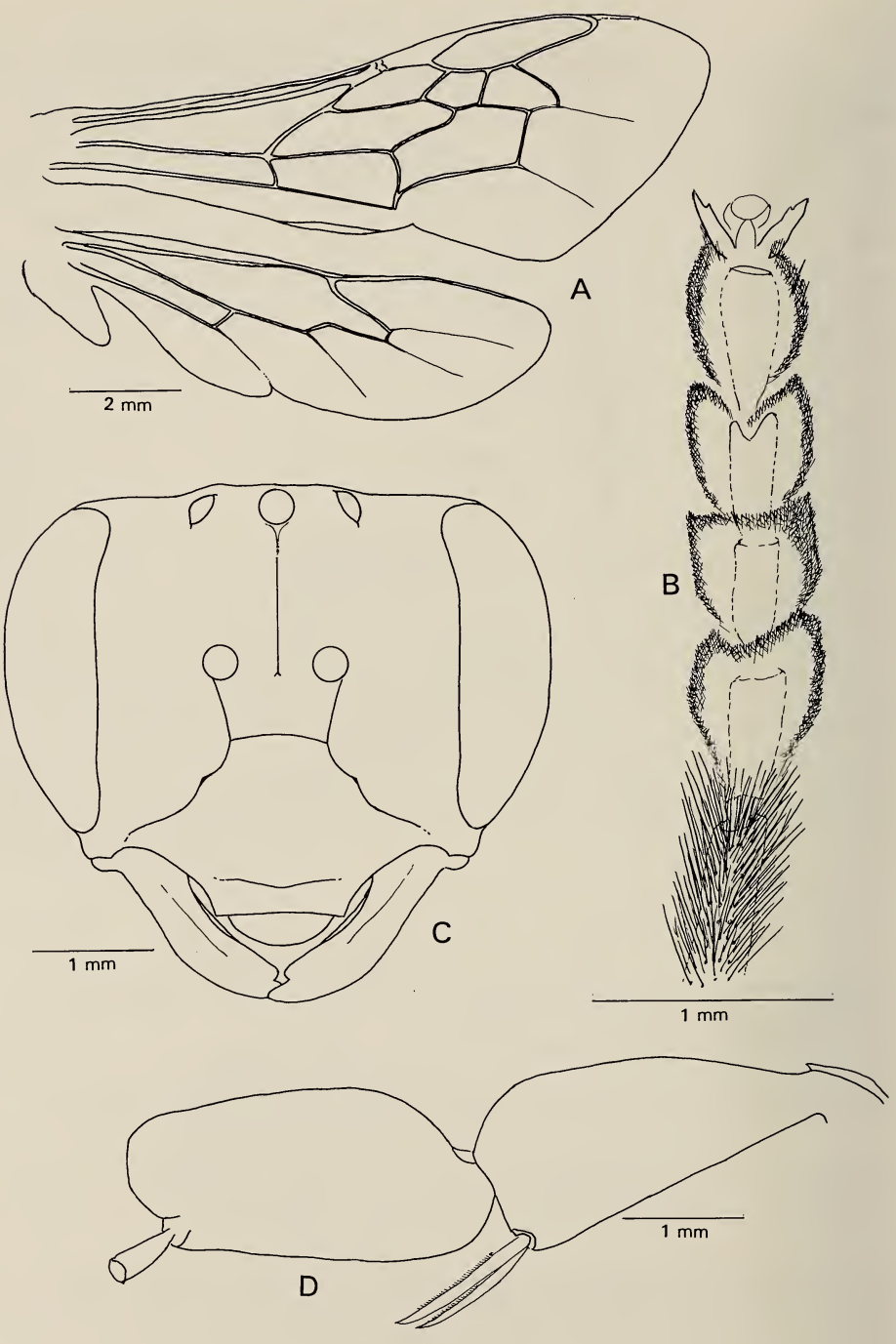

Fig. 47. *Rediviva peringueyi* (Friese, 1911). Female. A. Right wings. B. Distal portion of front basitarsus plus tarsomeres 2–5. C. Head, anterior view. D. Hind tibia and basitarsus.

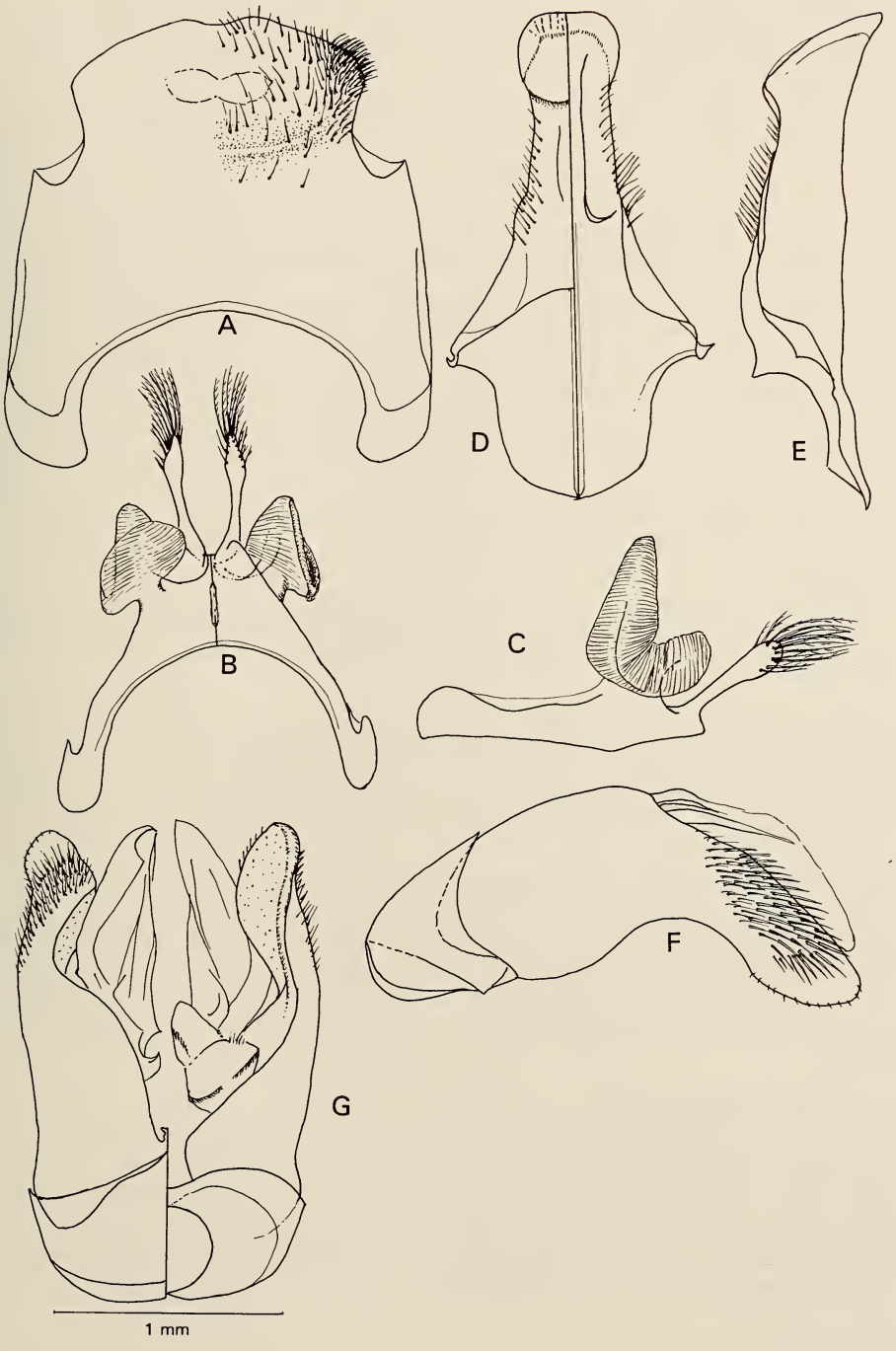

Fig. 48. *Rediviva peringueyi* (Friese, 1911). Male. A. S6, ventral view. B. S7, dorsal and ventral view. C. S7, lateral aspect. D. Dorsal and ventral view of S8. E. Lateral view of S8. F. Lateral view of genital capsule. G. Dorsal and ventral view of genitalia.

basitarsus (37 : 40), basitarsus more than twice as long as wide (85 : 40), distal margin rounded, extending beyond insertion of tarsomere 2, no scale-like projection on distal dorsal angle (Fig. 47D).

Sculpture. Head: labrum basal third impunctate, shiny; clypeus with distinct preapical ridge, distal margin largely impunctate, rest of clypeus with coarse punctures, less than one diameter apart on disc, surface between punctures shiny, coriaceous. Mesosoma: scutum with scattered punctures, area between coarsely roughened; propodeal triangle small, surface strigate, rest of propodeum with scattered punctures, surface between punctures coriaceous.

Vestiture. Head: labrum with long light brown unbranched hairs on apical two-thirds, clypeus light brown unbranched hairs on disc, plumose and paler laterally, vestiture on paraocular areas pale straw-coloured. Mesosoma: scutum and scutellum with short black branched pilosity on disc mixed with finer pale straw-coloured hairs on margins, metanotum with longer plumose hairs. Coxa, trochanter and femur clothed in short straw-coloured hairs, dark brown on tibia and tarsus; oil-collecting hairs on tarsomeres 2–5 of front legs (Fig. 47B). Metasoma: light brown hair band on apical margin of T1–T4, longer dark brown fimbriae on T5–T6.

Male

Measurements and ranges (n = 10). Body 11.2 mm (10.2–11.7 mm), forewing 9.1 mm (8.5–9.2 mm), foreleg 8.7 mm (8.3–9.0 mm). FL : B 0.79 (0.75–0.81), malar space L : W 0.22 (0.21–0.24).

Integumental colour. Head, mesosoma and metasoma black, front and middle tarsi, hind tibia and tarsus piceous to dark brown.

Structure. Head: malar space length one-fifth of width. Mesosoma: forelegs not attenuate, four-fifths length of body; hind tibia one and a half times breadth of basitarsus. Metasoma: S6 with poorly developed median lobes (Fig. 48A), distal margin shallowly emarginate, lateral lobes indicated by dense patch of strong bristles; S7 (Fig. 48B–C) with club-shaped median lobes, long plumose hairs distally, terminal hairs slightly shorter than lobe; large strigate translucent lateral lobes; S8 (Figs 48D–E, 64B) with apical plate ovate, concave, length one and a half times width, distal margin evenly rounded; genitalia (Fig. 48F–G): gonoforceps with stout unbranched hairs on distal half, not reaching apical margin.

Sculpture. As in female.

Vestiture. Head: long white branched hairs on clypeus, paraocular areas, frons and scape, erect black hairs on inner margins of eyes and distally on scape. Mesosoma: scutum, scutellum and metanotum with brown plumose pubescence, some scattered black hairs on disc; propodeum and epipleural areas covered in longer white pilosity. Metasoma: reddish-brown apical hair bands on T1–T5, fimbriae on T6 and T7 light brown.

Variations

Malar space measurements, length and width, were made on females from six localities and the ratios L : W were fairly uniform for five of these (Stellenbosch, Malmesbury, Piketberg, Darling and Swellendam) with a mean

of L : W = 0.22 and a range of 0.17–0.23. However, the Postberg sample from the West Coast National Park had a longer malar space with a mean of L : W 0.29 and a range of 0.25–0.32. In all other respects females from the six localities were similar. The Postberg reserve is on a peninsula where it is largely surrounded by water and this partial isolation may account for this divergence.

Note on the status of the type specimens of Rediviva peringueyi

Rediviva is based on two females of *R. peringueyi* collected in October 1888 by R. M. Lightfoot, a member of the scientific staff at the South African Museum at the time. These were sent to Friese in Berlin who retained the specimen from Paarl, and returned the other, collected at Stellenbosch. In his description Friese did not designate a holotype. However, Michener (1981) stated that 'one of Friese's original female specimens from Stellenbosch . . . is in the South African Museum' and the 'female type from Paarl' is deposited in Berlin.

There is a 'Type' label on pink card attached to the Paarl specimen, presumably by Michener. As Friese did not designate a type in his 1911 paper, we have labelled this specimen, deposited in the Humboldt University Museum, Berlin, as the *lectotype* and the Stellenbosch female (deposited in the South African Museum, Cape Town) as the *paralectotype*.

Host flower records

Of the 106 females collected on oil-producing plants, the majority (50.5%) were on *Hemimeris*, mainly *H. racemosa*, but four specimens were also taken on *H. sabulosa*. Five species of *Diascia* were also visited for oil; these include *D. 'grantiana'* (18.7%), *D. 'pusilla'* (4.7%), *D. elongata, D. capensis* and *D. 'arenicola'* (3.7%).

Rediviva peringueyi is one of the five species of *Rediviva* that collects oil from terrestrial orchids in the winter rainfall area. Twenty four per cent of our female specimens were collected visiting the orchids *Pterygodium alatum*, *P. caffrum*, *P. catholicum*, *P. hallii*, *P. inversum*, *P. volucris*, and *Corycium orobanchoides*.

Of the 35 males in our collection, 24 were collected in the vicinity of oil host plants, 23 patrolling *H. racemosa* and one *P. alatum*.

Females visited 11 species of nectar plants, with 45.9 per cent being collected on *Moraea* (*M. fugax, M. gawleri, M. miniata* and two *Moraea* sp.) and a further 25 per cent on *Stachys aethiopica*. The remaining material was taken on *Chironia decumbens*, *Cyphia* sp., *Heliophila coronopifolia*, *Oxalis* sp., and *Raphanus raphanistrum*.

Only eight males were collected taking nectar and of these, six were on species of *Moraea* and the remainder on *Chironia*.

Distribution (Fig. 49)

Rediviva peringueyi is restricted to the extreme south-western corner of the Western Cape Province, largely in areas below 300 m. Here there are several species of oil-producing terrestrial orchids from which it obtains oil. *Hemimeris*

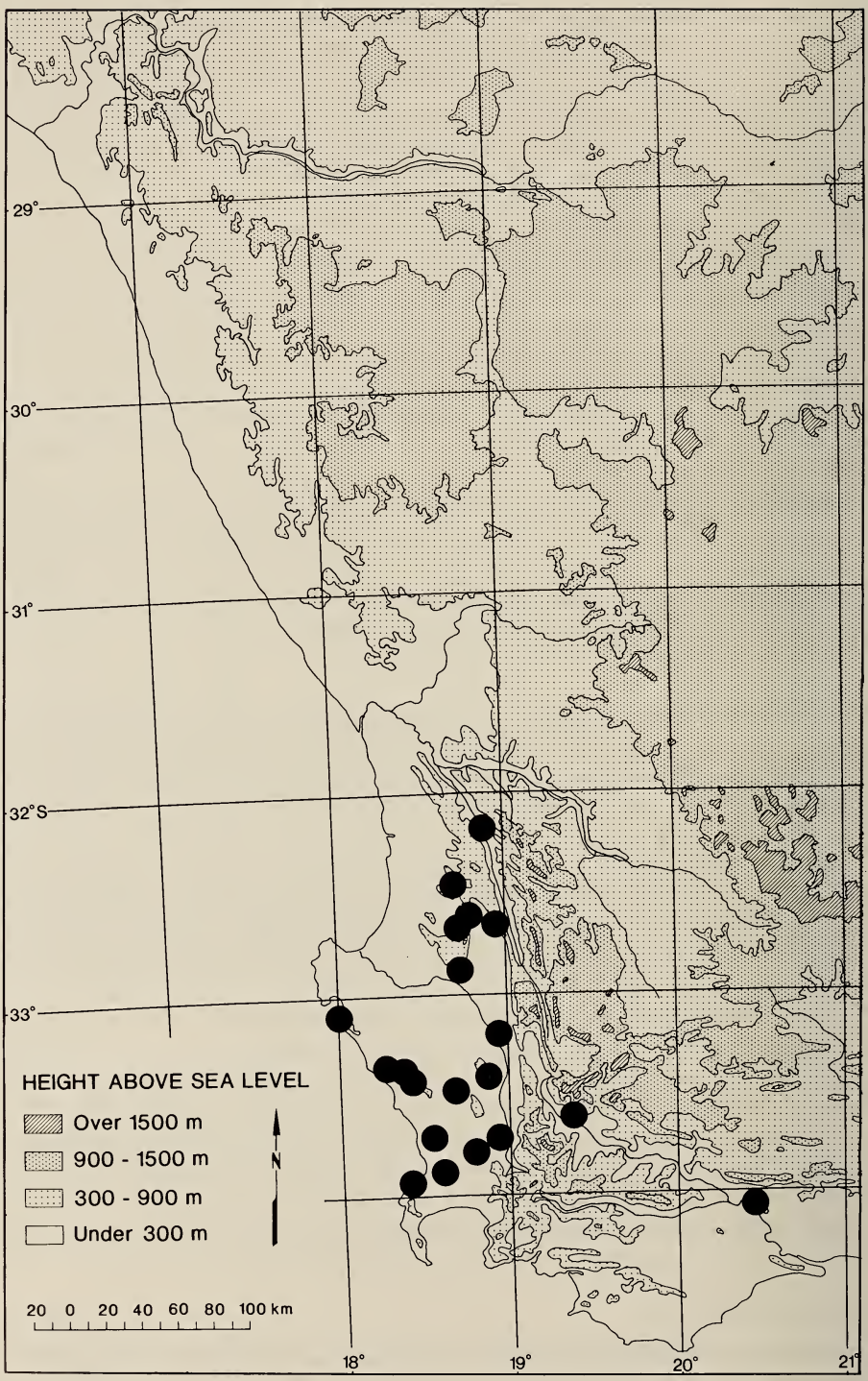

Fig. 49. Known distribution of *Rediviva peringueyi*.

racemosa, its favoured oil host plant, on the other hand ranges much more widely, but the presence of orchids, which occur late in the season, often when other oil-producing plants are declining, may be more critical than *Hemimeris* to the well-being of this species.

Rediviva parva sp. nov.

Figs 1C, 50–54, 61E

Diagnosis

Female: small, 9–12 mm, dark bodied. Mesosoma: pale straw-coloured to black pubescence; front coxa without apical spine; tibia and tarsus of all legs with light brown hairs, oil-collecting hairs on tarsomeres 2–5 of front legs and 2–4 of middle legs; hind basitarsus without scale on distal dorsal angle. Metasoma: T1–T4 with apical hair bands pale straw-coloured to black, light brown on T5–T6, hair bands less conspicuous on dark forms and worn females.

Male: small, 8–10 mm. Mesosoma: tibia and tarsus of front and middle legs black to light brown. Metasoma: conspicuous white apical hair bands on T2–T5, sub-erect black hairs on basal two-thirds of T3–T5; S6 with poorly developed lobes, S7 having long narrow lanceolate median lobes with branched hairs on surface of distal half, apical hairs as long as lobe. Apical third of gonoforceps with short stout unbranched hairs.

Etymology

From the Latin *parvus*, referring to the small size of members of this species.

Material examined

Type material. Holotype: SAM-HYM-B007517, female, Western Cape Province, Clanwilliam, 20 km south, farm Holfontein, 3218BD, V. B. Whitehead, 8 Aug. 1984. *Allotype*: SAM-HYM-B007518, male, Western Cape Province, Clanwilliam, 20 km south, farm Holfontein, 3218BD, V. B. Whitehead, 29 July, 1984. *Paratypes* (97 ♀♀, 26 ♂♂)—*Northern Cape Province*: 3 ♀♀, Hondeklipbaai, farm Diknek, 3017AC, VBW, 20 Aug. 1991; 3 ♀♀ same locality, VBW, 18 Aug. 1995; 3 ♀♀, Nieuwoudtville, 3119AC, VBW, 29 Aug. 1994. *Western Cape Province*: 1 ♀, Atlantis, 3318AB, VBW, 16 Sept. 1985; 1 ♀, Cape Point Nature Reserve, 3418AD, KES, 8 Oct. 1986; 3 ♀♀, Clanwilliam, 3 km south, 3218BB, KES, 3 Sept. 1986; 3 ♀♀, Clanwilliam, farm Klawervlei, 3218DD, VBW, 20 Aug. 1984; 3 ♀♀, Clanwilliam, 6 km south, 3218BB, VBW, 10 Sept. 1984; 2 ♀♀, Clanwilliam, Ramskop Camp Ground, 3218BB, VBW & MM, 20 Aug. 1984; 1 ♀, same locality, VBW & MM, 21 Aug. 1984; 3 ♀♀, Darling–Yserfontein Road, farm Slangkop, 3318AD, KES, 17 Sept. 1986; 3 ♀♀, same locality, KES, 18 Sept. 1986; 1 ♀, Elandsbaai, farm Skerpheuwel, 3218AD, KES, 28 Aug. 1987; 1 ♀, same locality, KES, 9 Sept. 1987; 5 ♀♀, same locality, KES, 11 Aug. 1988; 5 ♀♀, Elandsbaai, 3218AD, VBW, 21 Sept. 1984; 5 ♂♂, same locality, VBW, 11 Aug. 1988; 3 ♀♀, Gouda, Voëlvlei Water Purification Plant, 3319AC,

VBW, 6 Sept. 1988; 3 ♀♀, Graafwater, 3218AB, KES, 14 Sept. 1984; 4 ♀♀, Hetkruis, farm Groenrivier, 3218DB, VBW, 22 Sept. 1988; 7 ♂♂, same locality, VBW, 19 Aug. 1992; 3 ♀♀, Hopefield, farm Jantjiesfontein, 3218CD, VBW, 10 Sept. 1992; 3 ♀♀, 4 ♂♂, Hout Bay, opposite Duiker Island, 3418AB, KES, 11 Oct. 1986; 2 ♀♀, Klawer, 7.6 km north on N7, 3118DA, KES, 7 Aug. 1985; 6 ♀♀, same locality, 3118DA, KES, 6 Aug. 1988; 3 ♀♀, Mamre, 3318AD, KES, 16 Sept. 1985; 3 ♀♀, Montagu, 10 km east, farm Rietvlei No. 1, 3320CC, VBW, 26 Aug. 1981; 2 ♀♀, Piketberg, 19 km north, 3218DB, VBW, 27 Aug. 1987; 1 ♂, Sandberg Station, farm Droogerivier, 3218BC, VBW, 27 Aug. 1987; 2 ♀♀, same locality, VBW, 19 Sept. 1987; 3 ♀♀, Sauer, 3218DC, VBW, 9 Sept. 1994; 4 ♀♀, Stellenbosch, farm Joostenbergkloof, 3318DD, VBW, 16 Sept. 1986; 1 ♂, same locality, VBW, 14 Aug. 1988; 1 ♀, same locality, VBW, 16 Aug. 1988; 4 ♀♀, Swellendam, Bontebok National Park, 3420AB; KES, 29 Sept. 1987; 4 ♀♀, Velddrif, 13.4 km east, farm Doornfontein A, 3218CD, VBW, 15 Sept. 1994; 5 ♀♀, 5 ♂♂, Vanrhynsdorp, 3318DA, H. Brauns, Aug, 1927; 1 ♂, Vanrhynsdorp, 10 km north, 3318DA, VBW, 11 Aug. 1995; 1 ♀, Vanrhynsdorp, 3318DA, VBW, 14 Aug. 1995; 1 ♀, same locality, VBW, 28 Aug. 1995. *Other material* (299 ♀♀, 37 ♂♂)—*Northern Cape Province*: 5 ♀♀ Hondeklipbaai, 3017AD; 4 ♀♀ Koingnaas, 3017AB; 11 ♀♀, Kotzesrus, 3017DD; 12 ♀♀, Nieuwoudtville, 3119AC. *Western Cape Province*: 5 ♂♂, Camps Bay, 3318CD; 2 ♀♀, Cape Town, 3318CD; 3 ♀♀, Citrusdal, 3219CA; 84 ♀♀, 3 ♂♂, Clanwilliam, 3218BB; 14 ♀♀, Darling, 3318AD; 14 ♀♀, Elandsbaai, 3218AD; 25 ♀♀, Gouda, 3319AC; 3 ♀♀, Graafwater, 3218BA; 10 ♀♀, 6 ♂♂, Hetkruis, 3218DA; 11 ♀♀, Hopefield, 3318AB; 13 ♀♀, 11 ♂♂, Hout Bay, 3418AB; 5 ♀♀, Hondeklipbaai, 3017AD; 18 ♀♀, Klawer, 3118DC; 1 ♀, Lambert's Bay, 3218DC; 6 ♀, Malmesbury, 3318BC; 4 ♀♀, Montagu, 3320CC; 4 ♀♀, Melkbosstrand, 3318CD; 4 ♀♀, Moorreesburg, 3318BA; 1 ♀, Paleisheuwel, 3218BC; 17 ♀♀, Piketberg, 3218DA; 1 ♀, Porterville, 3318BB; 1 ♀, Riebeek-Kasteel, 3318BD; 3 ♀♀, 7 ♂♂, Sandberg Station, 3218BC; 11 ♀♀, 4 ♂♂, Sauer, 3218DC; 8 ♀♀, 1 ♂, Stellenbosch, 3318DD; 13 ♀♀, Swellendam, 3420AB; 2 ♀♀, Vanrhynsdorp, 3118DA; 9 ♀♀, Yserfontein, 3218BA.

Description

Female

Measurements. *Holotype*: body 9.7 mm, forewing 9.5 mm, malar space L : W 0.25. *Other material* (n = 30)—*Measurements and ranges*: body 10.5 mm (9.5–11.5 mm), foreleg 8.7 mm (8.0–9.2 mm), forewing 8.2 mm (7.3–8.5 mm), Ft+b 2.9 mm (2.6–3.0 mm). *Ratios*: FL : B 0.83 (0.75–0.92), malar space (n = 10) L : W 0.22 (0.16–0.23).

Integumental colour. Head, scape, pedicel and basal four-fifths of first flagellar segment black, rest of flagellum dark brown to black above, brown below. Meso- and metasoma black to dark brown, legs black, hind tibia and basitarsus light brown.

Structure. Head: disc of clypeus shallowly concave; mouth-parts (Fig. 50A–H): glossa half length of prementum, labial palp extending to tip of glossa, paraglossa one-quarter length of glossa; ligular process occupying basal

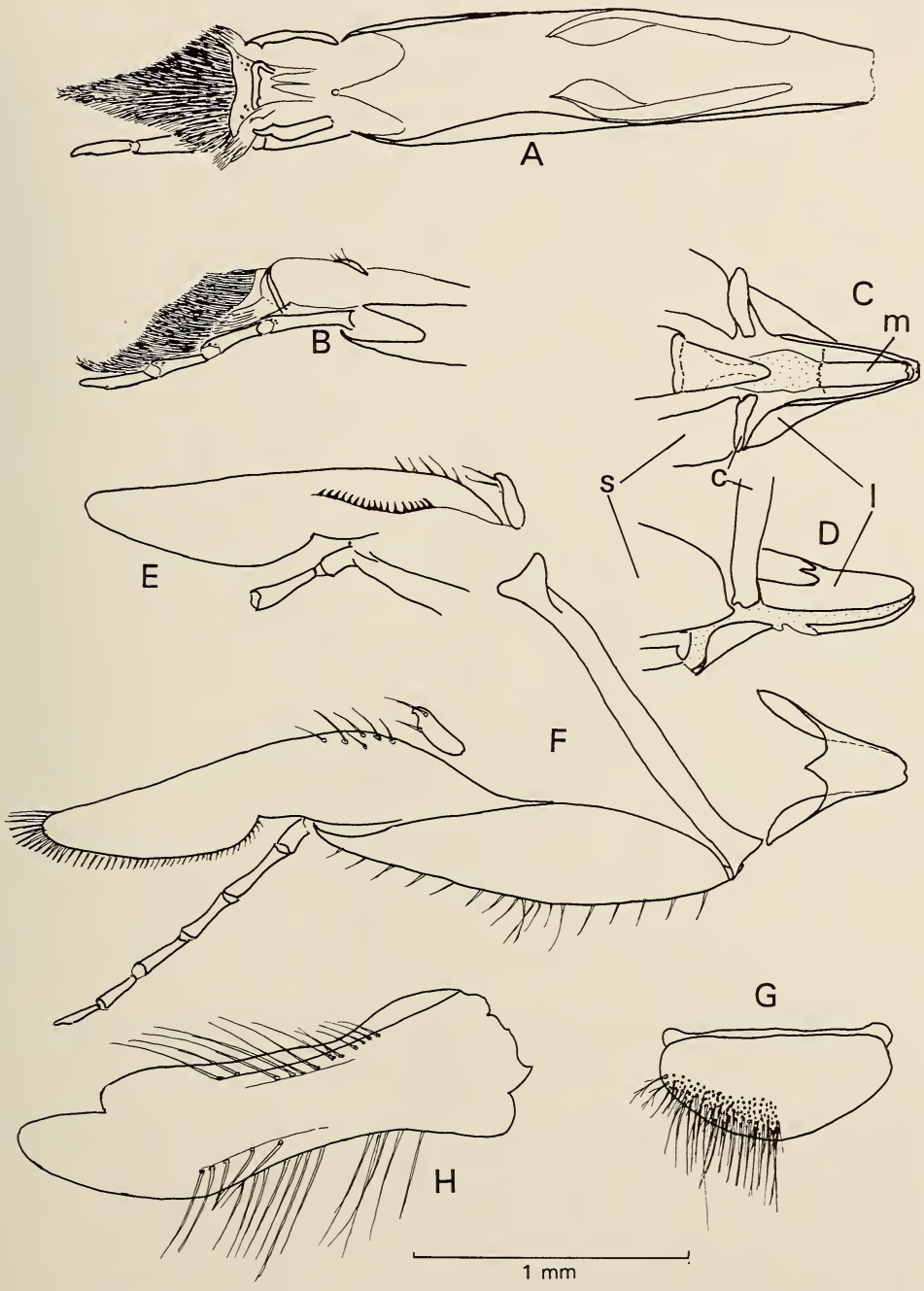

Fig. 50. *Rediviva parva* sp. nov. Female. A. Labium, anterior view. B. Distal part of labium, lateral aspect. C. Base of labium and associated sclerites, posterior view (c—cardo, l—lorum, m—mentum). D. Base of labium and associated sclerites, lateral view. E. Inner view of galea to show comb. F. Maxilla. G. Labrum. H. Left mandible.

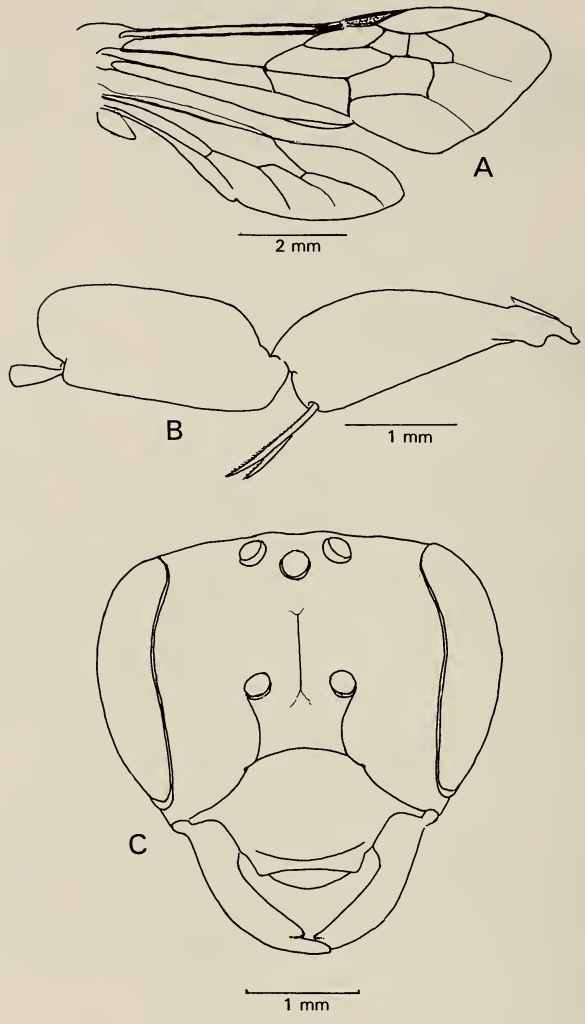

Fig. 51. *Rediviva parva* sp. nov. Female. A. Right wings. B. Hind tibia and basitarsus. C. Head, anterior view.

half of prementum (Fig. 50A); small triangular sclerite at junction of cardo and stipes; cardo slightly shorter than stipes, galea slightly longer than stipes, apex narrowly rounded (Fig. 50F), galeal comb of 17 teeth (Fig. 50E). Labrum (Fig. 50G) evenly convex apically, twice as wide as long. Mesosoma: forelegs shorter than body, hind basitarsus (Fig. 51B), nearly three times as long as wide (62 : 22), slightly narrower than hind tibia (22 : 25), without scale on distal dorsal angle, distal margin rounded, extending beyond the insertion of tarsomere 2. Propodeal triangle small, poorly defined.

Sculpture. Head: clypeus coarsely punctured, diameter of punctures less than distance between them, surface between punctures shiny, apical margin

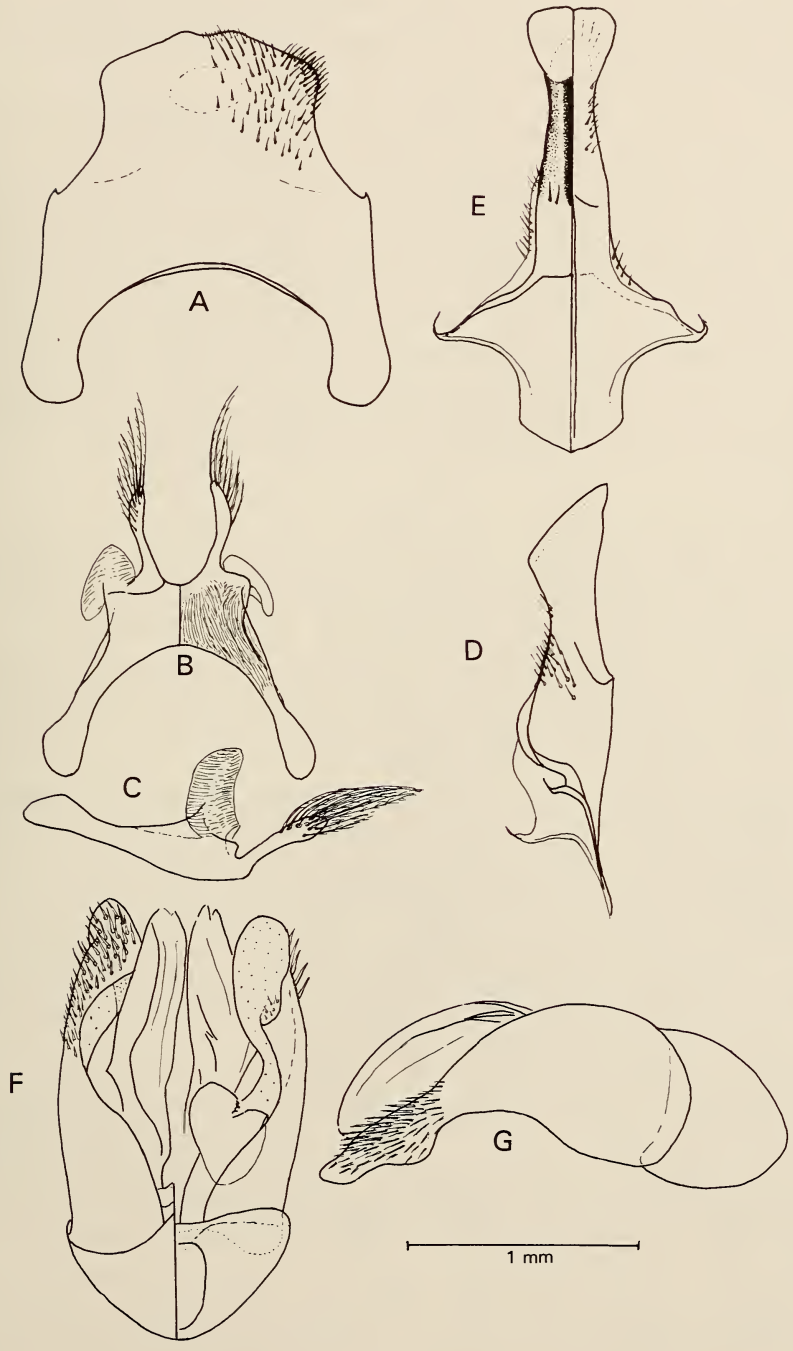

Fig. 52. *Rediviva parva* sp. nov. Male. A. S6, ventral view. B. S7, dorsal and ventral view. C. S7, lateral view. D. S8, lateral view. E. Dorsal and ventral view of S8. F. Dorsal and ventral view of genitalia. G. Genital capsule, lateral aspect.

impunctate. Mesosoma: punctation on disc of scutum fine, distance between punctures three to four times their diameter; propodeal triangle shiny, rest of propodeal surface punctate with scattered wrinkles.

Vestiture. Head: labrum with long, stout unbranched hairs on apical margin, shorter branched hairs interspersed; clypeus, supraclypeal and paraocular areas and frons with long white plumose hairs, some black branched hairs on inner ocular margin; long plumose white hairs on genal areas. Mesosoma: scutum with mixture of short plumose black and white hairs; scutellum and metanotum with light brown plumosity, longer white to straw-coloured on propodeum, hairs light brown to black in dark forms; coxa, trochanter and femur of all legs with long white branched hairs, light brown and shorter on tibia and tarsus, finely divided oil-collecting hairs on tarsomeres 2, 3, 4 and 5 of forelegs; scrapers and oil-collecting hairs on tarsomeres 2, 3 and 4 of middle legs. Metasoma: apical hairbands on T2–T4, varying from white, straw-coloured, piceous to black depending on the colour form; fimbriae on T5 and T6 light brown.

Male

Measurements. *Allotype*: body 8.3 mm, forewing 7.0 mm, malar space L : W 0.23. *Other material* (n = 10)—*Measurements and ranges*: body 9.4 mm (8.8–10.3 mm), foreleg 7.7 mm (7.6–7.9 mm), wing 7.9 mm (7.8–8.2 mm). *Ratios*: FL : B 0.82 (0.74–0.89), malar space L : W 0.24 (0.19–0.27).

Integumental colour. Head: antennae, basal three-quarters of mandible black; mesosoma black, tegulae dark brown; tibia and tarsus of front and middle legs black to light brown, hind tibia and basitarsus light brown; metasoma black, lateral margin of T1 reddish-brown.

Structure. Front legs four-fifths length of body. S6 with median and lateral lobes poorly developed, tuft of short, strong unbranched hairs on lateral lobe (Fig. 52A); S7 (Fig. 52B–C) with long narrow lanceolate median lobes, long finely branched hairs on lateral surface of distal half, terminal hairs as long as lobe; lateral lobes translucent, strigate, as long as median lobes; ventral surface of S7 costulate; S8 (Figs 52D–E, 63E), apical plate spade-shaped, shallowly concave, lateral margins diverging distally, distal margin shallowly crenulate. Genital capsule (Fig. 52F–G): gonoforceps not extending beyond tip of penis valves, apical third with stout unbranched hairs.

Vestiture. Head: long unbranched golden to light brown hairs on distal margin of labrum, long silky white plumose hairs on clypeus, supraclypeal and paraocular areas, some black hairs on inner ocular margin. Mesosoma: long white plumose hairs on episternal areas; scutum and metanotum with similar vestiture, some black hairs on scutellum. Metasoma: white hairbands on apical margin of T2–T5, short black sub-erect hairs on basal two-thirds of T3–T5, fimbriae on T6–T7 light brown.

The colour of the pubescence on the basal area of terga can be used to differentiate the males of *R. parva*, *R. albifasciata* and *R. aurata*. The basal area of T2–T5 of *R. parva* has obvious sub-erect black hairs whereas this area in *R. albifasciata* is smooth and shiny with hairs not readily discernible. *Rediviva aurata* has predominantly erect pale straw-coloured to white hairs on the base of T3–T4 with some black erect hairs on T5.

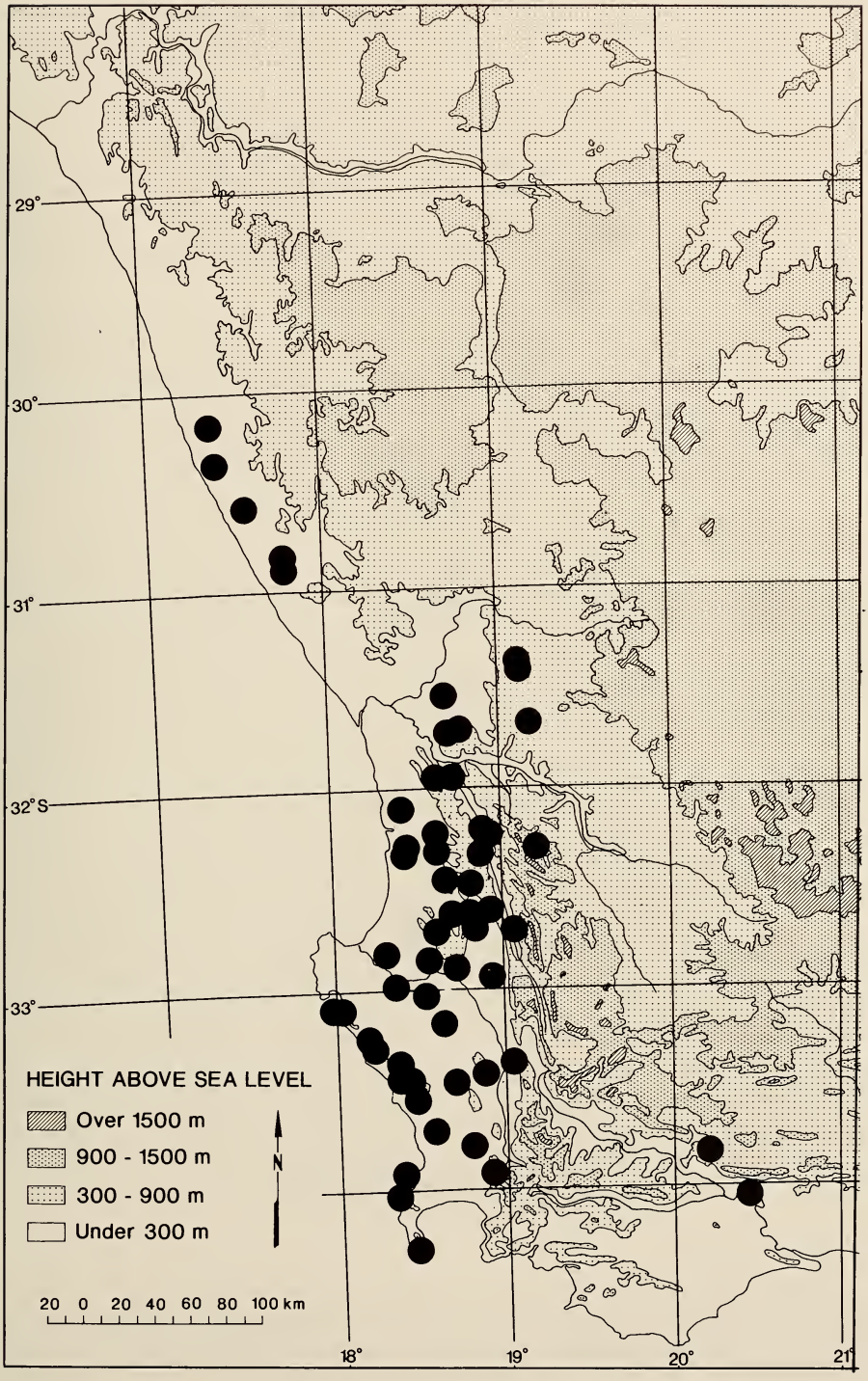

Fig. 53. Known distribution of *Rediviva parva* sp. nov.

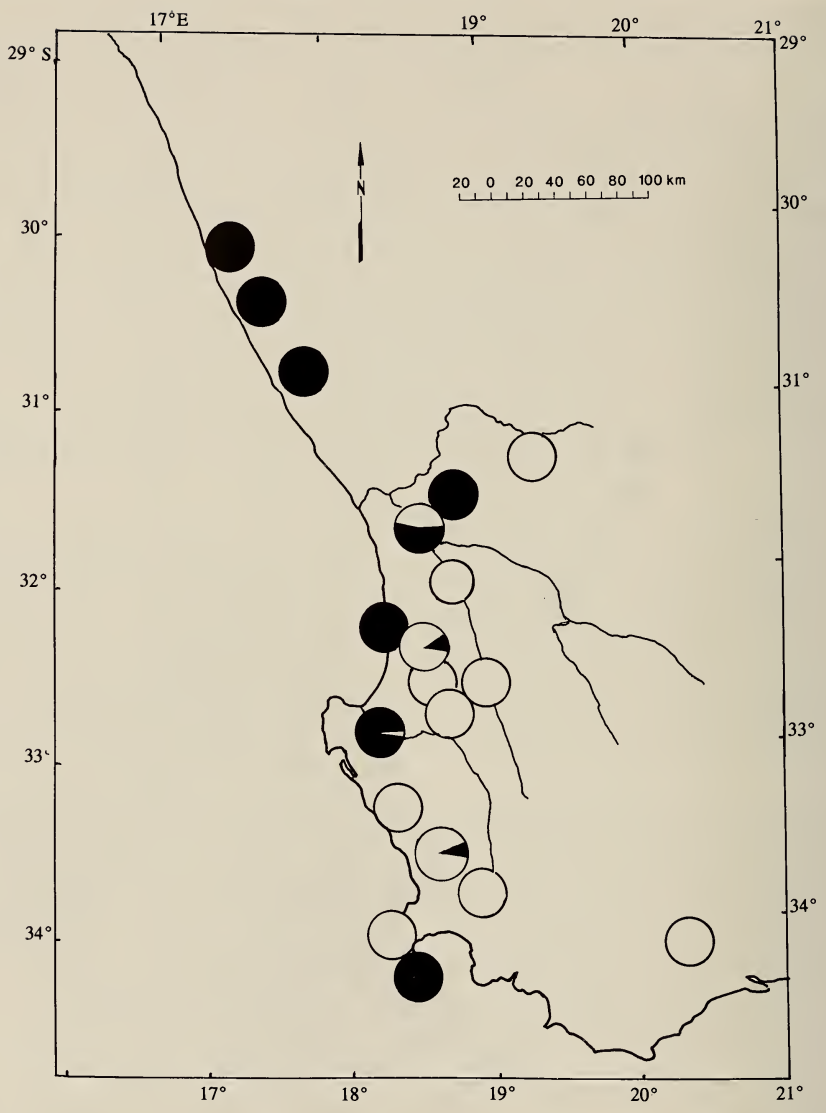

Fig. 54. Proportion of dark-haired to light-haired females of *Rediviva parva* sp. nov. at various localities in the Western and Northern Cape provinces. Symbols: ○ = white-haired form; ● = black-haired form; wedges of white or black indicate proportion of white- or black-haired forms at that locality.

Host flower records

Females collect oil from fourteen species of oil-producing plants. These are *Hemimeris racemosa*, *H. sabulosa* and *Alonsoa unilabiata* as well as 11 species of *Diascia*, which include *Diascia capensis*, *D. pachyceras*, *D. lewisiae*, *D. batteniana*, *D. 'arenicola'*, *D. 'arenicola'* ssp. *'bulbosa'*, *D. 'grantiana'*, *D. elongata*, *D. ellaphieae*, and *D. 'speciosa'*. Nectar plants visited by females

are *Moraea miniata*, *Oxalis obtusa*, *O. pes-caprae*, *Cysticapnos vesicaria*, *Geissorhiza aspera*, *Wachendorfia paniculata*, *Nylandtia spinosa*, *Heliophila* and *Trachyandra* spp.

Males occasionally patrolled oil host plants and have been collected cruising over *H. racemosa* and *D. capensis* but the greatest number were collected on six species of nectar plants. The majority (52%) were visiting *O. pes-caprae*, *O. obtusa* and an unidentified *Oxalis*. *Cysticapnos vesicaria* was also attractive and 10 per cent were taken on this plant. The remaining males were on *M. miniata*, *Hermannia* sp. and *Wachendorfia paniculata*.

Distribution (Fig. 53)

Rediviva parva has been found on the coastal plain from Hondeklipbaai in the Northern Cape to Cape Point in the Western Cape. Inland it occurs on the Nieuwoudtville plateau and along the western side of the inland range to Stellenbosch. Disjunct populations occur further east at Montagu and Swellendam. It is possible that its eastward range is restricted by the absence of *Hemimeris racemosa*, its most favoured host plant.

Colour forms (Fig. 54)

Females have a black integument and the majority have white to pale straw-coloured vestiture. However, some individuals have a darker pubescence, dark brown to black, the extent of which varies from completely to partially black with light-coloured pubescence on the metanotum, propodeum and lateral margins of the metasomal terga. The proportion of darker forms in any one population varies according to location (Fig. 54). The northern populations at Koingnaas, Wallekraal, Kotzesrus and Vanrhynsdorp have only dark individuals, as do Elandsbaai and Cape Point populations further south. Dark, intermediate and light-coloured forms occur together at Bergriver Station (97% dark and intermediate), Klawer (54% dark and intermediate), Sandberg Station (12% dark and intermediate) and Koeberg Hill (9% dark and intermediate).

Males collected in areas where dark females predominate tend to have dark brown pubescence, particularly the apical hair bands on the metasomal terga.

One can only speculate as to the cause of darkening of the pubescence, but it is evident that the northern populations all occur on dune systems and soils in areas such as Elandsbaai and Bergriver Station are extremely sandy. On the heavier clay soils of Piketberg and Nieuwoudtville no dark forms have yet been collected.

Rediviva alonsoae sp. nov.

Figs 1H, 55–58, 63F

Diagnosis

Female. Dark-bodied, medium-sized bees, 11–13 mm. Mesosoma: forelegs not attenuated, three-quarters length of the body; oil-collecting hairs restricted to distal portion of the basitarsus and tarsomeres 2–4 of the foreleg, no oil-collecting hairs on tarsus of middle leg; hind basitarsus lacks scale-like

projection on the distal dorsal angle. Metasoma: pale yellow apical hair bands on terga 2–4.

Male. Dark-bodied, medium-sized bees, 9–11 mm. Mesosoma: pubescence of legs straw-coloured to light brown. Metasoma: light brown diffuse apical hair bands on T1–T4, erect black hairs on basal half of T4 and basal two-thirds of T5, fimbriae of T6 light brown, of T7 black. Apical third of S6 concave.

Etymology

Females collect oil only from *Alonsoa unilabiata* (Scrophulariaceae), hence *alonsoae*.

Material examined

Type material. *Holotype*: SAM-HYM-B007511, female, Northern Cape, Middelpos, farm Blomfontein, 3120CC, K. E. Steiner, 3 Oct. 1995. *Allotype*: SAM-HYM-B001318, male, Northern Cape, Nieuwoudtville, Wild Flower Reserve, 3119AC, V. B. Whitehead, 4 Aug. 1988. *Paratypes* (26 ♀♀, 5 ♂♂)—*Northern Cape Province*: 1 ♀, Calvinia, farm Toren, 3119BC, KES, 26 Aug, 1985; 1 ♂, same locality, VBW & MM, 26 Aug. 1985; 3 ♀♀, Middelpos, farm Blomfontein, 3120CC, KES, 3 Oct. 1985; 9 ♀♀, Middelpos, farm Hartbeestfontein, 3120CC, KES, 2 Oct. 1986; 2 ♀♀, Middelpos, farm Blomfontein, 3019CC, VBW, 3 Oct. 1985; 6 ♀♀, Middelpos, farm Hartbeestfontein, 3120CC, VBW, 2 Oct. 1986; 1 ♂, Nieuwoudtville, Wild Flower Reserve, 3119AC, KES, 8 Aug. 1986; 1 ♀, Nieuwoudtville, farm Bokkefontein, 3119AC, KES, 25 Aug. 1988; 1 ♀, Nieuwoudtville, farm Glenlyon, 3119AC, KES, 24 Aug. 1990; 1 ♂, Nieuwoudtville, Wild Flower Reserve, 3119AC, KES & VBW, 2 Aug. 1984; 2 ♀♀, Nieuwoudtville, road to Teunisdrif, 13 km north-east from Grasberg Road, 3119AC, VBW, 25 Aug. 1985; 1 ♀, Nieuwoudtville, farm Glenlyon, 3119AC, VBW, 11 Sept. 1987; 1 ♂, Nieuwoudtville, Wild Flower Reserve, 3119AC, VBW, 19 Aug. 1988; 1 ♂, same locality, VBW, 10 Sept. 1996. *Other material*: 11 ♀♀, Nieuwoudtville Wild Flower Reserve, 3119AC, VBW, 29 Aug. 1995; 6 ♀♀, same locality, VBW, 31 Aug. 1995; 6 ♀♀, same locality, VBW, 6 Sept. 1995.

Description

Female

Measurements. *Holotype*: body 12.0 mm, forewing 9.8 mm, malar space L : W 0.21. *Other material* (n = 10)—*Measurements and ranges*: body 11.9 mm (11.2–13.2 mm), foreleg 9.7 mm (9.5–10.3 mm), wing length 9.2 mm (9.0–9.8 mm), Ft+bt 3.1 mm (2.9–4.2 mm). *Ratios*: FL : B 0.82 (0.76–0.87), malar space L : W 0.23 (0.21–0.25).

Integumental colour. Body and legs black, tegulae and underside of flagellum dark brown.

Structure. Mouth-parts (Figs 55A–E, 56E): glossa one-third length of prementum, labial palps extending beyond tip of glossa, paraglossae extending to one-third length of glossa; ligula arms occupying basal half of prementum (Fig. 55A); galeal comb of 21 teeth (Fig. 55B); labrum wider than long (12 : 5),

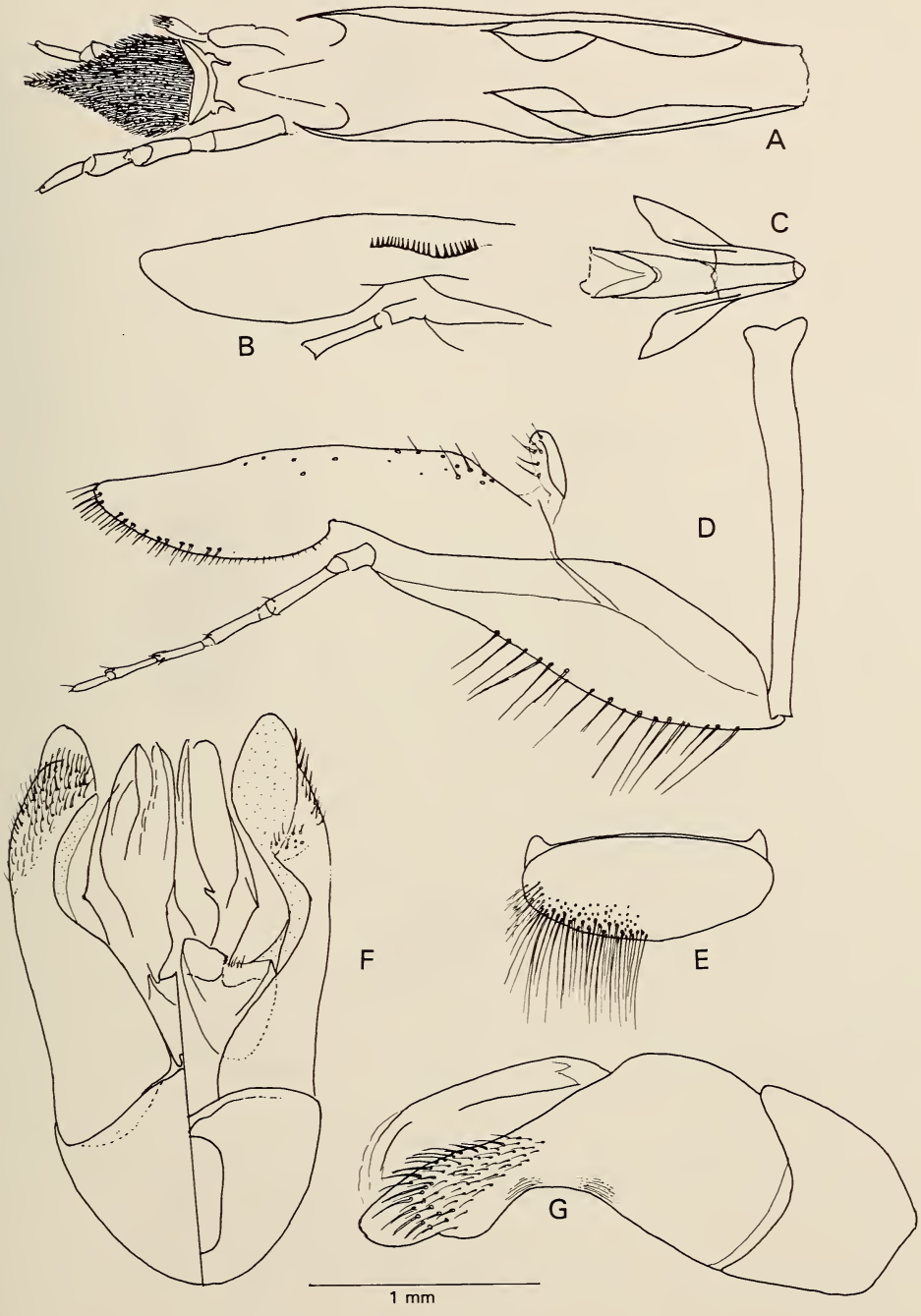

Fig. 55. *Rediviva alonsoae* sp. nov. Female. A. Labium, anterior view. B. Inner view of galea to show comb. C. Base of labium and associated sclerites, posterior view. D. Left maxilla. E. Labrum. F. Dorsal and ventral view of genitalia. G. Lateral aspect of genital capsule.

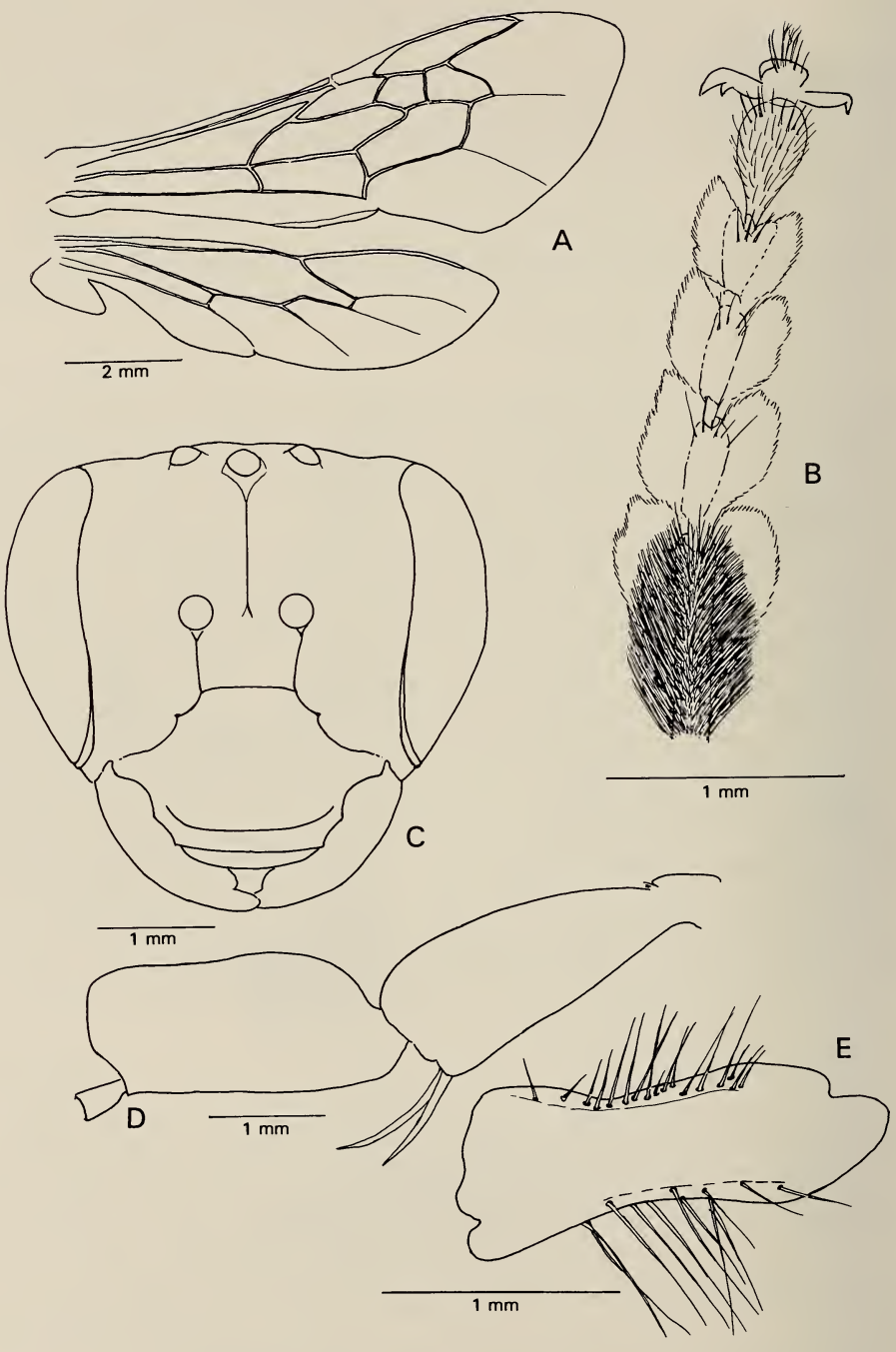

Fig. 56. *Rediviva alonsoae* sp. nov. Female. A. Right wings. B. Distal part of front basitarsus plus tarsomeres 2–5. C. Anterior view of head. D. Tibia and basitarsus of hind leg. E. Right mandible.

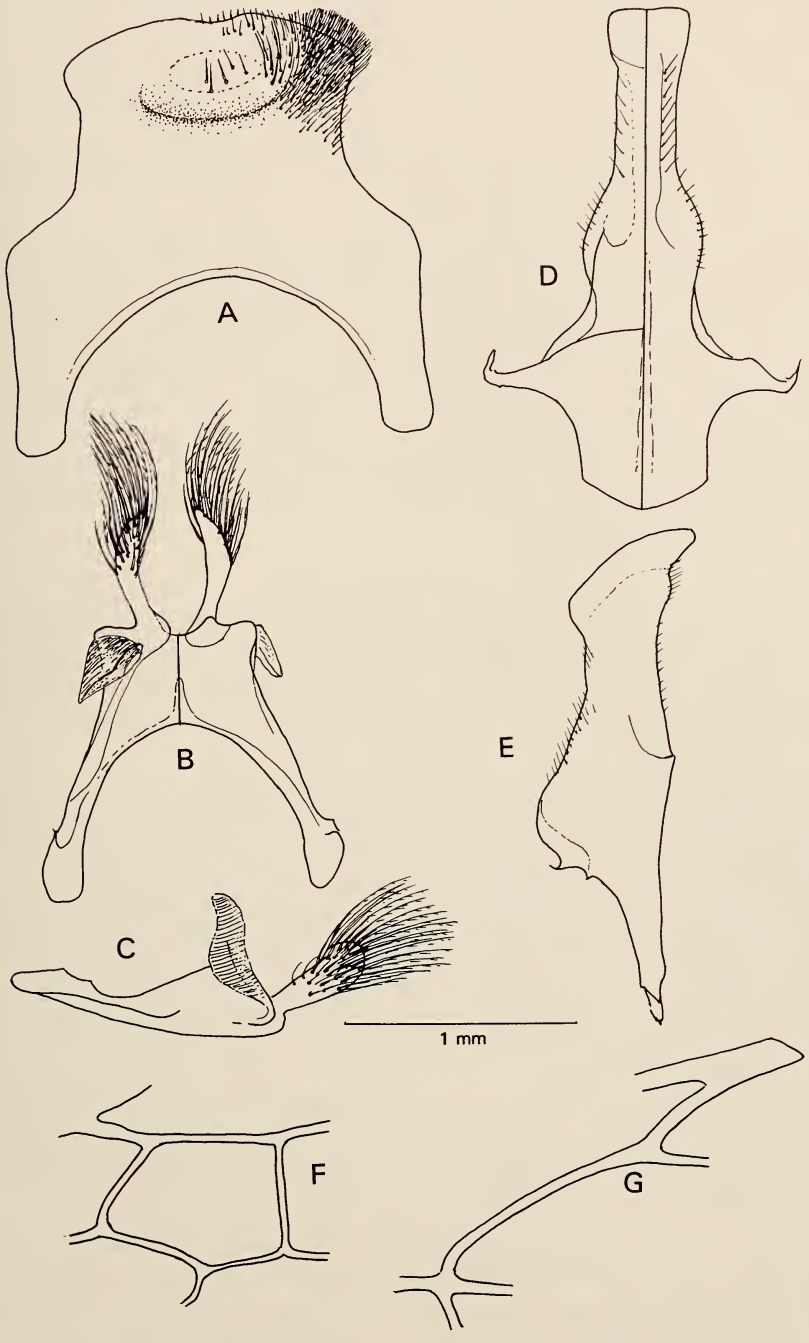

Fig. 57. *Rediviva alonsoae* sp. nov. Male. A. Ventral view of S6. B. Dorsal and ventral aspect of S7. C. Lateral view of S7. D. Dorsal and ventral view of S8. E. Lateral view of S8. F–G. Female. F. Second submarginal cell of right forewing. G. Basal vein and first abscissa of Rs of right forewing.

apical margin convex, evenly rounded (Fig. 55E). Mesosoma: forelegs not elongate, four-fifths length of body, hind tibia nearly as wide as hind basitarsus (3.1 : 3.3), hind basitarsus broad, length 2.3 times width, without scale-like projection on distal dorsal angle, distal margin truncate extending beyond insertion of tarsomere 2 (Fig. 56D).

Sculpture. Clypeus coarsely punctate, surface between punctures shiny, apical margin impunctate, shiny; labrum punctate on apical third; scutum finely punctate, areas between punctures shiny.

Vestiture. Head: pubescence on underside of head, white to straw-coloured. Mesosoma: hairs on scutum, scutellum and metanotum as well as pleura and mesosternum straw-coloured; tibia and tarsus of all legs with light brown pubescence; finely branched oil-collecting hairs on front tarsomeres 2–4 and on distal quarter of front basitarsus (Fig. 56B), no oil-collecting hairs on tarsomere 5 of front leg or on tarsus of middle leg. Metasoma: terga 2–4 with apical bands of pale yellow decumbent hair, sometimes less prominent on disc of T2–T3 especially on older specimens, sub-erect hair of same colour on basal two-thirds of T2–T3, some erect black hairs on middle of T4; fimbriae on T5 black basally, brown apically.

Male

Measurements. *Allotype*: body 11.8 mm, forewing 9.0, malar space L : W 0.19. *Other material* (n = 2)—*Measurements and ranges*: body 10.4 mm (9.8–11.0 mm), forewing 7.7 mm (7.5–7.8 mm), foreleg 8.3 mm (8.0–8.6 mm), Ft+bt 2.9 mm. *Ratios*: FL : B 0.80 (0.73–0.88), malar space L : W 0.19 (0.17–0.21).

Integumental colour. Body, legs and antennae black.

Structure. Mesosoma: forelegs approximately three-quarters length of body, hind tibia wider than basitarsus (2 : 1.5). Metasoma: S6 (Fig. 57A) with median and lateral lobes poorly developed, disc concave on distal third, strongly punctate basally; S7 (Fig. 57B–C) deeply emarginate apically with conspicuous spatulate median lobes terminating in strong curved branched hairs, lateral lobes well developed, strigate; S8 (Fig. 57D–E, 63F), apical plate sub-triangular, narrowing basally, distal margin entire; genital capsule (Fig. 55F–G), gonoforceps extending slightly beyond penis valves with short strong curved hairs on distal third.

Sculpture. Head: clypeus finely and densely punctured, areas between punctures shiny, anterior margin impunctate, shiny. Mesosoma: scutum finely punctate, less dense than clypeus, punctures of two sizes, surface between punctures shiny.

Vestiture. Head: clypeus, paraocular areas and frons covered with long white silky hairs; similar pubescence on underside of head. Mesosoma: scutum with shorter straw-coloured hairs mixed with black; scutellum with black hairs on disc, pale straw-coloured laterally; legs basally with white hairs becoming brown on tibia and tarsus. Metasoma: pubescence on metanotum straw-coloured; propodeum with vestiture black on disc, straw-coloured laterally; T2–T4 with light brown, diffuse, semi-decumbent apical hair bands, short erect

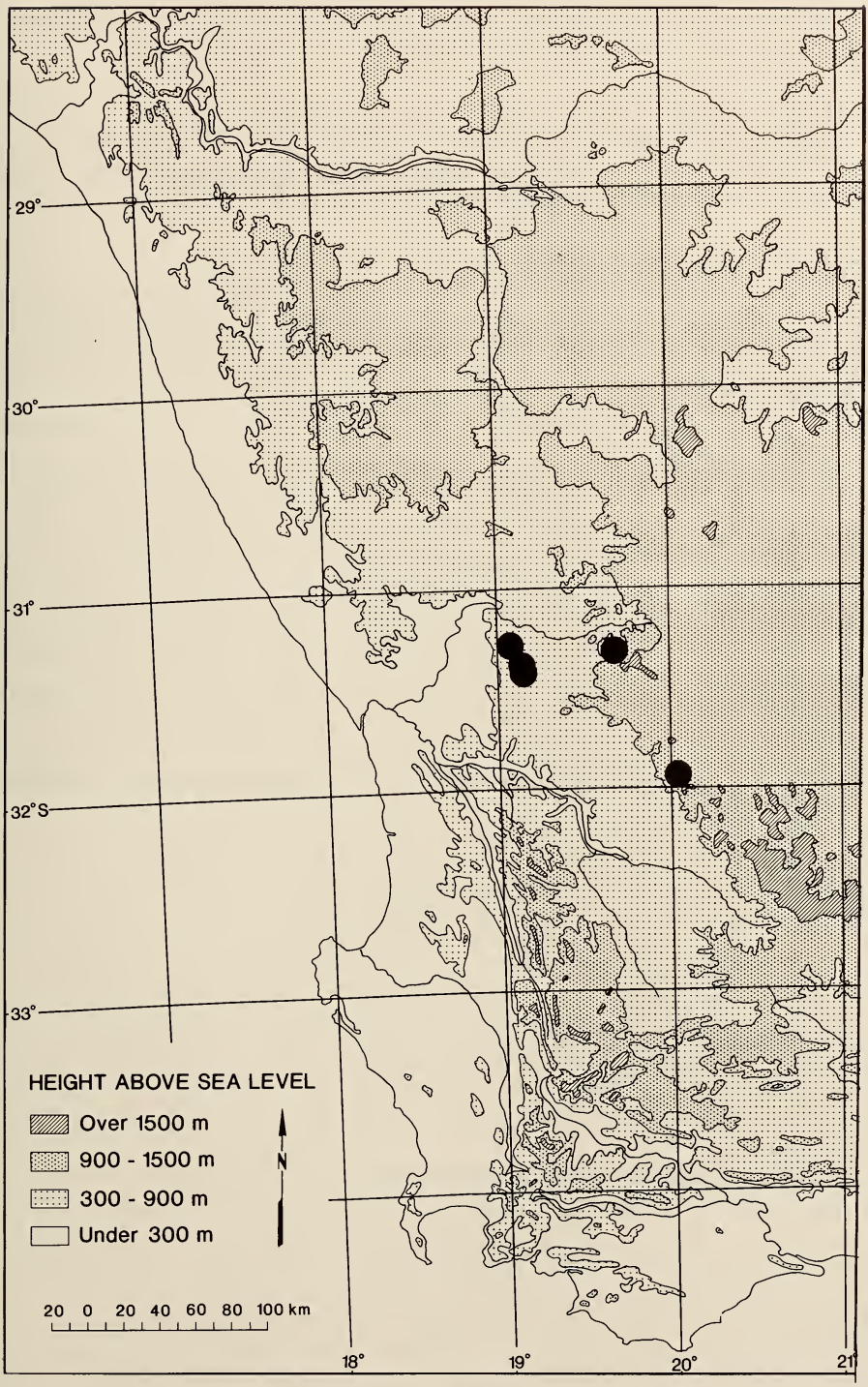

Fig. 58. Known distribution of *Rediviva alonsoae* sp. nov.

similar coloured hairs covering basal two-thirds of T2–T3, becoming black on T4–T5, fimbriae on T6 brown on T7 black.

Host flower records

Females collected oil exclusively from *Alonsoa unilabiata* and visited *Moraea bifida*, *Oxalis pes-caprae* and *O. obtusa* for nectar. Males obtained nectar from *Lotononis hirsuta*, *Oxalis obtusa* and an unidentified *Oxalis* sp.

Distribution (Fig. 58)

Rediviva alonsoae is a relatively scarce bee found on the farm Hartbeestfontein in the Middelpos area and on the Wild Flower Reserve at Nieuwoudtville. Isolated specimens have also been collected on the farm Toren in the Calvinia district and on two farms at Nieuwoudtville.

Discussion

Rediviva alonsoae females may be confused with several other *Rediviva* species that lack the scale-like projection on the hind basitarsus. *Rediviva macgregori*, which is abundant in the area in which *R. alonsoae* occurs, has similar hair bands on the metasoma and also lacks the scale-like projection on the hind basitarsus. *Rediviva macgregori*, however, is larger (mean body length 12.8 mm) and has front legs longer than the body (14.7 : 12.8). *Rediviva peringueyi* and *R. parva* females also have similar hair bands on the metasoma and lack the scale-like projection on the hind basitarsus, but *R. parva* is considerably smaller (body length 10.4–10.6 mm) whereas *R. peringueyi*, which falls into the same size-group as *R. alonsoae* (body length 11.0–12.5 mm, mean 11.8), has a granulate surface between the punctures on the scutum. This area is shiny in *R. alonsoae*.

Rediviva nitida sp. nov.

Figs 2A, 59–62, 63G

Diagnosis

Females: medium to large (10–12 mm) black-bodied bees. Mesosoma: front legs approximately length of body (10–13 mm), oil-collecting hairs on tarsomeres 2–5, no oil-collecting hairs on tarsi of middle legs, hind basitarsus lacking scale on dorsal distal angle. Metasoma: terga covered with short appressed pile, often abraded on discal area, appressed hairs on T1 and T2 always pale, on T3 and T4 black on disc, pale straw-coloured on lateral margin, T5 with longer sub-erect light brown hairs, fimbriae of T6 of similar colour.

Males: body black, 10–11 mm. Mesosoma: hind legs with patch of black hairs on distal dorsal half of tibia and basitarsus. Metasoma: T2–T4 with erect straw-coloured hairs apically, black basally, proportion of pale hair progressively decreasing until T4 has only apical third pale and basal two-thirds black, T5 and T6 with black pubescence only. S6 with concavity on apical third, surface of depression shiny, coriaceous. Median cluster of erect black hairs on proximal edge of depression. S7 with well-developed spatulate median lobes, apical hairs approximately length of lobe, lateral lobes large, crescentic,

strigate.

Etymology

Nitidus Latin for polished or shiny. Females of *R. nitida* have short appressed hairs on the metasomal terga which are often rubbed off on the discal area, giving the metasoma a polished appearance.

Material examined

Type material. Holotype: SAM-HYM-B008052, female, Northern Cape, Nieuwoudtville, Wild Flower Reserve, 3119AC, V. B. Whitehead, 19 Aug. 1995. *Allotype*: SAM-HYM-B008053, Northern Cape, Nieuwoudtville, Nieuwoudtville Wild Flower Reserve, 3119AC, V. B. Whitehead, 22 Aug. 1996. *Paratypes* (168 ♀♀, 8 ♂♂)—*Northern Cape Province*: 1 ♀, Nieuwoudtville, 24 km north on Loeriesfontein road, 3119AB, VBW, 20 Aug. 1986; 1 ♀, Nieuwoudtville, 5 km south, 3119AC, VBW, 11 Sept. 1987; 1 ♀, same locality, VBW, 22 Aug. 1988; 7 ♀♀, Nieuwoudtville, Wild Flower Reserve, 3119AC, KES, 26 Aug. 1984; 8 ♀♀, same locality, KES, 28 Aug. 1984; 1 ♀, same locality, KES, 24 Sept. 1986; 1 ♂, same locality, VBW, 2 Aug. 1984; 2 ♀♀, same locality, VBW, 17 Aug. 1986; 1 ♀, same locality, VBW, 9 Sept. 1986; 1 ♀, same locality, VBW, 26 Sept. 1986; 1 ♀, same locality, VBW, 24 Aug. 1988; 4 ♀♀, same locality, VBW, 28 Aug. 1988; 1 ♀, same locality, VBW, 29 Aug. 1995; 8 ♀♀, same locality, VBW, 5 Sept. 1995; 1 ♂, same locality, VBW, 28 Aug. 1996; 4 ♀♀, same locality, VBW, 30 Aug. 1996; 3 ♀♀, same locality, VBW, 10 Sept. 1996; 3 ♀♀, same locality, VBW, 20 Sept. 1996; 2 ♀♀, same locality, VBW, 16 Oct. 1996; 8 ♀♀, same locality, VBW & MM, 26 Aug. 1984; 8 ♀♀, same locality, VBW & MM, 28 Aug. 1984; 1 ♀, same locality, VBW & MM, 10 Sept. 1984; 1 ♀, same locality, VBW & MM, 23 Aug. 1985; 21 ♀♀, same locality, VBW & MM, 27 Aug. 1985; 4 ♀♀, same locality, VBW & MM, 9 Sept. 1986; 1 ♀, Nieuwoudtville, farm Glenlyon, 3119AC, VBW, 11 Sept. 1987; 1 ♀, same locality, VBW, 3 Oct. 1996. *Western Cape Province*: 1 ♀, Amalienstein, Seweweekspoort turn off, 3321AD, VBW, 7 Oct. 1988; 3 ♀♀, same locality, VBW, 16 Aug. 1995; 2 ♀♀, Calitzdorp 3 km west, 3321DA, VBW, 18 Aug. 1985; 1 ♀, Calitzdorp 3.2 km west, 3321DA, KES, 11 Sept. 1985; 3 ♀♀, Calitzdorp 3.4 km west, 3321DA, KES, 15 Aug. 1985; 6 ♀♀, Calitzdorp 4 km north-west, 3321DA, VBW, 15 Aug. 1985; 3 ♀♀, 6.5 km north of Klawer turn off on N7, 3118DA, KES, 21 Aug. 1985; 1 ♂, same locality, KES, 7 Aug. 1985; 1 ♀, 7 km north-east of Klawer turn off on N7, 3118DA, VBW, 11 Aug. 1989; 1 ♀, Knersvlakte, Namaqualand, S. A. Museum staff, 1 Sept. 1961; 4 ♀♀, Ladismith, 2.6 km east on R62, 3321CB, VBW, 16 Sept. 1992; 4 ♀♀, Ladismith, farm Phisantefontein, 40 km south on R323, 3321CC, KES, 1 Sept. 1992; 9 ♀♀, same locality, VBW, 1 Sept. 1992; 1 ♀, Oudtshoorn, 20 km west on R62, 3221DB, VBW, 16 Aug. 1985; 4 ♀♀, 2 ♂♂, Oudtshoorn, 7 km south on R62, 3322CB, KES, 2 Sept. 1992; 14 ♀♀, 4 ♂♂, Oudtshoorn, Zebra turn off on R62, 3322CD, VBW, 16 Aug. 1985; 2 ♀♀, same locality, VBW, 7 Oct. 1988; 6 ♀♀, same locality, KES, 16 Aug. 1985; 2 ♀♀, Oudtshoorn, Blossoms turn off on R62, 3322CB, VBW, 16 Aug. 1985; 3 ♀♀, Oudtshoorn, Zebra turn off on R62, 3322CD, VBW, 26 Oct. 1987;

1 ♀, Oudtshoorn, 7 km south on R62, 3322CB, VBW, 2 Sept. 1992; 3 ♀♀, Vanrhynsdorp, 15 km south on N7, 3118DA, VBW & MM, 21 Aug. 1985.

Description

Female

Measurements. Holotype: body 12.3 mm, forewing 10.2 mm, malar space L : W 0.31. *Other material* (n = 30)—*Measurements and ranges*: body 12.0 mm (10.0–13.3 mm), foreleg 11.1 mm (10.0–12.8 mm), forewing 9.7 mm (8.5 m-10.2 mm), Ft+bt 3.7 mm (3.0–4.3 mm). *Ratios*: FL : B 0.92 (0.82–1.04), malar space L : W 0.29 (0.24–0.35).

Integumental colour. Head, antennae, mesosoma including legs, metasoma black.

Structure. Head: mouth-parts (Fig. 59A–G); glossa one-quarter length of prementum, labial palp extending to tip of glossa, ligular arms occupying basal half of prementum (Fig. 59A); cardo slightly shorter than stipes, galea and stipes of equal length, galea acutely pointed (Fig. 59D), comb of 18 teeth (Fig. 59E); labrum two and a half times wider than long (56 : 21), anterior margin evenly convex (Fig. 59G). Mesosoma: forelegs slightly attenuated, equal length of body, hind tibia (Fig. 60B) at widest point as wide as basitarsus, basitarsus nearly two and a half times longer than wide (28 : 68), rounded distally, projecting only slightly beyond insertion of tarsomere 2, without scale on distal dorsal angle. Metasoma: propodeal triangle small, clearly defined.

Sculpture. Head: large dense punctures on disc of clypeus, area between punctures shiny. Mesosoma: distance between punctures on disc of scutum greater than their diameter, surface between punctures shiny; surface of propodeal triangle wrinkled, rest of propodeum with fine scattered punctures.

Vestiture. Head: short light brown branched hairs on clypeus, longer and more dense on paraocular and supraclypeal areas. Mesosoma: long light brown pile on episternal areas and three basal segments of legs; short pale brown vestiture on scutum, scutellum, metanotum and propodeum, isolated black hairs on margins of scutum; disc of scutum usually devoid of pubescence. Oil-collecting hairs on tarsomeres 2–5 of forelegs only (Fig. 60C). Metasoma: T1 with long pale straw-coloured sub-erect hairs on apical third, denser laterally, short appressed similar coloured hairs on T2, longer, denser and more erect laterally, T3 and T4 with short decumbent black hair, longer and light brown laterally. Fimbriae of T5 and T6 dark brown with some black hairs laterally on T5.

Male

Measurements. Allotype: body 11.0 mm, forewing 9.2 mm, malar space L : W 0.25. *Other material* (n = 8)—*Measurements and ranges*: body 10.6 mm (10.0–11.2 mm), foreleg 8.1 (8.1–8.6 mm), forewing 8.6 mm (8.3–9.0 mm). *Ratios:* FL : B 0.76 (0.70–0.80), malar space L : W 0.28 (0.25–0.32).

Integumental colour. Head, antennae, mesosoma, legs, metasoma black, tegulae light brown to piceous.

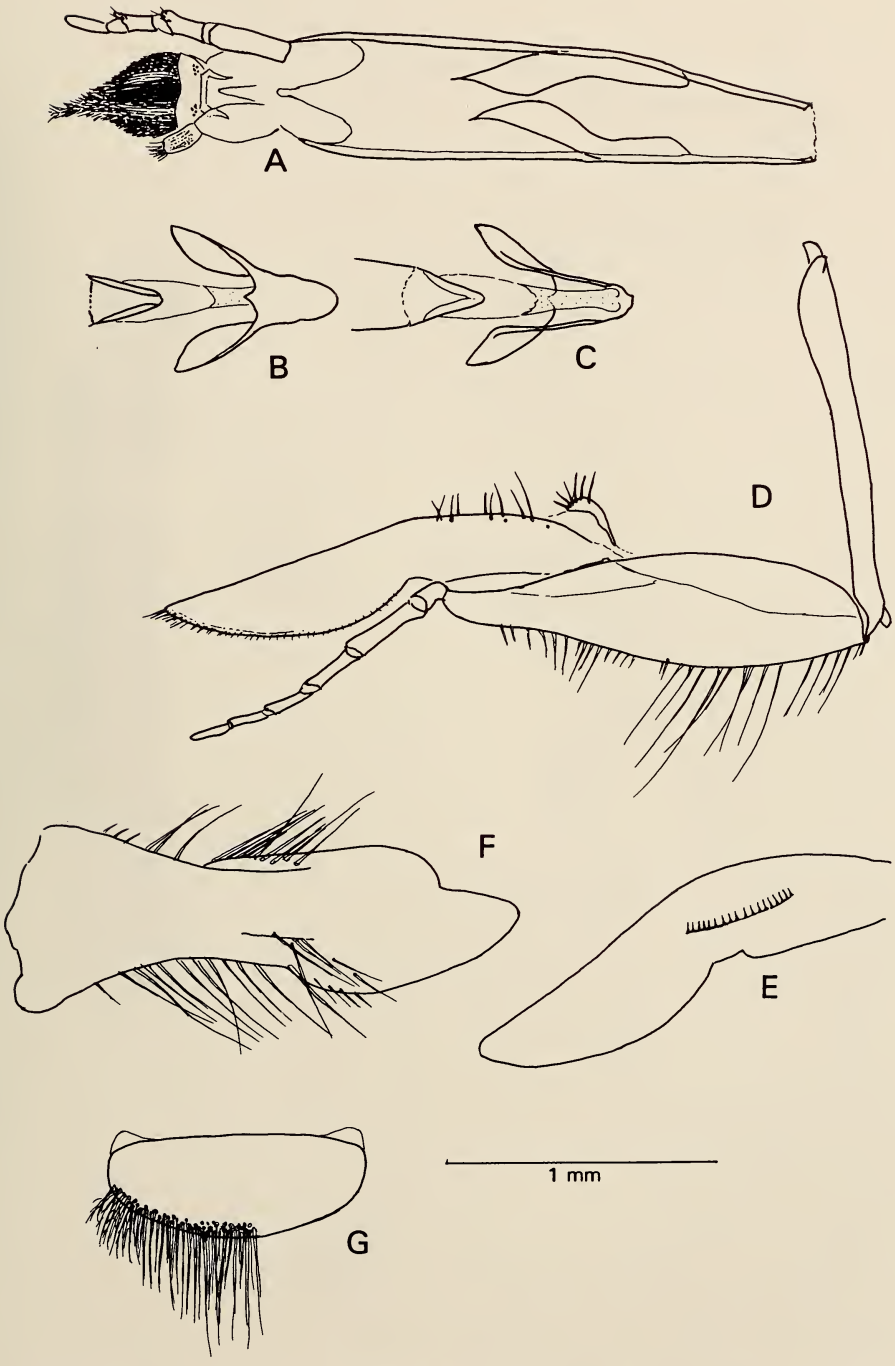

Fig. 59. *Rediviva nitida* sp. nov. Female. A. Labium, anterior aspect. B. Base of prementum with mentum and lorum, anterior view. C. Base of prementum with mentum and lorum, posterior view. D. Left maxilla. E. Inner view of galea to show comb. F. Right mandible. G. Labrum.

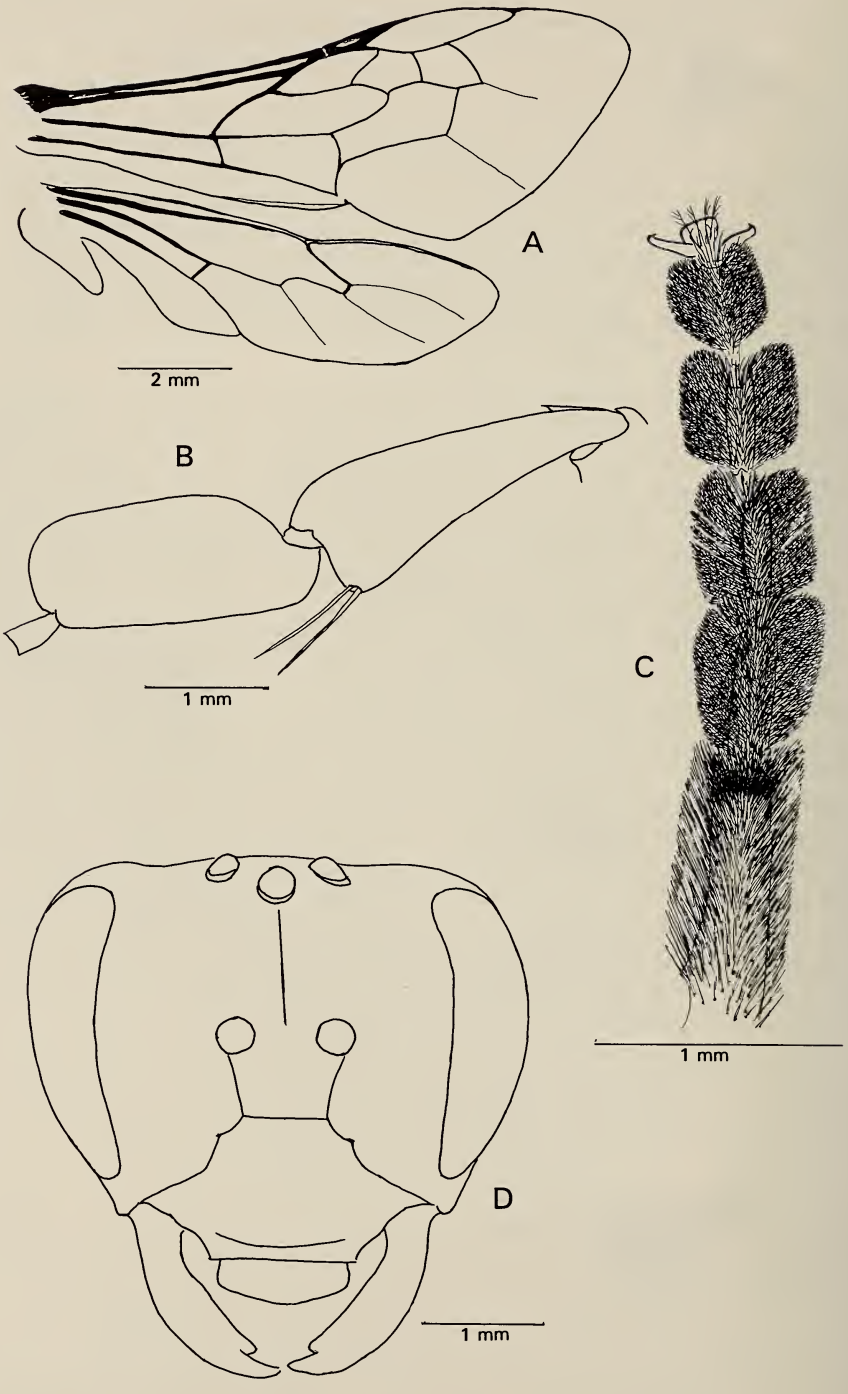

Fig. 60. *Rediviva nitida* sp. nov. Female. A. Right wings. B. Tibia and basitarsus of hind leg. C. Basitarsus and tarsomeres 2–5 of front leg. D. Anterior view of head.

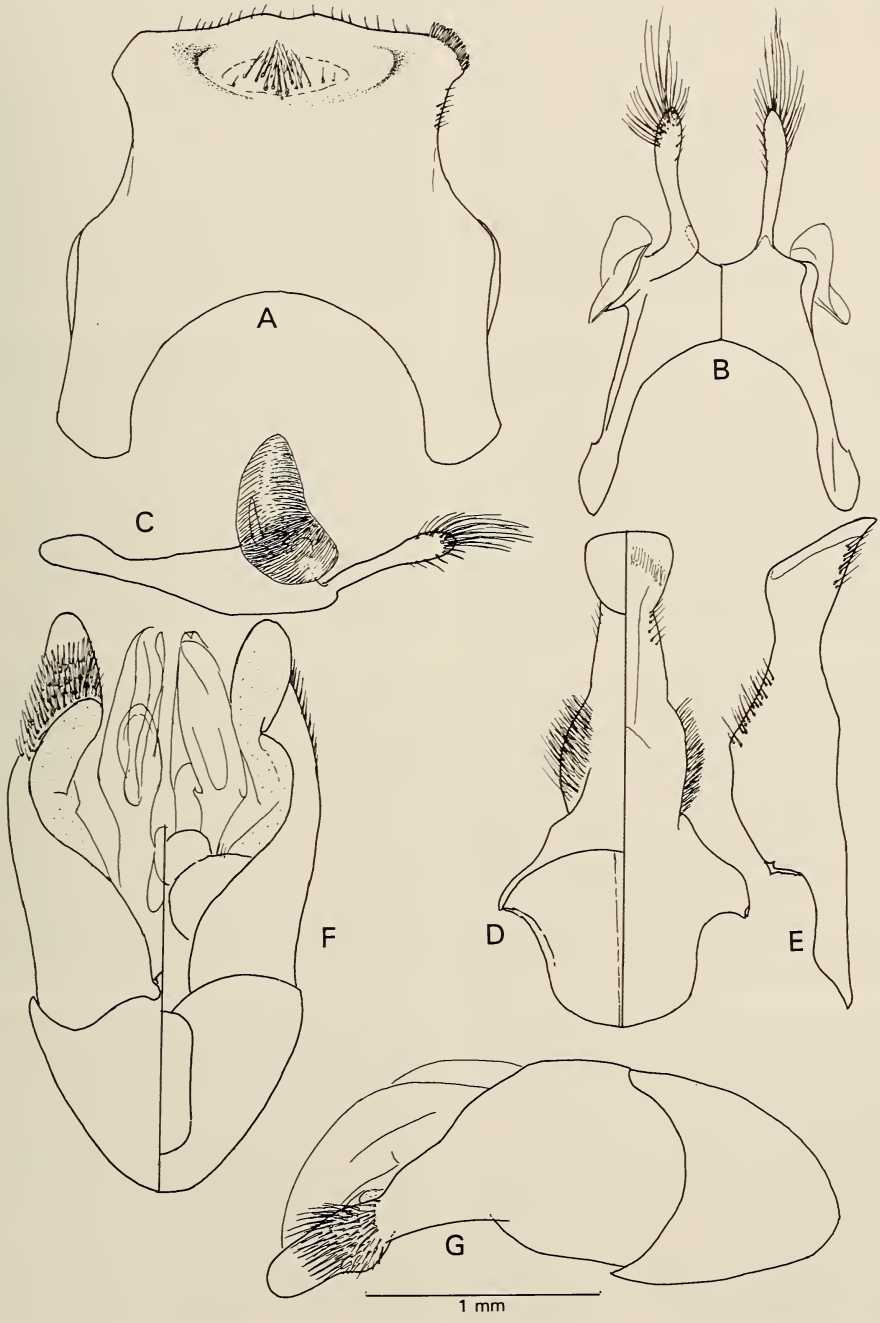

Fig. 61. *Rediviva nitida* sp. nov. Male. A. S6, ventral view. B. Dorsal and ventral view of S7. C. Lateral view of S7. D. Dorsal and ventral view of S8. E. Lateral view of S8. F. Dorsal and ventral aspect of genitalia. G. Lateral view of genital capsule.

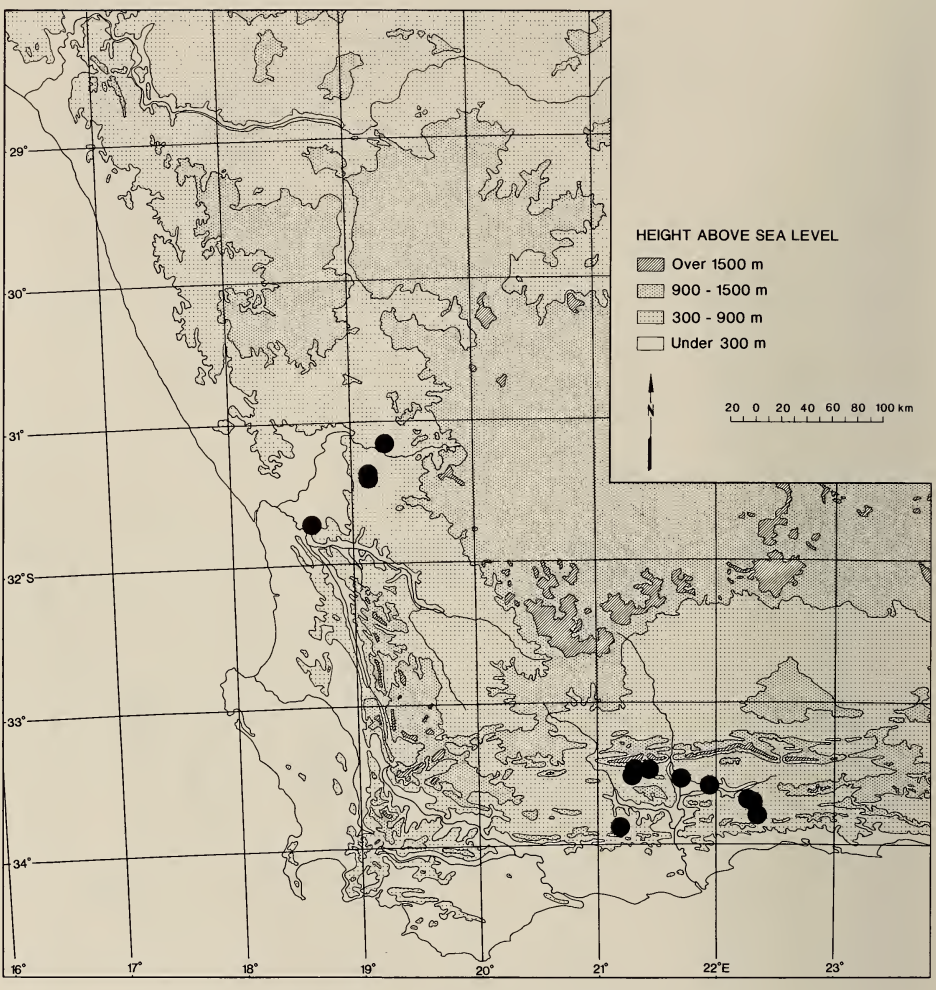

Fig. 62. Known distribution of *Rediviva nitida* sp. nov.

Structure. Mesosoma: tibia of hind leg nearly twice as wide as basitarsus (9 : 5). Metasoma: S6 (Fig. 61A) anterior third of segment concave, shiny, with cluster of black erect hairs on middle of proximal edge of concavity, median and lateral lobes poorly developed, apical margin of lateral lobes with short stout bristles; S7 (Fig. 61B–C) median lobes long, spatulate, apical hairs as long as lobe, lateral lobes large, crescent-shaped, translucent, strigate; S8 (Figs 61D–E, 63G) apical plate ovate, concave, narrow, more than twice as long as wide. Genitalia (Fig. 61F–G), gonoforceps as long as penis valves, stout unbranched hairs on apical third not reaching distal margin.

Sculpture. Large dense punctures on disc of clypeus, punctures sometimes coalescing, surface between punctures smooth shiny. Punctation on disc of scutum of two sizes, finer and less dense than on clypeus, surface between punctures smooth, shiny.

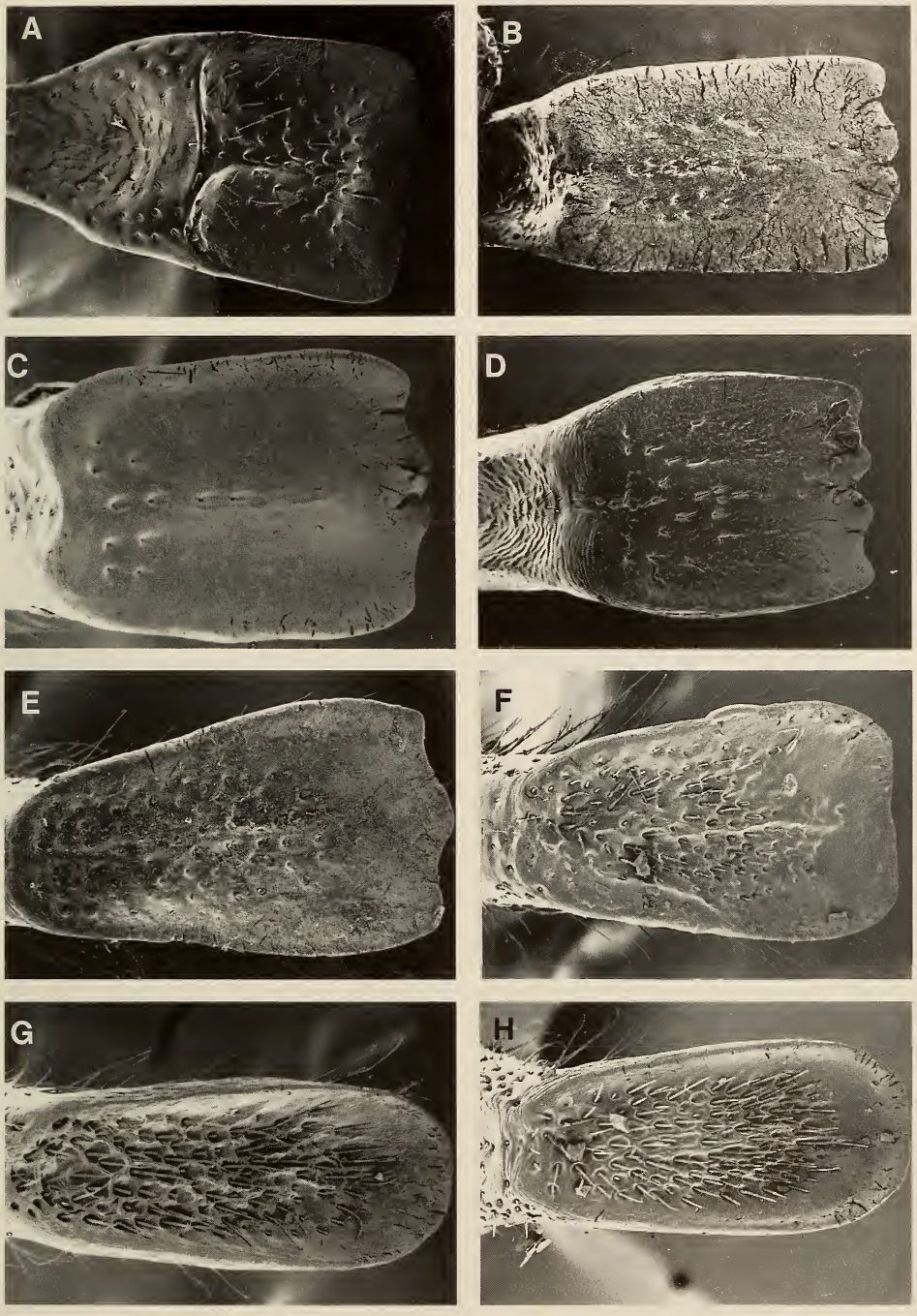

Fig. 63. Expanded distal portion of S8 (apical plate) of *Rediviva* males. A. *R. albifasciata*. B. *R. emdeorum*. C. *R. aurata*. D. *R. ruficornis*. E. *R. parva*. F. *R. alonsoae*. G. *R. nitida*. H. *R. micheneri*.

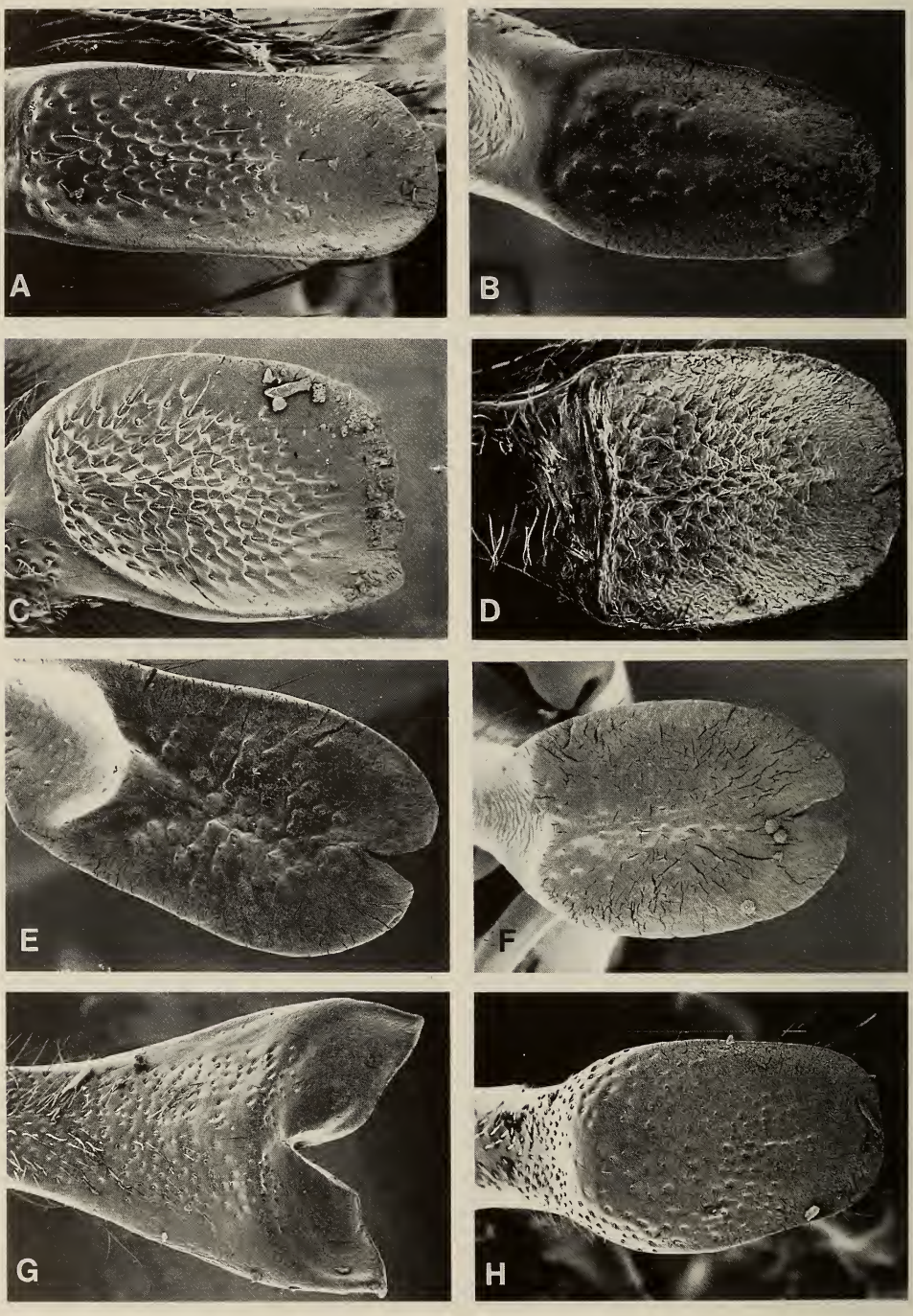

Fig. 64. Expanded distal portion of S8 (apical plate) of *Rediviva* and *Redivivoides* males. A. *Rediviva longimanus*. B. *R. peringueyi*. C. *R. macgregori*. D. *R. intermedia*. E. *R. bicava*. F. *R. intermixta*. G. *R. gigas*. H. *Redivivoides simulans*.

Vestiture. Head: long silky white decumbent plumose hairs on clypeus and paraocular areas, erect black hairs on inner ocular margin. Mesosoma: pale straw-coloured erect hairs on scutum, scutellum, metanotum and propodeum, some black hairs on margins of scutellum. Similar coloured pubescence on episterna and three basal segments of legs, patch of black hairs on distal dorsal half of tibia and basitarsus of hind leg. Metasoma: T1 erect pale straw-coloured hairs on most of segment, some black hairs on basal area, T2 and T3 progressive increase of black hairs basally, T4 anterior third with light coloured hairs, basal two-thirds black, T5 and T6 with black hairs only, T7 black to dark brown.

Host flower records

Eight *Diascia*, two *Hemimeris* and one *Alonsoa* species, were visited for oil by *R. nitida* females. The majority were collected in the Nieuwoudtville area on *Diascia cardiosepala* (44.7%), and in the Little Karoo on *D. bicolor* and *D. decipiens* (35.9%). Of the remainder, half were taken on *D. 'floribunda'* and *D. ellaphieae* and the rest on *Alonsoa unilabiata*, *D. lewisiae*, *D. sacculata*, *D. fragrans* and *Hemimeris racemosa*.

The relatively few females (14) that were seen to visit nectar plants were mainly on *Moraea bifida* and *Arctotheca calendula*. The remainder visited *Ixia* and other *Moraea* species, *Oxalis obtusa*, *Selago fourcadei* and *Sisymbrium orientale*.

Nectar plants visited by males were *Arctotheca calendula* (4), *Lotononis hirsuta* (2) and *Moraea miniata* (1). Two males were also caught patrolling *Diascia decipiens*.

Distribution (Fig. 62)

Rediviva nitida occurs as two disjunct populations. Most of our material originates from the Nieuwoudtville Wild Flower Reserve and adjoining farms on the Bokkeveldberge escarpment. Off the escarpment isolated specimens have been collected at a site north of the Klawer turn off on the N7. The other population is widely distributed in the Little Karoo from Ladismith through to Calitzdorp, Oudtshoorn and south on the N12 to sites near Blossoms and Zebra.

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Prof C. D. Michener, Professor Emeritus at the Snow Museum, Kansas University, has been our mentor since this project began. We would like to thank him for his advice and encouragement and his response to our many queries. Permission to examine type material of *Rediviva intermixta* and *R. emdeorum* was arranged by Dr Nigel Fergusson, Curator of Hymenoptera at the Natural History Museum, London, and Dr Frank Koch, Curator of Hymenoptera at the Humboldt Museum in Berlin, allowed us to borrow the type material of *R. peringueyi*.

We would like to express our appreciation for the assistance rendered by Mrs Margie Cochrane, Collections Manager in the Entomology Department of the South African Museum. She not only spent considerable time in curating the

oil-bee collection but assisted with field work and was also responsible for the SEM photography of male bee terminalia.

The extensive collecting necessitated by this revision was greatly facilitated by the co-operation of the National and Provincial authorities who granted us access to reserves and conservation areas. The Western Cape Department of Nature and Environmental Conservation is thanked for permission to work in the Groot Winterhoek Wilderness area and in areas under their control at Franschhoek and Grabouw. The Nature Conservation Service of the Northern Cape Province granted us access to the Goegab Reserve at Springbok and is also thanked for permits to collect bees in the Garies area.

In addition, many municipalities have small local reserves in which they allowed us to do research. The board of the Nieuwoudtville Wild Flower Reserve, under the chairmanship of Neil Macgregor, has been most accommodating and over a period of several years we have been able to accumulate valuable information, not only on oil-collecting bees and their flower relationships but on other pollinators and their host plants as well. Other municipalities that have been of assistance to us in the survey of oil-collecting bees are Malmesbury, Franschhoek, Stellenbosch and Ladismith.

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APPENDIX 1

Oil, nectar and pollen plants of *Rediviva* of the winter rainfall area.

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. albifasciata	Females	**Scrophulariaceae** *Colpias mollis* E. Meyer ex Benth. *Hemimeris racemosa* (Houtt.) Merill	**Fumariaceae** *Cysticapnos versicaria* (L.) Fedde **Oxalidaceae** *Oxalis pes-caprae* L.
	Males		**Asteraceae** *Othonna arbuscula* (Thunb.) Sch. Bip. **Oxalidaceae** *Oxalis pes-caprae* L. *O. comosa* E. Meyer ex Sonder
R. alonsoae	Females	**Scrophulariaceae** *Alonsoa unilabiata* (L.f.) Steudel	**Fabaceae** *Lotononis hirsuta* (Thunb.) D. Dietr. **Iridaceae** *Moraea miniata* Andrews **Oxalidaceae** *Oxalis pes-caprae* L. *Oxalis obtusa* Jacq.
	Males		**Fabaceae** *Lotononis hirsuta* (Thunb.) D. Dietr. **Oxalidaceae** *Oxalis obtusa* Jacq.

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. aurata	Females	**Scrophulariaceae** *Diascia 'arenicola bulbosa'* *D. capensis* (L.) Britten *D. 'collina'* *D. diffusa* Benth. *D. elongata* Benth. *D. 'grantiana'* *D. 'speciosa'*	**Iridaceae** *Moraea miniata* Andrews **Oxalidaceae** *Oxalis pes-caprae* L.
	Males		**Iridaceae** *Moraea miniata* Andrews **Oxalidaceae** *Oxalis pes-caprae* L.
R. bicava	Females	**Scrophulariaceae** *D. parviflora* Benth. *D. patens* (Thunb.) Fourcade *D. veronicoides* Schl. *Hemimeris gracilis* Schl. *H. racemosa* (Houtt.) Merill	**Fumariaceae** *Cysticapnos vesicaria* (L.) Fedde **Lamiaceae** *Stachys aethiopica* L. **Oxalidaceae** *Oxalis obtusa* Jacq. *O. pes-caprae* L. **Scrophulariaceae** *Nemesia leipoldtii* Heirn **Indet.** *Bulbine* sp., *Lachenalia* sp., *Polygala* sp.

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. bicava *(contd)*	Males		**Fabaceae** *Lotononis hirsuta* (Thunb.) D. Dietr. **Fumariaceae** *Cysticapnos vesicaria* (L.) Fedde **Oxalidaceae** *Oxalis pes-caprae* L. **Indet.** *Senecio* sp.
R. emdeorum	Females	**Scrophulariaceae** *Diascia 'floribunda'* *D. insignis* K. E. Steiner *D. macrophylla* (Thunb.) Spreng. *D. namaquensis* Hiern. *D. tanyceras* E. Meyer ex Benth *D. 'tenuis'* *D. 'whiteheadii'*	**Asteraceae** *Arctotheca calendula* (L.) Levyns **Indet.** *Moraea* sp., *Lachenalia* sp., *Oxalis* sp., *Trachyandra* sp.
	Males		**Asteraceae** *Arctotheca calendula* (L.) Levyns **Indet.** *Moraea* sp.
R. gigas	Females	**Orchidaceae** *Ceratandra atrata* (L.) T. Durand & Schinz *C. bicolor* Sond. ex H. Bol. *Pterygodium acutifolium* Lindl. *Satyrium rhynchanthum* Bol.	**Haemodoraceae** *Wachendorfia paniculata* L. **Iridaceae** *Moraea ramosissima* (L.f.) Druce *Watsonia borbonica* (Pouret) Goldblatt

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. gigas *(contd)*	Females	**Scrophulariaceae** *Ixianthes retzioides* Benth.	*W. marginata* (L.f.) Ker Gawler
	Males		**Haemodoraceae** *Wachendorfia paniculata* L. **Iridaceae** *Moraea ramosissima* (L.f.) Druce *Watsonia marginata* (L.f.) Ker Gawler
R. intermedia	Females	**Scrophulariaceae** *Alonsoa unilabiata* (L.f.) Steudel *Diascia cardiosepala* Hiern *Diascia 'floribunda'* *D. macrophylla* (Thunb.) Spreng. *D. nana* Diels *Hemimeris centrodes* Hiern *H. racemosa* (Houtt.) Merill	**Asteraceae** *Arctotheca calendula* (L.) Levyns
	Males		**Asteraceae** *Arctotheca calendula* (L.) Levyns **Indet.** *Othonna* sp., *Heliophila* sp.
R. intermixta	Females	**Scrophulariaceae** *Alonsoa unilabiata* (L.f.) Steudel *Diascia 'arenicola'* *D. 'bicornuta'*	**Aspodelaceae** *Bulbinella floribunda* (Alton) Durand & Schinz **Asteraceae** *Arctotheca calendula* (L.) Levyns

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. intermixta *(contd)*	Females	*D. cardiosepala* Hiern *D. 'floribunda'* *D. lewisiae* K. E. Steiner *D. longicornis* (Thunb.) Druce *D. macrophylla* (Thunb.) Spreng. *D. parviflora* Benth. *D. tanyceras* E. Meyer ex Benth. *D. veronicoides* Schltr. *D. 'whiteheadii'* *Hemimeris centrodes* Hiern *H. racemosa* (Houtt.) Merill	*Senecio arenarius* Thunb. *S. littoreus* Thunb. **Brassicaceae** *Raphanus raphanistrum* L. **Iridaceae** *Geissorhiza aspera* Goldblatt *Moraea bifida* (L. Bolus) Goldblatt *M. miniata* Andrews **Geraniaceae** *Erodium circutarium* (L.) L'Heritier **Neuradaceae** *Grielum humifusum* Thunb. **Oxalidaceae** *Oxalis obtusa* Jacq. *O. pes-caprae* L. **Indet.** *Polycarena* sp., *Polygala* sp., *Romulea* sp., *Wachendorfia* sp., *Zygophyllum* sp.
	Males		**Asteraceae** *Arcotheca calendula* (L.) Levyns *Senecio arenarius* Thunb. *S. littoreus* Tunb. **Iridaceae** *Moraea bifida* (L. Bolus) Goldblatt *M. miniata* Andrews

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. intermixta *(contd)*	Males		**Fabaceae** *Lotononis hirsuta* (Thunb.) D. Dietr. **Fumariaceae** *Cysticapnos vesicaria* (L.) Fedde **Oxalidaceae** *Oxalis obtusa* Jacq. *O. pes-caprae* L. **Indet.** *Othonna* sp.
R. longimanus	Females	**Orchidaceae** *Disperis circumflexa* (L.) T. Durand & Schinz *Pterygodium penthérianum* Schltr. *P. schelpei* H. Linder **Scrophulariaceae** *Diascia 'bicornuta'* *D. 'floribunda'* *D. parviflora* Benth *D. 'whiteheadii'*	**Iridaceae** *Moraea bifida* (L. Bolus) Goldblatt *M. fragrans* Goldblatt *Moraea tripetala* (L.f.) Ker Gawler
	Males		**Fumariaceae** *Cysticapnos vesicaria* (L.) Fedde **Iridaceae** *Moraea bifida* (L. Bolus) Goldblatt *M. miniata* Andrews *Moraea tripetala* (L.f.) Ker Gawler **Orchidaceae** *Holothrix aspera* (Lindl.) Reichb. f.

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. macgregori	Females	**Orchidaceae** *Corycium deflexum* (Bolus) Rolfe *Disperis purpurata* Reichb.. *Pterygodium hallii* (Schelpe) Kurzweil & Linder **Scrophulariaceae** *Alonsoa unilabiata* (L.f.) Steudel *Diascia cardiosepala* Hiern *D. dissimulans* Hilliard & Burtt *D. 'floribunda'* *D. insignis* K. E. Steiner *D. lewisiae* K. E. Steiner *D. macrophylla* (Thunb.) Spreng. *D. tanyceras* E. Meyer ex Benth. *D. parviflora* Benth. *D. veronicoides* Schltr. *D. 'whiteheadii'* *Hemimeris centrodes* Hiern *H. racemosa* (Houtt.) Merill *H. sabulosa* L. f.	**Aspodelaceae** *Bulbinella nutans* (Thunb.) Dur. & Schinz **Asteraceae** *Arctotheca calendula* (L.) Levyns **Iridaceae** *Geissorhiza splendidissima* Diels *Hesperantha cucullata* Klatt *Moraea bifida* (L. Bolus) Goldblatt *Moraea pritzeliana* Diels *Moraea tripetala* (L.f.) Ker Gawler *Sparaxis elegans* (Sweet) Goldblatt **Scrophulariaceae** *Nemesia leipoldtii* Hiern
	Males		**Asteraceae** *Arctotheca calendula* (L.) Levyns *Dimorphotheca pluvialis* (L.) Moench *Senecio littoreus* Thunb.

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. macgregori *(contd)*	Males		**Fabaceae** *Lotononis hirsuta* (Thunb.) D. Dietr. **Iridaceae** *Homeria bifida* (L. Bolus) Goldblatt *Moraea prezeliana* Diels *Moraea tripetala* (L.f.) Ker Gawler **Indet.** *Felicia* sp., *Othonna* sp.
R. micheneri	Females	**Scrophulariaceae** *Diascia 'arenicola arenicola'* *D. 'arenicola bulbosa'* *D. capensis* (L.) Britten *D. elongata* Benth. *D. 'grantiana'* *D. longicornis* (Thunb.) Druce *D. 'speciosa'* *D. 'whiteheadii'*	**Iridaceae** *Moraea fugax* (Delaroche) Jacq. *Moraea miniata* Andrews **Oxalidaceae** *Oxalis pes-caprae* L. **Indet.** *Dimorphotheca* sp.
	Males		**Iridaceae** *Moraea miniata* Andrews
R. nitida	Females	**Scrophulariaceae** *Alonsoa unilabiata* (L.f.) Steudel *Diascia bicolor* K. E. Steiner *D. cardiosepala* Hiern *D. decipiens* K. E. Steiner *D. ellaphieae* K. E. Steiner *D. 'floribunda'*	**Asteraceae** *Arcothaeca calendula* (L.) Levyns **Brassicaceae** *Sisymbrium orientale* L. **Iridaceae** *Moraea bifida* (L. Bolus) Goldblatt *M. miniata* Andrews

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
***R. nitida** (contd)*	Females	*D. fragrans* K. E. Steiner *D. lewisiae* K. E. Steiner *D. sacculata* Benth. *Hemimeris gracilis* Schltr. *H. racemosa* (Houtt.) Merill	**Oxalidaceae** *Oxalis obtusa* Jacq. **Scrophulariaceae** *Selago fourcadei* Hilliard
	Males		**Iridaceae** *Moraea miniata* Andrews
R. parva	Females	**Orchidaceae** *Corycium crispum* (Thunb.) Sw. **Scrophulariaceae** *Alonsoa unilabiata* (L.f.) Steudel *Diascia 'arenicola arenicola'* *Diascia'arenicola bulbosa'* *D. batteniana* K. E. Steiner *D. capensis* (L.) Britten *D. ellaphieae* K. E. Steiner *D. elongata* Benth. *D. 'grantiana'* *D. lewisiae* K. E. Steiner *D. pachyceras* E. Mey. Ex Benth. *D. 'speciosa'* *Hemimeris racemosa* (Houtt.) Merill *H. sabulosa* L.f.	**Fumeriaceae** *Cysticapnos vesicaria* (L.) Fedde **Haemodoraceae** *Wachendorfia paniculata* L. **Iridaceae** *Geissorhiza aspera* Goldblatt **Oxalidaceae** *Oxalis obtusa* Jacq. *O. pes-caprae* L. **Polygalaceae** *Nylandtia spinosa* (L.) Dumort. **Indet**. *Heliophila* sp., *Trachyandra* sp.

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. parva *(contd)*	Males		**Fumariaceae** *Cysticapnos vesicaria* (L.) Fedde **Haemodoraceae** *Wachendorfia paniculata* L. **Iridaceae** *Moraea miniata* Andrews **Oxalidaceae** *Oxalis obtusa* Jacq. *O. pes-caprae* L. **Indet.** *Moraea* sp., *Oxalis* sp.
R. peringueyi	Females	**Orchidaceae** *Corycium orobanchoides* (L.f.) Sw. *Disperis circumflexa* (L.) T. Durand & Schinz *D. cucullata* Sw. *D. villosa* (L. f.) Sw. *Pterygodium alatum* (Thunb.) Sw. *P. caffrum* (L.) Sw. *P. catholicum* (L.) Sw. *P. hallii* (Schelpe) Kurtzweil & Linder *P. inversum* (Thunb.) Sw. *P. volucris* (L.f.) Sw. **Scrophulariaceae** *Diascia 'arenicola'* *D. capensis* (L.) Britten *D. elongata* Benth. *D. 'grantiana'*	**Brassicaceae** *Heliophila coronopifolia* L. *Raphanus raphanistrum* L. **Gentianaceae** *Chironia decumbens* Levyns **Iridaceae** *Moraea fugax* (Delaroche) Jacq. *M. gawleri* Spreng. *Moraea miniata* Andrews **Lamiaceae** *Stachys aethiopica* L. **Indet.** *Cyphia* sp., *Oxalis* sp., *Moraea* sp.

APPENDIX *(contd)*

SPECIES		OIL HOST PLANTS	NECTAR / POLLEN PLANTS
R. peringueyi *(contd)*	Females	*D. 'pusilla'* *Hemimeris racemosa* (Houtt.) Merill *H. sabulosa* L.f.	
	Males		**Gentianaceae** *Chironia decumbens* Levyns **Iridaceae** *Moraea fugax* (Delaroche) Jacq. *M. gawleri* Spreng. *Moraea miniata* Andrews
R. ruficornis	Females	**Scrophulariaceae** *Alonsoa unilabiata* (L.f.) Steudel *Diascia 'arenicola arenicola'* *D. capensis* (L.) Britten *D. diffusa* Benth.	**Iridaceae** *Moraea miniata* Andrews
	Males		**Iridaceae** *Moraea miniata* Andrews **Oxalidaceae** *Oxalis pes-caprae* L.

6. SYSTEMATIC papers must conform to the *International code of zoological nomenclature* (particularly Articles 22 and 51).

Names of new taxa, combinations, synonyms, etc., when used for the first time, must be followed by the appropriate Latin (not English) abbreviation, e.g. gen. nov., sp. nov., comb. nov., syn. nov., etc. The name of the taxon should be followed, without intervening punctuation, by the author's name (not abbreviated) and the year of publication; a comma must separate author's name and year. The author's name and date must be placed in parentheses if a species or subspecies is transferred from its original genus. The name of a subsequent user of a scientific name must be separated from the scientific name by a colon.

Synonymy arrangement should be either according to chronology of names, i.e. all published scientific names by which the species previously has been designated are listed in chronological order, with all references to that name following in chronological order (see example 1), or according to chronology of bibliographic references, whereby the year is placed in front of each entry, and the synonym repeated in full for each entry (see example 2). The author should adopt one style or the other throughout a paper.

Family **Nuculanidae**
Nuculana (Lembulus) bicuspidata (Gould, 1845)
Figs 14–15A

Example 1

Nucula (Leda) bicuspidata Gould, 1845: 37.
Leda plicifera A. Adams, 1856: 50.
Laeda bicuspidata (Gould) Hanley, 1859: 118, pl. 228 (fig. 73). Sowerby, 1871, pl. 2 (fig. 8a–b).
Nucula largillierti Philippi, 1861: 87.
Leda bicuspidata (Gould): Nicklès, 1950: 163, fig. 301; 1955: 110. Barnard, 1964: 234, figs 8–9.

Note punctuation in the above example: comma separates author's name and year; semicolon separates more than one reference by the same author; full stop separates references by different authors; figures of plates are enclosed in parentheses to distinguish them from text-figures; dash, not comma, separates consecutive numbers.

Example 2

1845 *Nucula (Leda) bicuspidata* Gould, p. 37.
1856 *Leda plicifera* A. Adams, p. 50.
1859 *Laeda bicuspidata* (Gould) Hanley, p. 118, pl. 228 (fig. 73).
1861 *Nucula largillierti* Philippi, p. 87.
1871 *Laeda bicuspidata* (Gould): Sowerby, pl. 2 (fig. 8a–b).
1950 *Leda bicuspidata* (Gould): Nicklès, p. 163, fig. 301.
1955 *Leda bicuspidata* (Gould): Nicklès, p. 110.
1964 *Leda bicuspidata* (Gould): Barnard, p. 234, figs 8–9.

In describing new species, one specimen must be designated as the holotype; other specimens mentioned in the original description are to be designated allotype (if applicable) and/or paratypes; additional material not regarded as paratypes should be listed separately. The complete data (registration number, depository, description of specimen, locality, collector, date) of the holotype and paratypes must be recorded, e.g.:

Holotype. SAM–A13535 in the South African Museum, Cape Town. Adult female from mid-tide region, King's Beach, Port Elizabeth (33°51'S 25°39'E), collected by A. Smith, 15 January 1973.

Note standard form of writing South African Museum registration numbers and date.

7. SPECIAL HOUSE RULES

Capital initial letters

(a) The Figures, Maps and Tables of the paper when referred to in the text, e.g. '. . . the Figure depicting *C. namacolus* . . .', or '. . . in *C. namacolus* (Fig. 10) . . .'
(b) The prefixes of prefixed surnames in all languages, when used in the text, if not preceded by initials or full names: e.g. Du Toit, but A. L. du Toit; Von Huene, but F. von Huene
(c) Scientific names, but not their vernacular derivatives e.g. Therocephalia, but therocephalian

Punctuation should be loose, omitting all not strictly necessary. Reference to the author should preferably be expressed in the third person. **Roman numerals** should be converted to arabic, except when forming part of the title of a book or article, e.g. 'Revision of the Crustacea. Part VIII. Amphipoda.'. A **specific name** must not stand alone, but be preceded by the generic name or its abbreviation to initial capital letter (except at the beginning of a sentence or paragraph), provided the same generic name is used consecutively. The name of **new genus or species** should not be included in the title; it should be included in the abstract, counter to Recommendation 23 of the Code, to meet the requirements of *Biological Abstracts*.

8. GENERAL. Once referees' reports have been received by the editor, these will be discussed by the editorial committee. If the paper is considered acceptable after minor or major revision, the reports will be forwarded to the author who must then thoroughly revise in accordance with the referees' suggestions. Final acceptance of the revised manuscript will be considered by the editorial committee. In the case of major revision being necessary, the committee reserves the right to consult one or more referees regarding the revised manuscript.

WHITEHEAD, V. B.
&
STEINER, K. E.

OIL-COLLECTING BEES OF THE WINTER RAINFALL AREA OF SOUTH AFRICA (MELITTIDAE, REDIVIVA)

109 APRIL 2003 ISSN 0303-2515

ANNALS

OF THE SOUTH AFRICAN MUSEUM

CAPE TOWN

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   (b) *Abstract* of not more than 200 words, intelligible to the reader without reference to the text
   (c) *Table of contents* giving hierarchy of headings and subheadings
   (d) *Introduction*
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   FISCHER, P. H. 1948. Données sur la résistance et de la vitalité des mollusques. *Journal de conchyliologie* **88**: 100–140.

   FISCHER, P. H., DUVAL, M. & RAFFY, A. 1933. Études sur les échanges respiratoires des littorines. *Archives de zoologie expérimentale et générale* **74**: 627–634.

   KOHN, A. J. 1960*a*. Ecological notes on *Conus* (Mollusca: Gastropoda) in the Trincomalee region of Ceylon. *Annals and Magazine of Natural History* (13) **2**: 309–320.

   KOHN, A. J. 1960*b*. Spawning behaviour, egg masses and larval development in *Conus* from the Indian Ocean. *Bulletin of the Bingham Oceanographic Collection, Yale University* **17** (4): 1–51.

   THIELE, J. 1910. Mollusca. B. Polyplacophora, Gastropoda marina, Bivalvia. *In:* SCHULTZE, L. *Zoologische und anthropologische Ergebnisse einer Forschungreise im westlichen und zentralen Süd Afrika ausgeführt in den Jahren 1903–1905* **4** (15). *Denkschriften der medizinisch-naturwissenschaftlichen Gesellschaft zu Jena* **16**: 269–270.

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STRUCTURE AND PROCESS IN THE LOCAL GOVERNMENT OF PELLA, 1874–1980

by

G. P. KLINGHARDT

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STRUCTURE AND PROCESS IN THE LOCAL GOVERNMENT OF PELLA, 1874–1980

by
G. P. KLINGHARDT
Iziko: Social History Collections Division

(With 24 figures and 11 tables)

[*MS accepted 30 January 2001*]

ABSTRACT

This monograph examines processes of structural differentiation in Pella, a Reserve in Namaqualand, in the context of local government over a period of 126 years by means of a diasynchronic approach that synthesizes an analysis of constitutional structures with one of political practices and activities. The authority structure has been treated as a dependent variable in the political process and the decision-making system embodied in a set of custumals has been used to depict the dynamic nature of the political system through time. This has enabled the demonstration of continuities in form between missionary and bureaucratic systems of local government in the Reserve, and of the manner in which structures of social differentiation and government have emerged from continuous processes of class and ethnic struggle. It is shown how the formative period of the social groupings in the community at Pella was influenced by the dominance of the Church in the system of local government until 1973, and how the missionaries were unable to prevent the incorporation of the community into the wider socio-political system of 'apartheid' that developed in South Africa after 1948. Set against the background of capitalist domination in South Africa, the class struggle in the Reserve is shown as having been conducted in terms of ethnicity, with the elite of a ruled class exploiting avenues of political power made available by both missionaries and state government to replace a ruling class and transform itself into a ruling class. Through a diasynchronic analysis of the decision-making system introduced in 1974 as part of the new framework of secular local government, it is shown how the cycle of elites created a new set of conditions that altered the character of the struggle to one of local resistance to government policy to protect the interests of the new ruling class in the Reserve. This raises the prospect of ongoing resistance in the future to progressive forces under any regime perceived by the ruling elite as a threat to its interests.

Ann. S. Afr. Mus. **109**, 2003: 1–153, 24 figs, 11 tables, appendices.

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INTRODUCTION

THE METHODOLOGICAL BACKGROUND

This monograph examines processes of structural differentiation in Pella, a Reserve in Namaqualand, in the context of local government over the past 126 years by means of a diasynchronic approach that synthesizes an analysis of constitutional structures with one of political practices and activities. This is intended to demonstrate continuities in form between missionary and bureaucratic systems of local government in the Reserve, and the manner in which structures of social differentiation and government have emerged from continuous processes of class and ethnic struggle.

The anthropological study of political systems has long been hampered by a divergence in the emphasis placed on the analysis of political institutions and practices, to the extent that there is a division between those who examined constitutional structures and those who concentrated on the interplay of political events and other kinds of social events: '... those anthropologists who were concerned with modern social processes did not focus on the political system, while the anthropologists who did write about African political systems generally adopted a historical perspective.... Both these approaches, of course, have their own validity, but the unfortunate consequence was that the daily stuff of modern politics went unrecorded—or at least unpublished' (Kuper 1970: 3). As a result there have been few serious attempts to develop a set of concepts for recording, describing and analysing political life in the fieldwork situation, with the exception of authors such as Smith (1966) and Easton (1965), although Fortes & Evans-Pritchard (1940), Schapera (1956) and Gluckman *et al.* (1949) have also provided models useful for the purposes of comparative studies.

It is only comparatively recently that 'politics' has come to be understood as an all-encompassing sphere of human activity that is a defining characteristic of all human groups (Leftwich 1983: 1). Radcliffe-Brown (1940), for example, took politics to mean (a) the territorial rights of groups, (b) the maintenance of order by means of personal or group action, (c) sanctions on action, (d) accepted uses of violence, and (e) sets of rules dealing with the functions of (a) through (d). He was referring here to a real system, in the sense that the concept could be used as an analytical distinction to abstract political life from its context and subject it to study, enjoining consideration of the functional purpose of its components and directing attention to relationships both within the system and between the system and its socio-cultural background. Smith (1956, 1960, 1966), who derived his method of analysis from Weber's organizational theory of government, argued that politics referred to a set of actions by which public affairs are directed and managed. He divided governmental activity (the functioning of the system) into administrative and political spheres, in which the former referred to the authoritative structuring of government roles, and the latter to political interaction between people in these roles. In his study of Zazzau (Smith 1960), however, he did not go much beyond the formal authority structure and said little about the exercise of and competition for power within the system.

A consideration of power, which we have taken to mean an ability to influence the behaviour of others and/or gain influence over the control of valued actions or resources, must nonetheless remain an integral part of an analysis of the political system, as Weber himself showed in his distinction between authority ('herrschaft') and power ('macht') (Weber 1956: 541). He treated the administration of public and community affairs as the expression of authority and the political process as being generated by differentials in the distribution of power but, whereas authority is legitimate power in which a superior can exercise his right to command a subordinate, power in itself is available in some measure to all and results in competition for available resources. This distinction between authority and power enables one to identify an authority structure, a formally recognized role network, and a power structure, a set of relationships among those wielding power in the community (Bendix 1969).

The authority structure in this sense refers to the constitutional features of the political system, being a set of rules explicitly or implicitly stated that in practice indicates how scarce values are allocated between superiors and subordinates. Submission to the authority (or administrative) structure depends on legitimacy, or, as Lipset (1960: 74) put it, 'the capacity of the system to engender and maintain the belief that the existing political institutions are the most appropriate ones for the society'. Legitimacy, however, can be the view of either the people (the ruled) or the ruler, who can, if necessary, depend on coercion to provide a recognized right to rule, whether this is actual or structural coercion depending on the degree to which resistance is offered. One can therefore consider the political process (the competition for power) as being both an abstract relationship between power and authority based on the legitimacy of the authority structure and one that in practice manifests itself as a continuous set of activities under the rubric of decision-making.

Kuper's (1970) analysis of politics in an Ngologa village in the Kalahari is one southern African study that has endeavoured to combine a description of the authority structure with an analysis of the political process. As such it is a good example of the type of situational analysis advocated by, amongst others, Mitchell (1969), Turner (1957) and Van Velsen (1967), but it does suffer from certain defects. For example, although reference is made to a time dimension in following through some of the cases, there is no specific attempt to trace out in any detail events and political processes in operation before the period of fieldwork and the analysis therefore lacks the 'diachronic treatment of the actions of specified actors in on-going structural relationships' (Van Velsen 1967: 144) and the operation of certain principles through time. In the latter respect Turner's (1957) work is more successful, for by using a series of social dramas based on a central theme he demonstrates that all elements of social relations combine in a cyclical social process in which nothing is exceptional or unusual, but this approach also presents problems. As Vansina (1973) has pointed out, even though it is a type of diachronic analysis there is nevertheless not only the artificial reduction of chains of antecedent and consequent relations into convenient and therefore simplified processes, but also the problem that the specific case analyses impose an artificial rigidity on the resulting model by being in themselves synchronic.

A solution to these problems seems to lie in tracing out the past history of the organizational structure in which the processes of social relations are lodged. As stated above, a shortcoming in the work done hitherto has been a tendency to record only a description of the authority structure and to assume this to be a political analysis, but this is only true of the constitutional structure (Meisel 1958: 28). It is by knowing how and why this structure has changed with reference to internal and external pressures, how it works in practice as opposed to the ideal, and which influences facilitate or restrain its development in any direction, that attention can be focused on the processual and dynamic features of the political system, allowing an examination of the relationships between rulers and ruled, powerful and powerless, through the medium of the decision-making process.

In challenging the traditional classification of types of governments then current in the comparative analysis of politics, Mosca argued in 1884 that classification should be based on 'the essential characteristics of government and not on mere trivialities and appearances' (Meisel 1958: 29), and that it was only by taking into account substantial rather than formal differences that the reality of the political process could be illuminated. He saw the core of this reality in the facts of power. As a general proposition he stated that: 'In all regularly constituted societies in which something called a government exists, ... the ruling class, or rather those who hold the exercise of the public power, will always be in a minority, and below them we find a numerous class of persons who never, in any real sense, participate in government but merely submit to it: and these may be called the ruled class' (Meisel 1958: 32). Mosca was writing in general criticism of the Marxian notion of an identity of interests among those in a similar class position, emphasizing instead that differentiation of the ruling class prevented the monopoly of wealth and power and therefore the formation of oligarchies, whereas the varied interests of the ruling class also enabled this elite leadership to gain legitimation for its minority rule from the ruled class (Mosca 1924: 142–143). Pareto took Mosca's ideas further by drawing on Marx for his argument that the inevitability and ubiquity of interclass struggles resulted not in a classless Utopia but instead in a cyclical circulation of elites (Andreski 1972: 13) because ruling classes often espoused ideologies that merely led them along the road to a collective demise.

Central to these views of the political process, as in realist interpretations of Marx's social and political thought (Kitching 1988: 1, 187), is the concept of struggle between classes for the control of scarce and/or valued resources, whether this is cast in terms of economic class such as is argued by Ranger (1978) or in a more general sense of formal social groupings founded on non-economic ideological considerations, such as ethnicity, which are often expressed in various forms of utopianism (Berki 1983: 5; Geoghegan 1987). Since the authority structure is the arena of struggles for power, it is therefore through an understanding of the development of governmental structure that one comes to appreciate the nature of the struggles and the classes or groups involved, particularly those formed as a reaction to the imposition of colonial structures of authority that may not necessarily be conceded legitimacy by the ruled classes. At the same time, however, participation in the political process exerts influence for change on the authority structure

to the extent that success in the struggle may enable a ruled class to transform itself into a ruling class through subversion of the authority structure for its own purposes. This has the additional effect of according even the over-arching governmental process a degree of legitimation since this becomes a means of best serving the interests of the new elite, a process that is likely to continue even after the establishment of universal suffrage and rights in a democratic system, such as South Africa has had since 1994.

This study of local government in Pella, a Reserve in the Northern Cape, is concerned with interaction between the powerholders, the missionaries and government officials, and an aspirant ruling class comprised of the elites of the various groups or formations in the community. Following Carstens (1991) a 'diasynchronic' approach has been used, 'because it involves coming to grips with both socio-cultural relationships in time (*diachronic*) and space (*synchronic*) ... to come to terms with the ... reserve community in both space and time *as one system*, also taking into consideration socio-economic relations with the wider society' (Carstens 1991: xvi–xvii). After an account of the Reserve as constituted at the time of fieldwork, the process of colonization in Bushmanland, which led to a denial of control of the means of subsistence to the local inhabitants by incoming European settlers, is examined in some detail. The development of the community at Pella is then surveyed, with particular attention to differentiation on the basis of class and ethnicity. The following two sections are closely interrelated, being an examination of the historical role of the Roman Catholic missionaries in the development of the community through the establishment of a system of local government that favoured the European inhabitants over the other residents. These sections have been structured around the series of custumals, bodies of local regulations, applied in succession to the community by the missionaries, and it is shown how this system was brought to an end in the 1970s by irresistible secular trends that enabled the Nationalist Government to apply its policy of 'apartheid', with its particular provisions for people classified 'Coloured', to the community.

The background of Government policy towards the Namaqualand Reserves is then set out and the authority structure established in Pella after 1974 is described, and this is followed by a consideration of how this administrative system functioned. The final section then presents an account of the struggle of the new village elite to secure its position of power and prevent its destruction as a result of the introduction of official policies aimed at achieving far-reaching changes in the structure of the ruled classes in South Africa as a means of preserving capitalist domination of the state as it was constituted at that time. By any standards the political affairs of Pella are parochial, but, as implied above, it is at the local level that political processes are made most manifest. Such a study can illuminate these by providing an account of how policies applied at the national level affected a small rural community that had been under the protection of the Roman Catholic Church until the 1970s and had thus remained largely outside the sphere of influence of the government of the South African state. This, as Kuper (1992: 14; 1994: 551) has pointed out, allows us to '... confront the models current in the social sciences with the experiences and models of our subjects ...'.

THE FIELD OF STUDY

Pella is one of seven communal areas (called 'Rural Coloured Areas' between 1963 and 1994, and still popularly spoken of as 'Reserves') located in the magisterial district of Namaqualand in the Northern Cape (before 1994 part of the former Cape Province). Namaqualand is a sparsely populated semi-desert area of some 4 800 000 ha (18 518 square miles), bounded in the north by the Orange River, in the west by the Atlantic Ocean, in the east by the eastern half of Great Bushmanland, cut off by the boundary of the Kenhardt district, and in the south by an equally arbitrary line just north of Bitterfontein. The ecology of Namaqualand has always exerted a profound influence on settlement patterns and economic activities. Most of the population (55 318 in 1970; 63 323 in 1980) and five of the Reserves are to be found in the winter rainfall regions of the mountain-belt and coastal plain where the rainfall is not as low and the water sources not as unreliable as in the summer rainfall region of Bushmanland, an area of immense plains descending to a desert mountainland around the Orange River. Economic activities in Namaqualand are primarily concerned with stock-farming and mining, though coastal fishing is also important. The lack of a well-developed infrastructure has inhibited the establishment of industrial undertakings, other than those connected with these activities. Throughout the twentieth century Namaqualand was insignificant in terms of the national economy, contributing less than 0.7 per cent to the Gross National Product, and about 90 per cent of this amount was produced by the mining industry (National Physical Development Plan 1972; Dunne 1986).

There were 23 Reserves, or Rural Coloured Areas, in South Africa at the time of the field studies for this monograph. In terms of the Rural Coloured Areas Act (No. 24 of 1963) these areas were set aside for the exclusive occupation of people legally defined as 'Coloured' under the now-defunct Population Registration Act, although a sprinkling of people classified as 'White' was also resident in certain of them for the purposes of mining, trading and mission work. These Reserves originated as mission stations on Crown Land in the nineteenth century (Sharp 1980: 10) when Protestant missionaries, from the London Missionary Society, the Rhenish Mission Society and the Wesleyan Church, created more or less autonomous peasant communities by settling nomadic and semi-nomadic Baster and European stock-farmers and the remnants of the aboriginal Nama pastoralists of Namaqualand on defined territories that were recognized and in some instances granted by the Cape Government. The communities were able to survive into the twentieth century for several reasons, the most important of which included support from the missionaries for their territorial integrity, and their perceived value as labour pools for the mining industry in the region. The development of distinctive forms of local identity, arising from the need to regulate the distribution of internal rights to land for subsistence farming activities, also contributed significantly to the continued existence of the communities by preventing the inhabitants from identifying with the situation of the working class in the mining towns and on farms elsewhere in Namaqualand (Sharp 1977, 1980; Klinghardt 1979). The future of the Reserves as communal territories in the 'post-apartheid' period was still uncertain at the time of

writing, when far-reaching changes in local government were being implemented. The system of land tenure was communal in character, with local government being effected by Advisory or Management Boards responsible to the then Administration of Coloured Affairs. The land in the Namaqualand Reserves amounted to approximately 70 per cent of all the land set aside as 'Rural Coloured Areas' in South Africa at that time. Together these seven Reserves comprised some 1 210 000 ha, about 26 per cent of the land in the district. The rest of Namaqualand was divided up into 'White'-owned farms, apart from land held by the State, mining companies, and town and village allotment areas. In 1980 the total population of the seven Reserves was 31 243, some 40 per cent of the population resident in all the 'Rural Coloured Areas'. In Namaqualand this represented 65.4 per cent of the 'Coloured' population and 49.3 per cent of the total population. These statistics reveal that the 'Rural Coloured Areas' occupied an important position in the political, social and economic structure of the district in both the contemporary and historic periods, although they were insignificant in the South African context if compared with the various 'Black National States' and other 'self-governing' territories in the eastern part of South Africa at that time.

Pella Reserve, some 48 300 ha in extent, is situated on the border of South Africa and Namibia in the geographic region of Great Bushmanland. Although the smallest of the seven Namaqualand Reserves (but the seventh largest in South Africa), the physical setting of Pella offers vivid contrasts, ranging from sweeping semi-desert plains through a desert mountainland to the Orange River valley, where the riverbanks are lined by thickets of dense bush. The average annual rainfall is less than 70 mm and, as it is not unusual for years to pass without any rain, less than a quarter of the population of some 2 000 could be supported without the presence of an extensive mining industry.

TABLE 1

Comparative population statistics for the Namaqualand Reserves in 1978.
(Annual Report of the Administration of Coloured Affairs for 1978)

Reserve	Area (ha)	Population	Density (ha per person	Small stock	Large stock
Concordia	63 383	8 033	7.8	30 320	967
Komaggas	62 603	4 168	15.0	17 715	1 033
Leliefontein	192 719	6 930	27.8	32 050	1 872
Pella	48 276	2 473	19.5	18 496	215
Richtersveld	513 919	2 456	209.2	50 392	899
Steinkopf	329 301	7 044	46.7	80 000	1 948
Total	1 210 201	31 104	38.9	228 973	6 924

As is the case throughout Bushmanland, the availability of water has been a key determinant of human settlement patterns on the Pella Reserve. Pella village, the central

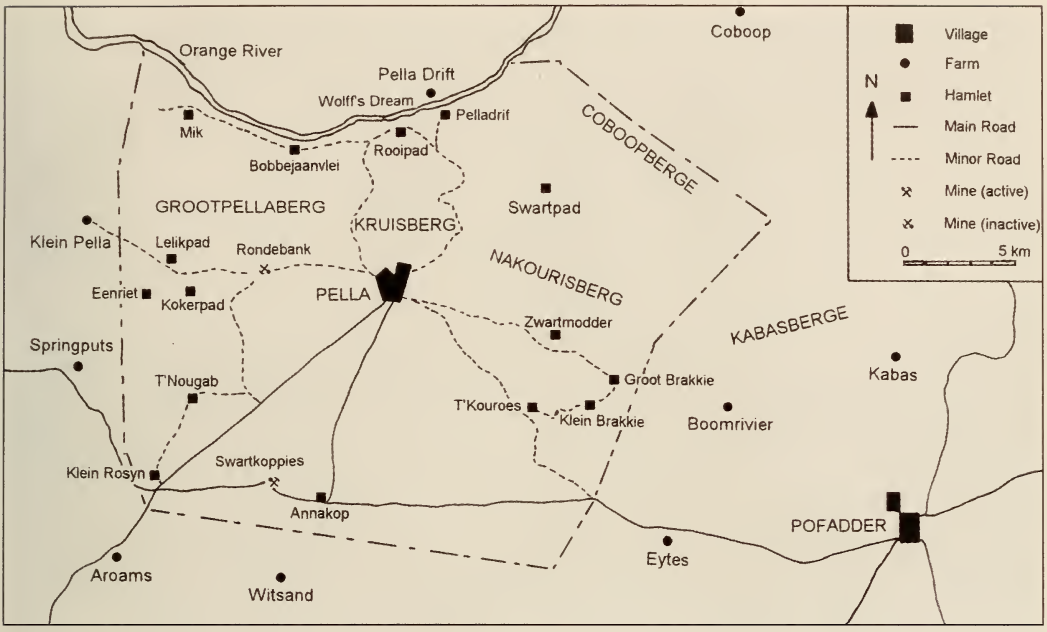

Figure 1
Pella Reserve in 1980.

settlement of the Reserve, owes its existence to the presence of eight springs, and it is here that the bulk of the population is resident, comprising some 1 600 people in 337 households in January 1980. At that time these households were clustered into five distinctive, named neighbourhood areas, which were in turn divided into a total of 17 sub-areas reflecting the diversity of class and ethnic differences in the community. The older neighbourhood areas tended to be quite homogenous in content—people considered as 'Basters' in 'Peuleboomstraat', 'Damaras' in 'Melkbosrand'—whereas those that developed after large influxes of people entered seeking work after the opening of the first sillimanite mine in 1952 were more heterogeneous (such as 'Die Brak'), with the sub-areas reflecting class differences rather than being based on kin or ethnic origins (Klinghardt 1994: 123). The remainder of the population, some 350, was resident in farmsteads and hamlets scattered elsewhere in the Reserve, at springs and wells or along the banks of the Orange River.

The centre of Pella village was occupied by the Roman Catholic Mission, with its fine cathedral and date plantations. The Mission is situated on a tract of land excised from the Reserve when it was incorporated under the Administration of Coloured Affairs as a 'Rural Coloured Area' in 1974, as until then Pella had been a Mission Farm controlled by the Church. Until 1968 Pella was the seat of the Bishop of Keimoes (formerly the Orange River) but, even after the Bishop had moved his official residence to Upington, Pella remained the ceremonial focus of the Diocese. At the time of fieldwork, the Mission was staffed by two French priests and two South African nuns of the Oblates of St Francis de Sales (O.S.F.S.), a French missionary order with its headquarters in Troyes, together with

Figure 2
The Cathedral of the Immaculate Conception at Pella Mission, an elegantly proportioned Roman-Gothic structure completed in 1895 and modelled on the Cathedral of SS. Peter & Paul and the Pope Urban VI Collegiate Chapel in Troyes, France. Some Baster women wearing their distinctive bonnets ('kappies') can be seen among the congregation conversing on the plaza after Mass on a Sunday morning in February 1978.

ten lay employees drawn from the local population to perform routine service and maintenance work. The primary school was part of the Mission but was controlled by the then Administration of Coloured Affairs, which hired the buildings from the Church and paid the teachers' salaries. In 1979 there were 22 teachers and 569 pupils from Sub. A to Standard 6. For secondary education children could be sent to the Catholic high school at Matieskloof Mission near Springbok, although some went to Steinkopf or even further afield.

In close proximity to the Mission, but inside the Reserve in the former European residential area, were two shops (one jointly owned and operated by the last two 'White' families still living in Pella), a clinic, post office, and the office of the Advisory Board, the five-member body under the chairmanship and control of the Superintendent, the official responsible for local government.

Table 2 shows the age distribution of the population of Pella and was derived from a random sample survey of 83 households in 1978. Allowing for sampling errors it can be seen that the age distribution approximated to the national distribution, although as reflected in five out of eight age-groups there was a tendency for the population to be slightly older. Table 2 also shows a slight imbalance in the male/female ratio due to the absence of economically active males, but the absence of large numbers of migrants was

due to the proximity of Pella to sources of employment that allowed daily or weekly commuting between home and workplace.

TABLE 2
Age distribution of residents of Pella in 1978.

Age decade	Males	%	Females	%	Total	%	RSA %
70+	5	2.3	5	2.2	10	2.3	1.7
60–69	7	3.3	7	3.1	14	3.2	2.8
50–59	18	8.5	12	5.3	30	6.9	4.7
40–49	16	7.5	25	11.2	41	9.4	7.6
30–39	24	11.3	25	11.2	49	11.2	10.8
20–29	29	13.7	38	17.0	67	15.4	16.2
10–19	52	24.6	53	23.7	105	24.1	24.5
0–9	60	28.8	58	26.4	118	27.5	31.7

Figure 3
Harvesting dates in 1984 in a plantation at Pella Mission, with the date-processing shed and an old mill-house in the background.

In the period before 1952, the population of Pella did not rise above about 700 and it was thus possible for most people to make a living from one or other form of agricultural activity, supplemented by occasional labour on farms in the district or at the copper and diamond mines in Namaqualand. With the development of the sillimanite mines in the district and on the Reserve in the 1950s, the significance of agricultural activity to the residents as a whole declined as a source of income. At the time of fieldwork, livestock-farming was still the most important form practised by the inhabitants, but cultivation had almost completely ceased and none of those still so engaged relied upon their produce as their sole source of income. In 1979 there were some 70 stock-farmers, although only 35 were recognized as *bona fide* farmers by the Administration of Coloured Affairs, whereas the number of livestock (principally karakul sheep and goats), including that of non-farmers, totalled some 12 000, although this figure was declining as a result of the prevailing drought at that time. Only the Roman Catholic Mission was

Figure 4
Watering karakul sheep on a farmstead at the hamlet of T'Kouroes east of Pella village in January 1978. This farmstead formerly belonged to a European family, but in 1974 it was taken over by a Baster farmer, WR, who was a Member of the Advisory Board, when that family had had to leave after Pella had been proclaimed a 'Rural Coloured Area'.

still engaged in extensive cultivation, having three plantations of about 2 000 date palms on its territory in the village, and an irrigation farm on the banks of the Orange River where it was producing lucerne, lawn-grass (for the mining company at Aggeneys) and citrus fruits.

In 1978 about 17 per cent of the potentially economically active males in a sample of 83 households were dependent on farming for a livelihood, 16 per cent either self-employed, in service with the Roman Catholic Mission or teaching, and the remainder engaged in wage labour—46 per cent as commuters to the sillimanite quarries at Swartkoppies and Koenabib, and 11 per cent as migrants to various places in Bushmanland and Namaqualand. Apart from those who worked as teachers, women who took up employment worked mostly as domestic servants in households in the Reserve and the nearby villages of Pofadder and Onseepkans, but they seldom continued to be employed after marriage. Tables 3, 4 and 5 provide details of income from farming activities and wage labour over a period of four years preceding and including the period of fieldwork.

Between 1976 and 1980, the pattern of economic activities on the Reserve was considerably altered through the development of extensive deposits of lead, zinc and copper at Aggeneys, some 40 kilometres from Pella. A large number of people from Pella moved with their families to live in the company-owned township, and the sillimanite

mines on the Reserve and in the district lost almost a third of their labour force in 1979. In 1979 the number of people from Pella employed at Aggeneys doubled from about 40 to 83 (15 per cent of the potentially economically active population). This loss had to be absorbed almost completely by the mine on the Reserve, and over the corresponding period its labour force lost 38 men, to stand at 111 in December 1979. This movement continued in the 1980s, although at a slower rate, as the mining company at Aggeneys proceeded with its programme of phasing out 'Black' migrant labour in favour of employing local 'Coloured 'people as a cost-cutting measure.

TABLE 3
Income from farming activities, 1976–1979.

	1976	1977	1978	1979	Average
	R	R	R	R	R
Farmers	31 613	51 663	29 918	15 979	32 293
Non-farmers	3 676	7 383	10 278	12 856	8 548
Total	35 289	59 046	40 196	28 835	40 841
Average annual income of farmer	596	1 123	747	456	751
No. of farmers	53	46	40	35	43

TABLE 4
Income from wage labour, 1976–1979.

	1976	1977	1978	1979	Average
	R	R	R	R	R
Total	185 671	383 567	258 323	413 775	310 334
Average annual income of worker	793	1 646	1 184	1 100	1 171
No. of workers	234	233	218	376	265

The population of Pella was diverse in origin and character, with the principal groupings comprising the descendants of people ranging from the indigenous Khoisan people to immigrant 'Basters', 'Whites' and 'Damaras'. Research in Pella showed that the boundaries of these groupings were a manifestation of complex processes of differentiation that had their roots in the diverse origins and character of the population. Pella has been inhabited in various proportions through time by aboriginal Khoisan people, comprising hunter-gatherers ('Bushmen', said by informants to have called themselves 'Tahamanannin'), Nama and Einiqua herders, as well as immigrant Baster and European stock-keepers, and Damaras (a heterogeneous grouping of people of Herero,

Figure 5
Migrant workers from Pella sorting crushed sillimanite ore at the Koenabib Mine west of Pella, August 1979.

Dama and Xhosa descent) (Klinghardt 1978, 1982). Historical records show that, by the mid-nineteenth century, Baster settlers had replaced the aboriginal hunter-gatherers and pastoralists in the area. The hunter-gatherers were for the most part destroyed in small-scale conflicts, whereas the pastoralists were forced to withdraw to the north across the Orange River after the Basters had taken possession of their pasture lands and water supplies by drawing on the support of missionaries and the colonial government (Marais 1939; Carstens 1966; Sharp 1977; Klinghardt 1982). These early Baster colonists, however, were scattered during the first Koranna War of 1868 (some going to Concordia and others to Mier and Rehoboth, where their descendants still live) and were replaced in turn by European settlers and other Basters from eastern Bushmanland in the 1870s and 1880s. The Europeans were numerically dominant in Pella, constituting some 70 per cent of the population until the end of the South African War in 1902, after which they were increasingly overshadowed by the rapid growth of the other groups resident there; they nevertheless maintained their politically and socially dominant position in the community until 1973. Herero and Dama refugees from wars in Great Namaqualand and Damaraland began crossing the Orange River into northern Bushmanland in the 1860s, some to seek work at the copper mines, others to establish themselves in the Orange River basin with their livestock, whereas a few Xhosa people from wandering groups in the Middle Orange River region also entered the area at the same time. Further waves of Herero people followed after the collapse in 1906 of indigenous resistance to German rule in what is now Namibia. Although the leading Damara families in contemporary Pella are of Herero origin, the long association with Nama people north and south of the Orange River has led to the incorporation of many Nama cultural traits in the pattern of identity of this group of people in the community. Whereas members of various Nama groups have lived at Pella in varying numbers during its history, the few people of Nama origin still there are mostly descendants of Bondelswarts refugees who entered the area after the German-Nama war in German South West Africa in 1906. This summary hardly does justice to the complex centripetal and centrifugal socio-political forces that have been at work in shaping the present community but, owing to both historical and present links, the groupings of people formed by the descendants of these immigrants may be considered as forming a continuum in the local population, although in local eyes the groupings have tended to be regarded as mutually exclusive, partly owing to perceived differences in racial, cultural

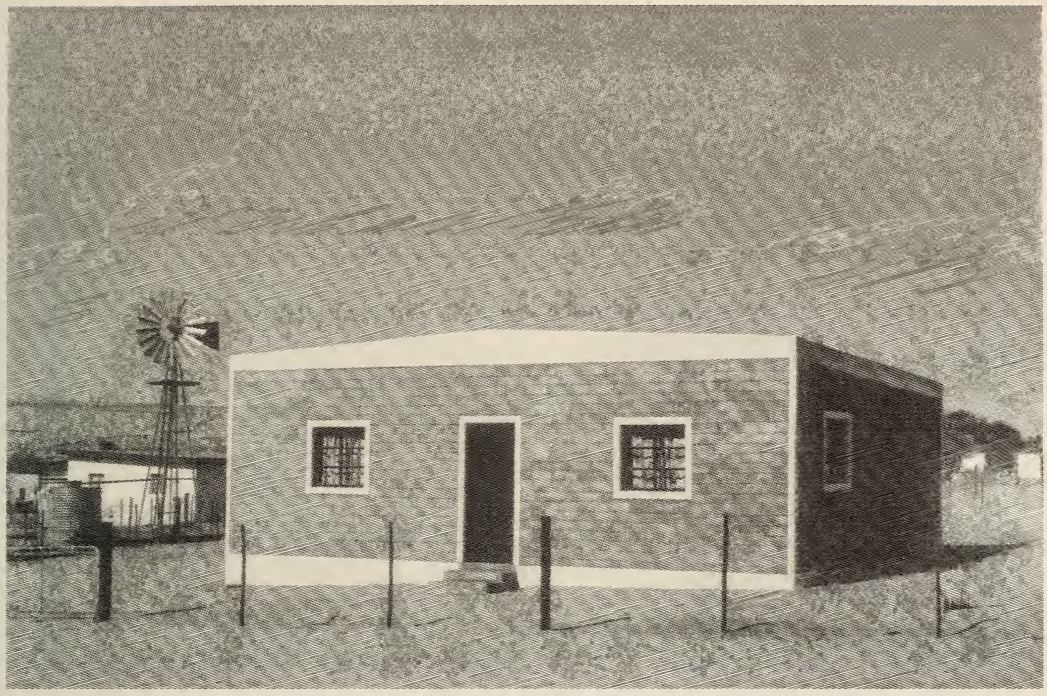

Figure 6
A mine-worker's dwelling in western Pella, November 1979.

and linguistic origins and partly due to an emphasis on kinship as a determinant of membership (Klinghardt 1982, 1987).

TABLE 5
Income from farming activities and wage labour, 1976–1979.

	1976	1977	1978	1979	Average
	R	R	R	R	R
Amount	220 960	442 613	298 519	442 610	351 175
Average annual income of economically active persons	770	1 586	1 157	1 076	1 140
Economically active persons	287	279	258	411	308

At the time of fieldwork, the Basters comprised about 60 per cent of the population, the Damaras 25 per cent, Nama 14.7 per cent and Europeans about 0.3 per cent. The first three groupings mentioned were officially classified as 'Coloured' and the Europeans as 'White', but few informants accorded legitimacy to the official racial classification system. Each of these groupings included people whose forebears had come from a range

Figure 7
The dwelling of a Nama-speaking family in the western neighbourhood area of 'Melkbosrand' in Pella, June 1978.

of racial and cultural backgrounds but, in their contemporary definitions, informants regarded these groupings as defined groups based on a notion of common origins that ignored the heterogeneity of their origins and treated kinship and family history as the deciding factors in determining membership. The absence of any emphasis on primordial bonds of attachment in this form of ethnicity at Pella can be ascribed to the fact that, as shown in genealogies and local parish records, no families could trace their ancestry to the original inhabitants of Pella in the early nineteenth century, and few had a continuity of more than four generations in the area. Although a high rate of marriage between the many offspring of the families within the boundaries of the various groups has produced a profusion of kinship bonds among the population, informal and formal restrictions on marriages among members of different groups have nevertheless produced patterns of marriage that have tended to reinforce the existing ethnic and social boundaries in the community as apparently immutable in the eyes of the members of all these groups. This study of local government in Pella is lodged within the context of interaction between these groupings of people in the recognition that there have been only qualitative rather than quantitative changes in their struggle for political and economic control of the Reserve during the last 100 years.

Northern Bushmanland, in which Pella is centrally situated, is that area between the Orange River and the main road from Springbok to Kakamas, where the Bushmanland Plateau slopes down from the crest mountains at Aggeneys and Namies to the Orange River. This part of Bushmanland is somewhat better supplied with water than the plateau

area but, even with a low population density, the low rainfall and sparse vegetation render it only marginally suitable for sedentary farming on a permanent basis, and in times of severe drought most of the farmers have to leave their land. In contrast to the situation found elsewhere in the world where great rivers pass through desert lands, and indeed also to that in the comparatively well-populated and intensely cultivated area between the Augrabies Falls and Upington, the Orange River has hardly any influence on the region because its valley is too narrow and deep to permit irrigation farming in more than a few places on its banks, and it is technically difficult and expensive to pump water out of the valley beyond the surrounding mountain ranges.

Apart from Pella, there are three other villages in the area. Pofadder is the 'capital' of Bushmanland, acting as a service centre for the farming community and local mining industry. European settlement on the site of a former Rhenish mission station commenced in 1889 and, after the first plots were given out in 1917, various civil functionaries at Pella were moved to the new village. By 1970 the population was 2 520 (469 'Whites', 2 015 'Coloureds' and 36 'Blacks'). Onseepkans is a government-sponsored irrigation settlement on the south bank of the Orange River dating from 1909. A canal serves the plots of some 70 families engaged in the production of a wide range of crops (such as cotton and lucerne), which are mostly marketed in Namibia. Aggeneys to the south of Pella is a mining township that developed between 1976 and 1980 to house the employees of the nearby Black Mountain Mine, and had a population of 1 500 (270 'Whites', 430 'Coloureds' and 800 'Blacks') in 1980. Both Pofadder and Onseepkans have well-established Catholic Missions (founded in 1921 and 1923 respectively), and the Mission at Onseepkans has a community of about 500 people (mainly Damaras with a few Europeans and Namas) living on its extensive property at the western end of the village. At the time of writing the Pella Mission administered an outstation at Black Mountain.

The mines at Aggeneys, Koenabib and Swartkoppies provide employment for a large number of people who would otherwise have had to leave the area in search of work; it has also been largely due to them that communications have been improved in the area, leading to a reduction in the isolation of these four villages from other urban areas in the Northern Cape. The region is traversed laterally by a tarred road from Springbok to Upington that gives access to the railhead at Kakamas (135 km distant), whereas gravel roads to the north and south lead to railheads at Karasburg in Namibia (180 km) and Bitterfontein (289 km) respectively. With the exception of a good gravel road from Pofadder to Concordia, the other roads in the area are poorly developed, particularly in the mountainland around the Orange River where there are areas inaccessible to wheeled vehicles of any kind. The Black Mountain Mine is connected by an excellent road to the Sishen–Saldanha railway to facilitate the shipment of ore, but this railway does not accept ordinary traffic. A road motor service connects Pella with Pofadder and from there with other towns in the Northern Cape; in addition, light and medium aircraft provide a regular service between airfields at Pofadder and Aggeneys and major centres in South Africa.

West of Pella towards Gudaos in the Steinkopf Reserve there are a few small settlements in the Orange River valley, such as Witbank where there is a Dutch Reformed Mission settlement, but during the past decade most of the people have gradually left these

places in search of work at the mines and elsewhere. In the 1970s and 1980s, the State took over many of the farms, ostensibly to allow the pasturage to recover from excessive overgrazing, but also for strategic reasons, and since 1994 some of these farms have been earmarked for redistribution in the settlement of land claims that have been lodged by some of the inhabitants of the region. In the Namaqua Pegmatite Belt (a strip of country roughly 40 km wide north and south of the Orange River), there are a number of small-scale mining operations extracting various minerals, but they are only irregularly worked and are too small for commercial operation. With the exception of a large, well-developed farm at Klein Pella, on which a wealthy German farmer had established a range of projects in addition to stock-raising (including date plantations, an irrigation works, several sillimanite mines and a lapidary factory), the rest of the area is sparsely populated and fewer than a dozen families occupy their farms permanently.

FIELDWORK

Most of the fieldwork on which this monograph is based was carried out between January 1978 and January 1980 and formed Project A in a long-term community study of the Pella Reserve. Pella was chosen as an area of study as it was the only one of the Namaqualand Reserves which at that time had yet to be subjected to anthropological study, and there was a need for comparative studies of all the Reserves to build up a resource of research data for use by those involved in various social issues relating to the Reserves.

While involved in Project A, I spent nine-and-a-half months living in the community, spread over two periods of two-and-a-half months in 1978 and a further period of seven months in the latter half of 1979. During the first two periods I established myself in the community and assembled a network of informants spanning as wide a cross-section of the community as possible. The results of this preliminary work were written up in a B.A. (Hons) dissertation on ethnicity and contemporary structures of social differentiation. In the third period I concentrated on studying the process of local government, both in the contemporary and historical contexts, as the extended period of familiarity with the community had enabled me to observe this process in action and had afforded me the time to tap both oral and written sources on the history of the Roman Catholic Mission, the community and local government in some considerable detail. This work was written up in a M.A. thesis at the University of Cape Town in 1982. Projects B and C, each comprising two parallel phases, were subsequently undertaken between 1983 and 1990, as general studies of patterns of settlement and land use and of Catholic missions in Pella and southern Namibia. These studies enabled additional material to be obtained to complement the data from Project A, and this material has provided the basis for a Ph.D. thesis with a focus on the Roman Catholic missionaries themselves. Project D, a full re-study of the Pella community within the transformation of South Africa after 1994, commenced in 1998.

Throughout the periods of fieldwork I lived in the Catholic Mission at Pella, the best (and most comfortable) arrangement, as it not only enabled me to establish close

relationships with the missionaries themselves, but also served to provide a relatively neutral base from which I could approach the various sections of the community without giving an impression of commitment to one or other faction involved in the political and social processes then in operation. I was always well-received by the people, although as was to be expected they were initially cautious in dealing with a stranger. Close acquaintanceship over the ensuing lengthy periods of fieldwork served to remove any lingering suspicions that I was a government official, a policeman or a priest in disguise. Most interviews were conducted in Afrikaans, but English was used with the missionaries and a number of European informants.

Four basic methods were used in examining the various aspects of the community under study: (a) surveys of the households with questionnaires to obtain statistical data; (b) structured and unstructured interviews with informants to assemble data on group identity formation and social life in general; (c) observation of representative authorities and other organized associations to examine decision-making processes; (d) tapping documentary and oral sources to provide the necessary time depth to the study.

The historical sections of the monograph are based on the documentation preserved in the files of the Parish Archives at Pella Mission and in the Diocesan Archives at Upington, supplemented with material obtained from the State Archives in Cape Town and a wide range of other sources, including missionary publications, published official reports and documents, early travellers' journals and other literary works dealing with the Northern Cape and southern Namibia. All the material in the Parish and Diocesan archives concerning the secular administration of Pella Mission and the Mission Farm was copied, with extracts and notes being made from material dealing with ecclesiastical matters. During Projects B and C all the statistical registers were copied, and additional material was collected. The material from the Parish and Diocesan archives was for the most part in English, which was the official language of the Catholic Church in the Northern Cape until it was replaced by Afrikaans in 1968, but some early material, private communications between missionaries and ecclesiastical documents were in other European languages. I made my own translations from German and Latin, but the priest in charge of Pella Mission very kindly translated various documents from French for me.

With oral testimony collected from informants added to the written sources, it has been possible to reconstruct the periods of missionary and secular administration of Pella in considerable detail without losing the voices of the various individuals and groups involved. In order to keep the historical aspect of the study within manageable limits, however, the focus of the presentation of the missionary period was on general trends and features on systems and processes, while an examination of the actual minutiae of administration was reserved for the period of local government under State control.

The identities of nearly all living persons mentioned in the text are protected by a system of initials, which are not necessarily those of their names. Government officials are indicated by a randomly-chosen letter, e.g. 'B', and the superintendents of the Reserve are labelled in order of succession as S1 and S2.

THE FRONTIER AND THE MISSIONS: SECURING THE RIGHT TO THE LAND, 1806–1873

EARLY EXPANSION AND SETTLEMENT IN NORTHERN BUSHMANLAND

The early history of the north-western part of the Northern Cape (Little Namaqualand and Bushmanland) has not received much serious attention from South African historians, other than Penn (1995). In most of the literature Bushmanland has been viewed as an arid, insignificant appendage to Namaqualand (Carstens 1966; Hanekom 1950; Kotze 1945), or as the desolate setting for a romanticized 'survival' of people thought to possess the original pastoral values of the Afrikaner (Rossouw 1973; Van der Merwe 1941, 1945; Van Niekerk 1964; Van Onselen 1961). This section does not pretend to summarize the history of Bushmanland, but rather to highlight those aspects that will enable the reader to understand the peculiar circumstances under which Pella followed so divergent a course of development from that of the other mission stations and reserves in Namaqualand. Previous authors have argued that 'the existence of an identifiable 'Baster' society was made possible only by their possession of land under a form of communal tenure' (Sharp 1977: 21), and that the people called Basters achieved their political aspirations by cultivating their political identity through setting themselves up in largely autonomous political communities (Carstens 1983: 1). It is therefore the purpose of this chapter to show briefly how the Basters of northern Bushmanland lost their independence and, in line with the general process of conquest elsewhere in Southern Africa, were subjected to European colonial domination.

The known history of Pella and northern Bushmanland stretches back to about 1750, when the expansion of Dutch settlers from the south-western Cape was first beginning to affect the Nama and Einiqua pastoralists and 'San' hunter-gatherers then living in Namaqualand and Bushmanland. Even before this time the movement of Dutch colonists had caused numbers of dispossessed and displaced Cape Khoekhoe to form the vanguard of a wave of people whose arrival in Namaqualand brought about the dissolution of the Nama groups living there. The incursions of these people and the Dutch colonists were closely interrelated and complex in their effects on Namaqualand but, in summary, the 'Orlams' (the name given to the emigrant Cape Khoekhoe) were able to take advantage of the disorganized state of the Nama clans, which had been seriously reduced in number by smallpox (Mossop 1947), to establish a hegemony over them. This was easily achieved because of the weak social organization of the Nama and the lack of centralized authority, as well as the poverty to which the surviving Nama had been reduced through the loss of much of their livestock (Elphick 1985).

According to oral tradition at Pella, which is confirmed in broad detail by Vedder (1985: 445–446), one such Orlams leader, Gamab /Hobesen (or Witbooi), obtained permission from the Nama chief ≠Huiseb to settle in the vicinity of the springs at Kamas, as Pella was known until 1812 (Mossop 1935), which was at that time occupied by the //Khauan clan. Gamab was said to have been wealthy and was able to bring many other people under him through the establishment of patron/client relationships. When

≠Huiseb died, Gamab had built up a group ('stam') equivalent in size to that of the //Khauan. When ≠Huiseb's wife U-eis married Gamab the tribal councils agreed that the two groups ('stamme') should unite into one and that the son of this marriage should be the new principal chief ('hoofkaptein'). This was Kido Witbooi, born at Pella in about 1780, and when he came of age the chieftaincy was transferred to him from the council. As the //Khauan were the senior clan in Namaqualand, Kido could thus claim most of Little Namaqualand and Bushmanland as his territory, but it seems that he delegated authority to protect his interests to other Orlams heads in Namaqualand, Abraham Vigiland at Steinkopf and Paul Links I in the Richtersveld, whereas he himself resided in northern Bushmanland (Carstens 1966: 18). The Nama groups were not settled, but roamed freely throughout Namaqualand in search of pasturage, merely regarding certain springs as theirs because of 'habitual exploitation' (Schapera 1930: 12). Whereas Kamas with its eight perennial springs might have been regarded as the 'capital' of the Witboois, the constituent clans and extended families were scattered all over northern Bushmanland wherever there was pasturage and water.

Nomadism and a lack of real centralized authority meant that there was no concerted resistance on the part of the Orlams-led Nama to other settlers and colonists entering Namaqualand and Bushmanland towards the beginning of the nineteenth century. Travellers' journals and missionary records reveal not only the influence exerted by climatic conditions on patterns of settlement by the Basters and Europeans, but also the numerical sparsity and poverty of these emigrants. As has been remarked of the entry of Afrikaner trekboers into the Kalahari, they came not as conquerors to exploit the local population, but as just another group of pastoralists (Russell & Russell 1979: 620), and their economy was local rather than orientated to distant centres of colonial settlement. Even the partially settled farmers of the Kamiesberg region seem to have been more concerned with subsistence—hunting, erratic agriculture, transhumant pastoralism, and exchange trading—than with breeding and dispatching their livestock on the long and dangerous haul to the Cape. Thus at the beginning of the nineteenth century one finds an amalgam of named groups of people living together in Namaqualand, all concerned with obtaining a share of the scarce natural resources of the region—indigenous Khoisan (Nama, Einiqua and 'San'), Orlams Khoekhoe (which included other groups such as the Griqua and Koranna), Baster and European colonists of mostly Dutch descent. During the following 100 years the two latter groups would succeed in securing these resources from the others, and the Basters themselves would eventually be subordinated because of the European colonists' control of governmental processes.

Carstens (1966: 18) observed that 'during the first two decades of the nineteenth century two important events took place in Little Namaqualand, events that were responsible for remoulding the former pattern of social relationships. The first was the northerly migration of Baster families who had hitherto lived mainly in the southern half of the north-western Cape Colony. The Basters were the descendants of Dutch colonists and frontiersmen fathers, and Namaqua and Cape Khoi Khoin mothers. Their culture was neither Khoi Khoin nor Dutch but is best described as a synthesis of the two traditions. They considered themselves superior to their maternal ancestors and tended to marry

amongst themselves, although some did marry Khoi Khoin women while others again were absorbed into the ranks of the Dutch. These Basters, who were the Voortrekkers of Little Namaqualand, were largely responsible for defeating and driving out the Bushmen, and in certain communities they also usurped the power of the Khoi Khoin'. Due to unfavourable climatic conditions, Baster penetration east of Little Namaqualand was limited to seasonal movements in search of pasturage after summer rains had made it possible for livestock to cross the Koa Depression into Great Bushmanland. Few settled there permanently, but in 1864 the Civil Commissioner of Namaqualand found that the Baster 'kaptein' at Pella, Jacob van Neel, and his son, Dirk, who was the Assistant Field Cornet, had been living at Pella since about 1824 and that about 41 out of 65 families had been at Pella since before the extension of the Cape boundary to the Orange River in 1847 (1/SBK, 5/1/3. Judge to the Colonial Secretary, 24/3/1864); this represented virtually the entire population of northern Bushmanland. Witbooi objected to the entry of Basters into his territory, but could do little as his people did not possess firearms (Carstens 1966: 107). Until about 1830 Pella remained firmly in the hands of the /Hobesen, but in about 1835 they moved north of the Orange River as the number of Baster and European settlers and graziers in Bushmanland increased and made it difficult to obtain adequate pasturage (Heywood & Maasdorp 1989: 37).

The second event to which Carstens refers was the entry of missionaries to the Northern Cape from about 1806 onwards. The mission station at Pella was founded in 1812 by missionaries of the London Missionary Society who had been forced to vacate Warmbad after it had been sacked by Jager Afrikaner, a bandit who preyed on both the indigenous and immigrant inhabitants of the area (Campbell 1815: 376; Thompson 1827: 65, 68–69). The missionaries built a small chapel and laid out gardens, but they were unable to induce the people to settle permanently in one place due to the difficulties in obtaining sufficient water and pasturage, and they were thus compelled to move about with the people. The London Missionary Society did not remain at Pella long, for in 1825 the station was abandoned and left deserted, although missionaries from the stations in Namaqualand continued to visit the area sporadically (London Missionary Society Missionary Registers 1826, 1827, 1828; Le Cordeur & Saunders 1976: 51–53).

When the Rhenish Mission Society took over from the London Missionary Society in 1840 (Strassberger 1969: 63) the first concerted efforts were made to form a settled community, but these met with limited success. The first Rhenish missionary to be appointed permanently to Pella was the Rev. J. Schröder, who arrived there in 1849 (Guedes & Reiner 1992: 435). He endeavoured to create a settled community according to the general principles laid down by the programme of the Rhenish Mission Society for mission work, which emphasized self-sufficiency (Von Rohden 1871: 194–199). He encouraged the inhabitants of Pella to engage in the cultivation of various crops, including dates, but he found that there was insufficient arable land at Pella itself or at the neighbouring spring Klein Pella, where he had laid out gardens for himself and his family, to support a large community (1/SBK, 5/1/3. Judge to Colonial Secretary, 24/3/1864). Accordingly certain lands at Brandkloof near the Rhenish mission station at Concordia in Namaqualand were made available for the use of the people at Pella. This reduced the

random movements of the people in search of pasturage to one of seasonal migrations between northern Bushmanland and Namaqualand and encouraged the development of semi-permanent settlements; but there was never sufficient land for all, and even that available was steadily being whittled away by the increasing numbers of European settlers and graziers who began entering Bushmanland from the 1840s onwards (Van der Merwe 1945: 207).

The penetration of the Northern Cape by European colonists took place at the same time as that by the Basters, although it was at first not as determined in dislodging the Nama (Carstens 1966: 15–16, 231–234). Graziers had obtained grazing licences to 'Kamasfontein' as early as 1776, although it lay beyond the then boundaries of the Cape Colony and the licences were obtained by exploiting official ignorance of the geography of the area (Alexander 1838, Vol. I: 35; Smalberger 1975: 53). Various hunters and traders, who dealt in, amongst other things, livestock, liquor and firearms, passed through the area from time to time, and occasionally outcasts, such as one Stephanas who had married a 'Black' woman and was unacceptable in 'White' society (Campbell 1815: 377), also settled there, but their numerical inferiority prevented any serious conflict. As the numbers of graziers increased during the nineteenth century, however, so it became more difficult for the other inhabitants to maintain their position. Favoured by the colonial government, the European graziers were able to secure grazing licences and to establish themselves at certain of the important springs, such Aggeneys and T'Gams near Pella, even though these were within territory claimed by the Rhenish Mission Society for Steinkopf and Pella on behalf of the Baster inhabitants, whereas some settled at the mission stations themselves. By the time the colonial boundary was extended to the Orange River, the combined pressure of the European and Baster graziers and settlers on the pasturage and water of Bushmanland was such that the 'weaker' farmers and Nama inhabitants were forced to go elsewhere in search of land, the last group of /Hobesen (Witboois) finally leaving after 1856 (G.1–'58: 7).

THE RHENISH MISSION AND THE STRUGGLE FOR RECOGNITION

The survival of the Baster communities in Namaqualand could only be assured once they had achieved some form of recognition from the Government of their rights to the lands they had occupied. Since the people had accepted British citizenship when the boundary of the Cape Colony was extended to the Orange River in December 1847, the Government seems thereafter to have taken the view that the rights of the indigenous people had become irrelevant (Sharp 1977: 37) and would be recognized only in so far as Government policy allowed. Although the land north of the old boundary had thus been laid open for occupation and use by any British subject who cared to move there, the Cape Government nevertheless did make it clear that it 'would not tolerate any encroachment on the part of farmers and others on the land occupied by the people of these institutions' (G. 60–'90: 4). At the same time it left the onus of making a substantiated claim to and application for survey of a piece of land on those people who considered themselves to be 'aboriginal inhabitants'. If the missionaries had not been prepared to take up the cause of

the Baster communities there can be no doubt that European settlers would have been able to secure the rights to the land and swiftly bring about the complete subjection of the local population (Sharp 1977: 33, 40).

With increasing numbers of European and other Baster graziers entering Bushmanland from the 1850s onwards, the question of land tenure in that area became increasingly acute. The people residing on the Pella lands found themselves having to compete for pasturage and water with European graziers, some of whom established themselves permanently at the southernmost springs and refused to leave when so ordered by the Assistant Field Cornet, the local representative of the Civil Commissioner for the district. The Rev. F. Brecher of Steinkopf mission applied in 1859 for the lands of Steinkopf and Pella to be surveyed and given out, and in reply the Government stated its readiness to recognize the lands 'to which the communities had just claim, namely, individual titles to arable lands, with commonage under certain regulations....' (G. 60–'90: 4). After further correspondence the Surveyor-General recommended to the Government that a ticket of occupation should be issued for Pella and Steinkopf as a temporary measure to prevent further 'trespassing', this to be followed in due course by the survey of individual allotments. Some two years later, after the Civil Commissioner had emphasized the urgent necessity of settling all the land questions up to the Orange River in order to avoid clashes between colonists and disaffected Khoisan (principally the Koranna), the Surveyor-General was instructed 'to prepare tickets of occupation, vesting all the lands of Pella and Steinkopf, within the undisputed boundaries, in the Civil Commissioner of Namaqualand and the Rhenish Missionaries, in trust for the natives', but nothing further was done (G. 60–'90: 4).

In April 1863 the Civil Commissioner responded to strongly worded complaints from the Assistant Field Cornet at Pella, a Baster named Dirk van Neel, that the inhabitants were being harassed by farmers intruding in 'their' pasturage by issuing a notice in which he clearly defined the boundaries within which he was prepared to recognize the rights of the people at Pella (1/SBK, 5/1/2. E. Judge to Field Cornet, Pella, 25/4/1863). He added, however, that the notice was only a temporary measure that did not form a precedent for the future (1/SBK, 5/1/2. E. Judge to Surveyor General, 29/4/1863) and also pointed out to the Government that 'it was high time that the extent of land to be reserved should be more intelligibly defined' because without clear borders he had 'always had a difficulty in keeping faith on the part of the Government with the natives' (1/SBK, 5/1/2. E. Judge to Surveyor-General, 29/4/1863). Subsequently, however, it became clear that the Civil Commissioner's concern was with the European settlers rather than the 'natives'. The Rev. Kupferberger, the Rhenish missionary then in charge of Pella (although the Rev. J. Schröder was still working there), emboldened by the apparent support of the Civil Commissioner, proceeded to demand the immediate departure of certain farmers who had settled at springs on the borders of the Pella lands, but the Civil Commissioner refused to allow this, accepting the claims of the farmers that they had already been living at these springs for many years (1/SBK, 5/1/2. E. Judge to J. Hayes, 6/5/1863). Evidently Kupferberger had made these demands acting on behalf of the Assistant Field Cornet and therefore also the Baster people at Pella, because relations between the Civil

Commissioner and the Field Cornet became somewhat strained after his refusal to take action, and eventually Judge had to threaten to dismiss Van Neel if he continued to fail to attend to his duties (1/SBK, 5/1/2. E. Judge to Kupferberger, 11/6/1863).

The first move made by the Government towards recognizing the rights of the inhabitants was in December 1863, when the Civil Commissioner was sent to Pella to investigate their claims. In order to determine who should be regarded as possessing a right to the land, he used as criteria residence at Pella at the time of the extension of the Cape boundary to the Orange River in 1847 without having demonstrated any intention of abandoning the claim by moving away, and/or special services performed during the 'Kafir Wars'. The Commissioner accepted the credentials of 41 of 65 applicants, described as 'respectable and deserving Bastards', but rejected those of certain Bushmen, Damaras and Hottentots, mainly because they led only nomadic lives in the vicinity of Pella and made no sizeable contribution to the economic well-being of the community at the Mission Station. The Civil Commissioner proposed to reduce the amount of land for the community to about 500 square miles, because the amount claimed (1 066 square miles) included all the water sources in northern Bushmanland, enabling the occupants to command the pasturage for almost the same area again outside the boundary. The people claimed that they had been accustomed to make use of these springs by means of seasonal movements but, as he remarked, they had chosen their boundaries with such care that they would thereby be able to exclude anybody else from northern Bushmanland (1/SBK, 5/1/3. E. Judge to Colonial Secretary, 24/3/1864). Had this recommendation been implemented, the effect would have been to reduce the community to poverty unless the people were allowed to move seasonally to other areas of pasturage. The Civil Commissioner might not have fully understood the nature of farming activities in the arid areas of the Northern Cape but, bearing in mind that the Government's policy was aimed at reducing the number of independent farmers in order to create a labour supply for the copper mines, it is also possible that he understood desert pastoralism all too well.

At the beginning of 1866 the Cape Executive Council decided in favour of disposing of the 'lands of the Missionary Stations of Pella, Steinkopf, Komaggas and Leliefontein ... by giving individual titles in favour of heads of families, and of the missionaries, to agricultural and pastoral lots, or farms and building lots near the church' (G. 60–'90: 5). Nothing further came of this, however, and the matter of rights to the Pella lands remained unresolved, apart from the temporary reservation granted by the Civil Commissioner in 1863.

From 1865 the numbers of European and Baster graziers making use of the pasturage in northern Bushmanland continued to increase steadily (Talbot 1961: 306). Large numbers of Basters from the Karee Mountains in the south of the Bushmanland began moving in from the south-east, concentrating around a spring known as De Tuin where a Rhenish mission station was established under the Rev. J. Heidmann. The Basters, who had been forced off the mission lands at Amandelboom and Schietfontein by European settlers, were themselves closely followed by European settlers who pushed the frontier of settlement up to the Orange River along the entire north-east edge of the Bushmanland (Strauss 1979: 23–25). This northward expansion exerted increasing pressure on the scarce resources of water and pasturage in that area, which was claimed by the various

Koranna clans living along the Orange River banks. The Koranna found themselves being compressed from all sides and unable to retreat to vacant lands— '... for to the north of them was the Kalahari Desert, to the east and north-east ... Griqua, Tswana and Whites, and to the west Afrikaners (Orlams) and Namaqua' (Strauss 1979: 26). The flocks of the colonists provided an obvious target for those unable to continue to maintain an independent pastoral existence, and by the end of 1868 stock-raiding by bands of Koranna had reached such a scale that the 'Koranna had taken the place of the Bushmen as "the enemy" on the northern frontier' (Marais 1939: 91).

The situation deteriorated rapidly between 1867 and 1868 as tension rose between the graziers (both European and Baster) and the Koranna, whereas to the west in Namaqualand the colonists were disturbed by the presence of a large number of well-armed Dama and Herero refugees who had moved into the area from Great Namaqualand, fleeing from the wars north of the Orange River and in search of work at the copper mines. The Civil Commissioner considered mounting an expedition to expel them, but nothing came of this and they settled along the Orange River in northern Bushmanland (1/SBK, 5/1/4. E. Judge to the Colonial Secretary, 21/5/1867; 1/6/1867; 8/6/1867; 22/6/1867; 13/7/1867). They were later joined by a second wave following the disastrous Herero uprising against the German occupation of South West Africa in 1904. The graziers began withdrawing to the south and west, whereas the Basters at De Tuin moved to Pella, before crossing into Great Namaqualand.

In September of 1868 the continuing Koranna raiding and settler reprisals finally erupted into a short but bloody war, now known as the First Koranna War (Broodryk 1992). In the vicinity of Pella raiders fell upon the various settlements that had developed at the principal springs, killing the inhabitants and driving off their livestock, poisoning the wells and ambushing wagon trains. The Assistant Field Cornet, Dirk van Neel, and Carl Schröder, the son of the Rev. J. Schröder, were killed in clashes with the Koranna (1/SBK, 5/1/4. Civil Commissioner to the Colonial Secretary, 18/2/1869; Strassberger 1969: 77). Pella itself was then attacked and destroyed (Dunn 1872: 61). The inhabitants were scattered; some moved to Great Namaqualand and eventually settled at Rehoboth; others fled to Concordia and Steinkopf where they were given shelter by the Rev. Brecher; a few went to Mier in the Kalahari (Nienaber 1989). Fighting between Koranna bands, burger commandos and the police continued in the Pella area until 1871, when the last of the bands was trapped and wiped out at the T'Gamsberg, a formidable mountain fastness to the south of Pella that had long offered shelter to raiders in the war in that part of Bushmanland.

In April 1869, the Civil Commissioner informed the Government that Pella had been abandoned (1/SBK, 5/1/4. Civil Commissioner to Colonial Secretary, 29/4/1869). The continued instability in Bushmanland coupled with a severe drought made it impossible for the surviving inhabitants of Pella to return and, in December 1872, the Rev. Brecher approached the Government for a grant of land for the use of the refugees (G. 60–'90: 5). After some correspondence Brecher agreed on behalf of the Rhenish Mission Society to give over all its rights to Pella to the Government in exchange for a Ticket of Occupation for a portion of land near Steinkopf (G. 60–'90: 5). Although this represented a significant

step in Brecher's attempts to secure a full Ticket of Occupation for the whole of Steinkopf, it also meant that the lands in Bushmanland were lost to the Rhenish Mission Society and the former inhabitants of Pella, and the Government could dispose of them as it saw fit.

Once an uneasy calm had again settled over Bushmanland, the Government began offering 32 lots for lease in northern and western Bushmanland. The lands formerly claimed by the Basters and the Rhenish Mission Society were divided into 16 lots, varying in size from 5 000 to 10 000 morgen, each centred on one of the springs or other watering places. Rights of outspanning and searching for minerals were reserved by the Government, and no compensation would be given for improvements made on them (1/SBK, 5/1/5. Civil Commissioner's Notice, 24/9/1872). With the scattering of the Baster population of northern Bushmanland, the defeat of the Koranna, and the relinquishing of its rights to Pella by the Rhenish Mission Society, the way was now open for the European graziers and settlers to take over permanently the lands and springs they had coveted for so long, and for the Roman Catholic Church to establish itself at Pella.

THE FOUNDATION OF THE ROMAN CATHOLIC MISSION

By the time the lands at Pella were offered for lease, the Roman Catholic Church had already been working sporadically in Namaqualand for some ten years. The Roman Catholic Church established itself in the Cape Colony only some time after the final British occupation, and at first restricted its activities to ministering to its adherents in the western and eastern Cape. Occasionally a priest was sent out to contact Catholics living to the north, but it was only after the opening of the copper mines in Namaqualand in the 1850s and the succession of an energetic bishop in Cape Town, Bishop Grimley, in 1861 who believed in contacting Catholics no matter what it cost the priests in physical and financial difficulty (Brown 1960: 78), that priests began visiting Namaqualand regularly in order to contact those of their flock working in the copper mines and convict settlements, or living as traders and farmers. In 1865 Bishop Grimley himself went to Namaqualand on a 'visitation' and after some negotiation persuaded the mining company at Springbokfontein to grant him a plot for a chapel and to assist him 'on commercial principles' with the support of a priest there. Thereafter the Bishop was a regular visitor to Namaqualand, and his journals contain vivid accounts of his experiences as a 'poverty-stricken' traveller in 1865, 1867 and 1869 (Brown 1960: 120–130). Shortly before the outbreak of the First Koranna War he contacted the Government surveyor in Namaqualand 'on the most important business of finding out an eligible site in Bushmanland for a Catholic missionary institution' (Brown 1960: 122). Both agreed on Pella as the most suitable site, because it not only had a permanent supply of water but was also in a strategic position from which the Church could expand its activities into Great Namaqualand as well as elsewhere in the northern part of the Cape Colony. The fact that Pella was at that time still under the control of the Rhenish Mission Society appears to have been considered a trifling inconvenience, but the war put an end to whatever schemes Bishop Grimley may have had to wrest Pella from the Rhenish Mission Society. In 1873

his successor, Bishop J. Leonard, dispatched a Jesuit-trained priest, Fr. Gaudeul, of the Society for African Missions of Lyons, to put the mission at Springbok on a firm footing.

Shortly after the priest's arrival in Springbok, however, the mine there was closed and the village became virtually deserted (Simon 1959: 29; Smalberger 1975: 73). The situation was saved by a Catholic English-speaking farmer, John Hayes, who pointed out to the priest that Pella was no longer the property of the Rhenish Mission Society and that it was now open to the Roman Catholic Church. Fr. Gaudeul visited Pella with the farmer (who appears to have had the lease to it for 1874), and on behalf of the Catholic settlers in Bushmanland drew up a Memorial to be presented to the Government, 'praying His Excellency the Governor for the grant of certain land in and about "Great Pella", Namaqualand, with the view of establishing there a Roman Catholic missionary station, together with a petition from farmers and others residing in those parts in support of the Memorial referred to' (RCMP/1. Commissioner of Crown Lands to Bishop Leonard, 31/3/1874). The plan for the new mission received the approval of the Administrator of the Central Prefecture of the Cape of Good Hope, Fr. Gaudeul's Superior, and the Bishop in Cape Town began making the necessary arrangements with the Government.

When one considers the difficulties that the Rhenish Mission Society experienced in securing Government recognition of the rights of their communities to the land they had occupied, an interesting point emerges, namely that the Government did not object so much to the presence of the Rhenish missionaries in Namaqualand as it did to the fact that, in granting defined tracts of land to the Rhenish Mission Society, it was thereby also granting recognition to the claims of 'wandering tribes of unsettled and thriftless nomads' (Commissioner of Crown Lands to Brecher, 25/4/1877, cited by Sharp 1977: 39) on whose behalf the Rhenish Mission Society had explicitly stated itself to be acting; claims that, as noted above, the Government did not consider wholly relevant. Since the Roman Catholic Church applied for the land at Pella for itself only, this problem did not arise. Consequently, whereas Brecher's struggle to obtain a Ticket of Occupation for Steinkopf did not succeed until after his death (Steinkopf's Ticket of Occupation was issued in 1905), the Roman Catholic Church secured a Certificate of Occupation for Pella only a month after Bishop Leonard's initial approach in March 1874, with the draft Certificate back-dated to the day on which the Commissioner of Crown Lands had received the application, although the final version was dated 27 July 1874 (Appendix A).

The Roman Catholic Church also enjoyed certain other advantages over the Rhenish Mission Society when it came to negotiating for land with the Government. Not only could the authorities at the Cape appreciate the need of the Roman Catholic Church to minister to its distant adherents as opposed to a rather romantic ideal of converting the heathen, but they were also well aware of the reputation of the Church for orderly and disciplined mission work that was conducted without particular attention to 'enlightened' ideas about the 'noble savage' or the 'equality of man'. Furthermore, as an Ordinary of an established church, which was also a significant secular power, the Bishop in Cape Town could deal with the Cape Government with an authority that could not be matched by the Rev. Brecher, a member of an obscure foreign society. Bishop Leonard, who resided in Cape Town, was also in the position of being able to meet the Governor quite frequently,

and most of the negotiations were conducted verbally, to judge from the correspondence that passed between the Bishop and the Administrator of the Central Prefecture at Mossel Bay. Allegations were made later by the Rhenish Mission Society that certain highly placed officials in the Government had been sympathetic towards the Roman Catholic Church on account of their own religious affiliations (Brown 1960), but there is no proof of this. These advantages, coupled with the desire to stabilize the northern frontier with settled communities, almost certainly enabled the Government to regard the application from the Catholic Church for land at Pella with more favour than in the case of the Rhenish Mission Society.

Despite these advantages, the Certificate of Occupation of 1874 (Appendix A) was in several respects an unsatisfactory document to the Church, even though it represented a step away from the policy of the Cape Government of only giving out tracts of land on lease. This policy caused the tenure of an occupant to be quite precarious, since the occupant had to compete for the lease against other contenders at an annual auction. Originally the Bishop had applied to the Government for a grant of the land at Pella under Section 10 of Act No. 2 of 1860, in which the Governor was empowered to grant or reserve certain lands for special public purposes with the approval of the Legislative Council and House of Assembly, in order to circumvent the Government's stated policy of not giving out titles until all the land in Namaqualand had been surveyed (RCMP/1. Bishop Leonard: Memorandum on Pella's Ticket of Occupation, 31/3/1874). What they in fact received was merely temporary permission to locate missionaries at Pella until such time as the land had been surveyed, when they could then purchase it under the conditions set out in Act No. 5 of 1870 (RCMP/1. Fr. Devernoille to Bishop Leonard, 10/5/1874). In itself this was acceptable, although Fr. Devernoille, the Administrator of the Central Prefecture, observed to Bishop Leonard that '... I do not consider it a very advantageous one. However, since it is the best one, we must accept it and only be thankful to get it' (RCMP/1. Fr. Devernoille to Bishop Leonard, 10/5/1874). Fr. Devernoille's principal objections lay partly in the costs that would be involved—'At the rate fixed under Act No. 19 of 1862, and Act No. 5 of 1870, the leasing and purchasing of the place will fetch something like 1 000 pounds ... so that establishing a good ground for a mission ... will be no small expense' (RCMP/1. Fr. Devernoille to Bishop Leonard, 27/8/1874)—but mainly that the Certificate had been made out to Bishop Leonard and not to the Society for African Missions of Lyons. This would cause difficulties should the question of compensation ever be raised, in view of the fact that it would be the money of the Society that was to be used to found the station, not that of Bishop Leonard. Following some correspondence Fr. Devernoille and Bishop Leonard agreed on having the Certificate transferred to Fr. Devernoille's name and, after this had been done, Fr. Devernoille joined Fr. Gaudeul in Namaqualand before crossing to Pella to open the station there.

It is quite clear from the correspondence between Bishop Leonard, the Commissioner of Crown Lands, and Fr. Devernoille that the small size of the area of land allocated to the proposed mission at Pella was not perceived as a problem until the missionaries actually arrived at Pella. Fr. Devernoille had been in Pella scarcely more than a week (he arrived at the beginning of December 1874) before he addressed a letter to the Commissioner of

Figure 8
The south-western corner beacon of Pella Reserve, said to have been erected by Fr. Gaudeul in 1881 when he laid out the new boundaries of the Mission Farm.
(SAM 278c.122, 1985)

Crown Lands, reporting the establishment of Pella mission station and outlining the severe difficulties that the missionaries faced on account of the small extent of land (some 10 000 morgen). He pointed out that the nature of the land and climate was such that the families who had settled at Pella were forced to spend a certain portion of the year on trek in search of pasturage and thus the establishment of a stable community was made almost impossible, whereas the missionaries required more land for laying out gardens (RCMP/1. Fr. Devernoille to Commissioner of Crown Lands, 9/1/1875). Although his request for the neighbouring lands of Klein Pella and Pofadder to be included with Pella was turned down, the priests at Pella later took to leasing Klein Pella annually where they re-established the gardens laid out by the Rhenish missionaries.

Over the following two years Fr. Devernoille and Fr. Gaudeul made repeated requests for the extension or enlargement of Pella, but these were all turned down, the reason given being that it was unnecessary as Pella was about to be surveyed and the matter would then be settled. As it turned out, the surveying of Bushmanland proceeded very slowly because of the continuing disturbances with disaffected Khoisan and the consequent reluctance of settlers to enter Bushmanland and commit themselves to purchasing farms. The Second Koranna War of 1878 was fought to the east of Bushmanland and did not affect the Pella area to any great extent (Broodryk 1992), but the general aridity of the area with such an unreliable rainfall and the poverty of those graziers moving between northern Bushmanland and Namaqualand discouraged closer settlement once the important springs had been occupied.

The land question was partially resolved in May 1881, when Pella was surveyed and the boundaries clearly defined. The Commissioner of Crown Lands appears to have left it to Fr. Gaudeul to set out the boundaries he desired to have for Pella; the priest took advantage of this by obtaining the incorporation of five neighbouring farms under lease to Catholic farmers associated with the Mission. As a result the area of land granted to the Pella Mission was increased from 19 999 morgen to 56 340 morgen, adding an immense tract of semi-desert plains (which are covered in grass after rain) and near-desert mountainland. A month later a new Certificate of Occupation (usually referred to in the correspondence as a 'Ticket') was issued, incorporating the new boundaries but retaining the original conditions for occupation by the Roman Catholic Church (Appendix B). The land could thus still be disposed of under Act No. 14 of 1878 (which had replaced Act No. 19 of 1864) and the grant remained revocable. In neither the Certificate of 1874 nor that of 1881 was any mention made of the land being held in trust for indigenous people; the term 'followers' was intended to refer to the missionaries' successors in office, although this interpretation was to be bitterly contested from the 1940s onwards.

Even after this enlargement of Pella the problem of adequate land for the rapidly growing community of settlers at Pella had still not been satisfactorily settled. After the transfer in 1882 of Pella from the Society for African Missions to the Oblates of St Francis de Sales, a French missionary order based in Troyes, the very first letter from Bishop Leonard (who now once again held the Certificate of Occupation to Pella) to the Government requested the extension of Pella to include the farms 'Eytes' and 'Namies' (RCMP/1. Bishop Leonard to Commissioner of Crown Lands, 14/8/1884). In reply the Commissioner of Crown Lands stated that these lands could be leased by the Church, but that a Ticket of Occupation such as that for Pella could only be given after the matter had been considered by the Cape Parliament (RCMP/1. Commissioner of Crown Lands to Bishop Leonard, 16/12/1884). After some correspondence between themselves, Bishop Leonard and Fr. Simon (Fr. Gaudeul's successor at Pella) decided not to pursue the issue, evidently in fear of losing Pella as well if the matter went before a Protestant-dominated Parliament, which, as Bishop Leonard pointed out to Fr. Simon, was not very sympathetic even to Protestant missionaries (RCMP/1. Bishop Leonard to Fr. Simon, 28/12/1884).

Once the matter of the boundaries to Pella had been settled, the Catholic Church was firmly entrenched at Pella, for not only had it succeeded in replacing the Rhenish Mission Society as the dominant missionary institution in Bushmanland (an attempt by the Rhenish Mission Society to open a new station at Pofadder in 1875 failed), but it had also managed to secure the rights to the land at Pella for itself. The Catholic missionaries were now able to set about creating a new community according to their own ideas, without having to take cognizance of other centres of secular power. With the support of the Church the position of the European settlers at Pella would be virtually unassailable for the next hundred years for, without even a tentative recognition of rights to the land, the Baster settlers were reduced to a position of complete social, economic and political inferiority once the natural resources vital to their survival had passed into the hands of the European missionaries and settlers.

THE DEVELOPMENT OF THE COMMUNITY AND GROUP IDENTITIES

Throughout Africa, missionary influence has played an important part in the integration of isolated communities into the wider society, to the extent that it has been a revolutionary force initiating the process of peasantization through the provision of new services and institutions such as education, medical services and the fostering of new economic skills, all under the umbrella of religious instruction and conversion as a means of obtaining ideological domination for the missionaries over the communities under their control (Trigger 1992). In the endeavours of the Cape Government to stabilize northern Bushmanland by providing a framework for the legal conquest of the region by European settlers, the grant of Pella to the Roman Catholic Church emphasized the recognition by the Government of the integral part played by the missionaries in the process of conquest. In contrast to Namaqualand, where the Rhenish missionaries advocated the rights of the self-styled 'aboriginal' inhabitants and thereby retarded the process, the Catholic missionaries in Bushmanland instead facilitated it through the introduction of a new political and social order in which they favoured the forces of colonialism rather than achieving their aim of the progressive extension of civilization through assisting the indigenous elements.

The community that developed at Pella after 1874 was one almost entirely dominated by European settlers. When the Catholic Church began its work in Bushmanland its immediate concern was with its adherents, of whom there were about 12 families in the vicinity (RCMP/1. Devernoille to the Commissioner of Crown Lands, 9/1/1875), rather than with converts, who were regarded as the fruit of a long-term project that could begin only when the mission station was firmly established. Consequently there was a tendency on the part of the missionaries of the Society for African Missions of Lyons and the Oblates of St Francis de Sales (which took over the station in 1882) to favour the entry of Europeans and people of European descent who were either Catholics or who showed signs of willingness to be converted. When those European families who had originally asked the Church to take over Pella were all settled at Pella, the missionaries extended their activities to include non-Catholic and non-European people living in the region, either travelling out on journeys to contact them or else encouraging them to settle at Pella on condition that they join the Catholic Church and place their children in the school (Simon 1959: 66; C.2–'88: 14–15).

Previous authors have emphasized the degree of social and cultural integration among the various groupings of people resident in Namaqualand, the fusion between the indigenous Khoekhoe inhabitants and the incoming European settlers resulting in the emergence of the Basters and the distinctive Reserve communities (Carstens 1966; Sharp 1977; Boonzaier 1980). Evidence of the extent to which this occurred and the resultant close relationship between the groupings of people can be seen in contemporary documents. In 1913, for example, the Superintendent of the Namaqualand Reserves wrote: 'The relationship which exists between the European farmer and the Coloured population ... requires to be observed to be believed and which has resulted in a total

absence of respect the one for the other and a familiarity between the races which is often disgusting. In some cases the European has sunk lower than the average Hottentot, with less education, lower morals and living the life of a Hottentot with the Hottentot—and often acknowledging without shame that he is living on the charity of the Coloured man. It is sometimes difficult to tell the one from the other—except that if he offers you his hand he considers himself a European and if he does not you may take him to be a Hottentot' (1/SBK, 5/6/1. Superintendent of Reserves to the Magistrate, Springbok, 5/2/1913). Such a degree of generalization, however, cannot be made about all European people resident in the Reserves (or Namaqualand), for there is much evidence for the existence of distinctive classes cross-cutting ethnic and cultural boundaries.

At Pella the development of a class structure was directly related to the missionaries' attempts to settle their congregation about the mission station, which was not so much for the support of the missionaries themselves as it was for achieving a degree of ideological control in order to prevent apostasy. As with the Rhenish Mission Society, the Catholic missionaries under the leadership of Fr. Simon (from 1898 Bishop Simon) faced the problem of nomadism caused by the need to search for pasturage during the dry months; this caused Pella to be practically abandoned by its inhabitants for at least six months of every year (RCMP/1. Bishop Leonard to the Commissioner of Public Works, 14/8/1884).

The position of the Church at Pella was quite secure, as it received extensive financial support from sources in Europe. In addition to money received from the Oblates of St Francis de Sales in Troyes and the Sacred Congregation for the Propagation of the Faith in Rome, substantial amounts came from donations sent by other religious Orders, Catholic organizations and private persons. These contributions varied in size over the years, but were important sources of income for the missionaries until they had managed to achieve a degree of independence with the development of agricultural and other enterprises at the mission station. The Roman Catholic Church in Namaqualand has never been dependent on support from its local adherents, and missionaries in the contemporary period pointed out that it would be impossible for the Church to continue its work if it had to depend on its congregations for support. These financial resources enabled the missionaries to provide various services to the population and to launch a determined effort to settle the people about the mission. This was done through the medium of education, for not only was literacy a necessary part of the process of conversion but it also encouraged settlement by having parents remain in the neighbourhood of the Mission in order to care for their children. This in turn meant that the flocks of livestock had to be given over to shepherds, providing employment opportunities for men whose families would then also be able to establish themselves in the village. At the same time the missionaries created further employment opportunities by undertaking extensive agricultural enterprises through the construction of irrigation systems that enabled larger amounts of land to be bought under cultivation, both in Pella village and along the banks of the Orange River. The largest of these was at Rooipad at the Orange River (see Fig. 1), where a pump-station and a dam were erected to bring eight morgen under cultivation in 1908, although small patches of land had been in use since 1890. A priest was permanently stationed at Rooipad until 1933 and, in addition to supervising the farm, it

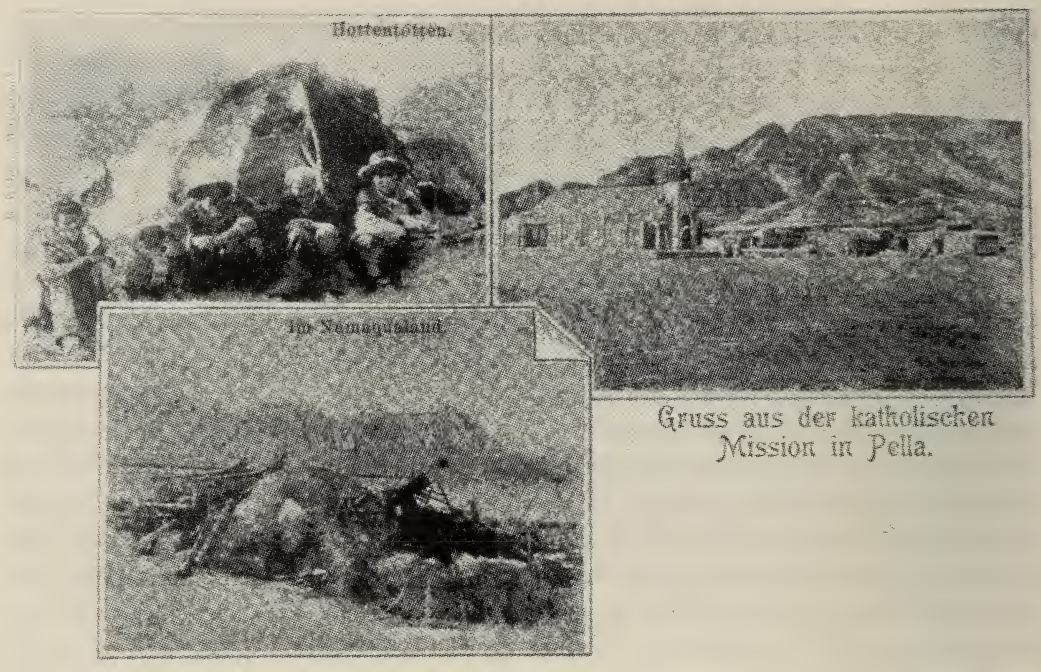

Figure 9
An early twentieth-century composite postcard of Pella Mission, produced by the Church for propaganda purposes. In the photograph of the mission complex at top right, the former Rhenish chapel, refurbished by Fr. Gaudeul in 1875 but demolished before 1910, can be seen at centre behind the gate into the Cathedral grounds. A 'trekboer' encampment, with a wagon, a mat-house and a characteristic windbreak ('skerm') is shown in the photograph at lower left. (Parish Archives, Pella)

was his task to convert the Herero and other Damaras living along the riverbanks, for which purpose his house also served as a school and chapel. The missionaries also opened up deposits of limestone at several places on the Mission Farm for general use by the inhabitants as a supplement or even as an alternative to agriculture (Simon 1959: 55; Klinghardt 1986).

To the services offered by the Church, such as education, a smithy and medical service, were added in due course trading stores, a postal service and agencies of the civil service under the divisional administration of Namaqualand (a field cornetcy and police post) and, after 1902, also a military post. With these developments Pella became the administrative centre of Bushmanland and it was superseded in this respect by the neighbouring settlement at Pofadder only in the 1920s. Some measure of the growth of Pella can be gained from three quotations. In 1889, Pella was described as (apart from the Mission itself) little more than 'a small centre for a pastoral people at certain seasons of the year' (G.41–'89: 9); in 1899: 'Pella has a Bishop and therefore ranks [*sic*] among the mission stations. It is a central field cornetcy, has a police station, merchants with large business ... and is surrounded by several important farms, all occupied by intelligent people' (RCMP/2. Bishop Simon to the Civil Commissioner, Springbok, 24/8/1899),

whereas in 1913 'Pella has grown into a substantial village this last decade. There is the mission station, two schools, stores and a police station. In the gardens are grown every description of fruit and vegetable, and our farm at the River is flourishing especially, where we also have a sawmill' (RCMP/1. Bishop Simon to the Magistrate, Springbok 10/3/1913). By 1955 the mission station was valued at £11 960 and the farm at £35 900, giving a total value of £47 860 due to the Church alone for its improvements if the Government was minded to take over the control of the Mission Farm.

The population of Pella diversified as rapidly as it grew. From an initial 15 families in 1874 the number of inhabitants increased slowly until about 1890 when there were about 300 individuals (see Table 6), but after the surveying and granting of farms began reducing the amount of Crown Land open to graziers and with an increasingly wider range of services offered by the Mission, more people began settling on the Mission Farm, particularly those who had already been converted during the priests' proselytizing journeys through Bushmanland (Simon 1959: 70; Anon. 1979: 6). Numerically the European (variously referred to as 'Europeans' or 'Whites' in the documentation) predominated until after the Anglo-Boer War (Table 6), and their relative wealth not only enabled them to establish themselves firmly at Pella by making improvements such as building houses, opening wells and laying out gardens for cultivation, but also to ride out severe droughts and stock losses without being reduced to poverty. Bishop Simon granted permission to the European settlers to make these improvements on behalf of the Church, and assured them that the Church would compensate them or their descendants if they ever had to abandon Pella. Under the provisions of the Ticket of Occupation private persons could not make such improvements or receive compensation, but Bishop Simon did this to encourage settlement around the mission station (RCMP/1. Bishop J. Simon to Bishop J. Leonard, 10/8/1903). Few of these assurances were given in writing, and the matter of compensation for the European settlers was to be one of the major stumbling blocks in the way of attempts by the Government to take over Pella in the 1950s and 1960s because claims in this regard could not be legally recognized. Between 1883 and 1944 fifteen substantial houses, which were valued at £10 000 in 1955, were erected by European settlers, the remainder living in 'portable dwellings' (mat-huts, tents and wagons). Few substantial dwellings worthy of valuation were erected by the 'Coloured' inhabitants until after 1945, but by 1955 the list of permanent dwellings occupied by 'Coloured' people comprised 37 houses valued at £1 475 (RCMP/4. [Fr. A] to the Secretary, Divisional Council of Namaqualand, 16/11/1955). In comparison with the European settlers, the Basters who settled at Pella were with few exceptions poor and far more susceptible to economic pressures, for the numbers of livestock that they possessed were so small that losses in time of drought compelled them to enter employment, either locally with the Europeans or the Mission, or temporarily at the copper mines in Namaqualand, until such time as they had accumulated sufficient capital to re-establish their independent economic activities. Bishop Simon played an active role in ensuring that none of his converts remained idle: 'I don't know of any able-bodied man here who does not earn his living. I make it my duty to send them to work at O'okiep or other places, whenever I see work and they need it.' (RCMP/2. Bishop Simon to the Civil Commissioner, Springbok, 6/4/1899).

Economic differentiation within the community was further encouraged by the system of land tenure developed by the missionaries. Fr. Simon gave unofficial recognition to an informal division of the Mission Farm into six districts based on the boundaries of the area granted to the Roman Catholic Church in 1874 and the portions of land leased as farms to European settlers that were incorporated with the Mission land in 1881. The European farmers in these districts were permitted to enjoy precedence in the use of water and pasturage, and were also allowed to limit the number of other people living in them through being given the right to decide whom they would accept in their areas. Although the missionaries retained the power to take a final decision in such matters, this had the effect of limiting the number of Basters who could take up stock-farming without the necessity of periodically leaving in search of pasturage. This and the introduction of extensive cultivation led to the emergence of a Baster peasantry practising mixed farming, some of whom in time became wealthier than many of the European residents who depended solely on their livestock for a living.

By 1914 there is sufficient evidence in the documentation to show that a definite class structure had emerged in the community. There was an elite consisting of fairly prosperous farmers, teachers and traders, who were able to wield some influence with the missionaries through their religious conformity and their control of local civil administrative positions, and a peasantry consisting of subsistence farmers dependent on pastoralism, cultivation and casual labour. Associated with the peasantry were numbers of semi-nomadic and nomadic Baster and European trekboers, who were Catholic but who spent most of their time on the move with their livestock in Bushmanland and made only periodic visits to the Mission. Although one can see a structural unity in the community on the basis of economic differentiation, the struggles that emerged over local resources in Pella were nevertheless conducted in terms of ethnicity. The potency of a struggle cast in these terms prevented any identification of common interests among those of similar class, for the very elements of economic interest and the ability to control resources solely on the basis of class were in fact divisive and the cause of conflict due to ideological considerations of cultural and racial superiority or inferiority.

In considering the role of ethnicity in the political history of Pella one is confronted with a situation somewhat different from that in the other Reserves in Namaqualand. The scale of settlement of Europeans in these Reserves was comparatively limited and the people themselves remained marginal to the communities, although there are instances where they were absorbed through marriage. The entry of those Europeans was related to difficulties in obtaining land on account of poverty and, in some cases, it was also due to the reluctance of established European society in Namaqualand to accept them as equal members due to a dubious background or other factors, as for instance among the people living around Bosluis and Kliprand (Boonzaier 1980). Some of these Europeans were eventually absorbed into the communities through marriage and their descendants were classified as 'Coloured' in terms of the now defunct Population Registration Act, but after 1950 those Europeans who were using the Reserves for their own farming began leaving, and those occupying official positions were gradually replaced by people classified as 'Coloured'. At Pella, however, the European settlers dominated the community, and it is

TABLE 6
Population of Pella, 1813–1995.

Year	Whites	%	Coloureds	%	Total
1813	–	–	–	–	636
1824	–	–	–	–	400
1828	–	–	–	–	250
1850	–	–	–	–	400
1860	–	–	–	–	420
1864	–	–	–	–	321
1869	–	–	–	–	600
1872	–	–	–	–	–
1875	–	–	–	–	71
1880	56	56.0	44	44.0	100
1885	155	62.0	95	38.0	250
1890	200	66.7	100	33.3	300
1895	257	65.9	133	34.1	390
1900	125	46.8	142	53.2	267
1905	268	41.6	375	58.4	643
1910	210	42.0	290	58.0	500
1915	157	33.3	314	66.7	471
1920	196	36.4	341	63.6	537
1925	250	39.3	386	60.7	636
1930	180	36.7	310	63.3	490
1935	60	15.0	340	85.0	400
1940	40	11.2	315	88.8	355
1945	50	9.0	500	91.0	550
1950	126	17.9	575	82.1	701
1955	83	7.9	955	92.1	1 038
1960	120	10.4	1 033	89.6	1 153
1965	75	4.5	1 586	95.5	1 661
1970	40	2.4	1 600	97.6	1 640
1975	14	0.5	2 537	99.5	2 551
1980	8	0.3	2 220	99.7	2 228
1985	15	0.7	2 030	99.3	2 045
1990	10	0.4	2 341	99.6	2 351
1995	8	0.2	2 668	99.8	2 676

quite likely that if Pofadder had not been established nearby, Pella may have remained the principal village in Bushmanland. The European settlers regarded themselves as permanent residents and viewed Pella as their home. Their attitude was supported by the missionaries, who also shared their ideas as to the proper relationship between 'civilized' Europeans and non-Europeans requiring advancement. This set the course of the political history of Pella as the record of a struggle for control of scarce resources paralleling that which occurred in the Northern Cape as a whole.

In dealing with ethnicity in a diachronic context one faces a distinct conflict between objective and subjective ('etic' and 'emic') perceptions of the development of ethnic groups and groupings through time. An objective view of the history of Pella reveals that a class struggle was cast in terms of ethnic identity, but the subjective views of one's informants from these groupings and the views expressed by past members through the medium of documents preserved in the records shows that for them ethnic identity, rather than awareness of class, was imperative in determining social relations both in the past and present. Barth's line of thought is particularly relevant here: 'ethnic groups are formed to the extent that actors use ethnic identities to categorise themselves and others for purposes of interaction' (Barth 1969: 13–14), so that ethnicity is a relational process constructed through social interaction (Eriksen 1993). Cohen (1969: 26, 69) argued that any social group (ethnic group, class, power elite) is, in the final analysis, a political interest group, and can be transformed according to circumstances. The important point that has to be made here is that one should see ethnicity (as a form of social organization, involving the invocation of symbols of common origin as agents for the articulation of perceived common interests (Sharp 1980: 16)), as only *one* form of group mobilization amongst others, the importance of which varies according to circumstances (Mach 1993).

The major groupings of people that appear throughout the historical record are those of the Europeans (often called 'Whites'), Basters and Damaras, with a minor grouping, that of the Nama, only rarely featuring. The principal opposition was between the Europeans and the latter three groupings, collectively referred to as 'Coloureds' (the term 'Coloured' first appeared in late nineteenth century documents) and, following the politicization of these social categories in the 1920s, the first three named were the most important as bases for political interaction in Pella.

Central to any consideration of ethnic identity at Pella is the concept of 'Pellanaarskap', which can be defined as a notion of citizenship similar to those found in the other Reserves in Namaqualand. The emphasis given to this concept varies from Reserve to Reserve, ranging from the sophisticated 'corporation' of Komaggas (Sharp 1977) to the regional particularism of Richtersveld (Boonzaier 1980), and its relative importance may also be related to changing political circumstances through time. Carstens (1983: 52) also refers to this concept in his discussion of the rise of so-called Baster 'nations' ('nasies') in the Reserves of the Cape and South West Africa, where the formation of 'moral community sentiments (die volk)' led to the transformation of Baster ethnic identity into one of 'nation'. Rehoboth can be regarded as the only such community to have reached so advanced a stage because the others south of the Orange River were under stronger missionary and government control. In its broadest sense the term

'Pellanaar' referred simply to a person born at Pella who had spent his or her life there, regarding the place as home. When linked to an awareness of ethnic identity, however, it was more tightly defined to become an instrument of exclusivity of varying severity according to its usage by the members of different ethnic groupings and political entities. The earliest reference to the identity 'Pellanaar' is given in 1857 in a report on Pella to the Rhenish Mission Society by Superintendent Zahn, in which he used the term to refer to all living at Pella (including a French settler) (Zahn 1857). By 1869 the Basters from Pella who had fled to Steinkopf and Concordia during the Koranna War had already developed the idea to the point where they could maintain themselves as a distinct unit in those Reserves (especially Concordia) and later use this identity in attempts to secure a privileged position there in the twentieth century (as can be seen in 1/SBK, 5/6/1: Civil Commissioner, Springbok, to Secretary of Native Affairs, 24/9/1912, 25/5/1913, 19/12/1913; Sharp 1977: 93). The entry of European settlers to Pella and their subsequent domination over the community caused both Basters and European to develop the notion of 'Pellanaarskap' further to the point where it became the focus for their disputes over rights to reside at Pella, and therefore a practical expression of the class struggle.

The European families who settled at Pella were of diverse origins. The first to settle were mainly 'South African Dutch' (as Bishop Simon called the Afrikaans-speakers or 'Boers') and Irish, the latter having drifted into Namaqualand after the failure of an 1820 plantation of settlers at Clanwilliam. These were families HL, VR, VE, and VP (Afrikaans), and HY (Irish), all of whom were itinerant stock-farmers. Other English-speakers who settled later at Pella included HR, D, RW, ST, TH and O'C, some of whom were connected with the civil service and military whereas others were dependent on farming, although the family heads of HR and D were wealthy traders who had benefited from lucrative trading operations in Great Namaqualand and Damaraland. The third group of Europeans, the Germans, began settling at Pella after 1890, notably the traders T, V and S. The descendants of certain of the English and German families later became involved in teaching in the local school, and a few (mainly women) entered the O.S.F.S.

Since most of these families were comparatively recent arrivals in Namaqualand they possessed little awareness of factors held in common with non-European people living in the area and the relationship of superior/inferior was accentuated, in contrast to the well-documented trend towards integration in the rural areas (as opposed to the villages) elsewhere in Namaqualand. Contact with the wider society in the northern Cape Colony and South West Africa and the encouragement of the missionaries prevented any similar trend from developing at Pella. This can be seen, for instance, in their marriage patterns, as revealed in the registers at Pella. Consistently the Europeans at Pella took their partners from either the other families at Pella or elsewhere in the vicinity, whereas (in the case of two of the German families) girls were sent out from their home-towns in Hanover and Prussia. There has only been one instance of a formal marriage between a European and a Baster—that between a woman of an impoverished branch of family HY with a farmer from the Baster family D in 1927. From all accounts she was ostracized from the European community, although she and her family continued to live in Pella and she was

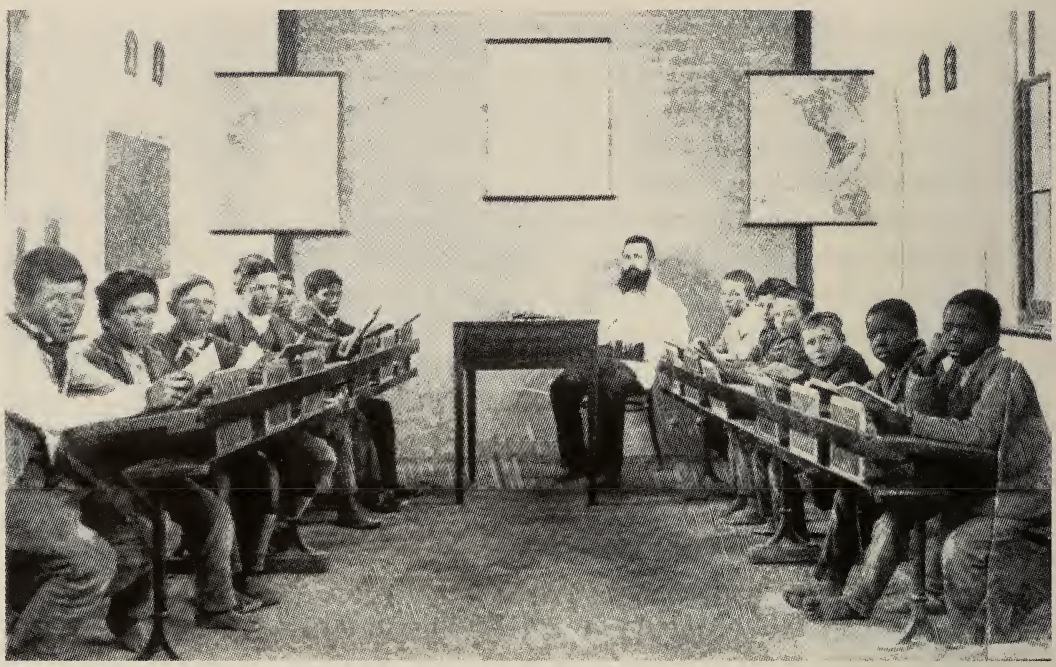

Figure 10
A school class in the old 'Klipskool' building at Pella Mission, probably between 1904 and 1906, with senior pupils on the left and junior pupils on the right. The careful composition suggests that the photograph was taken for propaganda purposes. The eight European boys represent six of the European family groupings in Pella and the two Baster boys the two largest Baster family groupings; the Damara and Herero boys each represent the leading families of these two groupings.
(Parish Archives, Pella)

classified 'White' in 1951. Although there were numerous cases where children were fathered by 'Whites', there appear to have been no difficulties over race classification in the 1950s, as the political situation at Pella had long before demanded unequivocal identification one way or the other (see below). All these people regarded Pella as their home, the more so as—under the protection of the Church—their presence had caused Pella to develop into a substantial village (by Namaqualand standards), and their descendants argued in the 1940s and 1950s that their position was no different to that of the European communities in other villages in the Northern Cape. In a letter to the Minister of Lands (that was referred to the Department of Social Welfare) in 1945, for example, AJHL pointed out that his parents had been given permission by the Church to establish themselves at Pella, that they were buried there, and that he himself had been born at Pella and had taken over the property of his parents, and that this gave him the right to regard himself as a permanent citizen of Pella (RCMU/7. [A. J. HL.] to the Minister of Lands, 5/2/1945).

The Basters at Pella never conceded the legitimacy of these claims. In the 1930s some were prepared to admit that European settlers had indeed been the first to settle at Pella under the Roman Catholic Church, but by 1945 they took the view that the Basters had managed to preserve a continuity through descent with the Baster 'Pellanaars' who had

Figure 11
Everyday interaction in the village shop in January 1978 among members of the four ethnic groupings in Pella, with the European shopkeeper attending to Damara, Baster and Nama customers.

lived at Pella under the Rhenish Mission Society, which had survived the ravages of the Koranna War. This view was held especially strongly by the descendants of the families W, D, R and M, who claimed to have been the first to 'return' to Pella and be converted to Catholicism as a necessary adaptation for resuming their occupation of Pella. These four families regarded (and still regard) themselves as a core-group whose claims to rights of residence on Pella were founded on the beliefs that their forebears had been the first to arrive at Pella and open up the wells abandoned by the /Hobesen under Witbooi, and that they had then 'allowed' other Baster families (Sw and Vs) to join them. They claimed that Pella was 'empty' on their arrival, the indigenous Nama having already left (although in fact this was not the case). The Basters recognized no Khoisan groupings as having any ongoing historical claims to Pella, for in their historical mythology the 'Bushmen' were simply vermin fit only to be destroyed, the term being used indiscriminately to cover the 'San' and Koranna. The notion of 'Pellanaar' was thus given a much more exclusive meaning than that accorded it by the Europeans, whose inclusive view of the community (as long as the inferior 'Coloureds' knew their place) was called into question by the Basters in the 1920s (see below). Around this core-group was a large number of other Baster families who moved into Pella when it became increasingly difficult for them to follow a semi-nomadic existence in Bushmanland. The integration of these people was hastened by marriage with members of the core-group, and whereas they were called 'Inkommers' (as opposed to 'Inboorlinge' or 'Pellanaars') until about 1965, their general acceptance into the community was never seriously contested by members of the core-group. At the time of fieldwork, the term 'Inkommer' had come to be reserved for those people whose origins lay outside the Reserve and who had not been granted 'Occupier' status by the Advisory Board, particularly those who did not conform to expected standards of behaviour. During fieldwork undertaken after 1983, I found that the claims to social dominance by the politically-involved members of the core-group were being contested by a numerically small sub-section of the core-group who asserted that their kinship links with the former 'Pellanaars' living in Steinkopf and Concordia actually gave them pre-eminence but, as they refused to involve themselves in the political process in Pella, they remained politically powerless.

Figure 12
The cemetery was divided into 'White' and 'Coloured' sections in 1962, when the European residents of Pella were seeking, unsuccessfully, to win the sympathy of the Nationalist Government for their claims to the right to live at Pella (Klinghardt 1994: 145). Although discrete areas had always existed in the cemetery, this demarcation with a wall and a fence was a material symbol of the division that had arisen in this non-racial community as a result of the dispute over land rights on the Mission Farm. (1987)

The Basters of Pella, the dominant ethnic grouping there at the time of fieldwork, constituted roughly 57 per cent of the population in 1980, the remainder comprising Damaras and Nama people. In addition to such obvious factors as physical appearance and a divergence in cultural components that have marked the Basters apart from the Europeans and Damaras (cf. Klinghardt 1994), a notion of descent was important for them in defining their boundaries with these groups. This was particularly true of the core-group, where members of these families claimed to adhere to certain principles in the choice of partners in marriage for the purpose of preventing outsiders from usurping their claimed rights to Pella to the disadvantage of the descendants of others of the core-group. Such a concept has received attention from previous authors with regard to its importance in the social structures of the Reserves in Namaqualand, but it is difficult to go as far as Carstens (1966) did in defining these Baster family groupings as 'lineages', any more than one would for similarly significant families (such as T and HR, prominent in political affairs) among the Europeans. Though these kin-based groupings did have a distinct patrilineal bias, the family was seldom internally structured on the principle of seniority. Attempts by Bishop H. Thünemann to encourage such a corporate system in both 'Whites' and 'Coloureds' at Pella as part of his programme for the imposition of 'Regenerationism'

as a socio-political strategy in the 1940s and 1950s did not succeed in formalizing this to any great extent, other than creating a deeper awareness of the significance of descent (see below). Similarly, and directly related to this, the family groupings did not act as a 'single legal personality' in the external politico-jural domain, although this should be qualified by drawing attention to the fact that in the political field the four main families in the core-group did view one another as units, especially in regard to possession of portions of the land in the Reserve and they likewise presented themselves on these terms in discussions of matters such as marriage and inheritance with me.

TABLE 7

Marriage patterns in the Baster families D, M, R, Sw, Vs and W, 1884–1980, contrasting the numbers of marriages in which both partners were drawn from these specified families against those in which one partner came from other families in Pella.

Period	Specified families	%	Other	%	Total	%
1884–1908	6	35.2	11	64.8	17	100.0
1909–1932	14	35.0	26	65.0	40	100.0
1933–1956	22	36.0	39	64.0	61	100.0
1957–1968	14	28.0	36	72.0	50	100.0
1969–1980	9	13.4	58	86.6	67	100.0

Table 7 sets out some statistical data on marriage patterns within the Baster ethnic grouping, focusing on those families who regarded themselves as archetypal 'Pellanaars' (the specified families). The sample is drawn from the marriage registers at Pella, which contain a total of 650 marriages covering the period 1884 to 1980, 235 of which concern the specified families (36.1 per cent).

The most significant feature of this Table is the decline in adherence to the principle of marriage within the core-group (if it could ever be called a principle in this sense), notably during the last two decades, but it does nevertheless show that some recognition was given to the principle in practice, although the extent varies among the family groupings.

In 1978, 43 per cent of the population of Pella consisted of Damaras, a proportion even more favourable to them as a group than had been the case before the Europeans had to leave Pella in 1973. 'Damara' is itself an expression of an over-arching identity beneath which lie several more exclusive identities based on cultural origins, namely Herero, Damara and Xhosa. During the nineteenth century several groups of Damara and Xhosa made their way into the northern Cape Colony, generally seeking refuge from disturbances in their areas of origin or in search of work at the mines. The Xhosa had first settled in the Kareeberge, from where they were dispersed into Gordonia and Bushmanland after they had lost their land (Marais 1939). In the 1860s, the Damaras settled around the mining centres in Namaqualand and at several places, such as Witbank

and Garganab, on the banks of the Orange River. They were later followed by waves of Herero refugees after the war with the Germans in 1904. The descendants of virtually all these people were classified 'Coloured' during the 'apartheid' era. This masked the extent of their presence in Namaqualand, where their relatively small numbers allowed a process of integration into the local communities to take place on an individual basis (Carstens 1966; Sharp 1977; Boonzaier 1980).

Such a process of integration did not occur at Pella for three interrelated reasons. The numerical scale of settlement in northern Bushmanland was much greater than in Namaqualand and this allowed the Damaras and Herero to establish themselves on an organized basis on unoccupied land, whereas the recognition accorded the 'Damaras' by the Europeans (including the missionaries) and Basters from their perception of them as a separate racial and cultural entity, encouraged the formation of a sense of identity based on their own positive values of origin, language and physical appearance, combined with a negative input of discrimination from those around them. A distinction has always been drawn between Herero and Damara (sometimes colloquially called 'Swart Damaras' and 'Rooi Damaras' respectively) and, although both groupings have lost nearly all overt signs of cultural difference, this division has been of particular significance in the political field.

The political organization of the Damaras at Pella was developed independently of the missionaries during the first two decades of this century. The Damara and Herero who had arrived earlier at first lived in loosely bound kin groups with each 'werf' more or less independent of the other (Simon 1959: 44–45), but this changed after the arrival of the Herero refugees, who brought their cattle with them and endeavoured to re-establish themselves south of the Orange River in the same way as they had lived before their defeat by the Germans. Bishop Simon noted this process with some alarm, as the Herero settlers took over lands along the Orange River that were being used by the Damaras (RCMP/1. Bishop Simon to Fr. Wolf, 13/2/1907), but he nevertheless attempted to accommodate them in spite of objections from the European settlers. A mission post with a chapel dedicated to St Joseph was built at Rooipad at the Orange River, and a priest was stationed there to convert the newcomers to Catholicism. After the First World War Maharero, then in exile in Bechuanaland, sent messengers ('bode') to visit all the scattered remnants of Herero people in and outside South West Africa in an attempt to encourage them to return to their homes. This movement was part of the resurgence of Herero nationalism in the Territory after 1917, when there was a possibility that land confiscated by the Germans would be returned to Herero people by the South African Administration. Among those who chose to remain where they were, the messengers set up systems of control consisting of 'kapteins' and headmen, evidently in an attempt to preserve some semblance of unity among the people. At Pella they appointed one HH as 'kaptein', the position passing patrilineally to his descendants, and lit an ancestral fire for him at Mik (see Fig. 1), where he was living at the time. His function was to settle internal disputes and deal with outside authorities, and under him were a series of minor headmen at other places in northern Bushmanland. This position was separate from that of the Damara headman, whose incumbent was descended from the foremost family (ENK) among the Damaras who had

been living at Pella since before the arrival of the Herero. In 1961, however, the then Herero 'kaptein' succeeded in marshalling sufficient support in the Damara community to oust the then headman, for allegedly unscrupulous dealings in the settling of disputes and the practising of dangerous sorcery. The two positions were then combined in the Herero 'kaptein', although at the time of fieldwork they were still regarded as conceptually distinct.

Initially the Herero were treated warily by both Europeans and Basters, who were not prepared to consider them as anything more than temporary sojourners at Pella. With increasing political activity among the inhabitants of Pella in the 1920s (see below) the Basters' demands for the expulsion of the Europeans and Damaras caused an understanding for common action to develop between these two groups; at the time of fieldwork members of the Herero families H, S and O recalled the good relations that were then developed with the previously aloof European settlers. The descendants of both Herero and Damara settlers regarded themselves as 'Pellanaars', although this was not conceded by the Basters, who pointed to the Herero claim that they intended returning to South West Africa/Namibia some day and to the perceived danger of intermarriage as reasons for their refusal to countenance the permanence of the Herero and Damara people at Pella. The exclusivity of the Herero in their attitudes to other non-European people is reflected in the fact that, until the 1980s, there had been no marriages between Herero and Baster people, although there had been considerable intermarriage between the Herero and the Damaras and, to a lesser extent, with Nama people. At the time of fieldwork, the few Nama people in Pella, mostly the descendants of Bondelswarts refugees who entered the Mission Farm after the German-Nama war in German South West Africa in 1906, formed a peripheral political and social grouping in the Reserve, and their networks of relationships were orientated towards Steinkopf and southern Namibia.

The boundaries to these ethnic groupings have been maintained until the present, and it was the interaction between these groupings and others that fuelled the political process in local government at Pella, exerting direct and indirect influence on the forms of the administrative structures devised to contain them by the missionaries. By examining these processes through time one may gain a far clearer understanding of the nature of interethnic relationships based on class than can be obtained from a static analysis based on cultural content alone.

MISSIONARY ADMINISTRATION OF PELLA I: THE EARLY CUSTUMALS, 1874–1939

BENEVOLENT DESPOTISM, 1874–1919

Until the present Bushmanland has remained a rural region with much of the population engaged in some form of agriculture, mainly stock-farming, or in the provision of supporting services. Only in the early 1950s were a few small quarries opened to exploit the sillimanite deposits in and around Pella, whereas the only major mining operation in the region, the copper, lead and zinc mine at Aggeneys, commenced in the late 1970s. In Pella Reserve, the control of access to the twin natural resources of pasturage and water has thus been the most important instrument of social domination, moulding the form of the community and conditioning its political life. That the missionaries at Pella exerted far greater influence over their community than was true of the Rhenish missionaries in the Reserves in Namaqualand can be directly ascribed to the fact that the Roman Catholic Church was recognized by the Cape Government as the sole occupier of the area granted under the Certificates of Occupation of 1874 and 1881.

In Namaqualand the land in the Reserves was held in trust for the benefit of the 'aboriginal' inhabitants by the State and missionary societies. This resulted in official recognition being given to structures of authority already established within the communities, and the temporal authority of the Protestant missionaries was circumscribed by various sets of local regulations, under which the people were able to order their affairs through councils in which the missionaries played a largely advisory role, influencing rather than directing the decision-making process (Carstens 1983). The extent of missionary involvement varied from community to community. In Rehoboth, for example, the missionary was an honoured member of the society who was valued for his role as adviser and mediator, whereas in Steinkopf the more direct involvement of the missionary in local government was balanced by the authority of the Field Cornet and Corporals. A consequence of this limitation in Government recognition of the missionaries' authority was that the Reserve communities were themselves more firmly bound into the system of regional government through the interest shown in their affairs by officials such as the Civil Commissioner and Resident Magistrate at Springbok, who held the ultimate power to settle important matters affecting the communities. The official view of the missionaries' secular power was consistent with the nineteenth century British conception of the role of the clergyman in his parish, in which the minister was part of the hierarchical structure established for the maintenance of law and order, having a degree of responsibility for all public affairs within his parish and powers far wider for this purpose than would nowadays be tolerated. By playing such a vital role in the affairs of the community the ministers were able to maintain the ideological influence of the church to a much greater extent than if they had been limited to exercising their spiritual authority alone, as is the case today. This may well have been one of the most important reasons for which the Cape Government did not discourage the Catholic Church from establishing the mission at Pella, because the influence of the missionaries would have assisted in settling

the recently troubled northern frontier, and so complete the process of conquest initiated by the Basters earlier in the century.

Although the priests at Pella were similarly viewed by the Government, the constraints on the secular power of the Protestant missionaries did not hinder them to the same extent, and they were left to do very much as they wished in restructuring the pattern of authority in the community at Pella. Traditional structures of authority, such as that of the Nama 'kaptein', were officially abolished after the advance of the Cape border to the Orange River in 1847, but those Nama people living in the vicinity of Pella still recognized an informal 'kaptein' as late as 1882. When the incumbent, T'guob, died without children, his followers approached Fr. J. Simon (later Bishop Simon) for a decision on his successor. Fr. Simon made use of the opportunity to remove this focus of secular authority by promising to look after them in the hope that this would encourage them to settle near the Mission (RCMP/1. Fr. Simon to Bishop Leonard, 12/10/1883). When the Baster population of Pella and northern Bushmanland fled during the First Koranna War, enabling the European settlers to take possession of the district, the important civil office of Field Cornet passed into European hands too, and the Europeans retained this as well as other civil offices, such as that of Justice of the Peace, through into the twentieth century.

During the first 52 years of the missionaries' hundred years of temporal control at Pella the community was under the direct control of the priests. Between 1874 and 1882 the mission was run by Jesuit-trained priests of the Society for African Missions in Lyons, with Fr. A. Gaudeul as priest-in-charge (Anon. 1975). When the Society began rationalizing its activities in the Cape Colony, it was replaced at Pella by the Oblates of St Francis de Sales (O.S.F.S.), a missionary order founded in 1872 and based at Troyes in France. From 1882 until 1932 the mission was headed by Fr. J. Simon, who was consecrated Bishop of the Orange River in 1898, and whose personal qualities and abilities enabled him to command a charismatic form of authority that outweighed even his sweeping secular powers as *de facto* owner of the Pella Mission Farm. During this period the missionaries exercised a form of benevolent despotism consistent with their view that the non-European inhabitants were '... but as children who must be guided and taught that they may improve themselves' (RCMP/1. Fr. Malinowski to Fr. Simon, 6/7/1886). One visitor, the perceptive magistrate of Namaqualand, W. Scully, commented that '... a community of that kind was as little fitted to govern itself as a reformatory ...' (Scully 1914: 145), yet at the same time pointed out that stagnation would follow from these conditions, because the dependency of the inhabitants was increased through having them constantly subjected to tuition and supported by outside financial assistance.

During the period up to 1927 Bishop Simon personally administered all local affairs without assistance from any members of the community, other than those in official positions, and for the first five years also without formal local regulations, taking the view that the provisions of the Canon Law of the Church on the government of mission stations were adequate for his purposes. In 1887, however, Bishop Simon introduced at least two sets of rules, one governing the use of liquor and another for the 'moral benefit' of the community. From that time the Bishop also began referring to other regulations that had been formed by past precedents established through his desire to lay down a foundation

for the most equitable distribution of the natural resources of the Reserve. These sets of rules and regulations are reproduced in Appendices C, D and E, and may be regarded as forming the first custumal of Pella. The two sets of Rules appear to have formed part of a larger whole, but the rest were missing from the files in the Mission Archives. Bishop Esser assembled and reconstructed the scattered references to these other Regulations while replanning the system of local government in Pella in 1957, and presented them in a modified form (Appendix E). The Regulations contained in Appendices C and D remained in effect until 1973, but were largely ignored after 1955 (the reasons that moved Bishop H. Thünemann to add a further regulation to Bishop Simon's Rules for the Moral Benefit are given below). These rules and regulations demonstrate not only the authoritarian, personalized rule of the missionary in charge of the community, but also the commitment of the missionary Order as a whole to a strict village morality, a consequence from the origin of the Oblates of St Francis de Sales in the Catholic revivalist movement in France and the fact that the missionaries themselves were from small villages and were seeking to recreate a similar type of community to those with which they were familiar. The effectiveness of the application of this first custumal can be gauged by the following piece of testimony to a Select Committee of Parliament in 1896: 'According to the ticket of occupation the missionary in charge has very large powers ... he can say to a man, if he has not conducted himself properly, "Go". I should not interfere with Pella in any way whatever' (A.7–'96: 23).

The authoritarian rule of the Catholic missionaries received universally favourable comments from Government officials and other visitors, particularly for the way in which the Basters, generally regarded as improvident and lazy, had been civilized and taught the dignity of labour (Marais, 1939: 79). Scully (1914: 144–145) summarized the general features of the Bishop's system in his inimitable style: 'The Pella lands were held by the Mission on ownership tenure; consequently the Superintendent was an autocrat ... Like an Arab chief he ruled his clan of about two hundred subjects'. Certainly there is a trend in the official reports from a critical caution to enthusiastic approval. In 1888, for instance, the members of a Parliamentary Select Committee evinced concern at the activities of the Roman Catholic Church in Namaqualand, particularly their tactics of using the bait of grazing rights and education for children as a means of inducing Protestants to settle at Pella and be converted (C.2–'88: 14–15), but in successive reports of later committees and commissions of enquiry this aspect was ignored and instead one finds the officials praising the missionaries for their economic endeavours and the strictness of their control over the community. For example, in 1909 it was reported that '... there is a very competent person in charge, and there they are compelled to work. Very strict control is necessary in order to do anything with these people ... the people have done excellent work' (A.2–'09: 209), and they '... are very much more advanced in civilization. It plainly shows that they must be under a despotic rule' (A.2–'09: 211).

The high regard for the secular aspect of the Roman Catholic missionary endeavour was necessarily based on the establishment of sound personal relationships between the Catholic missionaries and officials of the civil administration in Namaqualand, and the correspondence between them reflects a mutual respect that was enhanced by the fact that

both held similar paternalistic views on the non-European people under their control. The necessity and value of cultivating such good relations was demonstrated when these officials later testified in favour of the continued presence and control of the Church at Pella. For instance, 1896 evidence placed before the Select Committee on Namaqualand Mission Lands and Reserves by certain of these officials was instrumental in preventing Pella from being subjected to legislation, then being contemplated, for the purpose of exercising tighter civil control over the secular affairs of these Reserves by introducing an uniform set of local regulations and holding out the possibility of individual tenure of property for the inhabitants. A former Magistrate of Namaqualand stated: 'Fr. Simon and I agreed that it was unnecessary to extend the application to Pella ... he said he did not wish to introduce any regulations at all ... He said it was unnecessary. In the first place there were very few people and things were going on all right ... he told me that he had the people under control. The machinery would have been too big for such a small community' (A.7–'96: 24). Similarly in 1909 and 1913 when there was a possibility that legislation then being applied to the Namaqualand Reserves would be extended to include Pella, it was the Superintendent of these Reserves who argued against this, stating that: 'It seems hardly necessary to discuss at this stage the ultimate disposal of this large Reserve. For the present the Society [*sic*] is doing splendid work there—work which is not only an object lesson but is also of material benefit both to the residents and to the surrounding farmers' (1/SBK, 5/6/1: 162. Giddy to Secretary for Native Affairs, 10/4/1913).

THE STRUGGLE FOR REPRESENTATION, 1919–1939

Carstens (1983, 1984) has shown how the custumals, or 'constitutions', of the Baster-dominated Reserve communities in Namaqualand not only represented a stage in the development of law and order in that region, but also pointed to a growing concern with social relations based on the increase in movable property and local inequalities arising out of this increase due to a growing emphasis on private property (Carstens 1983: 137), and were therefore drawn up in response to definite and specific local needs. As shown elsewhere above, in Pella missionary-inspired developments led to the emergence of a community in which wealth (and therefore also the means of creating a basis for a favourable approach to the missionary in the political field) was concentrated in the hands of the European settlers and a small minority of Baster peasants, leaving the rest of the inhabitants relatively poor, a division which was emphasized by the ethnic differentiation of the community.

It was not until after the end of the First World War that the inhabitants of Pella began entering into political activity that challenged the *status quo* within the Mission Farm. The numbers of European settlers in Bushmanland increased markedly after the establishment of Pofadder and the beginning of large-scale surveying of central and southern Bushmanland (Talbot 1961: 315). As more and more farms were given out so the amount of undeveloped Crown Land open for the use of semi-nomadic pastoralists decreased, and the 'trekboers' either bought farms for themselves, or left the region, or were forced to enter the Reserves. With their greater wealth the Europeans were more capable of

purchasing farms than the Basters (although there were some exceptions, such as certain of the Basters living in the vicinity of Bosluis), with the result that the Reserves in Namaqualand had to cope with an influx of new inhabitants. At Pella the Church was able to exercise a measure of discrimination in the admission of would-be settlers by stipulating, as in the past, that prospective residents had either to be Catholics or else show a sincere commitment to conversion in the near future, before they could be granted the privilege of living at Pella. Combined with the increasing desertification of Bushmanland as a result of drought and over-exploitation (Acocks 1988), these factors led to greater pressure on the natural resources of the Reserve itself and caused the emergence of a struggle for the control of the resources along ethnic and class lines. This struggle manifested itself in the form of demands for a representative body which could settle disputes that arose over pasturage and water on the Mission Farm.

In the mid-1920s relationships between the Europeans and the Basters began to deteriorate rapidly as the Europeans were increasingly subjected to attacks on their claims to rights of residence on Pella by members of the Baster families W and R, who claimed to be the original occupiers of Pella and therefore possessed prior rights to make use of the land. The Damaras were also attacked as recent arrivals whose presence was tolerated only because their leaders had made it clear that they intended returning 'home' some day. When Bishop Simon attempted to squash the Basters' claims by pointing out that such rights as they may have possessed had automatically lapsed when the Church took control of Pella in 1874, it was a short step for the Baster 'Pellanaars' to question the legitimacy of the Bishop's authority to administer Pella and the right of the Church to hold Pella as if the Mission Farm was its property. One prominent Baster farmer claimed to Bishop Simon that the Basters had 'in fact' merely 'helped' the missionaries by 'lending' them the right to use the pasturage and springs in the Reserve (RCMP/6. Bishop Simon: Note in Pocketbook, 8/3/1925).

The attack on the position of the Church by the Basters arose from their view that, since Bishop Simon and the missionaries had firmly stated their belief that all people at Pella were entitled to the same rights, they were thereby assumed to be giving support to the European settlers in their attempts to dominate, if not to deny, the means of economic survival to the rest of the inhabitants. From this questioning of the Church's legitimate rights, the Baster peasants extended their demands to call for the separation of the missionaries' spiritual and secular powers, the latter to be invested in a council, and when the Bishop refused this, for the Government to intervene by applying Act No. 29 of 1909 to Pella.

The sudden upsurge of political interest at Pella was not entirely dependent on economic factors directly related to the situation there, but was also due to events in the Namaqualand Reserves, of which the Basters were well aware through being related to certain of the residents of Steinkopf. In Steinkopf the application of Act No. 29 of 1909 had separated the powers of the Rhenish missionary from those of the community council, and had transferred the political status and power of the missionary to the Magistrate of Namaqualand who acted as chairman of the Management Board that had replaced the missionary's council. There the Basters believed that they had reached a position of such economic and political strength that they no longer had to depend on Church support to

maintain their dominant position in the community, and wished to secure the power of control over their destiny for themselves (Carstens 1966: 32). With the Basters at Pella, however, the attraction of these ideas lay in the possibility that the application of the Act to Pella and the creation of a Reserve like that of Steinkopf would free them from political control by the missionary, economic domination by the European farmers, and their perceived 'racial' danger from the presence of the Damaras.

A further factor was the influence of the ideas of the leader of the Griqua Independent Church, the Rev. A. S. le Fleur, described by the Commission of Inquiry into the Bondelswarts Uprising as a 'notorious Griqua agitator' (U.G. 16/1923: 26). The question of whether or not to accept the implementation of Act No. 29 of 1909 was at that time a serious political issue that had split the Reserve communities, and its actual implementation regardless of their wishes had produced a reaction leading to a ready acceptance of Le Fleur's rather vague formulations of a return to the 'Golden Age' prevailing before the Government's intervention, including, amongst others, the possibility of recovering land that had been expropriated (Carstens 1966: 34). Le Fleur's utopian ideas, as interpreted by the inhabitants of Steinkopf, appealed to the Basters at Pella, for they suggested that at one stroke autocratic missionaries, overbearing Europeans and savage Damaras would disappear, leaving the Baster 'Pellanaars' to enjoy the fruits of a territory freed of excessive exploitation, and this served to channel resistance among the Basters to their incorporation in a subordinate role in the European-dominated political economy of the Northern Cape.

Bishop Simon's response to the growing ferment was at first to exercise his powers under the Certificate of Occupation, in conjunction with the rules in the early custumals (see Appendices C, D and E), to expel from Pella those guilty of 'disgraceful or disrespectful conduct' in order to harass vulnerable members of the families of the Baster leaders, such as those engaging in beer-brewing, as a signal that he was serious in his threat to remove those questioning the legitimacy of his rule over Pella. He also refused to entertain the idea of establishing any form of representative body for fear that this would endanger the position of the Church, as this could create a situation resembling that which had existed in the Namaqualand Reserves before the application of Act No. 29 in 1913, an open invitation to the central Government to demand the extension of the Act to Pella as a way of meeting the supposed aspirations of the inhabitants. The Bishop was also mindful of the fact that, appearances to the contrary, his position was in reality even more precarious than that of the Rhenish missionaries in Namaqualand because the Certificate of Occupation was revocable on any technicality and he was thus open to official pressure if there was a suggestion that the Church was no longer able to fulfil its expected role in controlling the people living on the land nominally in its possession.

From about 1926, however, the Bishop began to reconsider his position after coming under pressure from the Europeans to find some acceptable solution to the problem, because they feared being forced to leave Pella if the Government took control and established a Reserve along the lines of those in Namaqualand. In a petition to Bishop Simon they pointed out that the institution of a council would be a useful mechanism for regulating the use of the scarce resources of the Reserve, and that they hoped that the

Figure 13
A beacon on a ridge in southern central Pella, marking part of the boundaries of two of the farms that were incorporated into Pella in 1881 and which subsequently became districts of the Mission Farm. (1987)

accompanying set of regulations would set out clearly the rights and privileges of all the people at Pella, thereby not only confirming their own position but also serving to restrict any further stock-farmers from settling at Pella. Bishop Simon then changed his position and from that time onwards he took the view that, far from being a danger to his position, a representative body might really be a device for tightening the control of the Church on its errant flock (RCMP/1. Bishop Simon to Fr. B, 12/8/1926).

In January of 1927 Bishop Simon introduced a council of ten members 'to assist the Head Missionary in the administration and control of the Pella farm', and a set of simple regulations (Appendices E and F) that may be regarded as the second custumal of Pella. In examining these regulations it is clear that they were inspired as much by the model provided by Act No. 29 of 1909 as by past precedent, and there are also some peculiarities not encountered in the systems of local government in the Namaqualand Reserves. For instance, a significant feature is the recognition given to the division of Pella into six districts and the formulation of rules governing patterns of residence, including the movements of livestock. This is clearly a reflection of the dominance of the ideas of the European farmers on a limited form of individual tenure under the umbrella of the special position accorded them for having agreed to the incorporation of their farms with Pella in 1881—it is no coincidence that the boundaries of these districts corresponded to those of their farms.

There is the secret ballot, unknown in the Namaqualand reserves and also reflecting European usage, but above all there is the creation of a dual system of community administration through according legitimacy to the informal structures of authority in the community as a means of preventing them from becoming rallying points for resistance to the continued control of local affairs by the Church. The six foremen appointed by the Bishop assured him of automatic majority support on the council, for he invariably chose 'men of recognised stature' in the community, such as the traders and wealthy farmers, while the local Justice of the Peace held his seat without break until his death in 1940. Five of the six appointees were invariably Europeans, but the sixth was the Damara headman, who presided as foreman over the district along the Orange River in which the Damaras and Herero refugees were located. The remaining four members elected by the inhabitants were usually the prominent Baster spokesmen from families W, R, D and M, who depended on the numerical strength of their families to place them in office.

The Bishop's concessions to the demands for a representative body merely increased the conflict over the resources of the Mission Farm rather than diminished it. Whereas the Certificate of Occupation recognized only the claim of the Church to the occupation of Pella, the granting of a measure of self-government to the inhabitants implicitly contained an admission of the justice of the Basters' claims to Pella by conceding that all had a right to live at Pella, albeit at the pleasure of the Church. The Basters were keenly aware of this, and the Bishop's original fears were realized when the council changed from being merely an arena for airing tension to a platform for the repeated articulation of the Basters' demands for more concessions and more power, which served only to accentuate the existing differences in the community.

As before 1927, the reasons for this were rooted in economic considerations. The decade of the 1930s was a period of great hardship for the inhabitants of Namaqualand and Bushmanland, not only because of the Depression and its effects on the mining industry, but also because it coincided with extremely serious droughts that reduced previously wealthy people to poverty through the loss of their livestock. The concentration of the population around urban centres was encouraged through the possibilities of relief available from the missionaries or the Government; later, return to the land was inhibited through the continuing programme of surveying and giving out farms in Bushmanland (the last farms in the region were given out only in the period after the Second World War).

This led to a change in the composition of the population at Pella as many of the European families began moving away, either in search of work or else after purchasing a farm, after the loss of their livestock or the failure of their cultivated lands in the Reserve. When conditions improved towards the end of the decade the European farmers remaining at Pella were in the position of a minority among the Baster and other 'Coloured' farmers attempting to build up their flocks. This resulted in demands for a more equitable distribution of the resources of Pella being made by the Baster farmers, who bolstered their claims with arguments that they could not recognize the European settlers as legitimate occupiers of Pella and that the large numbers of livestock in the hands of the Europeans prevented the Baster farmers from re-establishing themselves.

Figure 14
Bishop J. M. Simon (centre), with his Coadjutor and successor Bishop O. Fages (fourth from left), priests from other Catholic missions in Namaqualand, and acolytes and choristers drawn from the local European population, in the vestibule of the Cathedral after a ceremony in 1923 to mark the Silver Jubilee of his consecration as the first Bishop of the Orange River. (Klinghardt Family Collection)

After Bishop Simon's death in 1932 his successor, Bishop O. Fages, resided outside Pella in the Mission Station at Keimoes and control of the administrative structure passed temporarily to a priest, Fr. L. Wolf, who had been closely associated with Bishop Simon as one of the first missionaries of the Oblates of St Francis de Sales to come to Pella. When the priest showed signs of equivocation over the Basters' demands, to the extent even of sympathizing with them, the European farmers reacted by sending a petition to Bishop Fages in which they 'humbly and most respectfully begged [his] Lordship' to give attention to their request that he confirm their family rights and privileged position granted under his predecessor as an enduring basis for a proper and just distribution of the available resources. Signed by the heads of the European families residing in the districts of T'Nougab, Annakop, T'Kouroes, Zwartmodder and Kleinrosyn, the petition presented in 1938 summed up their proposals thus: '... Give us pioneer families, Boer and English, the lands with which we helped the Church. Let the other English people and the Germans keep their houses and gardens in Pella [village], and the Church the land it had before we gave our farms. We shall look after the Coloureds who have lived with us and our parents, but let the rest live on the old mission lands and in the "River" district ... Only if Your Lordship consents to give us our lands in this way can we hope to stop the large numbers

of sheep and goats from destroying the veld and so impoverishing us and our children ...' (RCMP/41. Petition, 8/7/1938).

Although this proposal for individual tenure under the Church authority outraged the Baster peasants and demonstrated conclusively the gulf that existed between the two groups of inhabitants, it was also a logical extension of the situation that had resulted from administrative recognition being given by the Church to the informal social hierarchy in the community through formalizing this hierarchy into a structure for the exercise of power based on status and relative wealth. Bishop Fages' only response, however, was to remind all the people of Pella that the Church alone was responsible for the administration of its property, and no steps were taken to prevent the European farmers from increasing their flocks. Their success in this was such that the Baster peasants were often forced to leave the Reserve in search of pasturage, while some had to withdraw from farming and work as shepherds for certain of the European farmers while maintaining their much reduced flocks with those of their employers (RCMP/41. K.W. to Bishop Fages, 6/2/1939).

With this, the first phase of the struggle for control of Pella came to an inconclusive end late in 1939 when Bishop Fages died. It can be seen that, despite the success of the inhabitants in forcing the Church authority to concede them a measure of representation in the local decision-making process, in practice the people had no real power and the position of the Church was still as strong as before, because the missionaries were still determined to retain control of what they considered to be rightly their property granted to them by the Government.

MISSIONARY ADMINISTRATION OF PELLA II: THE LATER CUSTUMALS, 1940–1973

AUTHORITARIAN REFORMISM, 1940–1954

The period 1940 to 1974 is particularly important for an understanding of contemporary politics in Pella, for it was then that the Baster peasants' struggle for control of Pella reached its fateful culmination, leading to the end of Church control over Pella and thus the destruction of their shield against final incorporation into the system of capitalist domination that had developed in the Northern Cape and elsewhere in South Africa. In this section the progress of this struggle is examined through a focus on the missionaries' response to the ongoing challenge to their authority. Their first reaction was to endeavour to accommodate the aspirations of the people at Pella in new administrative frameworks; then, when this had failed, they began to take measures aimed at suppressing those aspirations.

The process of routinization of missionary authority over the community gained momentum after the death of Bishop Simon in 1932; for his successor, Bishop O. Fages, left the priests at Pella to deal with local affairs while he himself resided at Keimoes Mission. With the institution of the council and its regulations, the charismatic authority of Bishop Simon (charismatic in the Weberian sense that legitimacy was accorded because the person in authority possessed some sacred or outstanding characteristic) was converted into a rational-legal authority (in which, theoretically, the securing of obedience rested on a belief in the legitimacy of the code of legal rules and regulations) exercised by varying personnel within an established administrative structure without the influence of a dominant personality enjoying the respect of all around him (Weber 1947). This, however, then rendered the control of the Mission Farm by the Church even more vulnerable to the attacks on its legitimacy that were being made by the Baster peasants. By the mid-1930s the Mission was firmly established and dominated the community economically through the collection of taxes and exercising control over the exploitation of limestone deposits, the cultivation of crops, and the grazing of livestock on the farm. During the first three decades of this century the Mission operated the Mission Farm as an economic enterprise to generate income and become self-supporting in certain foodstuffs. After World War II the emphasis shifted from general cultivation by the Mission of land in Pella village and at the Orange River to the intensive cultivation of dates on its grounds in the village, and this in time became (and remains) an important source of income for financing the work of the Mission. The Basters thus claimed that the Church was doing little more than exploiting the land for its own benefit rather than assisting the people under its control, as was evidenced by the fact that the missionaries devoted more of their energies to activities for their own support than to the provision of facilities and services for the inhabitants. The missionaries regarded such perceptions as unfounded because the Mission had progressed to the point where the romantic conception of missionary activity, involving extensive efforts at proselytization, had ended with the conversion of the Herero in the 1920s. Apart from seeing that the necessary supporting activities for the mission

station were carried out, the principal duty of the personnel had become that of ministering to an established congregation, part of which was in Pella and the rest scattered across northern Bushmanland (at the beginning of the 1940s there were fourteen outstations, the most distant at Henkries in the Steinkopf Reserve). Faced with the economic hardships and uncertainties that prevailed in the first half of the twentieth century, they were obliged to seek ways to lessen their earlier dependence on support from European sources so that they could continue with the work of the Church.

Bishop Fages was succeeded in 1940 by Bishop H. J. Thünemann, who received the title of Bishop of Keimoes when the Vicariate was upgraded to a full Diocese at the time of his consecration. Bishop Thünemann was the son of a German trader at Pella, and the first (and so far the only) successful 'indigenous' priest to have come from the community at Pella. He had been ordained a priest in 1923 and was then sent to the Pofadder Mission to gain experience before returning to serve his native congregation. He made rapid progress through the hierarchy of the Church, for his Superiors were impressed by his fervent commitment to his vocation (RCMU/13. Memorandum, 13/6/1939) and there was an urgent need for the development of an 'indigenous' clergy. Up to the end of my period of fieldwork, despite intensive efforts at recruitment, the Church had managed to produce only four other 'indigenous' priests from the entire Diocese, leaving the congregations dependent on missionaries from Europe and the United States of America. Bishop J. Minder, the present Bishop of Keimoes/Upington, considered that the reason for this was that: 'The Coloureds, who make up the bulk of our Catholics, have unfortunately imitated the evils of the Europeans much better than their virtues. Blacks, with the foundations of their native cultures to build on, make better Christians than the Coloureds, but there are very few Blacks in our Diocese' (RCMU/5. Quinquennial Report for 1977).

Bishop Thünemann's succession was to have far-reaching consequences for Pella, for the new Bishop had followed events there with the keenest interest and he saw it as his task to find a solution to the problems facing the community. In his view, the poor relationship between the Europeans, 'Coloureds' and the Church stemmed from a deficient political structure assembled on an *ad hoc* basis in response to random pressures, without attempting to channel and utilize those forces for constructive purposes within the structure of local government. His underlying assumption appears to have been that the popularly-defined structure of the community—wealthy Europeans paternalistically guiding poor 'Coloureds' to some future prosperity—was sound and all that was needed was a reform in local government to make for effective administration and sincere reconciliation between the factions.

With this in mind, the new Bishop sought to solve the temporal difficulties of the Church at Pella by applying the ideological principles of the doctrine of 'Regenerationism', which called for adherence to a fierce orthodoxy and Catholic puritanism as a means of combating spiritual and social decline by a renewal of faith (RCMP/41. Bishop Thünemann to Fr. B, 16/8/1940). Bishop Thünemann's writings on this subject indicate that he had an enduring admiration for the synthesis between the theory of Fascism and the Regenerationist doctrine that had been achieved in Spain following the Civil War (Carr 1980). Regarding this synthesis, the foundation of modern

Spain, he wrote that—'It is nothing more than the construction of a new social order based specifically and directly on the policy of the Papal Encyclicals *Rerum Novarum* and *Quadragesimo Anno*—the most exciting thing in the history of Europe for many generations' (RCMP/41. Fr. Thünemann to MDG, 15/6/1939). The Regenerationist doctrine was anti-political and contended essentially that freedom and justice for all were to be achieved by reducing centralization in local government to a minimum by organizing people according to their social functions in self-governing, self-regulating syndicates (or corporations) for corporate action; the resulting hierarchy of institutions being democratically representative of these functions and obviating the necessity for political groups or factions (RCMP/41. Bishop Thünemann to PWD, 24/3/1941). According to my informants at Pella, Bishop Thünemann's serious expositions of these principles in church puzzled rather than enlightened his congregation, as vertical syndicalism was far removed from their own principles of egalitarian democracy in local affairs (Klinghardt 1994). Once after a meeting of the Council in November 1941 in which Bishop Thünemann had endeavoured to explain one of his homilies to the Members, he recorded in his diary the opinion that 'It is no use arguing with these people—their heads are not made for it' (RCMP/41. Diary of Bishop Thünemann, 20/11/1941). For all his theoretical enthusiasm, Bishop Thünemann was to be sadly disillusioned when the practical application of these principles had quite the opposite effect to his intention.

At a public meeting in January 1941 Bishop Thünemann introduced the third custumal of Pella, formally abolishing Bishop Simon's system of dual district and electoral representation and announcing the formation of a new council. The council was to be composed of directly elected councillors presided over by the Bishop himself, and it was to operate with a set of carefully formulated, more sophisticated regulations based on elements from Bishop Simon's Regulations of 1927 and the principles set out in Act No. 29 of 1909 (see Appendix G). The regulations in the early custumals were not withdrawn—those for the 'moral benefit' even received an addition—and technically remained in effect until the administration of Pella by the Church came to an end in 1973. Despite the obvious autocratic tone underlying Articles I, XIII and XIX, the structure envisaged by Bishop Thünemann seems to have owed more of its form to local circumstances than to principles of government in vogue in Europe at the time. Bishop Thünemann hoped that by conceding and delegating some authority he could reach a compromise with the Baster peasants on control of the decision-making process without offending the Europeans at Pella, who had made it clear to him that they would accept the new system only in so far as it did not raise the danger that they could be forced to leave Pella. According to the Bishop's notes, the meeting ended with the acceptance of the new system by all the inhabitants and no objections were raised (RCMP/4. Bishop Thünemann to Schröder, 29/5/1942).

No sooner had the Council begun its regular meetings, however, than the clashes between the Baster and European farmers resumed. The Baster leaders characteristically preferred to confront the Church authority through their actions rather than engage in public debates with the missionaries, which were largely futile displays of the gulf that

existed between them. Nowhere in the Bishop's correspondence and writings is there evidence that he recognized the possible validity of arguments against the legitimacy of Church control and the presence of European settlers at Pella. Bishop Thünemann took it as self-evident that the grant by the Government had rendered obsolete any other claims to rights of occupation. His opinion was reinforced by the fact that he regarded himself as a 'Pellanaar' and that his family possessed documentary proof of their rights in Pella (a letter from Bishop Simon, dated 6/8/1898, granting trading rights and permission to build a house), while his kinship links with the major European families at Pella also made it difficult for him to consider any alternative.

When it was clear that Bishop Thünemann was as inflexible as his predecessors on this issue and had demonstrated that he was prepared to support the European farmers, the Basters began defying the regulations by disregarding the internal boundaries between districts and driving their livestock into the reserved pasturage. This developed into a crisis of the first magnitude for the Bishop, for it became a test case for the legal basis of the Regulations. When the offenders refused to obey the Bishop's demand that they leave Pella, he asked the police to intervene on the grounds that these people were trespassing on the Mission Farm. When the case came to court at Pofadder in May 1942, however, the Prosecutor withdrew the summons on hearing that the persons concerned were inhabitants of Pella and therefore not trespassers in the strict legal sense (RCMP/4. Bishop Thünemann to Schröder 29/5/1942). Later the matter was put before the Attorney-General and it was then conclusively demonstrated that the Church could claim no legal recognition or force for its regulations. The Bishop thus found himself in the same unenviable position of the Rhenish missionaries of the previous century in Namaqualand: '... our administration became more and more difficult. The occupiers as they now call themselves saw the hopeless position of the Mission authorities to enforce order and observation of our local regulations, and therefore openly acted as they liked, to the detriment of both the public and the Mission' (RCMP/4. Bishop Thünemann to the Department of Social Welfare, 6/7/1944).

By the end of 1942 Bishop Thünemann had realized that his attempt to accommodate the differing groups in the community at Pella had failed. Exasperated by the continuing bickering, he abolished the Council and re-established the system of districts with foremen and two mayors. The European mayor (or 'dorfsleiter') was elected by the European inhabitants, but the Bishop appointed the 'Coloured' mayor (or 'burgemeester') to act as spokesmen for the 'White' and 'Coloured' sections of the community. Bishop Thünemann himself undertook to handle local affairs while he cast about for some other solution. When, however, he endeavoured to obtain legal recognition of the Regulations, to which few people paid much attention (cf. A7 '96: 12 and 35, with the example of Leliefontein Reserve: 'The missionary and his Raadsmen meet from month to month and transact some business but the whole thing is looked upon as a farce') through the Department of Lands, he was informed that this would involve the withdrawal of the Ticket of Occupation of 1881 and its replacement by one containing such recognition. His lawyers warned him that any approach to the Government implying that the Church was unable to exercise satisfactory control over the Mission Farm would lead the Government

to insist on the application of Act No. 29 of 1909 to Pella, and that this would involve the separation of secular from spiritual control, leaving the latter with the Church and the former with the State. Although Bishop Thünemann knew well that making such a request would be interpreted by both Europeans and 'Coloureds' as a capitulation to the Basters' demands, he nevertheless eventually decided in May 1943 to approach the Government on the matter, setting as a pre-condition that the occupation of the European inhabitants should not be disturbed.

As this application coincided with the transfer of control of the Coloured Reserves in South Africa from the Department of Lands to that of the Department of Social Welfare, there was a considerable delay before any serious steps were taken by the Government, as this could only be done after a departmental inquiry to the position of Mission Stations and Communal Reserves and the formulation of a general policy. Between 1943 and 1947 Bishop Thünemann was left to administer Pella's affairs as best he could after the Department had appointed him 'Temporary Superintendent', but '... the people now more than ever scorn the regulations, even those approved by your inspectors. People are now just trekking with their stock wherever they like and destroying the veld ... The situation will worsen unless something is done soon' (RCMP/4. Bishop Thünemann to the Department of Social Welfare, 8/7/1945). Contributing to the delay was the problem posed by the substantial European population of Pella, for the proclamation of a Coloured Reserve in Pella would obviously necessitate their removal because it was not legally acceptable for them to be subjected to the same laws as the 'Coloured' population, as would happen if they were allowed to remain there. Since the application of Act No. 29 of 1909 could not be effected without the consent of all the parties concerned, the problem of compensation for the dispossessed Europeans had to be solved to everyone's satisfaction before the procedure of incorporation could be initiated.

The first concrete steps by the Department of Social Welfare to apply Act No. 29 of 1909 to Pella in accordance with the procedure set out in Government Notice No. 897 of 1911 (RCMU/7. Department of Social Welfare to Bishop Thünemann, 6/8/1949) were taken between 1949 and 1950, six years after the Bishop's first approach. The Church and the Department managed to reach a provisional agreement on the conditions for the transfer, including amongst others the granting of about 80 morgen of land to the Mission that was to be excised from the Reserve and given to the Church under absolute title with rights to water and pasturage, as well as a compromise on the position of the Europeans whereby all the families would be required to leave the hamlets and settle on the property of the Church in the village, remaining there until their deaths but without having the right to pass on their rights of occupation to their descendants.

During the period of negotiations between the Church and the Department of Social Welfare both had endeavoured to prevent any interference by the inhabitants in the discussions. On one occasion the Baster farmers JR and JW approached a lawyer in an attempt to gain access for the 'Pellanaars' to the discussions on the future of the Mission Farm, couching their approach in the form of allegations that the Church authority was abusing its powers by allowing European farmers from outside Pella to use the pasturage to the disadvantage of the 'Coloured' inhabitants. The Department of Social Welfare lost

no time in pointing out that, although the 'Coloured' inhabitants would be consulted about their rights of occupation later, they should '... in the meantime refrain from contacting people outside the Reserve with no knowledge of the situation, as this will serve no good purpose and may work against their interests' (RCMP/4. Department of Social Welfare to Gordon, 24/6/1948). This 'consultation' took place in 1950 when two meetings were held with the community by officials acting on behalf of the Department of Social Welfare. At these meetings there were no objections from any of the 'Coloured' inhabitants to the application of Act No. 29 of 1909 to Pella, and all the family heads signed a statement to the effect that their acceptance was voluntary (S.W. 458/10 Vol. I. Superintendent of Communal Reserves to the Department of Social Welfare, 8/1/1950). It has to be noted, though, that the list of signatures to this statement also served as a list of those people to be regarded as occupiers of Pella by the Department—if anyone had not added his name he and his family would probably have been forced to leave Pella on its transfer to the Department of Social Welfare.

Although both meetings had passed off without incident, a number of repercussions followed from this consultative process. The Baster leaders were dissatisfied with the fact that the Damaras, whom they regarded as unacceptable strangers, were not to be removed from Pella together with the European inhabitants, for with their conversion to Catholicism the Herero leaders had evinced a preference to stay at Pella, particularly after the Church had granted them the right to remain on the Mission Farm. As they expressed it in a petition to the Department of Social Welfare: '... We coloureds have decided not to accept the Act along with the Damaras. We want a clean ("skoon") Reserve. Because we Coloureds get almost beaten almost to death and therefore we do not want them here ...' (RCMP/4. Undated Petition, submitted in November 1950). The root of the problem was that after the meetings a number of the Baster farmers were beginning to reconsider their position, for they had been informed that their farming activities were likely to be more strictly controlled under the Department, and they had also been warned of the possible introduction of a stock reduction scheme by means of a quota system. As a result, they had begun to question whether their leaders were right in insisting that the Mission Farm be placed under the control of the Government. Some of these people began advocating a more moderate stance, under which they would have been prepared to accept continued control by the Church, as long as the Europeans left Pella. Consisting mainly of members of families D and M, these people soon came to form a moderate faction among the Basters, but they could exert little influence and did not openly oppose the conservatives until after the transfer to the Administration of Coloured Affairs, which they later supported when the missionary indiscriminately suppressed their political activities along with those of the conservatives (see below). After 1974 the conservatives adopted the moderate arguments against the controls to be placed on the quantity of livestock allowed in the Reserve, having until then ignored this aspect of government planning for Pella, while the moderates also changed their position to support the stock reduction scheme so as to prevent the Baster conservatives, who dominated the Advisory Board established after 1974, from enriching themselves at the expense of the other farmers.

The emergence of this moderate faction led the more conservative Baster farmers to

attempt to win back the waverers by playing on their long-standing racial and cultural prejudices towards the Damara and Herero people at Pella, concentrating particularly on the dangers of intermarriage that could occur among young Baster and Damara people as a result of growing familiarity, and on the large amount of stock owned by the Herero farmers. Incensed by the attempt to remove them from the Mission Farm and fearful of being forced to return to South West Africa, where conditions were unsettled, the Herero retaliated by giving their support to the Bishop in his attempts to enforce the regulations and publicly favouring arguments that the Europeans be allowed to remain at Pella. A number of incidents and confrontations between Basters and Damaras then occurred in the village and at various places on the Mission Farm, culminating in a violent assault by a number of Damaras on a Baster farmer who had attempted to plough a piece of land within the area known as Mik, and which had been regarded as set aside for the Herero refugees by Bishop Simon. In response to a request from the Bishop for a clarification of the position regarding the Damaras, the Department of Social Welfare pointed out that Act No. 12 of 1949 (supplementary to Act No. 29 of 1909) protected the rights of Natives (Damaras and Hottentots) already settled on the Mission Farm and that there were therefore no grounds for concern (RCMP/4. Department of Social Welfare to Bishop Thünemann, 27/7/1950). Shortly after this incident there was another clash between the Basters and the Herero at a meeting preliminary to a visit by the Magistrate for further consultations on the transfer to the Department of Social Welfare. When their right to live at Pella was questioned the Herero walked out, the 'kaptein' threatening a 'bloodbath' if any Baster attempted to turn them off Pella. In political discourse at Pella at the time of fieldwork, this meeting was called the 'assegai-vergadering', and was often cited as the point from which the gulf between Basters and Herero parted so far as to be unbridgeable.

Disagreements later also arose over the question of the type and amount of compensation to be given to the Europeans, for at the meetings it had been made clear that the Government considered even the earlier compromise agreement as incompatible with its policy of 'apartheid' and it had been repeatedly emphasized that no descendants of the European families then living at Pella would be allowed to retain their parents' rights but would have to move away. After representatives from the Department of Social Welfare had consulted with the European inhabitants, however, this stand was modified so as to allow a small number of livestock to those families who wished to continue living on the piece of land to be allocated to the Mission, but endless wrangling ensued on the exact number to be permitted per person and how the rights were to be disposed of on the holder's death. The Baster conservatives refused even to consider this new compromise, whereas the Europeans were themselves dissatisfied with being unable to retain the means of securing a livelihood from stock-farming and with the manner in which the Department of Social Welfare was forcing them to abandon their homes. At the time of fieldwork, former European 'Pellanaars' spoke in interviews with considerable bitterness of how they had felt themselves to have been 'betrayed' by the Nationalist Government, which was particularly interesting as they were supporters of the Nationalist Party, and of the apparent bias of the Department of Social Welfare towards the 'Coloured' section of the population. These disagreements caused the negotiations between the Church and the

Figure 15
Bishop H. J. Thünemann (left) with his Coadjutor and successor Bishop F. X. Esser in the garden at Pella Mission in 1955. (Klinghardt Family Collection)

Department of Social Welfare to become deadlocked on the question of compensation for the Europeans, and eventually the Department of Social Welfare decided to drop the matter until the Bishop suggested some alternative set of proposals. Bishop Thünemann, however, was under pressure from his relatives and friends in the European community to protect them from being dispossessed and he decided to do nothing until he had reviewed the situation more fully, with the result that the negotiations came to an end with no prospect of a solution being found. From this date, in a conscious symbolism of the impasse, Bishop Thünemann began referring to two communities, 'White' and 'Coloured', at Pella, rather than two sections of one community as had been his previous practice in his correspondence.

Other factors were also at work in persuading Bishop Thünemann to reconsider his opinion that the best solution lay in transferring Pella to the Department of Social Welfare. In the period 1951 to 1953 one of the German families began mining operations on the deposits of corundum-sillimanite ore in the vicinity of the hamlet at Annakop (Weidner 1955). This created lucrative employment opportunities for a large number of labourers, whereas the contributions made by the mine-owner to the Church in return for the right to exploit the deposits on the Mission Farm enabled the missionaries to undertake projects to improve public facilities under their control. Before 1961 the mine-owner made considerable contributions of money, equipment and services (such as the construction of roads) to the Church, and after this date an annual amount of R1 000 (which was worth considerably more then than at the end of the twentieth century) was given to the Mission in addition to these (RCMP/28. Weidner to Bishop Esser, 28/5/1961). The opening of the mine meant that pressure on natural resources on the Mission Farm could be reduced through a lessening of the dependence of the population on stock-farming for a living, and led Bishop Thünemann to hope fervently that a rise in the living standards of the 'Coloured' inhabitants would contribute to making them 'more tolerant of their fellow human beings' (Weidner 1979: 82).

More important, however, for the immediate policy of Bishop Thünemann was the

influence of his Coadjutor Bishop, Bishop F. Esser, who was appointed during this period. Bishop Esser, who was at that time Vicar Apostolic of Keetmanshoop, encouraged Bishop Thünemann to consider reintroducing a representative system of local government to Pella and managed to overcome Bishop Thünemann's reluctance by drawing his attention to the success of a strictly limited and directed form that had been introduced at the Catholic missions of Gabis and Heirachabis in the Vicariate of Keetmanshoop in Great Namaqualand (RCMU/14. Bishop Esser to Bishop Thünemann, 6/11/1952). Bishops Thünemann and Esser co-operated in drawing up a new set of regulations (Appendix H), the fourth custumal for Pella, and in January 1954 Bishop Thünemann introduced the new system to the community. As had been the case since 1941, the priest at Pella remained almost entirely excluded from the process of local government, which continued to be dominated by the Bishop. After 1941 Bishop Thünemann had been able to dominate local affairs because the then priest in charge of Pella Mission (Fr. A) had been unable to wield much influence owing to an alcoholic problem. In 1951 a new French priest (Fr. M) had been selected by Bishop Thünemann as a successor to Fr. A, but in 1954 he was still in a subordinate position while undergoing further training in mission work.

The new system soon proved unworkable as the Council could not function effectively. The Council was composed of members selected by the Bishop and the European mayor (who was the Bishop's brother), but the three meetings actually held in 1954 ended in altercations between Bishop Thünemann and the mayor on one side and the Baster conservatives on the other (RCMP/4. Bishop Thünemann to Bishop Esser, 10/6/1954). The Basters not only continued to refuse to recognize the legitimacy of the secular authority of the Church, but also openly accused the Bishop of using the system to perpetuate the control of the European settlers over the resources of the Mission Farm.

This rebuff left Bishop Thünemann totally discouraged and, disappointed at his failure to solve the problems of Pella, and despite the advice of Bishop Esser, he again approached the Government (the Division of Coloured Affairs in the Department of the Interior, which had taken over responsibility for the Reserves from the Department of Social Welfare in 1952) with the intention of resuming the stalled negotiations. Before any concrete steps could be taken in 1955, however, Bishop Thünemann suffered a severe breakdown of his health that left him incapable of continuing his duties. Bishop Esser then assumed control of Diocesan affairs, and immediately halted the negotiations on Pella until such time as he could re-appraise the situation and formulate a new policy for resolving the problem posed by the intransigence of all the concerned parties involved in the dispute on the future of the Mission Farm (RCMU/14. Memorandum on Pella, 4/4/1955).

BENEVOLENT DESPOTISM RENEWED, 1955–1973

A consistent feature of discussions with informants on the history of Pella was the occurrence of widely disparate accounts of political affairs in the years between 1955, when Bishop Esser took over the Diocese, and 1973, when the Pella Mission Farm was incorporated under the Administration of Coloured Affairs. In contrast to the period under

Bishop Thünemann, on which the official records and informants' accounts tended to agree, the informants' perceptions of the struggle for control of Pella after 1955 differed markedly from the record preserved in the documentation in the Parish and Diocesan Archives. It was clear that this represented not merely changes in the leadership and the natural replacement of community members through time, but also the success of a radical change in strategic policy on the part of the Church authority dating from that time. Indeed, as one progresses through this latter period one finds that the role played by the 'Pellanaars'—of all groupings—diminished to virtual insignificance, while the Church and the State as steadily exerted ever greater control over the inhabitants and were eventually able to conduct their negotiations on the future of the Mission Farm in secrecy, without influences from the community affecting their deliberations.

The sillimanite mining industry that developed in northern Bushmanland during the 1950s decade (De Jager 1963; De Jager & Von Backström 1961) played an important role in this by altering the fundamental structure of the community from one almost entirely dominated by the peasantry to one in which there was a clear division between the peasantry and an emergent rural proletariat was emphasized. Although the mines were little more than large quarries, they were dependent upon abundant semi-skilled and unskilled labour because extensive mechanization was beyond the financial resources of the mine-owners. The deposits themselves were too small to warrant the expenditure of large sums of money on machinery that was subject to rapid deterioration, for the resultant capital loss represented a considerable loss of profit. The development of the mines thus absorbed a large percentage of the surplus population of the region, and led to its concentration around the mining centres, either in temporary settlements or in the nearest village, as in the case of Pella. This meant that the composition of the population of the Mission Farm altered again, with more people increasingly dependent on the mines for a living and fewer relying solely on agriculture. Whereas in 1941 the percentages of the population deriving their income from farming and non-agricultural sources were 68.2 and 22.7 per cent respectively, by 1960 this had been reversed to 25.9 and 73 per cent respectively (the remainder being unemployed). The higher wages obtained from labour in the mines encouraged a higher standard of living, and the mine-owner at Pella also made available loans for the construction of houses in Pella village. After twelve months continuous employment an employee could obtain an interest-free loan of up to R60 and the necessary building materials, the loan then being deducted from his salary, and further loans and materials could be obtained for extensions later. This had the effect of producing a division between those 'Pellanaars' whose livelihood depended on the natural resources of the Reserve, such as grazing, and those for whom wage labour had become a way of life liable to be adversely affected by the repercussions that could follow from the ending of Church control. In discussing this period of the dispute over Pella, informants said that they had been concerned that if the European mine-owners were alienated through the dispossession of their property in the village, they could have retaliated by refusing loans and other forms of assistance to the inhabitants. Although threats of this nature were never made in public, there is documentary evidence that the mine-owner made an effort to protect the European inhabitants from eviction by putting

pressure on the missionary in 1969 through cutting off his contributions to the Church and refusing to assist in the construction of new classrooms for the school, but that he relented in 1973 when it became clear that the transfer to the Administration of Coloured Affairs was inevitable (RCMP/38. P. Weidner to Fr. M, 10/4/1969; Fr. M to P. Weidner, 7/6/1973).

In retrospect it is possible to see that the experiment of placing an 'indigenous' bishop in control of the Diocese was responsible for many of the problems that beset the Church authority in relation to Pella after 1940, since Bishop Thünemann had been unable to free himself from obligations imposed by his close links, such as kinship, with a section of the people under his control. The succession of his Coadjutor, Bishop Esser, concluded this experiment and marked a return to genuine missionary rule over the community. Simultaneously this was also a turning point in the efforts of the Church to solve the vexed question of how the political aspirations of the community and the central government could be reconciled with its own ideas on ideal relations between spiritual and secular authorities.

Bishop Esser, a German, was as conservative as his predecessor and was also inclined towards the Regenerationist line of thought, but by all accounts he seems to have possessed a keener insight into many of the problems confronting the Church. As already shown, he was well acquainted with affairs at Pella and his advice had guided Bishop Thünemann when he had been 'quite at (his) wits' end with the Pellanaars' (RCMP/4. Bishop Thünemann to the Department of Social Welfare, 30/5/1952). Bishop Esser later played an important part in the deliberations of the Second Vatican Council dealing with lay participation in church affairs and, according to his letters to Fr. M, he took the view that the reforms then being formulated would revitalize and preserve the Catholic Church by placing it at the forefront of change rather than leaving it merely to respond continuously to pressures emanating from the laity—from being the unchanging Rock of Ages the Church would become the shepherd leading his flock towards a new future. It was with these ideas in mind that Bishop Esser approached the political problems of Pella, after having conducted a brief survey of the Mission Farm in 1956.

He identified four main problems facing the Church authority, namely '(i) the lack of legal authority to compel obedience from unruly followers, (ii) the loss of confidence in the Church on the part of the Coloured inhabitants, (iii) the direct involvement of our missionaries in local affairs, (iv) an incorrect assessment by the Coloureds of their position regarding their so-called rights of occupation' (RCMU/14. Memorandum on Pella, 6/1/1956). Bishop Esser considered (ii) to be the most urgent, and he thus directed his first steps towards rectifying this situation in the recognition that, by restoring the prestige of the missionaries, in particular that of the Bishop himself, as an objective authority, a firm foundation would be laid for future efforts to solve the impasse over the future of Pella.

Accordingly at the beginning of 1956 the priests at Pella (Fr. A and Fr. M) were transferred to other stations and replaced by an American priest (Fr. S) who had recently arrived in the Diocese. The sole responsibility for administering Pella was vested in the priest, ostensibly to allow the Bishop to withdraw from direct involvement in the process of local government. In reality it created a proxy ruler and left the Bishop free to deal with

the central government and to direct affairs from a safe distance unaffected by any local repercussions to any aspect of his strategy. Whereas Bishop Thünemann had lived in Pella, Bishop Esser preferred to stay at Matjieskloof Mission near Springbok for greater convenience in communicating with the other missions in the Diocese, although his official residence remained Pella.

Under the Bishop's guidance the new priest succeeded in his task of regaining the confidence of 'our Pellanaars'. After receiving a definite reply from the Department of Coloured Affairs as to the true extent of the powers of the Church at Pella—'... as all responsibility for the administration of your Mission Station rests with the governing church authorities in terms of the Ticket of Occupation and in the absence of any law authorising regulations applicable to Pella, your regulations would be of the nature of mutual agreement lacking the force of law. Local co-operation seems to be the only alternative for the success of such a system ...' (RCMP/4. Department of Coloured Affairs to Fr. S, 7/2/1957)—the priest was encouraged by the Bishop to move boldly to co-opt the influential Baster conservatives. The council set up under the New General Regulations was abolished and replaced by a 'Raad van Korporale' or 'Burger-raad' consisting of five members and a chairman (the 'Hoofkorporaal', who was also called 'president' in some documents, and who was always a Baster). It was intended to serve as a representative body for the 'Coloured' population only and to assist the priest in the administration of Pella. The various taxes were replaced by a simple tax on livestock, which was to be used for the direct benefit of the 'Coloured' farmers. The Europeans were indignant at losing their representatives, but were somewhat mollified when the priest let them know that he still regarded the mayor as their spokesman (when Fr. S took over the administration of Pella, the title of 'mayor' was reinstated, the position still being held by Bishop Thünemann's brother, the shopkeeper). The priest managed to overcome the suspicion of the conservatives by adopting a favourable stance on the arguments of the Baster farmers concerning the use of the natural resources of the Mission Farm, and openly took their side against the Europeans in a dispute over rights to a spring that the mine-owner had claimed for his own use in 1957. Bishop Esser considered that the priest's sympathetic treatment of the grievances of the Baster farmers had contributed to his success (RCMP/38. Bishop Esser to Fr. M, 12/6/1964) for, to the Bishop's surprise, Fr. S persuaded the Baster farmers to pay their taxes to the Church. These were then used for the purchase of fodder to assist the farmers in the prevailing drought conditions, and this further enhanced his standing. Nevertheless, the conflict between the Europeans and the 'Coloureds' over the right to live at Pella continued, and the Baster conservatives used the 'korporaalsraad' as a platform to approach the Department of Coloured Affairs on the question of their rights, and again to demand the removal of the Europeans, Damaras and 'Hottentots' when the control of the Church was ended (RCMP/38. Fr. S to Bishop Esser, 4/10/1958).

Between 1955 and 1959 the central government took no further steps on the proposed creation of a Coloured Reserve at Pella, mainly due to the inadequacy of the legislation then in use to resolve the difficulties over compensation for the European inhabitants and because a firm policy for the Coloured Reserves in general had still to be developed (see

p. 80). Towards the end of 1959, however, the Department of Coloured Affairs notified the Bishop that it had received letters from the community that indicated that 'the occupants are still as willing to have the Department assume the responsibility for Pella as they were in 1950', and advised him of a new set of proposals, which were that (i) the Church should confirm its agreement of 1950 to the application of Act No. 29 of 1909 to Pella, (ii) the Ticket of Occupation of 1881 should be cancelled so as to facilitate the application of the Act, and (iii) that a portion of land would be granted to the Church after the application of the Act so that it could continue its religious activities (RCMU/7. Department of Coloured Affairs to Bishop Esser, 4/9/1959). No mention was made of compensation for the Europeans, nor of further consultations with the local inhabitants.

Had such an offer been made to Bishop Thünemann he might well have accepted it merely to rid himself and the Church of the whole problem, but Bishop Esser viewed the second proposal with alarm, for it seemed to indicate that the position of the Catholic Church as the established church at Pella would be at the mercy of the Protestant Nationalist government once the Ticket of Occupation had been cancelled. The proposal implied that by conceding the rights of the 'Coloured' inhabitants and consenting to the deprival of the Europeans of theirs', the Church would also be required to surrender its privileged position at Pella. This was in direct conflict with Bishop Esser's view of the role that the Church had to play in the community as a source of spiritual, if no longer temporal, leadership. The Bishop's fears were founded directly on his observations of events elsewhere in the Northern Cape and South West Africa, and one of his letters to Fr. M. on the subject clearly sets out his concerns:

'... The situation has changed in Pella. There is still trouble over the veld, as we know, but now the Europeans are beginning to leave of their own accord, and the Government now wishes to establish a settlement only for Coloureds. If this happens and we renounce our rights given by the Ticket of Occupation of 1881, we are going to lose control over the entire territory. This is what will happen:

a) A Superintendent (a Protestant, who might even be an 'eerwaarde' like in other places) will be appointed, and with a committee to assist him. His discretion on the admission of new people will open a legal door to introducing a majority of non-catholic Coloureds who will have a say over Catholic Pella.

b) Then with enough Protestant families on the place they will claim their denominational school and the right to open their own churches. We will not have enough children there to carry on with the present staff, and the Catholic community will be outnumbered by others.

c) Even though the Department assures me that we will still have some say through our Catholic representatives on the committee to counteract non-catholic proposals and developments, we well know how little we can rely even on our own good Catholic people at Pella!

If these things come to pass in the years ahead, who knows but that the mighty Catholic fortress erected by our revered Bishop Simon will become a historical ruin and all our work and sacrifice brought to naught. I do not wish to be too pessimistic, but we have seen all too often how things develop in other places under similar circumstances.

We should keep our rights to Pella. After all, the place is given to us, the Catholic Church, and not the ordinary people as in Steinkopf or Kakamas. We should therefore retain the administration, reserving the right to eject or admit people, and to this end we should collaborate with the Department, but letting them know that we are withdrawing the application for the Act to be applied at Pella. We must keep what we legally have, and fight as long as possible to preserve that right, for once we give it away we shall never get it back under this Protestant government.' (RCMU/7. Bishop Esser to Fr. M, 1/10/1959).

This letter clearly shows that Bishop Esser fully appreciated the trend towards a subdued anti-Catholic policy that was adopted by the Nationalist government in the 1950s, involving pressure on private schools and institutions that served as foci for opposition to the implementation of the 'apartheid' policy, for the Catholic Church had early on made known its opposition to enforced segregation, as evidenced by the statements published by the Roman Catholic Bishops' Conference in 1952, 1954 and 1957. The Church remained true to its traditional doctrine of 'accidentalism', whereby the form of the secular government was of little consequence as long as Catholic interests were respected; this always enabling the 'lesser of two evils' to be accepted and exploited to the advantage of the Church. This was also the reason for the Bishop's urgency in attempting to regain the confidence and trust of the people at Pella in order to remove any 'democratic' reason the Government could offer as cause for demanding the transfer of the Mission Farm to the State 'so as to further the aspirations of the inhabitants' that were allegedly being hindered by a reactionary church authority (RCMP/38. Bishop Esser to Fr. M, 5/11/1959). At the end of 1959, Bishop Esser transferred Fr. M back to Pella to replace Fr. S, in preparation for the re-establishment of a regenerationist system to stifle opposition to the continued control of the Church.

After seeking legal advice at the beginning of 1960 the Bishop took a fateful decision, which he communicated to Fr. M as follows:

'Our present position is that our Ticket of Occupation allows us wide powers of administration, but has the disadvantage that our tenure may be terminated at will by the Government. I am given to understand that there is now no legal bar to this in accordance with a law passed in 1952 (State Lands Disposal Amendment Act, Act No. 1 of 1952), whereby parliamentary approval is no longer required. So the political deterrent of questions in Parliament if there is suspicion of anti-Catholic bias is gone. However, there is nothing to compel us to give up Pella voluntarily, as the Minister cannot proclaim a change in the status of Crown Land without the consent of any person having an interest in that land.

So should we voluntarily subject Pella to the Act or not? Certainly there are advantages; we would have security of tenure with absolute title to a portion of land and our buildings, and we would be freed from onerous administrative duties, but it is in this last that the difficulty arises. A Board of Management such as the Department would cause to be appointed will consist of nine members—six elected and four appointed [sic]*—and, assuming the worst as I said in a previous letter, there need be only two non-catholics elected to oust our supremacy. I am convinced that there is a very real*

danger that our interests at Pella are imperilled. I cannot say yet if this government will take a definitely anti-catholic stance in the near future or not, but all the signs are there. I certainly don't intend to take into account any goodwill on the part of the Government in return for surrendering Pella to them.

With these things in mind, it is therefore my intention to attempt quietly and tactfully to maintain the status quo, until such time as the Government threatens to eject us under the Crown Lands Disposal legislation, when we shall have to reconsider our position.

I shall inform the Department that the Church has administered the secular affairs for over eighty years, that this has been well-received on the whole and certainly beneficial, and that we wish to continue this administration; further that the Coloured "occupiers" already enjoy a form of self-government and the majority are satisfied but for the trouble-makers whom we well know. I expect the Government will argue that Pella must be subjected to the Act because it is desirable to have all such places uniformly under the Act (vaguely logical, but how should we answer this?), that nowadays Church administration of secular affairs is inappropriate because of the social and economic advance of the community (nonsense, I doubt that a bunch of "occupiers" or even a politician such as the Minister is more competent than the Church—and I know that the boards in Namaqualand are hopelessly inadequate), and that they are in a better position to finance the necessary capital works (true, as you have also said, but we shall have to tax the people living at Pella and get contributions from the mine—it is on our property). I suppose they will also tempt our good people with the offer of giving them their own plots of land, but this will be no more than what we have given them in the past.

As a matter of tactics I propose to start a protracted correspondence on this matter with the Department, for as long as possible, until they show signs of exhausting their patience and this attitude becomes dangerous, so as to give the impression that we are indeed interested in giving over Pella at some time in the future. We can fight it all the way on the smallest points of difference on conditions, compensation, etc., etc. We shall have to hope that the life of this Government will not last much longer—its policies will soon be unpopular with everybody—and I am assured that after an election a new government of the opposition will drop the matter.

For your part, you will have to see to the usual everyday things! I must impress on you that anyone agitating for any reason whatever cannot be tolerated, and must leave Pella. You may count on my support in this. I suggest you rebuild the council as we discussed recently and try to keep old [JW] and [JR] on it like Fr. S did. Our success largely depends on keeping the goodwill of all our people, and if we are able to hold Pella then the Catholic fortress will be preserved and the Faith of the future generation saved' (RCMU/7. Bishop Esser to Fr. M, 3/7/1960).

The policy outlined in this document was pursued determinedly until 1972, when, ironically, Bishop Esser's successor found himself forced through its logic to end the control of Pella by the Church.

As recommended by Bishop Esser, the priest at Pella reformed the structure of local government by establishing a conservative, authoritarian system with the same

underlying assumptions of Bishop Thünemann's 'Regenerationism' of the 1940s. The idea behind the reform lay in the recognition that until then (1960) the system of local government had been deficient because the councils had failed to represent all the various competing forces and groups in the community, and that genuine representation could only be achieved by applying the principles of what Bishop Esser called 'organic democracy', by which he meant that heads of families and corporate bodies were the proper channels through which the society of individuals conducted its relationship with government (RCMP/38. Bishop Esser to Fr. M, 15/10/1960). Despite such high principles, the reform was nevertheless more practical in that it endeavoured to bring together all the competing interest groups into a situation in which they could be tightly controlled and, as in the past, rested on exploitation of the submissive apathy of the 'satisfied majority' to expose the activist elite to incorporation in the system.

The linchpin of such a system of local government was the priest in charge of the Mission at Pella, whose responsibility it was to administer local affairs. It has been pointed out that one of the reasons for the poor performance of missionary-dominated administrative bodies in the Reserves in Namaqualand was that the missionaries themselves were often men incapable of shouldering the responsibilities of both religious and political office (G. 60–'90: 8). At Pella, however, this does not seem to have been the case, and certainly in the period after 1960 the priest in charge of the Mission acted adroitly in local political matters, and was able to prevent any diminution in the standing of the Church among the inhabitants, in contrast to what had happened during Bishop Thünemann's period of office.

In reconstituting the Council, the priest revived the form of the 'Ruling Council' as it had been under Bishop Simon, with five European and five 'Coloured' Members, but removed the deputy status of the foreman of Central Pella (Appendix E). The available information about the composition of the Councils from 1960 revealed a simple formula for the success of the system. Through selective appointment the politically-conscious elite of the community could be partially satisfied by the rewards of public office—such as the apparent power to regulate their affairs themselves (although the missionary still held the final power to approve or disapprove their decisions), and the prestige derived from their position as recognized decision-makers—while simultaneously the chemistry of the composition of the Council balanced and neutralized the families and groupings. For example, the 'Pellanaar pioneers' were always opposed by those who were regarded by them as 'newcomers' ('Inkommers'), members of family R were always counterbalanced by members of family D or W, and there were equal numbers of farmers and labourers, so ensuring that no representative of any grouping was ever entirely excluded from holding symbolic power. The missionary furthermore prevented the development of monopolist tendencies in the Council by retaining the power to appoint or dismiss Members at will outside the electoral process. Thus if a Member showed signs of overstepping the limits of acceptable political activity, such as endeavouring to undermine the position of the missionary by writing letters of complaint to the Department of Coloured Affairs or the Bishop, or attempting to upset the balance of power by advocating re-alignments of interests (such as suggesting that the 'Pellanaars'

and Europeans had common cause against the Church, as happened at one meeting), he could be summarily dismissed and replaced. The priest also revived the division of Pella into districts with foremen, and again recognized the European mayor and 'Coloured' 'burgemeester'; none of these officers were *ex officio* members of the Council, but here too it was possible to play off one faction against another through the appointments of the foremen.

Inevitably this system stultified political life at Pella and naturally produced much frustration among the Baster 'Pellanaars', who began suspecting that the Government was aiding and abetting the Church, an effect not planned but also not unwelcome to the missionary. The balancing of members produced weak councils with the members so riven by competing interests that they lacked the coherence to resist the Church authority, and were thus unable to hinder the Bishop in his intention to prevent the realization of the Government's desire to bring the Mission Farm under its control. The inhabitants were well aware that the Bishop was continuing to negotiate with the Department of Coloured Affairs on the future of Pella, as was made evident to them from time to time when officials conducted inspections of the Mission Farm and held public meetings to inform them of progress in the discussions, and it was probably this that kept the frustration at their powerlessness from degenerating into disinterest. There was always the possibility that, as part of the process of incorporation, the Department of Coloured Affairs would take over the Council and give it a measure of meaningful power, as Government Notices No. 897 of 1911 and No. R.1866 of 1960 (both supplementary to Act No. 29 of 1909) provided for a 'temporary consultative committee of Coloured persons to advise and assist (the Magistrate)' as part of the procedure for incorporation.

In line with Bishop Esser's instructions the priest also took steps against those whom he regarded as 'dangerous troublemakers' and agitators, with whose assistance the resistance of the 'Pellanaars' was being strengthened. These included certain teachers and nuns who had been assisting and advising the Baster farmers in their dealings with the Church and the Government. The removal of these vulnerable elements left the 'Pellanaars', especially the conservatives, bereft of support within the system and rendered it all the easier for the missionary to control their activities. In a further effort to undermine the Baster conservatives' support, the Church permitted considerable numbers of people to enter the Mission Farm between 1961 and 1965, which also had the advantage of enlarging the labour pool for the mines. While the moderates gained numerical support from those of the newcomers who took any interest in local political affairs, the implementation of this policy of administrative suppression alienated the moderates, with the result that they began giving a modest measure of support to the conservatives in the dispute with the Church.

While resistance in the community at Pella was being suppressed in this way, Bishop Esser followed his stated policy of delaying the intentions of the Government towards Pella with considerable skill. Unlike Bishop Thünemann, who had regarded the Government as an ally, he saw it as a threat to all that had been achieved by the Catholic mission, not only at Pella but also in the Northern Cape. During this period Bishop Esser was also engaged in a similar dispute over the rights of the Mission in the Native Reserve

of Riemvasmaak north of the Augrabies Falls in Gordonia; here too, as was to happen in Pella, the Church was eventually unable to save the inhabitants from the imposition of the 'apartheid' policy. In the case of Pella, the Bishop struck a careful balance between co-operation and obstruction, drawing up alternative sets of proposals that then had to be subjected to the closest examination by both the Department of Coloured Affairs and the Bishop together with his Diocesan Council, a body of priests set up to advise the Bishop on matters affecting the Diocese. Between May 1960 and December 1962 there were some 30 points of difference that had to be cleared up, despite a formal proclamation issued by the Bishop and the Diocesan Council in November 1960 to the effect that the Church was prepared to offer 'provisional and conditional approval, subject to further discussion,' (RCMU/7. Proclamation. 20/11/1960) of a set of 'guidelines' for the eventual agreement to be drawn up on the transfer of Pella to the Department of Coloured Affairs. These provisions included, amongst others, the recognition of the Roman Catholic Church as the established missionary society at Pella, with modest restrictions on the rights of other denominations to practise there (such as not being allowed to build churches), the granting of a portion of land, roughly 50 morgen in extent, under absolute title to the Church, and a further portion of 15 morgen on the banks of the Orange River for irrigation purposes, the granting of rights to pasturage for a limited number of livestock, firewood and water, and the reassurance that the Church would be in no way subject to the Management Board to be established to administer the affairs of the Reserve.

The problem of the rights of the Damaras to live at Pella was, from an administrative point of view, resolved in 1961 when, despite strong objections from the conservative Basters, the Bishop and the Department of Coloured Affairs agreed that the Damaras had every right to live at Pella because they were officially classified 'Coloured', but that no Natives ('Naturelle') could live on the Reserve. Although this recognition gave the Damaras, especially the Herero, much needed security, it did not remove the possibility that the Basters would attack the basis of their classification, a fear that was still very much alive at the time of fieldwork in the 1970s and 1980s, and this effectively prevented the Herero 'kaptein' from attempting to reach any form of understanding with the Basters for mutual benefit. With the formation of the second temporary Advisory Committee in 1973 as part of the preliminary arrangements for the transfer of Pella to the Administration of Coloured Affairs, the Herero 'kaptein' was appointed as a Member along with the leaders of the Baster conservatives, and he gave them his support in their discussions with officials from the Administration of Coloured Affairs in return for a seat on the Advisory Board that was established after the proclamation of the Reserve. Although he thus succeeded indirectly in gaining recognition from the Basters of the Damaras' right to representation, neither group saw this as a full alliance.

Between 1962 and 1966 there was a long delay while the Government introduced new legislation on the Coloured Reserves in South Africa (Act No. 24 of 1963, with its various sets of subjoined regulations), under which the Reserves were transformed into 'Rural Coloured Areas' and were thereby incorporated into the evolving policy of the Nationalist Government towards the 'Coloured People' in general. During this period the stance of the Catholic Church towards 'apartheid' became even more inclined to one of outright

opposition in contrast to the disapproving tolerance of the 1950s, and consequently Bishop Esser grew ever more convinced that his policy on Pella was sound. He considered it important to provide a symbol of the commitment of the Church to its principles, even if this called for a disregard of the conflict within the community, a struggle that showed little sign of Christian tolerance on either side, and was at the cost of imposing dictatorial rule on the last non-racial mission station under the control of the Catholic Church in the Northern Cape.

Shortly after the resumption of the discussions between the Department of Coloured Affairs and Bishop Esser in 1966, an official from the Department held a public meeting at Pella to draw up a list of the rightful occupiers and to convey to the inhabitants details of the incorporation procedure. Part of this involved the creation of an Advisory Committee to assist the Department, in terms of regulation 5(1) of Government Notice No. R.1375. This body had no powers other than to make available such information as desired by the officials involved with the transfer, but the Baster conservatives used the prominence given to them by their membership to make a last attempt to demonstrate their desire for independence from the Church. As it happened, Fr. M went on leave shortly after the meeting and the members of the committee informed the relief priest, who knew little about the internal situation at Pella, that they alone had responsibility for the affairs of Pella and that he and the remaining Europeans had to restrict their activities to the portion of land allocated to the Church. This occasioned the only instance when Bishop Esser directly took charge of affairs at Pella, for he promptly deflated the Committee members by producing a telegram from the Department of Coloured Affairs confirming that the Advisory Committee had no powers whatever. He then visited Pella and addressed the congregation in church, assuring them that he had no intention of withdrawing Fr. M despite the wave of complaints about the priest's methods of administration that had reached him soon after Fr. M's departure. Bishop Esser's notes (RCMU/14) for his address are illuminating of how he viewed these complaints and the people who made them: 'Has proven himself worthy of his important position here. Energetic, much good work. Speaks bluntly, points out sin unceasingly. Some of you find him difficult. Has no respect for people get in his way [*sic*]. The way of God. Will remain to serve your community.' This rather futile gesture on the part of the Baster conservatives was their last attempt to exercise any influence on the negotiations on the incorporation of Pella, and thereafter the Baster leaders made no further effective appearance in macro-level political affairs in Pella. In interviews with me they stated, perhaps with the benefit of hindsight, that they had realized that, although they had been rendered powerless, the Government was committed to taking control of Pella, and they had thus but to possess themselves in patience until the incorporation of Pella under the Department of Coloured Affairs had been completed, when they expected to be given the necessary powers to handle their own affairs.

Despite his attempts to delay the negotiations, Bishop Esser found that by the end of 1966 his confident gamble on the defeat of the Nationalist Government had not been realized. As with many liberals, he had not understood the strength of the Nationalist Party or the weakness of the opposition parties, for in the election of 1966 the N.P. gained a

record 126 seats out of 166. He was thus being pushed inexorably to the point where he would no longer be able to delay taking a final decision, for he had been trapped by his own tactic of pretending to negotiate while the Department took his concessions seriously, evidently on the assumption that his wily persistence was aimed merely at securing the best possible conditions for a transfer. In December 1966 all that remained were a few small points on the wording of the agreement and its final approval by the Diocesan Council. Bishop Esser's sudden death at the end of 1966 sadly but conveniently resolved the dilemma temporarily for the Church, and the whole process of negotiation came to a standstill until such time as his successor could take office. In the interim a Vicar-General acted in Diocesan affairs, but took no action on Pella.

Almost a year passed before the new Bishop, Bishop J. Minder (an American of moderately liberal views), was appointed and consecrated. Under his rule, which has continued until the time of writing, the liberalizations and reforms recommended by the Second Vatican Council (Abbott 1966; Flannery 1977) were spread throughout the Diocese, despite opposition from certain conservative priests, and greater attention was paid towards conformity with the standards and opinions of the Roman Catholic Church towards the serious social and political problems of South Africa. The re-orientation of the Roman Catholic Church towards the Nationalist Government and its policies proceeded rapidly after the 1960s. In 1977 the South African Catholic Bishops' Conference admitted that the Church had lagged behind in matters of social justice, and by 1980 they had committed themselves to the 'total liberation' of all people in South Africa. After making a careful examination of the problems surrounding Pella, Bishop Minder reached the conclusion that the prevailing situation was highly unsatisfactory and had to be resolved before it damaged the new image of the Church as the champion of the oppressed and poor. At the time (1968–69) the Bishop was also influenced by arguments inside the Church against the holding of large amounts of Church property in a country where land tenure was so contentious an issue.

Bishop Minder shared Bishop Esser's opinions on the inadvisability of giving over control of Pella to people who showed no evidence of being capable of handling their own affairs in an 'objective, responsible fashion' (RCMU/7. Bishop Esser to Fr. M, 27/11/1962), but agreed with the Government view that much capital expenditure was necessary to update or create necessary public facilities and services. He was, however, also fully aware of the injustice that would be done if the remaining European inhabitants were to be forced to leave, for by then, faced with an uncertain future, most of the younger European families had left, leading to the closure of the European school in 1965, and only about 50 mainly elderly people were still living in Pella. The Administration of Coloured Affairs, which had taken over the rural Coloured areas in 1969, also appreciated these points concerning the European population, with whom the difficulties of compensation had been a major stumbling block in the way of a settlement in the past, and accordingly made its last compromise on this matter in 1969 by offering to allow the pensioners to remain at Pella in their own houses, but without livestock, until their deaths, while only the younger people would have to leave and settle elsewhere. At the same time it reduced the amount of land to be excised and granted to the Church, but guaranteed the freedom of

the Church from any interference in its affairs from the Advisory Board to be established in the Reserve. It was intended that the Advisory Board would be upgraded to Management Board status after a probationary period to give the inhabitants time to adjust to their new circumstances.

These were the most favourable conditions ever offered to the Church (and testified to the late Bishop Esser's skills as a negotiator), but Bishop Minder continued to delay taking the final decision, both on account of pressure from the Europeans for compensation for their houses if they intended leaving and from reluctance to be seen assisting the Government in the implementation of its 'apartheid' policy. After much correspondence the Administration of Coloured Affairs eventually maintained its refusal to pay compensation but agreed to allow the departing European families to sell their fixed property to interested 'Coloured' residents of the Reserve. After a number of further delays on the Bishop's part caused by renewed opposition from the Europeans, the Administration of Coloured Affairs indicated in 1971 that its patience was running out, pointing out that the environmental conditions at Pella were rapidly deteriorating and were allegedly causing much hardship among the farmers. Mindful of his predecessor's policy directive in such a case, Bishop Minder then finally gave his consent to the application of Act No. 24 to Pella, and so brought an end to the long dispute (RCMU/7. Bishop Minder to Fr. M, 3/11/1971). On the 22nd of June 1973 Pella was formally declared to be reserved exclusively for the occupation and possession of 'Coloureds' (Proclamation No. 141, dated 30/5/1973. Government Gazette No. 3937, 22/6/1973). The European inhabitants, with the exception of the shopkeepers in Pella village and those employed on the mine at Swartkoppies (where they were living in houses at the mine compound), were then compelled to leave and their properties were taken over by wealthier 'Coloured' residents. Control of the new 'Rural Coloured Area' was transferred from the Roman Catholic Church to the Administration of Coloured Affairs on 1 January 1974, and a new era in the history of Pella was initiated.

The period of Catholic missionary control at Pella can be viewed in summary as having been characterized by a highly centralized structure of authority in which temporal and spiritual power were combined, enabling the missionaries to control their subjects on the Mission Farm with considerable success through exercising the power derived from their position as an integral part of the system of government developed in South Africa to perpetuate capitalist domination. Yet their position was contradictory and was gradually undermined by irresistible political trends, so that ultimately the Catholic Church was compelled to give up its secular control of Pella under pressure from the central government. After 1974 a new administrative structure was introduced to the community in the Reserve and, while the inhabitants were virtually as powerless as they had been during the period of Church control, the new system of government was to be more open to manipulation by the political elite, allowing them to exercise a degree of influence not previously possible under missionary control. The course of their struggle to protect their interests under the new regime is the subject of the following sections.

THE FRAMEWORK OF LOCAL GOVERNMENT AFTER 1974

GOVERNMENT POLICY AND THE RESERVES IN NAMAQUALAND

In the preceding sections it was shown how the formative period of the social groupings in the community at Pella had been influenced by the dominance of the missionaries in the system of local government. Their control of the decision-making process enabled them to maintain their dominance in political affairs by suppressing the efforts of local leaders among the inhabitants to influence the policies of the Bishops in their dealings with the central Government. As a result, the various bodies formed to articulate the interests of the various groupings could not play a meaningful role in the decision-making process and were unable to match the expectations of either the participants or their supporters. Despite the splendid designations of these bodies—'Raad', 'Council', 'Burger-raad', 'Dorfsrat', and grandiose titles bestowed on their chairmen—'headman', 'kaptein', 'hoofkorporaal', 'president', 'mayor', 'burgemeester' or 'dorfsleiter'—they had all remained essentially advisory in character because the final power to propose and dispose had rested with the priests and bishops.

It was also shown how the missionaries had used their dominant position in an endeavour to prevent the Nationalist government from imposing a uniformity on their community that paralleled that in the Reserves in Namaqualand, particularly in regard to the separation and segregation of racial groupings under its 'apartheid' policy. In this respect, however, they failed, partly because of factors beyond their control but mostly on account of errors of judgement and misunderstandings of the real nature of Government policy towards the Reserves in Namaqualand, and indeed towards 'non-White' people in South Africa as a whole. Consequently they had been unable to prevent the incorporation of the community into the wider socio-political system of 'apartheid' that developed in South Africa after 1948.

The Government of the former Cape of Good Hope did not adopt a definite policy towards the Namaqualand Reserves until shortly before Union in 1910. Once the question of rights of occupation and the boundaries had been more or less settled, the Government 'left the reserves severely alone' (Marais 1939: 77). In the four Reserves of Concordia, Komaggas, Leliefontein and Steinkopf, local councils under the direction of the missionaries administered community regulations that had for a time been given legal sanction under Act No. 10 of 1879, with offences being dealt with by the Magistrate of Namaqualand, but this Act was repealed by Act No. 29 of 1881 (A.7–'96; Marais 1939: 77). After this, local administration appears for the most part to have 'depended on the moral authority exercised by the corporals and the missionary' (U.G.26/1932: 5). The first active intervention by the Government in the affairs of the Reserves came with the introduction and implementation of the Mission Stations and Communal Reserves Act (Act No. 29 of 1909), which incorporated the Reserves under the Department of Native Affairs and removed the secular authority of the missionaries through the institution of Boards, with members both elected by the residents and appointed by the Government, and chaired by the district magistrate. Act No. 29 was first applied in 1913, and must

therefore be seen against the backdrop of similar legislation scheduling reserves for Africans, the Native Lands Act of 1913, which marked the beginning of systematic segregation on the basis of racial inequality and explicitly established the African Reserves with the functions of acting as reservoirs of labour and as reason for denying civic rights to Africans elsewhere in South Africa (Welsh 1972: 40). It has been suggested (Klinghardt 1979) that there is a similarity in the outline of the historical formation of the Reserves in Namaqualand and of the African Reserves ('Homelands', 'Self-governing Black National States', etc.), even allowing for enormous differences in scale, and that Government policy has been directed towards ensuring an adequate supply of labour to local industry as well as redirecting nationalist aspirations into appropriate avenues of harmless expression (Molteno 1977: 30). Although this would account for measures such as the levying of rates on the residents, that encouraged people to enter the labour market, it also indicates the reasons for which the Governments of the Cape of Good Hope and South Africa rejected recommendations by various commissions of inquiry (commissions of inquiry reported in 1889, 1890, 1896, 1909, 1932, 1937 and 1947) that the communal land tenure system should be abolished and replaced by one of individual tenure. The introduction of individual land tenure would have enabled local 'White' entrepreneurs and farmers to initiate a process of 'creeping expropriation' that would have eventually led to the disappearance of the Reserves and the dispersal of their inhabitants into the villages and mining settlements of the region. One has therefore to account for the absence of any clear action concerning the political constitution and local government system of the Reserves on the part of these Governments. Although Act No. 29 of 1909 did introduce a new system of administration to the Reserves, commissions of inquiry in the period between the two World Wars repeatedly emphasized the striking inefficiency of this system (U.G. 26/1932: 7; U.G. 54/1937: 72), and it was not until after control of the Reserves had been passed from the Department of Social Welfare to the Department of Coloured Affairs in 1952 that efforts were made to change the system of local government.

The development of Government policy towards the Reserves in Namaqualand has to be seen as an integral part of the formulation of a definite policy towards 'Coloured' people in general, for the Government had to take into consideration the development of the Reserves on a uniform basis within the wider politico-economic structure of Namaqualand as an integral part of the South African state. Such a formulation could not be achieved until unanimity had been reached in the ruling party on the position of 'Coloured' people in the political future of South Africa. This policy problem became acute after 1948, for even though 'Coloured' people were treated as a 'population group' in terms of the now-defunct Population Registration Act of 1951, this merely placed legal boundaries around an amorphous social category (declaring what 'Coloureds' were not, rather than what they were) without giving any indication of how that 'group' could be accommodated in the general policy of granting 'self-determination' to the different 'population groups'.

The Nationalist government never succeeded in resolving this issue, but shortly before the creation of the Republic in 1961 the majority of National Party policy-makers appear

to have taken the view that 'Coloured' people should be regarded as a 'Volk-in-wording' (Venter 1974: 10) and should be treated as a 'nation' for the general purposes of the policy of separate development. The legislation that replaced Act No. 29 of 1909 and its numerous amendments and supplements was clearly designed to assist in the realization of this dream. Shifts in official terminology are good indicators of changes in policy, and the substitution of 'Rural Coloured Areas' for 'Reserves' is as reliable in this regard as the various changes from 'Bantustans' to 'Self-governing Black National States' in the case of the African Reserves. The Rural Coloured Areas Act (No. 24 of 1963) marked the incorporation of the Reserves into the general policy of separating 'Coloureds' from other population groups and they became in effect rural Group Areas. The Act made provision not only for the political evolution of the territories through a process of increasing local autonomy, but also, equally important, for economic development on an unprecedented scale that was intended to create and sustain a significant degree of differentiation between town-dwellers on the one hand (each of whom would live on a plot in a planned village) and *bona fide* farmers on the other (each of whom would have an 'economic unit', or small farm). The ending of the system of communal land tenure and the division of the land into privately-possessed strips would have deprived most of the inhabitants of the means of at least sub-subsistence and made them totally dependent upon outside sources of employment and income, in this way creating a ready labour pool for the rapidly-expanding mining industry of the Northern Cape (Klinghardt 1979: 12).

Despite the clear parallels between this policy and that applied to the African Reserves, there is little evidence to suggest that the 'Rural Coloured Areas' would have formed the basis for a 'Coloured Homeland'. A distinguishing feature is that there were no legal controls on the movement of resident registered occupiers in and out of the Areas, although there were regulations governing the entry of outsiders (set out in Government Notice R.1375 of 1965), but these were minimal compared to those affecting 'Blacks' in the homelands. No serious attempt was ever made to enlarge or consolidate the various Areas, although the notion of some form of 'Coloured' homeland enjoyed support in the conservative quarters of the National Party, as it still does among the present conservative opposition parties and, ironically, among some 'Coloured' nationalist movements that have emerged since 1994, notably the self-styled 'Griquas'. The Reserves in Namaqualand were ideally situated and constituted for consolidation, and there was a precedent in the creation in the 1960s of 'Namaland', the former 'homeland' for Nama people in the then South West Africa. Significantly, between 1963 and 1970 certain Government publications began referring to the Reserves, especially Steinkopf, as 'Kleurlingtuistes', which was rendered in English as 'Coloured Homelands'. Land added to the Reserves up to 1994, however, consisted of only a few small neighbouring farms; the consolidation of the Reserves would have meant the expropriation of considerable amounts of land owned by 'Whites' and would possibly have cost the National Party support in Namaqualand if implemented. Similarly, in comparison to the 'Black Homelands', the funds made available for agricultural and other improvements in these areas were relatively low; between 1964 and 1979 about R2.3 million were used in the six Namaqualand Reserves (including Pella after 1974) and the Boards of Management spent a further R0.7 million

out of their own funds (Annual Reports of the Administration of Coloured Affairs, 1964–1979). After the Theron Commission had questioned whether it was worth spending such 'large' [*sic*] amounts for so little return (RP.38/1976: 147), there appears to have been a re-appraisal of the policy, allowing for greater concessions in those Reserves where the strict application of the policy was impracticable, as in Pella and the other smaller 'Rural Coloured Areas' where environmental factors did not encourage individual tenure because the 'economic units' would not have been viable.

In 1978 Act No. 24 of 1963 was repealed and replaced in 1979 by the Rural Coloured Areas Law, Act No. 1 of 1979 of the Coloured Persons Representative Council, under which the powers over the 'Rural Coloured Areas' held by the Minister of Coloured Affairs were transferred to the Executive Committee member of the Coloured Persons Representative Council who was responsible for Rural Areas and Settlements. Shortly afterwards this Member of the Executive Committee, Mr D. Curry, announced at a conference of the Management Boards of Gordonia in Upington that the 'Rural Coloured Areas' were to be administered in a manner similar to that of other 'Coloured' villages and were no longer to be treated as Reserves resembling the 'Black homelands' (Official Minutes, 31/8/1979). This shift in policy represented a further change in Government thinking on the position of 'Coloured' people, inclining away from legal separation towards eventual integration in a common political structure with 'Whites', and this later came about when the second Constitution of the Republic of South Africa was introduced in 1983. The Reserves then became the responsibility of the House of Representatives in the tricameral parliament and there was a considerable surge of official interest in their development, but attempts to introduce individual land tenure were abandoned after successful court challenges by the residents of several of the Reserves. Under the Interim Constitution of 1994 and the third republican constitution of 1996, transitional local councils were set up in the Reserves and it appeared likely at the time of writing that some form of communal land tenure would be retained, possibly through vesting land rights in Community Trusts as was being done in the former 'Black homelands'.

THE STRUCTURE OF LOCAL GOVERNMENT IN PELLA

The transfer of Pella to the Administration of Coloured Affairs on the 1st of January 1974 represented a profound and abrupt change in the patterns of political life in the community, although recognition and acceptance of the change was rendered easier for the people in view of the fact that most of them were at the time in favour of the transfer of secular control from the Church to the civil administration. In this respect the task of establishing a new form of local government in Pella was not as difficult for the central Government as had been the case in certain of the Reserves in Namaqualand, where there had been concerted resistance to the implementation of Act No. 29 of 1909 (Carstens 1966: 31; Luyt 1981: 163–166).

In the field of local government, Act No. 24 of 1963 made provision for a graduated system of increasing local autonomy for management bodies drawn from those inhabitants classified as Registered Occupiers. In areas incorporated under the

Administration of Coloured Affairs the first stage was the appointment of a Superintendent, followed by the formation of an Advisory Board. At Pella the Superintendent was assisted for the first six months of his period of office by an appointed advisory committee of leading residents until an election was held to choose members for the Advisory Board. From then on this system, an effective executive officer assisted by an Advisory Board, continued until 1987, when it was replaced by a Management Board consisting entirely of elected members under a local chairman. The vagaries in performance of the Advisory Board were such that the central government delayed upgrading the status of the Advisory Board to that of Management Board, despite repeated applications from the Baster members who were keen to secure full control over their affairs, until it was satisfied that it would be able to receive the co-operation of the Management Board in implementing the programme of development for Pella.

The Advisory Board (popularly referred to as the 'Raad') consisted of five ordinary Members ('Raadslede'), a Chairman (the Superintendent) and a secretary. Neither the chairman nor the secretary was able to vote in proceedings, even when decisions could not be reached through a consensus of opinion among the Members. Meetings were held at least once a month in the office of the Superintendent, but special meetings could be held from time to time to discuss matters of urgent concern. The secretary or, in the absence of one, the Superintendent, was required to keep the minutes, a copy of which had to be submitted to the Regional Representative of the Administration of Coloured Affairs in Upington. Only in exceptional circumstances were verbatim records of meetings kept, and the summaries of discussions inevitably tended to give a favourable gloss to the role of the Chairman and Members supporting his opinions.

The ordinary Members of the Advisory Board were elected by the registered occupiers of the Reserve (subject to the complete payment of their taxes) at annual meetings called for that purpose in July. Candidates for election not only had to be registered occupiers, but also had to meet certain conditions, such as, amongst others, being neither insolvent, mentally disordered, nor having been previously convicted for an offence (Government Notice R.1375 of 1965, Regulation 11). There was no formal economic incentive for Registered Occupiers to make themselves available for public office as the Members did not receive payment for their services, other than being granted allowances according to distances travelled in the Reserve on 'official business'. In general, a term of office covered three years but, as one-third of the Members were obliged to retire each year in order of the least number of votes received, a term was often considerably shorter. In addition to ordinary elections, extraordinary elections could be held to replace Members who vacated office before the expiry of their terms. Government Notice No. R.1375 of 1965 lists over 20 conditions under which a Member could be compelled to vacate his seat, the most important of which is probably 15(I), in which a Member could be forced to resign if he had attempted to undermine the authority of the Advisory Board, refused to submit himself to the provisions of Act No. 24 of 1963, or had shown himself generally unfit to perform his duties in a satisfactory and dignified manner. This regulation was open to very broad interpretation, as shown for example in the case of a Secretary's dismissal (see below), and it also effectively prevented Members from resorting to

informal measures to exert pressure on the authorities if their political aims were thwarted by the Superintendent or other Members. This, as Carstens (1966: 136) pointed out for a similar provision in the regulations subjoining Act No. 29 of 1909, '... reveals very clearly the extent to which the (Advisory Board) is subjected to the control of the central government'.

Although there were no officially recognized wards, the Members agreed among themselves at the first meeting after the election as to who would represent each of the districts established by Bishop Simon under the former custumals of Pella, in tandem with one or more of the discrete neighbourhood areas in the village. In contrast to the system prevailing under the missionaries, the boundaries of the areas (which were called wards—'wyke') for which each Member was responsible were elastic, varying according to circumstances such as place of residence of the Member, personal preferences or other reasons, but the responsible Member was still expected to act as an intermediary between the people of the district and the Advisory Board, and if possible also to deal with minor disputes and problems in the area as had been the case during the period of Church control.

The responsibility for the administration of local affairs rested with the Superintendent, this authority having been delegated to him by the Regional Representative of the Administration of Coloured Affairs, who was the head of the Regional Office at Upington. The fact that Pella fell under the Gordonia Regional Office and was thus, for administrative purposes, separated from the other six (as there were at the time of fieldwork) Reserves to the west in the magisterial district of Namaqualand, had important implications for both the recruitment of personnel and the implementation of government policy, on account of certain differences in orientation and practical experience of administration. The Gordonia Regional Office was more concerned with the settlements along the Orange River between Augrabies and Prieska and had only three Reserves (Pella, Mier and Eksteenskuil) under its control, limiting the range of opportunities for staff to gain practical experience in running the independent administrative structures envisaged by those who framed Act No. 24 of 1963.

The function of the Advisory Board was to assist the Superintendent in his duties by making recommendations regarding the handling of local affairs and approving administrative decisions taken by the Superintendent and/or officials in the Regional Office. Its decision-making powers were severely limited although, as shown below, the few important decisions actually taken by the Advisory Board could affect all persons residing in the Reserve and the course followed in implementing key aspects of Government policy, in particular that of the Development Programme for the Reserve.

The principal executive duties of the Superintendent in consultation with the Advisory Board consisted of the provision of essential services, the control of farming activities, the collection of taxes, and the granting of various applications, which could range in a single meeting from issues as diverse as a mining prospect to the acquisition of a building plot in the village, as well as the general administration of Pella according to Act No. 24 of 1963 and the accompanying regulations set out in Government Notices R.1375 and R.1052.

The Advisory Board had no judicial functions, although, as Carstens (1966: 137) pointed out for the Management Board of Steinkopf, some features of a judiciary were

present. For example, the Advisory Board could advise or approve of action to be taken against registered occupiers who had failed to pay their taxes, or against trespassers in the Reserve. Under certain circumstances people approached the Advisory Board to settle disputes that they considered to be either too trivial or too delicate to be handled through the normal legal channels available at Pofadder, but in general neither the Superintendent nor the Members of the Advisory Board favoured such approaches, mainly because they had found that a solution was not always acceptable to the various parties involved as it was not regarded as binding on those concerned.

THE ADVISORY BOARD AS AN ADMINISTRATIVE INSTRUMENT

CHARACTERISTICS OF MEETINGS AND BUSINESS

Meetings of the Advisory Board can be divided into three types, namely ordinary and extraordinary meetings of the Advisory Board Members and general meetings held by the Advisory Board with the residents of the Reserve. At ordinary meetings the matters discussed were those of immediate concern to the general routine administration of the 'Rural Coloured Area', representing both internal affairs and matters of importance to the Regional Office of the Administration of Coloured Affairs in Upington. These were things such as finances and the works programme, matters affecting farming and other agricultural activities, and the handling of various sorts of applications, including those for building plots and tracts of land that affected the rights of inheritance and usufruct of the inhabitants. Extraordinary meetings of the Advisory Board might also be held from time to time for special purposes, but were extremely rare. On one occasion during the period of fieldwork when an ordinary meeting had been cancelled for lack of a quorum, the two Members present sat informally with the Superintendent to hear a complaint from a registered occupier, and this was later entered in the minutes as such a meeting. General meetings were essentially tests of public opinion, whether in the form of elections of Members, annual report-back meetings (usually held in December), or when either the Members of the Board or the Administration of Coloured Affairs itself had decided to refer a matter for consultation and discussion with the inhabitants of Pella. In such cases, of course, this did not mean that the Advisory Board or the Administration of Coloured Affairs would necessarily respect the opinions expressed at the meeting; as will be seen below, the Advisory Board referred a decision on the implementation of the Development Programme to a general meeting but later disregarded this opinion under pressure from the Regional Office.

Table 8 shows the kinds of business transacted by the Advisory Board in 24 ordinary meetings during the period January 1977 to December 1979, as recorded in the Official Minutes (Official Minutes, Volume II, RCAPA) and in my fieldnotes of the seven meetings that I attended. The figures given represent the number of occasions on which reference was made to the item in all the meetings in the sample, and not to the number of meetings at which such a discussion took place.

From Table 8 it is clear that in terms of quantity applications made up the bulk of the business of the Advisory Board, with matters concerning finance, the works programme and the development programme being more or less evenly distributed. The distribution of issues, however, does not of course reflect their relative importance either for the local administration or for the people involved. At the meetings that I attended, discussions of the Works Programme and Development Programme claimed most of the attention of the Advisory Board, and other matters were dealt with quickly towards the end of the meetings. The Members and Superintendent could, and did, spend up to an hour discussing merely one aspect of the Development Programme, such as the erection of fences in certain parts of the Reserve, or devote almost half an hour to pondering the pros

and cons of repairing windpumps and gates, and yet dispose of an application for rights of occupation (that would determine the course of the applicant's life) in a matter of one or two minutes. If the applicant's credentials were questioned, the process would of course have taken longer, or the application would have been dismissed even more swiftly.

TABLE 8

Business transacted at ordinary meetings.

Item	Occasions arising	%
FINANCES	53	18.2
Report of income and expenditure, and existing funds	14	
Taxes: general, health, dogs, and pasturage	1	
Payments for equipment and fuel	22	
Payments for travelling costs of members	8	
Auditing of books	2	
Communal reserves tax	3	
Misappropriation of funds	3	
WORKS PROGRAMME AND STAFF	49	16.8
Appointment of secretary	8	
Appointment of labourers	7	
Appointment of nurse for clinic	6	
Control of alien vegetation	5	
Control of vermin and predators	1	
Control of stray animals and livestock	2	
Compulsory dipping of livestock	5	
Repairs to fences and gates	1	
Repairs to windpumps	4	
Security of Advisory Board office and government depot	1	
Maintenance and equipment for clinic	9	
DEVELOPMENT PROGRAMME	45	15.5
Discussion of acceptance or rejection of development programme	8	
Discussion of compromise proposals for development programme	6	
Decision on acceptance or rejection of development programme	8	
Town planning	8	
Sanitary collection and removal: establishment of disposal area	5	
Question of additional land to be added to Pella	6	
Tenders for fencing and piping	4	

Item	Occasions arising	%
APPLICATIONS	132	45.8
For rights of occupation by outsiders	4	
For transfer of rights of occupation between registered occupiers	16	
For cancellation of rights of occupation	1	
For building plots	38	
For exchange of plots between registered occupiers	4	
For return of plot to advisory board	3	
Discussion of problem of non-registered occupiers obtaining plots	1	
For approval of building plans	6	
For temporary residence in reserve	9	
For permission to offer boarding facilities	3	
For permission by outsiders to visit Pella over extended periods	6	
For prospecting and mining rights	21	
For hiring tracts of irrigation land	1	
For trading rights	9	
For renewal of trading rights	5	
By private persons to lay water pipes to certain parts of the village	2	
By the advisory board for a public telephone	1	
By corporate bodies for the construction of water and electricity lines across Pella to mines and villages in the district	2	
MISCELLANEOUS ITEMS	11	3.7
Discussion of calling elections	2	
Discussion of people refusing to pay taxes	2	
Decision on action to be taken against those people refusing to pay taxes	2	
Complaints (on behaviour of children)	1	
Discussion of cases of dispute between inhabitants	4	
Total	290	100.0

Average number of items per meeting: 29–30.

Table 9 reveals the character of the activities carried out by the Advisory Board while in session. The sample is the same as that for Table 8, being the 24 ordinary meetings held over a three-year period.

Table 9 clearly shows how restricted the Advisory Board was in terms of being able to take decisive action. It could do little more than recommend and approve on most issues, and there were few areas where firm decisions were required. The Superintendent and the

Regional Office could intervene at any stage in those areas where the Members had been asked to give an opinion or where a decision had been left to them. This was particularly the case in meetings where the Superintendent or officials of the Regional Office persuaded or directed the Members to express the 'correct' views. The first Superintendent of Pella (S1) told me that on several occasions he had had to 'guide' the Members so that they did not make 'stupid' decisions as a result of their 'ignorance'. This was not so much out of concern for the Members as from fear of censure from his superiors, for the Superintendent had to reconcile the conflicting interests of the Government and Regional Office with those of the Members without attracting the adverse publicity that would have followed from an excessive display of authoritarianism (as shown in sections above, the missionary administrators of Pella had not had to labour under such constraints). The Regional Office could also reject recommendations from the Advisory Board and return a matter for further consideration—if necessary repeatedly until it had received a satisfactory answer.

TABLE 9
Executive activities of the Advisory Board.

Activity in dealing with items	Occasions	%
PASSIVE RECEIPT ONLY	78	26.8
Receipt of instructions from Regional Office	42	14.4
Receipt of information on matters dealt with by the Superintendent	36	12.4
DISCUSSION AND OPINION	160	55.3
Discussion only of item by Members	35	12.0
Provisional recommendation on action to be taken by the Superintendent	38	13.1
Approval of action taken or to be taken by the Superintendent	87	30.2
OWN DECISION	52	17.9
Discussion and decision taken by Members on item	52	17.9
Total	290	100.0

THE ADVISORY BOARD IN SESSION

The following summarized but detailed account of the proceedings at an ordinary meeting of the Advisory Board is given as an example of how this body actually went about its business. Although it may be regarded as typical if lifted out of its context and merely presented for its indications of procedure, it is nevertheless remarkable for this very reason. The meeting, the last ordinary meeting that I attended in 1979, took place at a time of considerable tension in the community. After having made a renewed attempt to reject the Development Programme for Pella that had been tabled by the Administration

Figure 16
Members of the Advisory Board on the verandah of the Superintendent's office, after a meeting on 15 February 1978. From left, AW, S1, WR and AH (BB and SW were absent). The room on the left housed the Post Office.

of Coloured Affairs, the Members had been forced to accept it under pressure of a threat that the Advisory Board would be suspended and the programme implemented by officials from the Administration without local assistance. The Members themselves were anything but representative of the residents' interests, and the Superintendent (the second Superintendent of Pella—S2) had been involved in two episodes of scandalous misconduct (one involving the misuse of Administration funds, and the other involving being trapped dealing illegally in liquor), all of which had deprived the Advisory Board of the respect previously accorded it by the inhabitants. It is in fact a good example of how administration continues under the most adverse circumstances.

Record of Proceedings at an Ordinary Meeting of the Advisory Board, held on the 23rd of November, 1979 (From the official minutes, 23/11/1979, and my fieldnotes of the proceedings).

Present: S2 (Chair), VD, GJ, AW, CW, PW, CT (Registered Occupier), GPK (Visitor—researcher)

Although scheduled for 09.00, the meeting was delayed for ten minutes until three Members (VD, GJ & CW) were present to form a quorum. After the meeting had been

opened with a prayer by GJ (incorrectly noted in the official minutes as PW), S2 welcomed those present and asked the Members to impress on their colleagues the necessity of punctuality in future.

1. S2 read the minutes of the previous meeting, an informal sitting to hear a dispute only, which he had decided to classify as an 'Extraordinary Meeting'. None of the Members was prepared to second approval because they had not been present, and he had to ask GJ to volunteer, to which he agreed after some hesitation. (In the official minutes, however, S2 later recorded that approval had been proposed by VD—not himself as was the case—and seconded by AW, the two Members who had been present at the previous meeting.)

2. Following the agenda, S2 read an application for the post of part-time secretary to the Members, but he then decided to delay the discussion until the other Members had arrived.

3. Turning to the financial section of the agenda, S2 laid four bills for payment before the Members for their approval. Three dealing with the routine purchase of equipment for the use of the Advisory Board and the Clinic were approved without discussion.
   While S2 was reading the third bill to the Members, AW and PW arrived, bringing with them CT, a farmer from the hamlet of Klein Brakkie who wished to exercise his right as a registered occupier to attend meetings of the Advisory Board. S2—with the support of the Members—courteously but firmly refused him permission until he presented himself in suitable attire with a tie and, if possible, a jacket.

   After CT had retired, the discussion of the bills resumed, with the Members, principally AW, criticizing S2 for having 'forgotten' to repay by the due date a loan in connection with the Development Programme, necessitating the payment of extra interest.

   The payment of various costs arising from the compulsory dipping programme led to considerable discussion. VD (the sitting Member and representative for the district of Annakop) demanded R20 for the use of his pump at Annakop, stating that although he had originally only wanted R15 the extra amount was meant to cover costs from having had sand block the valves. PW questioned the use of the pump over the whole period of two days that dipping had been in progress at Annakop and said that the Advisory Board ought to have its own portable pump for use in future, an opinion supported by GJ who also agreed with PW's assertion that VD ought to be satisfied with the original amount in view of the fact that he had offered the use of his pump. AW supported VD, however, and suggested that they vote to decide the matter. S2 agreed to this proposal, claiming that he had been about to suggest it himself. The voting (a verbal indication of agreement or disagreement) was as follows: for: VD, CW, AW; against: GJ, PW.

   With regard to the second case of costs from the dipping programme, S2 informed the Members that JW (a general labourer and tractor-driver employed by the Advisory

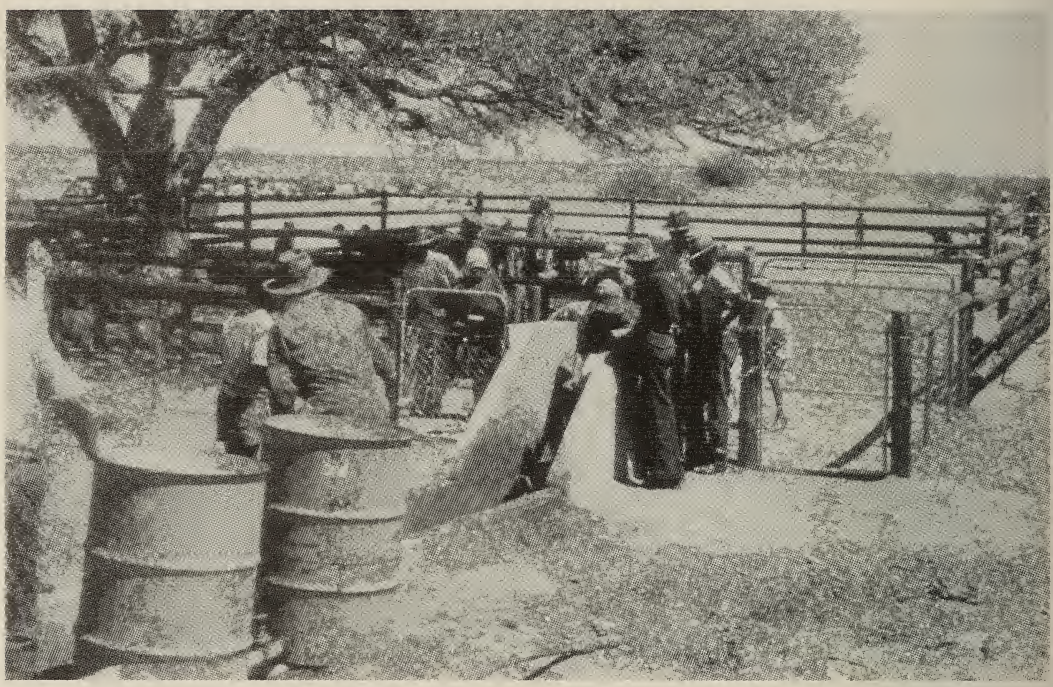

Figure 17
Dipping sheep and goats at Pella on 3 October 1979. JW (in overalls and hat) can be seen behind the drum at centre left.

Board) had complained of being overworked during the dipping campaign, for he had had to start very early in the morning, did not have the afternoon off and had had to work almost 12 hours a day. S2 suggested that, as JW usually worked only in the mornings, he should be paid for this extra time. PW immediately disagreed, stating that, as JW was being paid at a monthly rate, extra pay was unnecessary. If he was being paid per day and worked according to hours stipulated by the Administration then such an extra payment would have been justified but, because he was being paid per month, this meant that he was on duty all the time. GJ supported PW, adding that this was also the arrangement on all the 'White'-owned farms around Pella. The other Members also expressed agreement with PW, but AW suggested that JW receive something as a mark of appreciation for his hard work, as he was not lazy and did his work well at all times. S2 agreed with AW, and remarked that JW would not have had so much work if the Members themselves had done their duty and assisted him. He (S2) had had to stay behind in the evenings to help JW. In reply to this mild reprimand PW attacked S2, saying that if he had done his work properly the pipeline to carry water to the village would have been laid long ago and then there would have been no problems with labourers and people not turning up because they did not want to have to manhandle heavy drums of water and so on. AW agreed with PW's criticism, but pointed out that the pipes had had to be ordered by the Administration in Upington and that the proposal on water supplies had not yet been approved by the Regional

Representative. This was a development that everybody needed but nothing was being done about it—'If we could do what we wanted, as a Management Board, then there would not be such problems'. (On several occasions the Members had applied for the status of the Advisory Board to be raised to that of Management Board but, as this would have given the Members more power over the affairs of the Reserve, including a veto over proposals from the Regional Office, it was not granted until 1987, when the Development Programme was already under way.) S2 did not comment on these remarks but merely asked whether JW should be given money or leave. AW, supported by CW, proposed that he be given money. S2 then had to work out the amount (as provided for in the Regulations for labourers in the employ of the Administration of Coloured Affairs) but, as his calculator battery had run dry, he was forced to count it out three times on his fingers, to the ill-concealed amusement of AW, PW and GJ. Eventually S2 and the Members agreed in their calculations on a 'gift' of R10.94.

4. S2 re-read the application for the post of part-time secretary and requested the opinion of the Members on whether or not the application, the only one received, should be accepted. AW had as his principal objections the fact that the woman (EMA) was rather young for such a responsible post, having only recently left school, and that she had only Std. 8, but on the other hand she was quite intelligent and had only had to leave school after her first term of Std. 10 on account of becoming pregnant. PW recalled the curious circumstances of this pregnancy, EMA having claimed she had never 'known' a man and her family having believed that she was 'possessed' by an evil spirit, causing some amusement among the Members with his remarks, so that S2 had to remind them that a formal meeting of the Advisory Board of Pella was in session. The Members agreed that EMA was not the most desirable sort of person to have as secretary, particularly as she was the daughter of an 'Inkommer' who was a teacher politically opposed to the Advisory Board. Nevertheless, as they had to have somebody they advised S2 to accept the application, but to reconsider her appointment if another person applied for the post.

5. Turning to matters concerning the Development Programme, S2 presented two tenders for the erection of fences to divide the pasturage into camps. After some discussion the Members recommended that S2 accept the tender of HBT, a resident of Pella, in preference to that from an 'Outsider' from Pofadder. Although HBT's tender was higher than the other, the Members claimed that this ensured that local people would be employed and that 'fences would run straight' (i.e. that the fence should be placed exactly on the boundary line, without following physical topography and possibly excising small portions of the pasturage to neighbouring farms). S2 disapproved of this recommendation and said that although he would accept it as their opinion he doubted whether the Regional Office, let alone the Agricultural Extension Officer, would accept it. S2 then informed the Members of a telephone conversation he had had with the Agricultural Extension Officer, who had wished to know when he could order the scraping of the new streets in the village so that the town-planning programme could be

implemented. They (the Agricultural Extension Officer and S2) had agreed on allowing the people a period of six weeks to re-align the fences of their plots. The Members expressed their approval of this agreement. At this point, almost an hour after the meeting started, CT returned (having changed his shirt and put on a tie) and the discussion resumed for his benefit—people with plots in the village have four [*sic*] weeks to put their fences in order. AW then suggested that stop-signs would be necessary to control traffic and prevent accidents, especially with children, because the new streets would be straight and people would be tempted to drive faster than ever. S2 agreed to put this suggestion to the Agricultural Extension Officer.

S2 refused a request from CT to be allowed to smoke; with the support of the Members he pointed out that this was a privilege reserved to the Members and the Chairman only. CT then inquired whether it also applied to GPK, but he stated that the ruling did not concern him as he did not smoke. To ram the point home, the Members proceeded, over the following five minutes, to light their cigarettes and pipes.

S2 read a letter from the Namaqualand Divisional Council to the effect that the proclaimed road from the south-western gate on the border of the Rural Area to the Mission was to be closed, leaving only the road built to service the water pipeline to the mine at Black Mountain open for public use. All the Members agreed that this was a good thing, because there were too many roads through the veld on Pella and this reduced the amount of pasturage.

6. S2 then began dealing with the various applications that he had received over the past two months. An application from a local mining company based at Pofadder for the renewal of its rights to prospect for marble in certain parts of Pella was quickly approved, with PW remarking that they would object only if the prospect areas were to be fenced (thereby reducing pasturage). S2 then read a letter from the Regional Office requesting an explanation from the Advisory Board as to why it should have approved an application from LMA (brother of EMA) for a trading licence whereas it had rejected that of a 'White' outsider in 1977, who was a well-known and respected trader and café-owner at Kakamas. S2 pointed out to the Members that they would have to give a satisfactory answer in view of the fact that the current contract with Thünemann Bros. would expire only in 1983 (Thünemann Bros was a 'White' family trading business that had been operating at Pella since the late nineteenth century). The Members claimed to have been unaware of the previous decision as AW was the only Member left from that 'Raad' (a reference to the notion that the various groups of Members elected annually since 1975 bore collective responsibility for decisions taken during their term of office, reflecting the missionaries' views of the corporate Councils as having had 'lives', in contrast to the official view of the Advisory Board as an enduring institution with membership implying automatic acceptance of precedents set by past Members). AW stated that the reason for that decision was that the Members were unwilling to favour outsiders ('buitestanders') at the expense of the inhabitants because the outsiders always took their profits out of the area and left the people poor—this was also why he, the other Members and most other people in Pella were in

favour of allowing Thünemann Bros. to continue their business in the area, even though all the 'Whites' ought to have left Pella in 1974. (Thünemann Bros. had retained the right to continue trading at Pella and to renew this until such time as they no longer wished to continue, subject to the approval of the Board, as part of the agreement between the Church and the Administration of Coloured Affairs as they were highly regarded on account of their honest dealing with the inhabitants.) S2 refused to accept that local people should be favoured and given preference over outsiders, quoting the provisions of the Regulations on the granting of trading licences. The Members questioned him on this and he showed them the relevant passages so that they could see for themselves. S2 stated that whatever may have been the case under his predecessor (S1), applications would thenceforth be dealt with strictly in terms of the relevant regulations. The Members then decided to cancel their permission to LMA and to stand by their recommendation to refuse the application of the 'White' outsider. AW and PW then suggested that S2 explain to the Regional Office that the recommendation given on LMA's application was because he was a local man (although he was the son of an 'Inkommer' and not a 'Pellanaar'), and also that the 'White' outsider's name should be placed on a waiting list to take over from Thünemann Bros. if they did not wish to renew their contract later, pointing out further that, for the present, Thünemann Bros.' shop and GW's café were regarded as sufficient to meet Pella's needs. Although S2 was prepared to transmit this explanation to the Regional Office he nevertheless asked the Members to vote on its general acceptability to the Advisory Board as a whole, the result being: for: AW, PW, CW; abstain: VD, GJ.

S2 then read an application from VD to demolish his house and return the plot to the Advisory Board. This was approved and AW reminded VD that the foundations of the house also had to be demolished. At the end of this discussion PW asked S2 to explain the arrangement on the double-plot system in the Development Programme because he was uncertain as to how he would be taxed for the use of water supplied to the plot in the Development area of the village. S2 and AW explained (correcting each other from time to time) that he would have to pay tax on two plots if he did not actually live on his allocated plot in the Development area but on another in the village, or elsewhere. Anyone who did not already live in or did not move into the Development area would automatically be allocated a plot there and taxed on both. He would also have to pay for the hire of the tap and meter and then, additionally, for any water that he might use. AW added, for clarity, that each occupier would be able to lock the meter to prevent unauthorized use and that the plan was to induce people to move into the development area. PW replied that he now understood, and then said that a good scheme would be to develop the plot by building a house and then hiring it out. The person living there would pay for the water and PW would pay the taxes, recovering his expenses from the rent, after which he would start making a profit. CW commented then that he had heard some people saying that having so much water on the plots would encourage snakes to infest the residential area. PW agreed, saying that there were always more snakes around where there was water. Also, one should be careful about killing them because

they 'called something after them' when they were killed—when a dog killed a snake it almost always died soon after, whether it had been bitten or not, and people suffered misfortune. AW agreed, and GJ added that he was always worried when he found snakes on his property in the village, and even more so at his farmstead. The black ones in particular should not be killed at all because they were the messengers of the Damara sorcerers who would take revenge if their snakes were killed. And if the snake was coming to you, you could do nothing unless you had the right medicines to ward them off. S2 then jokingly remarked that GJ would know all about those things because he represented the Damaras on the Advisory Board. GJ shook his head and said he hoped the 'kaffers' would not do anything stupid. (This exchange well illustrates the ethnic attitudes of the Basters towards the Damaras, notably the element of fear of peculiar powers attributed to them.)

After this digression (a sign that the Members were becoming bored) S2 continued with the applications, there being five, all applying for allocation of a building plot in the village. Commenting on the first, from one JNR living in Kraaifontein (Cape) requesting that he and his old wife be permitted to 'come home' to Pella to build a house and end their lives there, PW stated that he saw these people as 'oudboorlinge' who could not be stopped from returning—'if not, then we cannot accept ourselves here'. On the other hand, a man not born at Pella but who was allowed to settle there and then later left could be refused. AW put in that this 'is only what we think' for, as far as the Advisory Board was concerned, people leaving, to go to the mines for example, kept their rights as long as they paid their taxes. S2 agreed, saying that he had pointed this out to them many times in the past. AW said that he had heard from the priest (Fr. M) that after six months the people at the mines (at Aggeneys) belonged to the congregation there and not to Pella. The Members then indicated their agreement that JNR should be given a plot.

The following two applications were approved for similar reasons; both were from men who had been born at Pella, although they had left long before the Administration of Coloured Affairs took over from the Church. AW said that, as far as he was concerned, even those who were at Pella before the Catholic Church came could be called 'Pellanaars' or 'Boorlinge' and, even if a man of the great age of 99 years, born at Pella but taken away a month later, should now apply, he would still be permitted to come back and settle at Pella. VD, who had hitherto remained silent on this matter, then said that AW and PW should be careful or else the 'Whites' would be coming back. S2, rather tactlessly, said that from what he had heard that might not be such a bad thing, and then quickly went on to the next application in case the Members took his remark too seriously. (As shown below, relations between S2 and the Members were strained at this time, and S2 probably could not resist the opportunity for a snide remark at the expense of the Members. S2 might also have been reflecting his superiors' opinions, for they were familiar with the situation at Pella before 1974.)

In the next application HnJ requested two building plots for his sons G and J, to be situated near his plot in the village. He pointed out that both had been born at Pella, and he also asked to transfer his grazing rights to G. GJ said that he had expected this for a

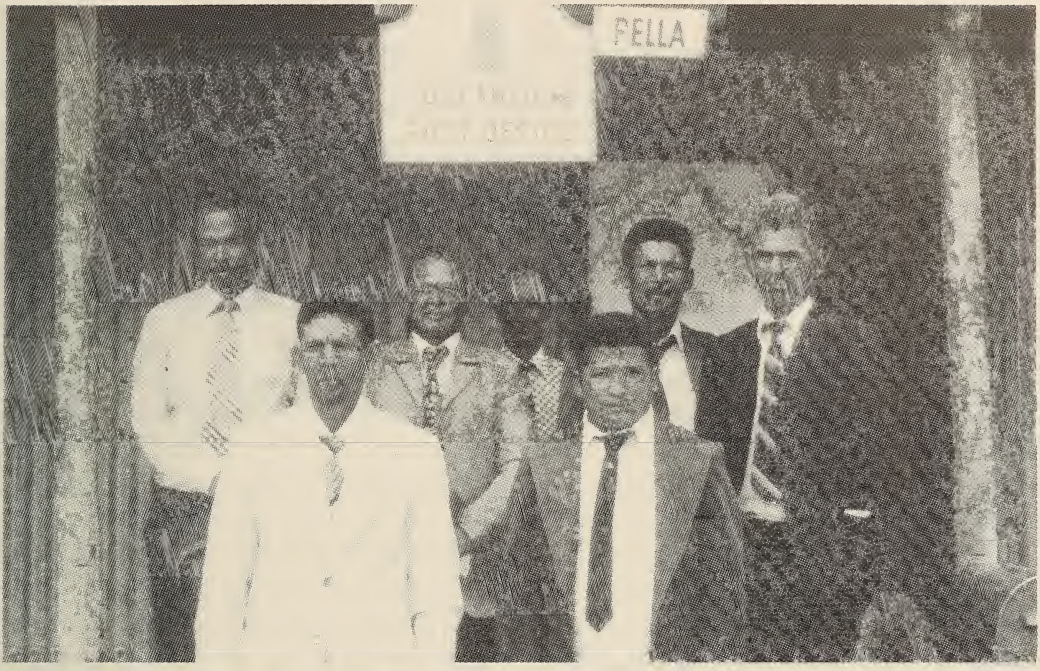

Figure 18
Members of the Advisory Board on the verandah of the Superintendent's office, after the meeting on 23 November 1979. From left, CW, PW, GJ, CT (the Registered Occupier who attended the meeting), S2, AW and VD.

long time—this was an 'Inkommer' trying to establish himself on Pella. (HnJ had already been at Pella some 30 years and had married VD's FZ.) GJ considered that the main problem was really that of rights to keep livestock. The other Members agreed that they were quite willing to give the sons plots, but that they had no wish to create a new farmer, therefore the application should be placed on the 'waiting list' rather than be rejected and the sons could continue living with their father, who already had far too much livestock for an 'Inkommer' and teacher, but he had a plot and there was not much they could do about it. The regulations were quite clear on this point: that if a man had a plot then he was an Occupier and was entitled to keep livestock. AW suggested that G be placed on the 'waiting list' so that he could take over his father's plot and then also his livestock, but that J (the younger son) be put on 'probation' for inclusion in the 'waiting list'. He referred to an incident in which J had been involved in a brawl with the sons of AW and SW and said that, although the Members were sympathetic, he would first have to prove himself a good citizen ('burger')—he was still too 'wild' and irresponsible and maybe when he was married they could think about it again. The other Members agreed with this suggestion, which was also favourably received by S2.

S2 then adjourned the meeting, at 12.13, and it was closed with a prayer by CW, who thanked the Lord for His wisdom in all things.

TABLE 10

Contributions by the Chairman and Members of the Advisory Board to discussions of Items on the Agenda.

Item	S2	VD	GJ	AW	CW	PW	Total
MINUTES & DELAYED ITEM (1.5%)	4	1	3	–	1	–	9
FINANCES (23.1%)	40	7	13	42	7	29	138
Bills 1 & 2	4	2	2	–	2	–	10
Bill 3	9	1	3	13	2	6	34
Bill 4	4	–	–	3	–	–	7
Pump and JaW	23	4	8	26	3	23	87
SECRETARY (4.1%)	5	1	3	7	2	7	25
WORKS PROGRAMME (16.7%)	22	–	14	33	1	30	100
Tenders	6	–	5	8	1	10	30
Roads	10	–	6	14	–	1-	40
Divisional Council Road	6	–	3	11	–	10	30
APPLICATIONS (54.6%)	55	10	40	95	23	103	326
Prospecting	4	–	–	–	1	3	8
Traders	10	3	6	38	8	41	106
VD's plot	2	1	1	2	–	22	8
Water supply	13	3	12	22	4	22	76
Application for plot 1	8	–	10	15	4	14	51
Application for plots 2 and 3	7	1	3	6	2	9	28
Application for plots 4 and 5	11	2	8	12	4	12	49
Total	126	19	73	177	34	169	598
Percentage per Participant	21.0	3.1	12.2	29.9	5.6	28.2	

Table 10 shows the contributions made by the Chairman and Members to discussions of items on the agenda. It reveals clearly that most of the discussion was done by two Members (AW and PW) and the Superintendent (S2). Although each of the other Members did contribute, two (VD and CW) said scarcely anything; VD in particular spoke only on those items in which he had a direct interest or on which his opinion was solicited by the other Members or S2. The dominance of AW and PW can be directly related to their relative experience and interest: AW had not only served on the Advisory Board since its inception, but he had also been prominent in the affairs of the Councils under the Church and had a sound knowledge of procedures to complement that of S2,

while PW as representative of the conservatives felt bound to make his voice heard as frequently as possible, with the support of GJ, also a conservative. All the Members had served on the Councils under the Church at one time or another, but AW was the only Baster member to have kept his position for any length of time, mainly by taking a conciliatory position on controversial issues, as he continued to do as a Member of the Advisory Board.

THE MEMBERS AND THE PROBLEM OF LEADERSHIP

As shown above, the Advisory Board was the lowest level in the system of local government provided for the administration of the of the Rural Coloured Areas. As such it served as a link between the structure of general government in South Africa and the people it was supposed to represent in the implementation of the policies of the ruling party. Just as Carstens (1966: 28) pointed out for the Management Board of Steinkopf, so also the Advisory Board at Pella was an instrument of the central government used to enforce Act No. 24 of 1963 and its subjoining regulations. The Advisory Board, however, also functioned to serve the people in the area of its jurisdiction in the management of their own affairs and as an outlet for those with leadership potential. Such low-level government bodies are inevitably subjected to stresses in attempting to reconcile the interests and demands of higher-level government with those of the people and communities which they represent and from which they are recruited (Kuper 1970: 101; Williams 1970). In writing of the difficult position in which chiefs find themselves in contemporary systems of government, Gluckman, Mitchell & Barnes (1949: 98) refer to such situations as deriving from the 'inter-calary' nature of their roles, and Kuper (1970: 102) described this as follows: '... the headman has been at the same time the leader of his people and a servant of Government. His tribesmen expect him to represent their interests to the Administration, while the Administration tends to expect him to behave like a Government servant, representing the interests of the Administration in his village. Both Carstens (1966) and Sharp (1977) have shown that the system of local government applied in the Reserves in the Northern Cape during the twentieth century has always functioned under similar dual constraints and, since the Reserve Management Boards were relatively autonomous, one would expect the more dependent Advisory Board at Pella to display more evidence of such stress and divergence in the perception of its tasks, for the role of the Members would have been even more exposed to the conflict that inevitably develops between internal and external socio-political forces.

Members of the Advisory Board were recruited through popular elections, which also served indirectly as a means of testing public opinion on the effectiveness of the administration of local affairs. Until the time of fieldwork there had been six such elections, as well as two extraordinary elections to replace one Member who had been killed in a motor accident and another who had resigned before the end of his term of office (see below). The election that I attended cannot, however, be regarded as representative of the others because it fell at a time of considerable community dissatisfaction with the Advisory Board that caused a virtual boycott by the inhabitants, whereas

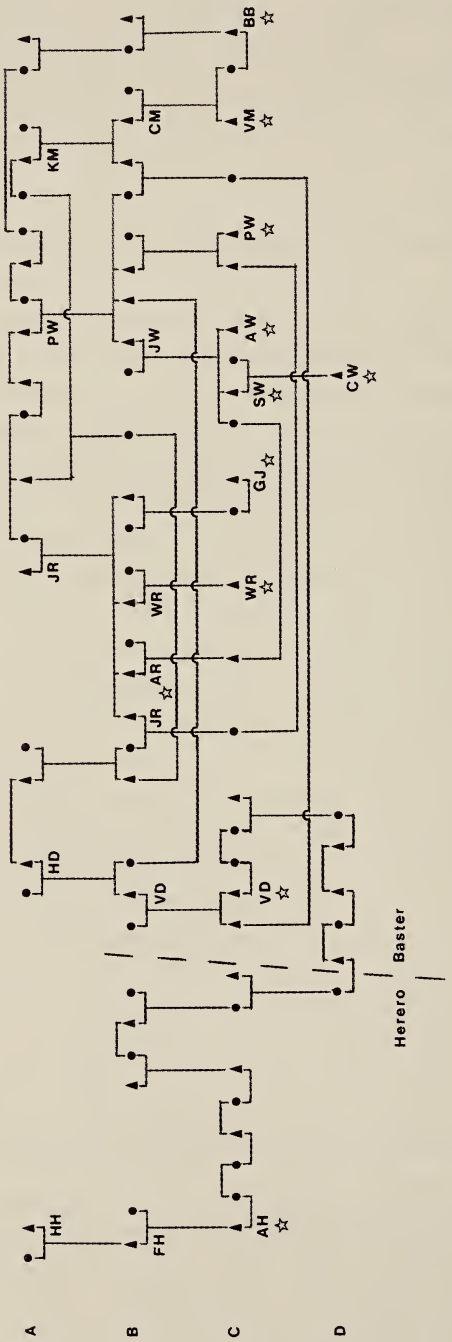

Figure 19

Kinship links and continuities among members of the councils established under the custumals of Pella and of the Advisory Board. Prominent members of the councils are shown by their initials, and those who also served on the Advisory Board are indicated by a star.

to judge from the records and informants' accounts the previous elections were, generally speaking, fairer representations of the electoral process. At the election meeting in 1976, for example, attendance by registered occupiers was some 300 (a poll of about 85 per cent), whereas at the election in 1979 there were only 19 people from Pella present, apart from the Superintendent and myself. Of these, only 14 actually took part in the voting, the others being the Advisory Board Members themselves who were excluded from casting votes, giving an effective poll of about 4 per cent.

Taken as a group, the Members elected since 1974 closely resembled those who had served on the various Councils under the missionaries after 1941, although, of course, there could no longer be any Europeans. All except one were members of the dominant Baster grouping and were closely related to one another, if not by descent then at least through one or more marriages in their families. Figure 19 clearly shows not only how the Baster members were related, but also the extent of the continuity between generations in participation in political activity. The exception was AB, the Damara headman, and also the Herero kaptein, who, as shown in Part 1, had secured a seat on the Advisory Board in exchange for his support for the Basters, but even though there were distant links with the Basters created by marriages contracted by his relatives after 1974, obligations that might have arisen from these were not recognized, mainly because none of these mixed couples of Basters and Damaras were resident in Pella or its vicinity.

TABLE 11
Election and replacement of Members of the Advisory Board.

1974	1975	1976	1977	1978	1979
AH e	e	e	e	e R*	GJ e
VM e R*	WR e	e	e R	PW e	e
AR e	e	e	eD* BB xe	e R	VD e
AW e	r		e	e	e
SW e	e	e	e R	CW e	e

e = elected/re-elected; R = resigned; xe = extraordinary election; D = died
* discontinuity in political orientation of Member (see below)

Table 11 shows the process of selective replacement of Members through the electoral mechanism, and reveals shifts in the relative strengths of conservatives versus moderates. Other divisions such as those between farmers and labourers are not significant as none of the Members have been anything other than farmers. It will be noted that the partial alliance between the Basters and Damaras broke down in 1979 after relations had become strained during 1978. The headman walked out after a series of disputes with the Baster Members over the rights of the Damaras to live on Pella and when he refused to be further associated with official cover-ups of misconduct on the part of the then Superintendent (see below).

All the Members were 'Pellanaars' as non-registered occupiers (the 'Inkommers') were unable to stand for office, and all except AH were Basters. On the moderate-conservative continuum it can be seen that the moderates, represented by VM, withdrew from the Advisory Board after only a year, whereas another moderate (WV) who was appointed to replace AR resigned within a few months, his place being taken by a conservative (BB) (see * discontinuity in Table 11). The personnel changed markedly from 1978, with all but AW being replaced at one time or another. This was because the Members found it impossible to continue after having been forced to accept the Development Programme, and they made way for younger men who again endeavoured to prevent its implementation. These too, however, were compelled to give way under pressure in 1979 (see below), but they were still all in office at the end of the period covered by the field study.

The comparative fluidity of election and replacement can be ascribed to the fact that there were no genuinely representative leaders at Pella, with the exception (as has already been noted) of the Damara headman/Herero Kaptein. In this respect the effects of the missionaries' policy to suppress viable leaders can be readily seen, but there is also another element. As shown by Sharp (1977: 251) for the 'burgers' of Komaggas and Concordia, the Basters of Namaqualand are generally loyal to what he called 'the ideal of extreme democracy', in which political authority is supposed to be vested in the 'burger corporation' and is therefore only temporarily conferred on the individual by the community. At Pella the idea of a communal hold on political authority was also restricted as a result of the divisions in the 'Coloured' community for, despite the necessity for the 'Coloured' inhabitants to combine in dealing with the Church authority and with the Europeans, the notion of an over-arching local identity had been developed only as an ideological concept among the politically conscious minority of conservative Basters and had little appeal for the passive majority. Most of my informants took the view that a genuine leader had to be invested with authority from a source outside the community before he could be recognized, and the fact that the community itself was splintered into jealously independent kin-groups, cross-cut by other divisions such as those between Baster and Damara or 'Inkommer' and 'Inboorling', tended to encourage this idea. The result was that legitimacy as a leader was very difficult to obtain beyond the bounds of kinship or what could be loosely called 'tradition', as in the cases already mentioned of the Damara and Herero leaders, and the more prominent Baster families. Consequently, unless an individual was given authority from a recognized source, his recognition depended on circumstances such as the need for leadership in the face of outside pressure. Even here, leadership tended to be restricted because the Members were not allowed to take part in political activities that could have undermined the standing of the Advisory Board (Government Notice R.1375, 15/9/1965: 15(i)), and informal leadership was incapable of overcoming the constraints set out above. At the time of fieldwork in 1978–1979 there was little direct involvement with 'Coloured' political parties outside the Reserve, such as the Federal and Labour Parties, although there was some support for these two parties and for the African National Congress among certain of the schoolteachers. In contrast to the situation in the other Namaqualand Reserves, however,

the teachers as a body enjoyed little respect among the local people and they were frequently derided for their pretensions and superficial outlook on local affairs. During later periods of fieldwork, however, it was noted that these attitudes were changing as new teachers joined the school and a younger generation in the population came to maturity in the community, and this resulted during the 1980s in a few teachers being elected to the Management Board that replaced the Advisory Board.

As in the past, sources of power for those aspiring to become leaders lay for the most part outside the community, these being external individuals or bodies such as the Church (as in the case of small community associations) or the Administration of Coloured Affairs as the representative of the central government that had, as always, continued to hold the final decision-making power. This is because, generally speaking, the most important political struggles were waged across the boundaries of the community with outsiders rather than within the community between groupings or factions. Consequently the weaknesses of local-level leadership were magnified in the wider arena and rendered the community powerless to determine its own affairs, and even informal leaders were reduced to being only opinion-makers. The formal leaders were unable to force compliance with their wishes or those of the Administration of Coloured Affairs without the backing of the State, and both they and the informal leaders could only appeal to factors held in common to create a basis for decision-making.

In order to illustrate the points given above, the following section provides an account of the course of political events in Pella between 1974 and 1980, taking as a theme the struggle waged by the various representative Members against the implementation of the Development Programme that was intended by the Government to bring Pella in line with the other 'Rural Coloured Areas' in the Northern Cape. The principal question that has to be answered is thus who actually took the political decisions concerning the whole community in its relations with outside authorities, and to what extent there was active support for these decisions. It will be shown further that, despite the weakness of local leadership and the continuing absence of mass political mobilization, the politically-conscious Baster conservatives represented on the Advisory Board were able to bring about an alteration in the policy of the Administration of Coloured Affairs towards Pella and exercise a degree of influence that would have been unthinkable during the period of missionary control.

THE POLITICS OF PROGRESS, 1974–1980

THE DEVELOPMENT PROGRAMME

One of the principal motivations for the transfer of Pella to the Administration of Coloured Affairs given by the Government and the Church alike was the absence of facilities and the necessity of providing these for the rapidly growing population of Pella. The Church had claimed that it did not have sufficient funds to cope with the increasing numbers of people on the Mission Farm, and most of the improvements that were made to the farm and were of benefit to the population as a whole, were made with the assistance of private individuals or groups after about 1950, the Church confining itself to the maintenance of the existing facilities. After the Administration of Coloured Affairs took over the administration of the Reserve in 1974 this situation changed dramatically, for the development of the resources of the area was seen as synonymous with the progress of the settlement towards becoming a viable, autonomous 'Coloured' community bound into the wider economic and socio-political framework planned by the Government. The principles underlying this policy of developing the 'Rural Coloured Areas' so that potentially economically active persons would be redistributed between agricultural and non-agricultural activities, in the latter case with the bulk being concentrated into labour outside the borders of the Reserve, have been noted above. The consequence was that, during the main period of fieldwork for this study, the political affairs of Pella focused on by the Advisory Board were for the most part concerned with the issue of acceptance or rejection of the provisions and implementation of the Development Programme that had been drawn up and put forward by the Administration of Coloured Affairs.

In general outline the Development Programme for Pella resembled those for the other 'Rural Coloured Areas' in Namaqualand, Gordonia and elsewhere, although, as shown below, it was modified later in certain aspects. The Theron Commission has given the best available summary of the key features of these programmes: '[It] ... provides for the planning, classification, and division of each area with due regard to local circumstances, the cancellation of existing rights, where necessary, and the re-allocation of land rights, to provide for: residential areas in accordance with town-planning standards; a town commonage for dumping and for the expansion of the residential area and, if and so long as it may be available for the purpose, as grazing for animals of occupiers of erven; ... an agricultural area, subdivided into lots of such size, shape and situation as the Minister may determine, and an outer commonage, being the remaining extent of the area for the exclusive use in the prescribed manner of *bona fide* farmers.' (RP 38/1976: 145).

The planning of township areas 'in accordance with modern standards' called for the surveying of erven or building plots and the issuing of deeds of grant to registered occupiers, the building of roads and streets, the installation of water, electrical and sanitary systems, the provision of medical services (usually in the form of a clinic) and for making available facilities for the provision of certain types of public services, such as policing. Agricultural planning called for the division of the grazing area into camps, the erection of boundary and camp fences, the sinking and equipping of boreholes or the

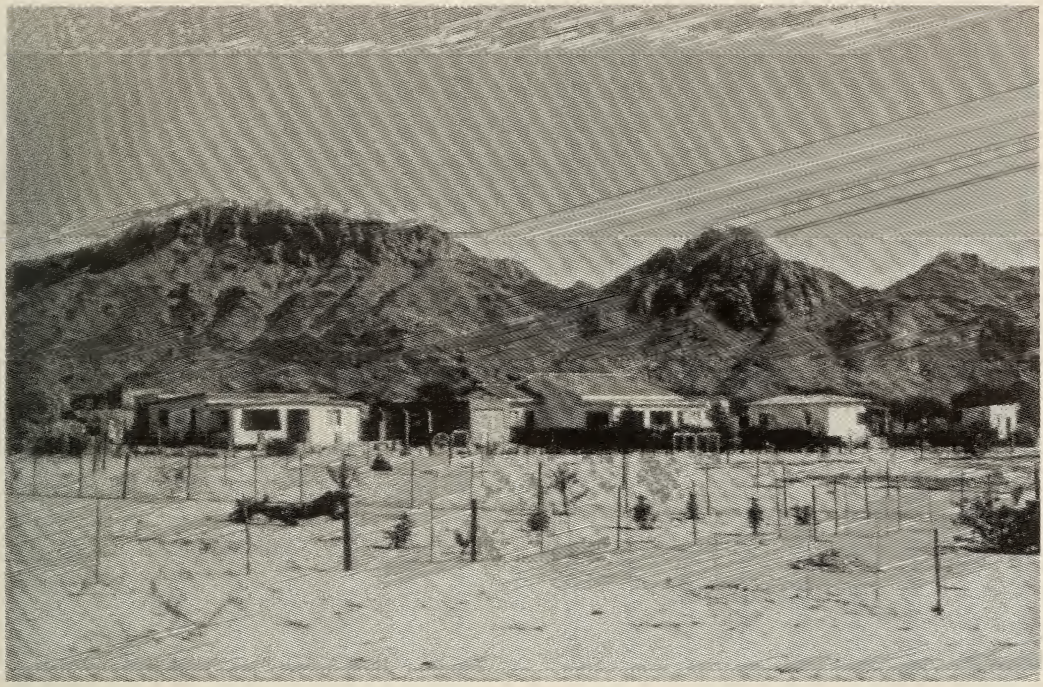

Figure 20
Surveyed and fenced sites, separated by graded streets, in the 'development area' in the 'Peuleboomstraat' neighbourhood area. Beyond can be seen five of the seven distinctive types of permanent dwelling structures found in Pella. (1984)

improvement of existing water supplies in each camp, including the building of dams and stock-watering points, and land reclamation, including the making of contour banks, the eradication of alien vegetation and pests, and the planting of trees and drought-resistant crops where appropriate. The most important and controversial aspect of agricultural planning in the eyes of those affected, however, was that calling for the restriction of the numbers of livestock to or within the carrying capacity of the available grazing, the reduction of the numbers of draught animals (mainly donkeys), and stopping the cultivation of uneconomical crops as well as the over-exploitation of natural vegetation for fuel.

The effort to achieve greater control over and direction in farming activities must, in addition to its part in the policy of the Government towards the 'Rural Coloured Areas', also be seen in the light of strategic economic planning at national level, where the decline in the quality of the natural resources available to farming was causing considerable concern at that time. One sees then the extension of conservation principles, such as grazing systems designed to stabilize the vegetation and encourage its recovery from past over-exploitation (which were particularly in vogue during the 1960s decade) and more drastic measures through the reduction of stock numbers (from the 1970s onwards) as having been in line with similar measures then being introduced with the aim of enabling the 'White' farming community to become more efficient and more economically

Figure 21
Poor planning and the lack of a drainage system resulted in flood damage in the 'development area' after rain fell in Pella in November 1985. (SAM 278c.175)

productive in the support of the population of South Africa (Barnard *et al* 1972: 70–71). The key difference, however, clearly recognized by the farmers at Pella, was that whereas the 'White' farmers in Bushmanland were being compensated for reducing stock (Cloete 1971), they were having to do it under what could be called 'voluntary compulsion', and this naturally led to considerable opposition on their part.

As a result of the missionaries' covert but effective policy of retarding the transfer of Pella to the Administration of Coloured Affairs to the limit of the available avenues open for this, the replanning of Pella by the Administration was also restricted before 1974, although there were two visits of inspection by officials from the Regional Office in Upington in 1972 and 1973. Much of the planning was therefore done only after 1974, including surveying of the village and the available agricultural resources, and the final plan was eventually presented in mid-1976. In the interim period certain essential developments were carried out with the approval of the Members of the Advisory Board. Given the interests of the Members almost all of these were connected with farming, and this naturally caused some resentment among the villagers who had not been informed of the long-term character of the Development Programme, a feeling that was increased by the apparent lack of any direction in the developments themselves. For example, the road from Pella village to the hamlet of Annakop was fenced on both sides with only two sets of gates in a distance of twenty kilometres, cutting through two of the grazing areas established by Bishop Simon and disrupting the grazing patterns of those people with

Figure 22
Jackal-proof fencing along the southern flank of Kruisberg, erected to separate the controlled grazing camps on the plains in the southern half of the Reserve from the commonage in the northern half. (1980)

small numbers of livestock herded in the vicinity of the village. To most people this appeared to have been done without any obvious purpose but, in terms of the long-term agricultural planning, this fence was intended to be the baseline from which the boundaries of the so-called 'economic units' would be determined. By November 1976 the Superintendent could report the sinking of ten boreholes at a cost of R18 999, of which four had been successful, the installation of two waterpoints (windpumps, reservoirs, pipelines, and drinking troughs) at a cost of R9 000, and the installation of two dipping units for R4 000. Together with the cost of the fencing these minimal improvements had already cost some R45 000 (Annual Reports of RCAPA for Pella: 1974/1975, 1975/1976), which the residents believed had been met with the money derived from the taxes that they had paid and that appeared to have been of no benefit to anyone, except those farmers in whose areas they had been carried out. Since there had been some muted opposition to the idea of paying taxes (on average about R5 per annum) when the Administration of Coloured Affairs took over, especially among the lower income groups and those who conveniently forgot that they had defied the Church in the payment of dues and spread it about that they had in fact lived free under the Church, there was thus already an undercurrent of dissatisfaction in the community that would be likely to surface in response to any unpopular measures that might be introduced by the Regional Office or Advisory Board. Consequently, when the Regional Office presented the Development

Programme in mid-1976 to the Advisory Board for its comments and approval on behalf of the community, there was an immediate negative reaction that caused both conservatives and moderates among the Basters and Damaras to find themselves for once in general agreement and united in opposition to its implementation.

General agreement did not mean that the various groupings opposed the Development Programme for the same reasons. From the point of view of the Regional Office, and in particular the Superintendent (S1), resistance of the people as a whole stemmed from both ignorance and conservatism, coupled with confusion about the real aims and benefits of the scheme. During interviews with me, S1 frequently argued that he and the Administration had favoured a scientific approach to the development of the community, whereas the people wished to follow their 'traditional way of life' and continue in the 'ways of their fathers' with all the resulting inefficiencies and poverty that these customs brought. Coloured Affairs officials from the Regional Office who visited Pella expressed similar views in formal contexts, but in informal conversations with me were wont to add that anti-Government 'agitators' were at work in persuading the people to oppose the Administration. Although phrased in the characteristic paternalism frequently encountered in mid-level directive government for 'Non-white' people in South Africa at that time, these views were not wholly inaccurate, for in themselves they offered a tacit recognition on the official side of the disparities in aims and expectations between rulers and ruled, and by which relations between the two exist and are conducted in a state of mutual incomprehension and misunderstanding.

In contrast to the official view, the inhabitants of Pella saw the development programme as a threat to their livelihoods and their future. The peasant farmers, for instance, both Basters and Damaras, rejected the idea of dividing the pasturage into six or seven 'economic units' thereby forcing most of them off the land, and even those wealthier farmers who saw that they would probably gain from the introduction of such a scheme, opposed it on account of the limitations it would place on their farming activities. In short, they found the idea of changing the communal nature of grazing to be unacceptable, even though, as shown above, these farmers had in the past (with the exception of the Damaras) not seen anything wrong in demanding the removal of the European farmers and others, as well as demanding recognition from the Church and from one another of rights to certain portions of the Reserve. On the other hand, the residents of Pella village, who were for the most part labourers, were with few exceptions in favour of the improvements because they clearly perceived the benefits that the town planning programme would have on their standards of living, although many were dubious about the proposed changes in agricultural land tenure as they realized that they were going to be deprived of the possibility of keeping a small number of livestock for domestic use.

RESISTANCE TO THE DEVELOPMENT PROGRAMME, 1976–1978

At a meeting of the Advisory Board on 20 November 1976, officials from the Regional Office formally requested the Advisory Board to indicate its opinions on the Development Programme and state whether it accepted or rejected it. The Members put forward the

various arguments against the Programme, emphasizing those in connection with agricultural activities, and refused to accept it in its entirety, preferring the implementation of town planning while holding firm to their rejection of the implementation of the planned 'economic units' and reductions of stock. Instead of seeking an outright confrontation (although the meeting was said by the former Members, in interviews with me, to have been heated at times) the officials accepted these opinions and promised to attend to the town planning side of the programme 'as soon as funds became available', probably as a way of marking time while they made further efforts to have the Programme accepted. Shortly after the meeting WV resigned his seat, under pressure from the moderates not to become involved in a long and possibly damaging struggle with the Administration, and he was replaced by BB in an election. This put the Advisory Board solidly in the hands of the conservatives, but it also meant the loss of WV's restraining influence, leaving the Damara headman to face the Baster conservatives alone. The moderates recognized that the conservative dream of being able to handle their own affairs free of outside interference was impossible and preferred to take a pragmatic stand on matters such as the Development Programme and the presence of the Damaras on Pella, in the belief that modest collaboration was more beneficial than outright confrontation. The likelihood that such a struggle would discredit the conservatives and enable the moderates to take control of the Advisory Board was recognized as a tactical possibility, but at the time of fieldwork informants were vague about the long-term strategic implications for Pella as a whole from such a take-over.

Two months later the Regional Office made a renewed effort to persuade the Members to accept the Development Programme, having been encouraged by the success of the Superintendent and two officials in persuading the Members to reverse a previous decision refusing approval of an application to exploit uranium-bearing limestone deposits. Had this project been undertaken, it would have necessitated the relocation of almost a quarter of the population of the village before the beginning of mining operations. This decision was not made public, but news of it was eventually 'leaked' by the secretary. As the company involved had by then already announced its intention of not commencing operations until the demand for uranium made this necessary, the potential damage to the relationship between the Members and their public was considerably reduced, although the secretary 'voluntarily' resigned at the request of the Superintendent. She was replaced by HM, a grandson of VM, who was regarded as more reliable and better qualified. At the meeting held on 20 April 1977, however, the officials did not succeed in obtaining a favourable response, although the Members offered a compromise—they would pass the programme if the Government would add more land to Pella and so allow more of the farmers to continue their activities. When the officials refused to accept this, the Members decided to call a general meeting of the inhabitants and then approve whatever decision was taken on a vote by all the registered occupiers present. The officials agreed to this, although they regarded it as unnecessary in view of the fact that the Members had been elected by the people for another term and that BB's by-election had shown that they still enjoyed their support (Official Minutes, 20/4/1977; informal conversations with Coloured Affairs officials).

The General Meeting held on 16 May 1977, was in several ways an unusual one. Not only was it the first in which a governing body at Pella regarded itself as bound to honour whatever decision was taken by the people and, as such, was the first time that any community decision could be called wholly democratic in the sense of 'one man, one vote' taken literally rather than structurally, but it also showed that the Advisory Board Members were sufficiently confident of their support among the people to be able to count on a display of unity in the face of outside pressure, in spite of the deep divisions in the community. Up to the end of my period of fieldwork this was the only public meeting that had been called for the express purpose of testing public opinion, and fortunately a reasonably accurate account of the proceedings was kept by the Advisory Board secretary, HM, a teacher, who surpassed his predecessors in the detail and accuracy of his minutes of meetings. As will be shown below (see pp. 113–114), however, the question of the accuracy of his account of the General Meeting was to cost him his post. An account of the proceedings is given below:

Record of Proceedings at a General Meeting of the Advisory Board with the Inhabitants of Pella, held in the Community Hall at 19.00 on the 16 May, 1977 (Official Minutes, 16/5/1977)

Present: [S1] (Chair), [AH], [BB], [WR], [AW], [SW], [HM] (Secretary); [A], [B] and [C] [Visitors—senior officials of the Regional Office of the Administration of Coloured Affairs at Upington]; ± 300 people (Registered Occupiers)

Mr [JMA] opened the meeting with a prayer, after which the Chairman welcomed all those present.

The Chairman read the Notice of the 5th May 1977, calling the meeting, and explained the purpose of the meeting to the inhabitants. The Advisory Board was unwilling to take so important a decision on the future of Pella without consulting the people, and had decided that it would abide by whatever decision was taken at the meeting. He then invited Mr C to take the floor.

In his opening remarks [C] stated that the door of the Regional Office which served Pella was always open to those with problems or complaints, and its officials were always willing to give assistance. The Regional Office was also always well aware of all dissatisfaction, and satisfaction, among the people about its services. [There was a network of reliable informers, which I observed in action during subsequent investigations by the Administration of Coloured Affairs into the various alleged illegal activities of the Superintendents of Pella, and the police had a similarly effective local network.]

[C] went on to state that Pella was one of the last areas to be incorporated under Act No. 24 of 1963, and emphasized that Pella needed to be developed—no-one could argue that Pella was in a sufficiently well-developed state at that point in time. In this regard the State gave aid with the greatest willingness and only ten percent of these loans had to be paid back, from the taxes which had to be paid. That was to say, by paying taxes the inhabitants helped in the development of their area. He took as an example another Rural Area where

the State spent R3 000 on establishing pine plantations, and where the proceeds had already exceeded R34 000, which the people were now using to help themselves.

Turning to the problems facing Pella, [C] maintained that with regard to development the dominating factor was grazing. The prevailing conditions at Pella left much to be desired. The condition of the grazing was so poor that it definitely had to be given a chance to recover and improve. He himself had noted the presence of 'suurgras', a tough plant which offered only poor nutrition. [C] declared that the most important reason why the pasturage had been destroyed ('snuifgetrap') was due to overgrazing, because at that time there were 22 000 head of livestock on an area which could only carry 7 000, i.e. the grazing had to carry twice [*sic*] as much livestock as it was able to support, and this was why the original indigenous plants had been destroyed. [C] went on to explain that he had pointed this out to the Members and that he saw no hope for the farmers in the difficult times ahead unless systematic farming began at once, but that the Members had decided that they would prefer the inhabitants to indicate their approval by a majority vote; therefore the meeting that night.

The planning of farming at Pella would be done carefully and with clear objectives in mind. Camps would be fenced; water found in each; windmills and dams would be built; pens for dipping, counting and medical treatment of livestock would be built; and facilities for loading of animals also. This sort of development work could be done immediately, but the main problem facing the Administration was the large number of animals on Pella, and therefore the numbers of smallstock and largestock had to be drastically reduced. As far as he [C] was concerned, seven or eight full-time farmers could make a reasonable sort of living on Pella. He pointed out that the State only gave assistance where people could be seen to be making progress. He thus again made an urgent appeal to the people to reduce the number of livestock on Pella.

After these remarks about agricultural planning, [C] turned his attention to town planning. He named by way of interest as an example the development and growth of Johannesburg. Then he explained that when the town planning programme was implemented the existing houses would be accommodated in the plan and streets would be arranged accordingly. In line with the plan streets were to be laid out so that more plots could be included in the open spaces between the existing houses, allowing the provision of water and, hopefully at some time in the future, also electricity, as well as sanitary services. A more efficient and regular postal service, a business area, cinema, playgrounds, and sportsfields were all the aims of the town planning programme. [C] stated that the only large expense here was the surveying of the plots and the issuing of deeds of grant to Registered Occupiers.

Mr [C] then concluded his remarks, and the Chairman [S1] gave those present an opportunity to put questions to Mr [C].

[PW] asked whether it was necessary to spend so much for the sake of only 7 000 head, and whether more ground could not be added to Pella and so prevent people from having to reduce their flocks.

[C] in reply asked if there were any farms in the district which were unused or without owners.

[PW] said there were not, and this was confirmed by [S1].

[PIW] criticized Mr [C] for his remarks about 'suurgras' not being indigenous on Pella, saying that it was in fact good grazing and that it was unjust to say that the number of livestock on Pella was supposed to be responsible for destroying the vegetation.

[VR] asked if the Government could not find another more acceptable solution, rather than just saying that the number of animals had to be reduced. He went on to say that there was enough State Land in the district which could be incorporated with Pella.

Mr [C] answered that it was not the policy of the State to give just anybody a bit of ground, neither was it under any obligation to do so. However, the State would readily assist those who demonstrated convincingly that they were good farmers who could make a success of their undertakings and in so doing further the progress of the community. He could thus not promise that more land could be made available; in any case that available State Land did not lie contiguous with Pella—and he had absolutely no assurance that it would be used and cared for in the proper manner.

[It is notable how firmly C put down suggestions to enlarge Pella. This supports the interpretation given above of Government policy on the long-term purpose of retaining the Rural Coloured Areas, but there were also strategic considerations involved. Most of the farms along the Orange River were at that time under State control—the owners having left and other occupiers having been compelled to leave, ostensibly to allow the pasturage to recover from overgrazing—and formed a belt of unpopulated land along the frontier with South West Africa, ready for military use if hostile forces were to threaten South Africa from an independent Namibia.]

[AfW] stated that Mr [C] had thus far only spoken of the part livestock played in the destruction of the grazing, and he asked if Mr [C] did not also think that roads played a role in causing erosion and he went on to ask how large a prospect area ought to be, specifically that of the Mine-owner, because these seemed to be taking up more and more of Pella.

Mr [C] replied that the fencing of camps would prevent the making of new roads and control the use of those already there. He also said that there was no real limit on the size of prospect areas as these were not supposed to be fenced, and that the Mine-owner had applied for an area of 1 000 morgen.

In conclusion Mr [C] asked those present to indicate their approval of the Development Programme so that he could apply for the necessary funds.

This request provoked negative shouts and remarks against development, whereupon the Chairman adjourned the meeting because it had descended into complete chaos.

The Secretary's minutes veiled the dramatic conclusion of this meeting, for according to informants and other eye-witnesses, C's last remarks were drowned by loud shouts and stamping. Large numbers of people began leaving the hall and a group of young people began hurling stones on to the roof of the building to indicate their disapproval. People involved in this incident told me that they had been careful not to damage the hall, which was the property of the Church, as this would have provoked an unwanted confrontation with the priest that could have had political repercussions. As soon as the government officials had left the hall, unmolested, the public protest ended.

Although the meeting had served the purpose of the Members in demonstrating to the officials concerned with the Development Programme the depth of feeling in the community over the implementation of plans drawn up by outsiders without regard to local considerations, it also had more indirect effects. To the residents of Pella, it demonstrated that the Advisory Board was virtually powerless to make a serious impression with the central Government, and revealed the extent to which the inhabitants had become subordinated to the Regional Office of the Administration of Coloured Affairs, whose officials could afford to ignore public opinion, as had happened at the meeting. As shown in the minutes, the possibilities for genuine consultation and the reaching of a compromise had been offered from the floor. This led to a general diminution of the standing of the Members and the Advisory Board, for many of my informants who had supported the transfer from the Church to the Administration of Coloured Affairs cited this meeting as the point when they first began questioning whether they had made the right decision on the matter, and whether they had not been misled as to what would happen once they were supposedly allowed to handle their own affairs. Not surprisingly this feeling was most marked among the farmers who stood to lose the most, but there was also a reaction among those who wished to see the town planning programme introduced to improve the village and its facilities, these being labourers and others not concerned with farming. This then led some to ask whether the Members were as capable as they had previously been supposed, with the result that differences between the prominent families came to the fore and accusations of self-service and allegations of corruption began to overshadow the more important political issue of opposition to the Development Programme.

The reactions of the outside authorities were rather different. The priest saw confirmation of his opinion that the people were incapable of handling their own affairs, and that there was a lack of resolution on the part of the Regional Office in its dealings with the local people. The remaining Europeans at Pella were alarmed by what they saw as the open defiance of the Government by the 'Coloureds' and by the strongly anti-'White' racist remarks that had been shouted at the officials when they were leaving the hall. The following morning the Mine-owner, informed of events in Pella village, requested the police at Pofadder to be ready to assist him in case of disturbances at the mine and he armed his 'White' employees to serve as guards at his explosives store. Although nothing happened, one of these men, who had been born at Pella, claimed in an interview with me that he would not have hesitated to shoot anyone causing trouble at the mine. It was noticeable that in general the poorer ex-Pella Europeans who had been forced to take employment locally were more embittered about their removal from Pella than the wealthier ones who had been able to buy farms with State assistance or move to urban centres after 1973, and were correspondingly more hostile towards the Baster inhabitants of Pella. The extent of their reaction has, of course, to be seen in the context of events elsewhere in South Africa, where there was serious unrest in the urban areas at that time. The officials involved indicated in interviews with me that the Regional Office decided to await developments rather than take direct measures to compel the Members to pass the Programme. Accordingly, when the Members met to confirm their original decision on

the Programme of 1976, S1 could do little more than warn the Members of the dangers of their action, although he was able to obtain a resolution to the effect that the Programme would not be approved until additional grazing was made available and thereby leave the door open to further discussions.

The election of mid-1977 returned all the sitting Members to the Advisory Board, leaving the Regional Office little choice but to continue its attempts to persuade them to approve the Development Programme. Although the Members were re-elected by only 30 registered occupiers (± 10 per cent), S1 was instructed to deal with them as if they represented the entire population. During the following three months he was able to persuade the Members that it was in their own interests to consider offering at least some compromise proposals that would enable the Administration of Coloured Affairs to implement parts of the Programme, particularly that dealing with town planning. As it happened, the Members themselves were coming under pressure to put the interests of the villagers before farming, especially those Members who lived in the village. Late in 1977 S1 succeeded in having the Members approve a resolution in which they requested the Administration of Coloured Affairs 'to separate town planning from the planning of the Pella grazing, and to go ahead with the surveying of the residential and business plots so that the occupiers can be given the opportunity of buying their plots. Their decision [is] thus hereby withdrawn in so far that it concerns town planning. However, the Advisory Board reaffirms its decision that all development work in connection with the grazing should be stopped until such time as additional grazing is made available' (Official Minutes, 21/9/1977). Having opened this crack in the door, the Regional Office then refused to accept the resolution and instead demanded that the entire Programme be passed.

After this meeting, a dispute that had been brewing between the Superintendent and the Secretary (HM) ever since the general meeting finally reached a climax. HM, as already noted, had kept the minutes at the various meetings with greater diligence than his predecessors and consequently there had occasionally been some considerable disagreement between HM and S1 as to what should appear in the official reports. This was particularly true of the general meeting, because S1 had wanted HM to leave out or gloss over elements that reflected badly on himself (particularly his inability to control the people) and the Members. HM had insisted on including details of exactly what had happened in the minutes and the official report on the meeting, with the result that S1 had rejected outright the first two drafts of the report prepared by HM, and had only grudgingly accepted the third version. The Members themselves had disliked the report because HM had included the names of those who had asked questions, and they too would have preferred more details that were favourable to themselves. Similar disputes had arisen when HM had presented his reports on meetings at which S1 had attempted to cajole the Members into accepting the Development Programme. When, in December 1977, HM presented the minutes and his report on the most recent of these meetings (during which the Members had passed their compromise resolution), S1 again refused to accept it, but on this occasion HM insisted that his version was correct and declined to alter it. In the ensuing heated discussion HM declared his determination 'to record things

as they happened and not to take orders on how they ought to have happened' (during a discussion of this case with me HM claimed he had used these very words) and S1 demanded his resignation. HM refused and was supported—to S1's surprise—by the Members, who had benefited in the past from having HM present to explain difficult matters to them and assist them in their dealings with the Administration of Coloured Affairs. S1 then threatened to invoke the provisions of the regulations on misconduct by employees of the Advisory Board to secure his removal, warning him that his private life was also open to legal action (it was widely alleged and believed in Pella that HM and a fellow-teacher, AfW, were involved in a homosexual relationship). HM thereupon agreed to resign, despite the continued support of the Members, who threatened that they would expose the Superintendent's illegal dealings in liquor. HM, a grandson of VM, was then replaced by DW, a brother's son of AW and SW.

In March of the following year (1978), the government official A again visited Pella with the intention of persuading the Members to approve the Development Programme. His task was made considerably easier by the fact that the Members themselves were finding it difficult to maintain a united front against outside interference. The HM affair had alienated the second-largest of the 'Pellanaar' families (M) as well as the moderates in their own families (W and R), and had given rise to a series of unpleasant exchanges of insults and snubs among them at social events in the village. The resulting tension made it virtually impossible for an informal consensus of opinion to be reached on the acceptance or rejection of any compromise proposals. The conservative farmers were determined to resist the Programme, whereas the moderates (who included labourers among their numbers) wished to see the town planning programme implemented as soon as possible, and among these people there was some talk of bypassing the Advisory Board with a petition to the Administration of Coloured Affairs. The conservative Basters could also no longer count on the automatic support of the Damara headman, for WR and BB had returned to attacking the presence of the Damaras in Pella. This had led to some heated exchanges during meetings, and to a growing apprehension on the part of the Damaras as a whole that another attempt to have them removed was imminent, with the result that the headman had considered it politically advisable to renew his mutual understanding with the moderates and act in a way that would not antagonize 'die Regering'. Although officially classified 'Coloured', the Damaras had always attempted to remain inconspicuous and avoid attracting the attention of Government officials out of fear of being reclassified, but in practice they were of course highly visible because of the headman's presence on the Advisory Board. The headman told me that he had thought it useful to have some 'Coloureds' prepared to support the Damaras' rights at Pella, and he was encouraged by the fact that the moderate Basters had consistently opposed the removal of the Damaras as demanded by the conservatives. As a result of the official decision taken in the 1960s, the Administration of Coloured Affairs took no interest in the fact that people generally regarded as 'Blacks' in the then South West Africa were living as 'Coloureds' in South Africa, presumably to avoid unnecessary local complications that could have jeopardized its plans for Pella, but neither the conservative Basters nor the Damaras believed that this apparent indifference would endure indefinitely.

In the meeting A expressed his disappointment that two Members (BB and SW) had absented themselves. They had wished to avoid being compelled to face the responsibility —and the humiliation of having to give way, because A had preceded his visit with a letter to the effect that he expected a firm decision to be taken. According to the minutes, A spent most of the meeting explaining the Development Programme to those present in the greatest detail and pointing out all the advantages it would offer the inhabitants, with the aim of 'attempting to convince Members of the Advisory Board of the correctness of other points of view' (Official Minutes, 15/3/1978). In answer to questions from AW, A assured the Members that the Advisory Board would be informed in advance of any work that was to be done and the implementation of the plans for the 'economic units' would be introduced gradually over an extended period. This was evidently the turning point, for the Members then expressed themselves to be have been 'convinced that it is in the interests of the future of Pella that the development work should go forward' (Official Minutes, 15/3/1978), and decided to call a special meeting the following week so that a final decision could be taken with the absent Members present.

BB again absented himself the following week, but A and S1 agreed that a final decision could now be taken with SW present. SW repeated his objections to the reduction of livestock and to the introduction of the 'economic units', claiming that he had the support of 'most of the Pellanaars and our people' on this point (SW's objection was noted in the Official Minutes, but the claim of support is based on his recollection of the meeting. His distinction between 'our people'—the conservative Basters—and the rest of the 'Pellanaars' is noteworthy, as it shows the growth of a sense of elitism presaging the appearance of a ruling class or oligarchy of comparatively wealthy farmers according to Mosca's model), but was evidently won over by A's reply: '... the farmers will reduce their stock systematically. The planning is a long term process. Some of the older farmers may die. Some of the younger farmers, particularly sons taking over from their fathers, may find again that they cannot make a decent living out of farming and therefore seek other ways of living' (Official Minutes, 21/3/1978). A also reassured the Members, in particular AH, that people living in the hamlets would not be forced to leave and live in the village, which had been one of the few objections of the moderates. A unanimous decision was then taken to withdraw the original refusal and instead to recommend that development work should begin, on condition that the Advisory Board would first be consulted on all projected improvements.

Whereas the Regional Office was gratified to learn of the decision, the general reaction of the inhabitants was one of deep disapproval and rising dissatisfaction with the way in which the Advisory Board had gone back on its promise to honour the decision taken at the general meeting. Even those moderates who had favoured the implementation of the town planning programme saw the decision as an abject capitulation to outside pressure, because the Members had failed to secure any guarantees on the limits to which the Administration of Coloured Affairs could go with the development of the area. Members of the headman's family and others of his supporters remained unconvinced on the question of whether they would be able to remain in their hamlets when the 'economic units' were fenced, and continued to fear that the Baster conservatives were craftily

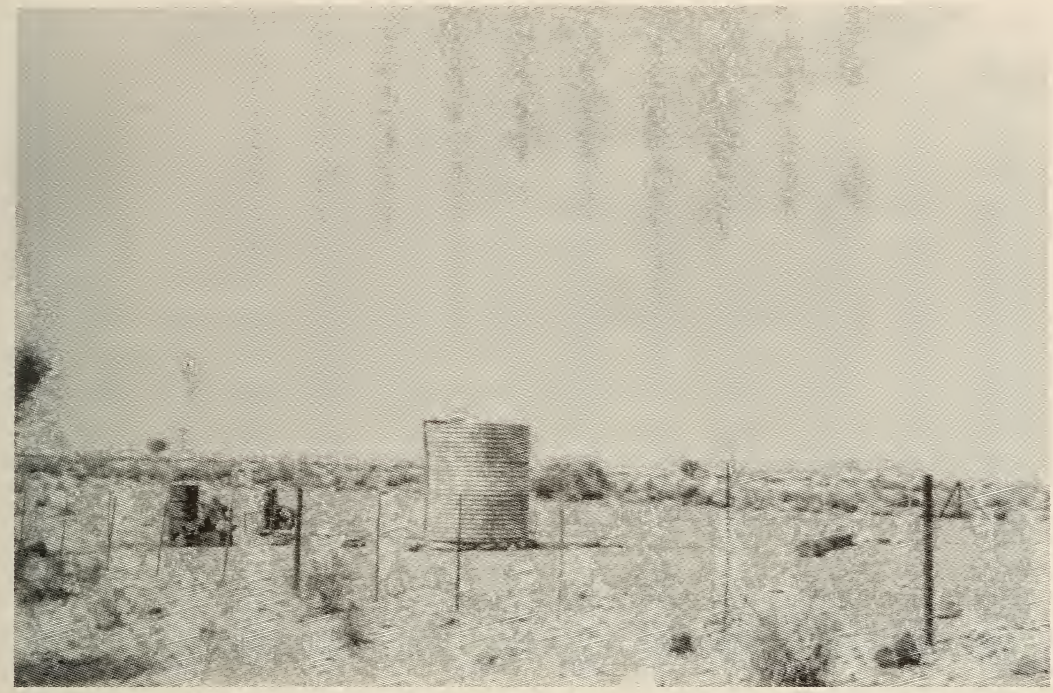

Figure 23
The borehole near T'Kouroes that was appropriated by WR and fenced and equipped at his own expense for his own farming operations, as seen in September 1979.

manoeuvring to take over 'their' part of the Reserve. As noted above, Bishop Simon had set aside a tract of land on the bank of the Orange River for Damara and Herero refugees from German South West Africa, and over time this had come to be regarded as exclusively allocated for the use of their descendants, a view reinforced when Bishop Thünemann later ordered the land to be fenced after the disputes between the Basters and the Damaras in the early 1950s. The Members were also criticized for failing to protect the interests of the 'Pellanaars' as a whole, and accusations of self-service and even corruption were made. The conservatives turned on their representative WR in particular for his attempt to utilize one of the boreholes that had been sunk near his home at T'Kouroes; WR had installed a pump and water tank in it, in co-operation with his cousin GJ. The objection was not that WR and GJ ought not to have exploited the delay on the part of the Administration of Coloured Affairs, but that they had done it without consulting the other farmers in that area. WR was also criticized by farmers of family D living at Annakop who occasionally moved into that part of the Reserve, for fencing the area around the installation, as well as for locking the pump (to which only members of his own family and that of GJ had keys) and charging a small fee to others who wished to use it to draw water for their animals.

S1 also became the focus of much public dissatisfaction during this period. His handling of the affairs of the Advisory Board and the administration in general was severely criticized, and he was said to be weak, vacillating and inconsistent in dealing

with the submission of applications and in private attempts to settle differences between parties who approached him. An unexpected inspection of the financial affairs of the administration by inspectors of the Administration of Coloured Affairs revealed large sums of money unaccounted for or missing, and it was found that S1 had been financing his illegal dealings in liquor with government money. The Members had threatened to expose this during the HM affair, and some of my informants said that the Administration of Coloured Affairs had been 'advised' to look into the Superintendent's affairs, but the Coloured Affairs officials were of course circumspect in discussing this matter with me, as they were in a similar case later involving the second Superintendent (S2). The Regional Office then requested S1's resignation but, as a suitable successor could not be found, he was transferred to the head office in Upington from where he continued to handle the affairs of Pella under supervision, visiting Pella only to conduct the meetings of the Advisory Board. As the Gordonia Regional Office tended to be more concerned with the various villages along the Orange River rather than with the relatively sparsely-populated Reserves under its control, there were few staff members with the necessary administrative experience in running a Reserve and there were none available at that time who would have been able to replace S1 at short notice. Officials from the Regional Office persuaded the Members to assist them in covering up the affair, but nevertheless many people began refusing to pay their taxes, not only as a way of showing their disapproval but also in the belief that by so doing the lack of funds would prevent the implementation of the Development Programme (seemingly unaware that their financial contribution was minimal).

The last two meetings to be held under the chairmanship of S1 took place in May and June, 1978. The official minutes give little hint of the clashes that occurred between S1 and the Members, who refused on both occasions to allow the Administration of Coloured Affairs to take action through S1 against those people refusing to pay their taxes, not only because a failure to collect taxes would further embarrass S1, but also because certain of their relatives were involved. With the exception of AH, the Members were prepared to co-operate in covering up the financial scandal, although some showed their disapproval by staying away from the meetings; AH and BB from the first, and BB and WR from the last. After these meetings nine months elapsed before there was another meeting of the Advisory Board, but the annual election was held as usual. WR and SW resigned and were replaced by CW and PW, both as conservative as the men they replaced. AH made himself available for re-election only after some considerable discussion with his supporters, as he himself was reluctant to be further associated with the Development Programme and what he considered to be indefensible corruption in the administration. Although his supporters unanimously agreed with his views, they nevertheless considered it necessary for the headman to remain in touch with political affairs in the Advisory Board. AH's son AdH summarized the position to me with a fine distinction: 'The headman will have to bow down to the Coloureds, but the Kaptein does not'. As noted above, despite the fact that these two offices have been united in one man since the early 1960s they have nevertheless remained conceptually distinct. This was a good example of how the Herero leaders justified working with the 'Coloureds' while remaining strictly apart socially. As

an ethnic group the Herero looked down on the other Damaras but used the identity 'Damara' to obscure their origins and lessen the risk of being reclassified 'Black' yet, at the same time, in making this distinction signalled their determination not to 'lower themselves' (as informants expressed it) into the 'Coloured' category and thereby abandon the charter received from Maharero in the 1920s.

THE END OF THE STRUGGLE, 1979–1980

The new Superintendent (S2) opened his period of office in March 1979 by convening a meeting of the Advisory Board at which he gave the Members the official explanation of the shortfall in the Board's funds ('administrative oversights') and informed them that he intended to take immediate action against people refusing to pay their taxes by depriving them of their voting rights until they had made their payments. The Members objected, however, and he agreed to a compromise put forward by AW in which defaulters were to be allowed a period of grace for one month; he also urged the Members to use their personal influence to encourage the payment of taxes (Official Minutes, 9/3/1979).

If the older Members WR and SW had withdrawn from public office despairing that they would ever be able to control their own affairs in the way that they wished, their successors were more sanguine. When the officials B and C attended the April meeting of the Advisory Board and discussed the progress made in implementing the Development Programme, their presentation was abruptly interrupted by PW and CW who stated that they refused to permit the Programme to go any further, pointing out that the Reserve could not be divided into camps because the surface area was too small and that the mountains were practically useless as grazing. When the other Members indicated their agreement an argument ensued, with the officials repeatedly demanding that the Members reconsider their decision and warning them that their action could have 'adverse effects' on the town-planning programme by causing more delays in its implementation. After some discussion among themselves, PW and CW eventually agreed to return to the compromise proposal of allowing the town planning to continue but called for an immediate halt to the agricultural planning of Pella. Neither the officials nor, later, the Regional Office was prepared to accept this and as a result the entire Development Programme again came to a standstill.

The following three months were an unhappy time for the administration at Pella. Another inspection of its financial affairs revealed that S2 had followed his predecessor's example in using Advisory Board funds to pay his debts and finance his dealings in liquor, as well as 'other purposes'. A hastily-convened meeting to arrange another cover-up of the scandal ended in confusion after a series of angry exchanges between S2, the Baster members and AH. Apart from the strong criticism levelled by the Members at S2 and the Administration of Coloured Affairs in general, in-fighting among the Members erupted when AH refused, in the strongest possible terms, to co-operate any further with them in helping 'the Government'. PW, SW and BB responded by threatening to demand the removal of the Damaras 'because they were causing trouble', couching their remarks in offensive and abusive terms (according to S2, AW and AH), whereupon AH walked out

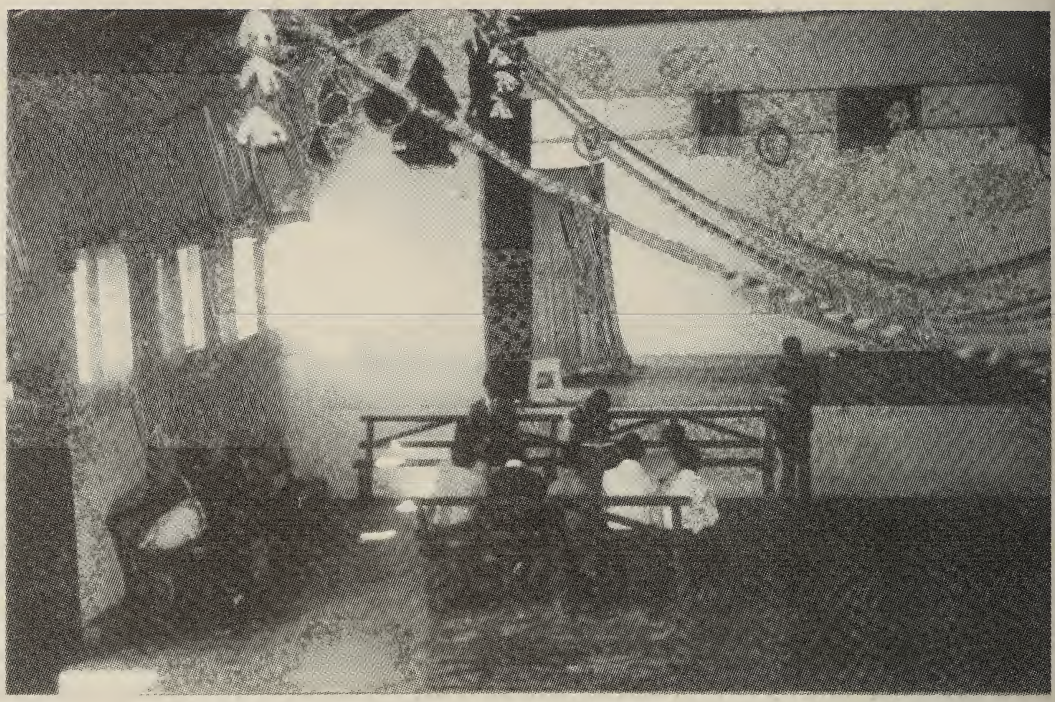

Figure 24
The Superintendent's annual 'report-back' meeting with the 'community of Pella' on 30 December 1979 in the Village Hall, with S2 reading his report on the Development Programme and EMA taking the Minutes. The members of the 'community' are seated on benches that were originally made by Bishop Simon and Fr. Wolf as pews for the Cathedral.

with a parting flourish reminiscent of the 'assegai-vergadering' of 1951. As at that aptly dubbed meeting, AH again threatened a 'bloodbath' if anyone tried to force the Damaras off the Reserve. The Basters took such threats very seriously, much to the secret amusement of AH who in discussions with me often mocked Baster fears of the 'wild savages up on the ridge' (Melkbosrand—the neighbourhood area in Pella village where most of the Damara and Herero people lived at that time). After the meeting BB handed in his resignation, refusing to be further associated with the administration until it had been 'cleaned up', but the other Baster conservatives saw no objection to assisting in resolving S2's predicament. They had realized the value of having the Superintendent beholden to them in their dealings with the Administration of Coloured Affairs, and they also hoped to gain concessions from the Administration in return for their assistance. They did not subsequently exploit this situation, however, apparently preferring to allow the possibility to rest as a passive threat to the Superintendent.

The annual election that followed closely after these events was almost entirely boycotted by the residents as a result of dissatisfaction with the state of affairs in the administration, although it was also interpreted to me by AW as indicating indifference on the part of the people to their own interests. CW, AW and PW were joined by GJ and VD, both Baster conservatives, although VD was inclined to take a rather more pragmatic

stand on issues such as the presence of the Damaras at Pella, in contrast to GJ who was even more extreme in his views than WR. AH did not make himself available for re-election, having let it be known that he was no longer interested in co-operating with the 'Coloureds' while they continued to attack him and the Damaras and to condone corruption in the administration. There were no Damaras present at the election and AH appears to have spent the day at his home at Mik. For all their prejudice, the Baster Members found this disquieting, as the rising tension between Basters and Damaras was being accompanied by the occurrence of unpleasant incidents in the village. During fieldwork in Pella at that time, I noted that people from both groups were decidedly more aggressive towards one another than had been the case during previous periods of fieldwork. This was particularly noticeable when they were in close proximity at the shops, dances and filmshows, where there were frequent altercations and occasional fights with ethnic overtones, especially among the younger people. Although the Members decided that one of their number should undertake to represent the Damaras' interests in meetings of the Advisory Board, their choice of GJ scarcely inspired confidence among the Damaras who regarded this appointment as yet another direct insult.

The manner of GJ's appointment is in itself a good example of how carefully S2 had to tread in his dealings with the Members following the financial scandal, and of then prevailing ethnic attitudes. Whereas S2 had previously dominated meetings he was now left virtually bereft of authority, with his transfer pending the appointment of a new Superintendent, and proceedings in the meetings held from then on under his chairmanship continued according to a logic of procedure, rather than from any attempt on the part of either S2 or the Members to direct them (the meeting given above in the section on the Advisory Board as an administrative instrument as an example of procedure took place during this period). This neutral compromise on 'business as usual' is clearly demonstrated below:

Extract from Proceedings at an Ordinary Meeting held on 30 August 1979 (Field record of proceedings at the meeting.)

... AW told S2 that the Members must decide who is to represent the various districts in the Area, as is customary after each election. S2 agreed that this was an important matter, especially that AH was no longer there. AW and PW stated that they and CW would retain their districts and that VD should take over that of BB, leaving GJ to deal with that of AH. However, GJ was unwilling to have to represent the 'Rivierwyk' (consisting of Mik, Rooipad and Pella Drift) as he was not interested in 'kaffers en hotnotte' and would have preferred to have the ward containing 'his' hamlet of T'Nougab. AW then pointed out that GJ was one of the new Members who had to 'learn' how to handle a ward. All the other Members had their wards and it was the only one left for him—in due course it would be his turn to have one of the big wards. GJ then asked if they could not make another arrangement, such as letting the Superintendent look after the 'kaffers' and dividing up the wards on the plains more equally among them, but the other members did not accept this.

S2 then said that if GJ did not want to have to work with people whom he did not like, or did not wish to neglect his farming activities to have to travel to the other hamlets, then he (S2) would type out instructions and notices that GJ could arrange to give AH whenever they were in the village at the same time. The Members and GJ agreed to this proposal, GJ adding that in any case people ignored the notices at the shop and Advisory Board Office and that the 'kaffers' would only listen to AH....

Not only does this example show the negative attitudes and hostility of the Baster conservatives towards the Damaras, but it also shows the extent to which the members of family grouping W could dominate the others, particularly GJ. Although GJ was related to them (Fig. 19) and was a wealthy farmer, he was nevertheless regarded as junior to the others, both because he had only recently been elected and because he came from a family that had achieved prominence from its farming activities rather than from the length of its residence at Pella. The differences between the Members soon paled, however, in the face of a renewed attempt by the Regional Office to settle the question of the Development Programme once and for all, for the officials involved had evidently been encouraged by the appearance of new, possibly more pliable, Members on the Advisory Board. Changes in policy towards the 'Rural Coloured Areas' had made it possible for the Regional Office to be more accommodating towards local conditions in the Reserves under its control and thus more receptive to compromise proposals if these were offered.

A meeting held on 31 August 1979 attended by the official B from the office of the Regional Representative of the Administration of Coloured Affairs proved to be the decisive culmination of the dispute between the Advisory Board Members and the Administration. As the start of the meeting had to be delayed owing to the late arrival of the official B, the Members agreed to a suggestion from S2 that, while waiting for B, they should deal with a case involving a dispute between CP, a Damara youth, and HM, the Baster teacher who had previously been the secretary of the Advisory Board. CP (a former pupil of HM) had been stabbed by HM in a fight at a dance held in the community hall in July 1979, after he had taunted HM for his association with the conservative Basters on the Advisory Board and for being a homosexual. HM refused to pay CP's medical costs, and CP (ironically) took the matter to the Advisory Board. As the Members regarded CP as a 'trouble-maker' in the village, they took HM's side in the matter and declined to handle the case, leaving S2 with no option but to advise CP to approach the priest to act as an intermediary. Had AH still been serving on the Advisory Board it is unlikely that the matter would have been so summarily dismissed, but as it happened the priest was able to settle the dispute in favour of CP by threatening to cut off further financial assistance to HM, who was pursuing a higher teaching qualification. The meeting began immediately after this case, as the official B had arrived while the hearing was in progress.

Summary of Proceedings at an Ordinary Meeting of the Advisory Board, held on 31 August 1979 (From the official Minutes, 31/8/1979, and my fieldnotes of the proceedings)

Present: S2 (Chair), VD, GJ, AW, CW, PW, B (Visitor—senior official of the Regional Office of the Administration of Coloured Affairs at Upington), GPK (Visitor—researcher)

After opening the meeting S2 addressed the Members, reminding them that B expected a firm decision to be taken on the acceptance of the Programme. The Members are the leaders of the community and must be aware of public opinion and sensitive to shifts in it. All the same, the people elected them and would have to be happy with the decisions they take on their behalf. That day an important decision had to be taken on behalf of the people, which would affect the future of everyone at Pella, and it was therefore no time to think in the same way as the forefathers—times have changed since then.

B informed the Members that he had taken note of the opinions of the Members on the Development Programme at previous meetings, and stated that it had been difficult for the Regional Office to implement the Programme due to factors beyond its control and unconnected with Pella. He expressed regret that only two of the Members had accepted invitations to attend a conference of the other Management Boards in Upington earlier that month, as they would then have been able to hear about and see what could be achieved by means of systematic planning of the natural resources, such as had been done in the other Rural Areas—only Pella remained undeveloped. He reminded the Members of the statement of the Member of the Coloured Persons Representative Council responsible for Rural Coloured Areas on what happened in Areas that refused to accept the planning of their resources—the Management or Advisory Board would be suspended by the Minister, and the Development Programme would be implemented under the control of 'White' officials from the Regional Office.

B then set out the Development Programme in detail for the benefit of the new Members, pointing out that the plan for establishing 'economic units' had been abandoned, and that the land would be divided into four camps that would be fenced and the livestock rotated among them under the control of an officer to be appointed for this purpose. The people could thus go on farming as before, but the number of animals would be strictly controlled in the camps and the rest would have to be kept on the commonage. He went on to state that only applications from *bona fide* farmers for grazing on State Land west of Pella would be considered, and that these farmers would have to show themselves capable of farming in the correct manner.

Turning to the town planning proposals, B stated that the intention was to begin developing the village as soon as possible, because, as the Member of the Coloured Persons Representative Council had said, 'Rural Coloured Areas' were from then on to be just places in which people will live as Coloureds [*sic*] (see above). This involved the laying out of roads and plots, as well as connecting the village to the Pella Drift–Aggeneys pipeline so that each plot could be supplied with water. Plots situated outside the planned town unit would be linked to empty plots in the town unit, so that every occupier would have access to a tap where he could obtain purified water. Persons not living in the unit would be taxed for two plots, and all would be taxed for water used, as measured on a meter that could be locked by the occupier.

The Members reacted unfavourably to B's statements, and he reminded them of his opening remarks. They pointed out that the plan had not been drawn up in consultation with them, whereupon B stated that he was consulting them at that moment. Although the Members were prepared to accept the proposed division of the grazing, they saw problems as to who would be able to make use of the controlled areas. PW suggested that no government official or pensioner be allowed to keep livestock after the Programme had been implemented; he was supported by the other Members and B accepted this. The Members continued to hesitate, and eventually B demanded a clear answer to his repeated question as to whether they accepted the Programme or not, at the same time reminding them of the consequences of a negative answer. The Members then agreed to accept the Development Programme in its entirety and to recommend formally that it be implemented without delay. After commenting on their wisdom in doing so, B dictated to S2 the conclusion of the resolution, so that it read as follows: 'The Advisory Board accepts unanimously the planning of Pella, and confirms also that this decision may not be with-drawn again in the future'. (As B arrived late for the meeting, S2 did not have the opportunity to introduce me to him in any detail. B went through the meeting on the assumption that I was a Coloured Affairs official from Cape Town, and was disconcerted after the meeting to find that I was a post-graduate student from the University of Cape Town. I was able to re-assure B that I had no intention of writing an exaggerated account of his steamroller tactics in the meeting.)

With this decision came the end of formal resistance to the Development Programme on the part of the Advisory Board, and the Administration of Coloured Affairs was able to proceed with the implementation of the principal components of the plan. The Members, in particular the conservatives PW and GJ, were depressed after the meeting on account of the manner in which they had been forced to accept the plan, but they were generally agreed that the people would have little objection as the principal difficulties had been cleared up with the new proposals. They all doubted, however, that even the obvious benefits that would follow from the Development Programme would encourage the people to regard the Advisory Board with as much favour as when it had been first established.

While the Regional Office was able to register satisfaction at the course of these events, problems with the administration in Pella continued and swiftly deteriorated. S2 was trapped in a police raid on illegal dealers in liquor, and he was forced to resign his post, shortly after having received a severe reprimand for having used Advisory Board funds for his own purposes earlier in the year. Due to a lack of a suitable replacement, however, the Regional Office left him to oversee routine matters, but for several months there were no meetings of the Advisory Board and local government all but came to a standstill. At the beginning of 1980 S2 was replaced by a 'White' official from the Regional Office who was to act as Superintendent until a successor could be appointed. For the Administration of Coloured Affairs, this conveniently ensured that a 'responsible' official would be present while the Development Programme was being implemented. For the Members and the inhabitants of Pella, these events merely served to emphasize again

that they were powerless to do more than delay the intentions of the outside authorities. Many of my informants pointed out how the administration of Pella had come a full circle—from a European-dominated council under the Bishop and his priests to a 'White' official under the Administration of Coloured Affairs, with the 'Coloureds' having to be present just as observers.

In retrospect, one can see that the picture at the end of 1979 was not as gloomy as suggested by the opinions of the Members and my informants. Their general objection to the original proposals was essentially that such an inflexible pattern of development would have been inequitable and would have furthered internal differentiation of a kind which they considered unacceptable. Objectively viewed, a combination of internal and external factors won for the Baster conservatives an alteration in the Development Programme in the direction that they desired, yet simultaneously actually served to strengthen their position by giving them a more secure grip on the Advisory Board as the instrument of administrative power over the community, even though ultimate control still rested with officials of the Administration of Coloured Affairs. Even after the Advisory Board had been upgraded to the status of a Management Board after 1987, there was little real change in the situation as the chairman of the Board was held accountable for local compliance with the ongoing programme of developments. There is an analogy here with the situation during the period of missionary rule over Pella, but when one considers that administration by a bureaucracy rendered weak through subjection to the course of political events elsewhere in the Republic had been combined with an incipient ruling class of conservative peasants, it is clear that, as elsewhere in Namaqualand, a powerful bulwark had been raised against the forces of progress.

Although the transitional local councils instituted in the Reserves under the interim constitution of 1994 and the constitution of 1996 subsequently drew the diverse local interest groups temporarily together, the new local government structures to be established in 2000 in Namaqualand will have to function within the framework of a district council that will be incorporating the competing interests of the communal areas (Reserves), neighbouring urban settlements and commercial farming areas. In the case of Pella, which will probably have a ward council to support its representative on the new district council, it will be of considerable interest as to whether or not the pattern of peasant resistance to outside political control and socio-economic changes will be any more effective than it was in facing the regenerationist 'fortress' of the Catholic missionaries or the secular 'apartheid' structures.

CONCLUSION

This monograph has sought to illuminate the nature of the relationships between certain groupings of people within the context of the political system in the Pella Reserve. In using a diasynchronic method of analysis, it has been possible to treat the authority structure as a dependent variable in the political process, enabling the dynamic nature of the political system to be captured in an examination of the changing form of the decision-making system through time.

During the hundred years of secular control of Pella by the Roman Catholic Church the system of local government was characterized by a highly centralized authority structure that enabled the missionaries to exercise wide-ranging powers derived from their position as both spiritual leaders and temporal rulers. The position of the missionaries was legitimated by the fact that missionary control of communities was recognized as forming an integral part of the general system of local government in South Africa during the period of European rule. Although the missionaries at Pella were not held personally responsible for their administrative function by the central Government, they were none the less accountable to the hierarchy of the Church. The concentration of authority in the structure of Church government produced a personalized form of local government based on the authoritarian relationship between the priest and his congregation that resulted in an autocratic rule, mediated only by the process of routinization. Ultimately the missionaries' position of authority was undermined by political processes set in motion by the elaboration of the 'apartheid' policy by the Nationalist Government after 1948, and they were eventually forced to transfer their secular control of Pella to the central government. Subsequent administrative development incorporated the community into the formal bureaucratic system of local government for people classified as 'Coloured' in South Africa. The removal of those of the inhabitants who had been classified as 'White' was a major step in the subjection of the community to the application of national policies through the extension of central government laws and administrative enactments. In this period, in contrast to the personalized rule of the missionaries (assisted from time to time by largely powerless councils), the decision-making process under the new system was placed in the hands of officials outside the Reserve but, as the provisions of the constitutional structure for 'Coloured' people called for participation by the community in the political process, the new political elite, consisting mostly of the leaders of the Baster peasantry, was able to manipulate the system for its own benefit and exercise a degree of control over its affairs previously beyond its reach.

In reviewing the process of political incorporation it is clear that there was a certain continuity of form between the missionary and bureaucratic systems of local government that resembles a similar continuity observed in the Reserves in Namaqualand (Carstens 1966, Sharp 1977). Pella Reserve differs from the Reserves in Namaqualand, however, in that, whereas the Namaqualand Reserve councils were transformed into boards of management with an enhanced degree of authority and power (but not necessarily legitimacy), in Pella the authority structure altered in outward appearance while its essential content remained the same, with the balance of power unaffected on account of

legal restraints placed on the performance of new socio-political roles by members of the ruling class. The fact that this transformation took place within a process of political incorporation designed to establish a distinctive type of administrative structure required by Nationalist policy meant nevertheless that the position of the participants themselves was shifted.

During the period of Church control the various councils established under the custumals were used by the missionaries as devices to channel the aspirations of the ruled class and resistance to the missionaries' authoritarian rule into harmless avenues of expression, and the participants were regarded by the missionaries as little more than useful instruments to these ends, even though some of them endeavoured to use the councils as platforms from which they could attempt the realization of fundamental changes in the system of local government in their favour. In contrast, the Advisory Board conceded a modest measure of influence over the decision-making process to its Members, including them as an integral part of the system of local government and offering them the possibility of political advancement for as long as they co-operated with the administration. For this reason the Members faced difficulties in role performance due to the necessity of resolving the conflict between demands made on them and the community by the regional government, personalized in particular by the Superintendent, and the interests of their supporters. This intercalary position required that they reconcile their role in the implementation of government policy, which was inherent in their acceptance of seats on the Advisory Board, with the problem of securing legitimacy for that policy from their supporters, an ongoing contradictory situation that changed little after the upgrading of the Advisory Board into a Management Board, and which continued in the interim local authorities established after 1994 and 1996 (pers. com. C. Cloete).

The political process in the Pella Reserve has to be understood in the context of the wider struggle that was being waged between the ruling class and the ruled class for control of scarce and valued resources. It has been argued that it is not the structures of social differentiation and government that have determined the course or the outcome of class struggle, but rather that the structures themselves have emerged from continuous processes of class struggle, so that struggles and structures stand in a dialectical interrelationship (Morris 1976: 5). At Pella the struggle for power was cast in terms of both class and ethnicity, with the latter serving to create a diversity of interests in both rulers and ruled so that the resulting differentials in access to symbolic power generated the political process. Simultaneously, however, this conflict enabled forces beyond the community to exploit the dependency between ethnicity and class as a means of furthering the wider struggle in a desirable direction. It is ironical that in their struggle to obtain control of the Pella Reserve the Baster peasantry perceived the Church as being wholly in league with the 'White' inhabitants, for while they saw the conflict as cast in terms of altering the ethnic basis of control of the resources of the Reserve they were unaware that in supporting the Government against the Church they were destroying their shield against final incorporation into the system of capitalist domination. The position of the Church on these issues was far from static and was evolving according to principles laid down at Vatican Council II to meet new and changing circumstances in South Africa.

This conjunction of struggles and structures is by no means unique to Pella, or even Namaqualand as a whole, and further reflects a struggle at national level (Sharp 1981: 11). Any society that is in transition from pastoralism and/or agrarianism to industrialism is of necessity fragile on account of disparate degrees of development in its components and can thus be easily mastered by a resolute minority ready to rally conservative interests against the emergence of mass politics. As was shown above, the modified, renewed policy of 'apartheid' of the Nationalist government being implemented at that time was designed specifically for this purpose with its aim of the creation of a new class structure in South Africa (Klinghardt 1979; Molteno 1977). The situation in Pella at the time of fieldwork was a manifestation of the success of this policy, that was to be consolidated in the following decade through the gradual implementation of the Development Programme. The cycle of elites can be seen to have created a new set of conditions that altered the character of the struggle to one of local resistance to progressive forces directed from whatever source, legitimate or otherwise, and thus raised the possibility that the process of administration in the system of local government would be more difficult under any regime perceived by the ruling elite as a threat to its interests.

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RCMP/28. European School Correspondence. No. II
RCMP/38. Important Documents
RCMP/41. Miscellaneous Items of Bishop Thünemann

Diocesan Archives, Roman Catholic Mission, Upington

RCMU/1. File A. Diocese History. Documents.
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APPENDIX A

CERTIFICATE OF OCCUPATION, 1874

Under authority of the Government surveyor by letter of the Hon'ble the Commissioner of Crown Lands and Public Works, No. 875, dated 31st March 1874, I do hereby certify that the Most Reverend Dr. Leonard, Roman Catholic Bishop and Vicar Apostolic, Western Districts, Cape of Good Hope, and his Successors in that Office, have permission to locate certain Roman Catholic Priests of the Society for African Missions and their followers, upon the Crown Land known as "Groote Pella", situate in the Division of Namaqualand on the Orange River, and described as in extent about ten thousand (10,000) morgen (equivalent to about 21,165 acres English measure), on the following Conditions:-

I. That the occupation of the said land shall not begin before the expiration of the existing annual lease thereof; and that the said occupants shall not be disturbed until the said land shall have been advertised for lease under Act No. 19 of 1864.

II. That notice shall be given by the Government to the said Most Reverend Dr. Leonard or his Successors in Office, of at least one year previous to the termination of this permission to occupy.

III. That Government Land Surveyors employed in the survey of Crown or other Lands, with their assistants and servants, shall have the right of access at any time to any part of the said Land for professional purposes, and the right of occupying any part of the said Land and grazing and watering their cattle or horses on all pastures and at all waters.

IV. That all roads running over the said Land may be used by the public as cattle Thoroughfares ("Trekpaths") to the extent of two hundred (200) yards on each side of any such road.

V. That the public travelling shall have the right of outspanning on any part of the said Land.

VI. That the right of searching and mining for ores, metals, minerals, or precious stones upon the said Land is reserved to the Government, or to any person authorised by it.

VII. That the Government does not undertake to point out any beacons.

VIII. That should the Description given of the said unsurveyed land be such as to take in any part of a surveyed lot already leased, the lease shall stand precedent.

IX. That the Government will not be prepared to make any compensation to the said Most Reverend Dr. Leonard or his Successors in Office, at the termination of this

permission to occupy, for any Improvements made by him or these without formal authority from the Government—should such authority be desired in respect of any contemplated Improvements, the Applicant will have to state the character, object, situation and estimated cost of such Improvements; and further supply all such particulars as may be required to enable the Government to judge whether or not, and for what maximum amount, any contingent eventual claim for compensation ought to be entertained on termination of this permission to occupy. Compensation will be made in respect of such Improvements, in the event of the Applicant not becoming the Owner or Leasee of the said Land. Such compensation will in no case exceed the amount either of the estimated or of the actual costs of authorised Improvements and will be determined by valuators appointed for the purpose in the following manner, viz.:- one valuator to be appointed by each side, and a third to be chosen by those two, before proceeding to act—and the award of such valuators or any two of them shall be final.

X. That any existing Improvements on the said Land shall be kept in good repair during the duration of this permission to occupy and be delivered up in good repair at its termination—but that no compensation will be given in respect of such improvements.

XI. That the said Most Reverend Dr. Leonard, or his Successors in Office, shall not let any portion of the said Land or any buildings or erections thereon, without the sanction of the Government.

XII. That the Government may cancel this permission to occupy forthwith, without any notice, upon the breach of any of the Conditions of Occupation herein set forth.

Surveyor General's Office,
27th July, 1874
(sgd) A. de Smidt
Surveyor General

Appendix

I do hereby certify that the right of occupation conveyed by this Inclusurement to the Most Reverend Dr. Leonard, Roman Catholic Bishop and Vicar Apostolic at the Cape of Good Hope, has been transferred to the Very Reverend John Devernoille, Administrator and Vice-prefect Apostolic, Central District of the Cape of Good Hope. (See letter from the Hon. the Commissioner of Crown Lands and Public Works dated 8th December, 1874, to my address).

(sgd) A. de Smidt
Surveyor General

Surveyor General's Office,
17th February, 1875

Source: RCMP/1

APPENDIX B

CERTIFICATE OF OCCUPATION, 1881

Under authority of the Government, conveyed by a letter of the Honourable the Commissioner of Crown Lands and Public Works, No. 905, dated 9th May, 1881, I do hereby certify that the Very Reverend Auge Francois Gaudeul, Vice Prefect Apostolic of the Cape Central Districts, and his Successors in that Office, have permission to locate certain Roman Catholic Priests of the Society for African Missions, and their followers, upon the Crown Land known as "Groot Pella", situated in the Division of Namaqualand, on the Orange River, and described as extending on the West to the "Klein Resinbosch River", a dry watercourse, from a place on the Orange River called "De Myk" up to Klein Resinbosch; on the South to the Road from Klein Resinbosch to Pofadder, so far as its intersection with the Road from Pella to Pofadder; thence, on the East, to a straight line to the nearest point of the Mountain range North-East of Pella; thence, on the North, to the said Mountain range as far as the place called "Rooi Pad", on the Orange River, where the mountain range comes to the water's edge; thence, on the North-West, to the Orange River so far as "De Myk"; on the following Conditions:-

I. That the said Occupants shall not be disturbed in their occupation of the said land until it shall have been advertised for Sale under the provisions of Act No. 14 of 1878.

II. That notice shall be given by the Government to the said Very Reverend Auge Francois Gaudeul, or his Successors in Office, at least one year previous to the termination of this permission to occupy.

III. That Government Land Surveyors employed in the Survey of Crown or other Lands, with their assistants and servants, shall have the right of access at any time to any part of the said land for professional purposes, and the right of occupying any part of the said land and grazing and watering their cattle or horses on all pastures and at all waters.

IV. That all roads running over the said land may be used by the public as Cattle Thoroughfares (Trekpaths) to the extent of two hundred (200) yards on each side of any such road.

V. That the public travelling, shall have the right of outspanning on any part of the said land.

VI. That the right of searching and mining for ores, metals, minerals, or precious stones upon the said land is reserved to the Government, or to any person authorised by it.

VII. That the Government does not undertake to point out any beacons.

VIII. That should the description given of the said unsurveyed land be such as to include any part of a surveyed lot already leased or granted, the lease or grant shall stand precedent.

IX. That the Government will not be prepared to make any compensation to the said Very Reverend Auge Francois Gaudeul, or his Successors in Office, at the termination of this permission to occupy, for any Improvements made by him or them without formal authority from the Government. Should such authority be desired in respect of any contemplated Improvements, the applicant will have to state the character, object, situation and estimated cost of such Improvements; and further supply all such particulars as may be required to enable the Government to judge whether or not, and for what maximum amount, any contingent eventual claim for compensation ought to be entertained on termination of this permission to occupy. A record should be kept of all authorised Improvements, and on termination of this permission to occupy, compensation will be made in respect of such Improvements, in the event of the applicant not becoming the proprietor of the said land. Such compensation will in no case exceed the amount either of the estimated or of the actual cost of authorised Improvements and will be determined by valuators appointed for the purpose in the following manner, viz.:- one valuator to be appointed by each side, and a third to be chosen by those two, before proceeding to act – and the award of such valuators or any two of them shall be final.

X. That any existing Improvements on the said land shall be kept in good repair during the duration of this permission to occupy and shall be delivered up in good repair at its termination, but that no Compensation will be given in respect of such Improvements.

XI. That the said Very Reverend Auge Francois Gaudeul, or his Successors in Office, shall not let any portion of the said land or any buildings thereon, without the sanction of the Government.

XII. That the Government may cancel this permission to occupy forthwith without any notice upon the breach of any of the Conditions of Occupation herein set forth.

(sgd) A. de Smidt,
Surveyor-General

Surveyor-General's Office,
9th June, 1881.

Appendix 1

KNOW ALL MEN BY THESE PRESENTS, that I, the undersigned, Francis Gaudeul, Roman Catholic Priest, at present of Cape Town, do hereby, in my capacity of Administrator of the Roman Catholic Missions of the Central Prefecture of the Colony of the Cape of Good Hope, nominate, constitute, and appoint the Most Reverend John Leonard, Roman Catholic Bishop of Cape Town aforesaid, to be my true and lawful attorney and agent, with power of substitution, for me, and in my name, and on my behalf, to occupy, manage, use, and administer the missionary house, land, and other property situate at Pella, Namaqualand; and also for me and in my name to act with the Colonial Government, and all or any other persons or person interested, in respect of such missionary place and property as aforesaid; and also for me and in my name to make and do all lawful acts and things whatsoever in and concerning the said premises as fully and effectually as I might or could if personally present and acting thereon; hereby ratifying, allowing, and confirming, and promising and agreeing to ratify, allow, and confirm, all and whatsoever my said attorney and agent shall in my name lawfully do, or cause to be done, in and about the premises, by virtue of these presents.

Thus done and executed at Cape Town this Twenty-fifth day of October, in the year of Our Lord One Thousand Eight hundred and Eighty-two, in the presence of the subscribing witnesses.

(sgd) A. F. Gaudeul

As Witnesses:
(sgd) John J. O'Reilly
(sgd) John O'Dwyer

Appendix 2

Under authority of a letter of the Honourable the Commissioner of Crown Lands, dated 11th December, 1882, I hereby certify that this Ticket of Occupation is transferred with the consent of the Very Reverend Auge Francois Gaudeul to the Most Reverend John Leonard, Roman Catholic Bishop of Cape Town.

(sgd) J. Templer Horne,
for Surveyor-General

Survey Office,
2nd March, 1883

Appendix 3

By a deed of the 5th September, 1917, and the 4th December, 1917, the right hitherto possessed by the Roman Catholic Bishop of Cape Town, by virtue of this Certificate of Occupation, in respect of a certain portion of the within property, in extent approximately 200 hundred square roods, and certain buildings, etc., thereon, has been renounced and

waived in favour of the Government of the Union of South Africa, as will more fully appear on reference to the deed filed in this Office with the duplicate original certificate thereof.

Deeds Office, Cape Town,
6th December, 1917

Appendix 4
Government rights cancelled. Vide certificate filed with counterpart.

Registrar of Deeds(sgd)
Assistant Registrar of Deeds (sgd)

Deeds Registry, Cape Town,
31st July, 1940

Countersigned by Bishop H. J. Thünemann, 17th April, 1942

Sources: i. Certificate of Occupation; Appendix 1, 2: RCMP/1
ii. Appendix 3, 4: RCMU/1

APPENDIX C

The following Regulations on the use of Liquors
compel all the Inhabitants of Pella.

---

1) To bring or have brought on Pella any intoxicating liquors such as Beer, wine and Brandy unless a permit has been given to the effect and which must be renewed for each.

2) It forbid to search honey on Pella ground without having the same.

3) All liquors such as Beer wine brandy that shall be brought to Pella without this permission shall be confiscated and in such case always destroyed.

4) Those who become intoxicated on Beer wine or brandy be procured with permission shall be punished as follows:
   (a) All Beer, wine or Brandy which he yet possesses shall be confiscated and destroyed.
   (b) He shall be made to give in the written hand, that he will not use liquors, namely Beer wine or Brandy, before at least twelve months are passed.

5) The privilege given to live at Pella shall no longer be granted to these Offenders, under these Regulations.

6) Guilty Offenders of the Government service shall be reported to their Superior, namely the Magistrate, the Chief Constable.

Source: RCMP/3

APPENDIX D*

The following Regulations for the Moral Benefit
compel all the inhabitants of Pella.

---

1) Women shall not appear in the Village with clothes such which provoke the evil passions of men.
   (a) Forbid to women are Dresses tight in certain places, or short above the ground.
   (b) It is shameful for women to wear dresses of short Sleeve or made low in front.
   (c) Women shall wear Stockings at all times.

2) Girls of the age 12 and more to wear dresses that shall reach to the knees, and they must wear Stockings at all times.

3) Boys shall not appear in the Village with the upper legs naked.

4) Girls shall not walk out in hidden places. This is immoral and dangerous.

5) It is forbid to All to dance, except with my permission.

6) Those who ignore these Regulations are Offenders before the Holy Church, and in such case the privilege given to live at Pella shall no longer be granted.

*Regulations (1) to (6) were issued by Bishop Simon in 1887, and they were later confirmed by Bishop Thünemann along with (7).

Additional Regulation

(7) No respectable, decent woman or girl is ever to be seen on a bicycle.

Approved by the Chairman and Council,
(sgd)+ H. J. Thünemann
Pella, the 11th June, 1941

Source: RCMP/3

APPENDIX E

V + J

RULES FOR THE GENERAL GOVERNMENT OF PELLA

I. Under the Certificate of Occupation the Crown Land Pella is given as a farm to the Roman Catholic Church, represented by the Head Missionary.

II. The Head Missionary has the following rights:

1. to admit people wishing to reside at Pella, who are Catholics or who are convinced of the Truth of our Holy Religion.
2. to compel the departure of those guilty of public scandals, such as beer-brewing, dancing without permission, adultery and fornication, disgraceful or disrespectful conduct, for between two and three years, or permanently.
3. to grant and withdraw trading rights.
4. to give permission to use pasturage and watering places on the farm.
5. to give permission to build houses, on condition that the occupants demolish such buildings on the instruction of the Head Missionary in the event of their leaving Pella without giving over the house to another occupant. The Church may hold such vacated buildings for its own purposes.
6. to enter contracts with prospectors, and grant leave to tap milkbushes, and to cancel such contracts.
7. to draw up and apply such regulations as he may deem necessary from time to time.

III. The farm is divided by inspection into six districts, in which each inhabitant shall have a fixed place of residence.

The inhabitants shall not be permitted to roam about at will with their flocks but shall remain in these districts, with an exception being made only in time of droughts.

Each district shall have a Foreman, whose duty it is to look after the affairs of the inhabitants there and to assist the Head Missionary when necessary.

IV. The Ruling Council consists of ten members, being five Europeans and five Natives.

The foremen of the districts are ex officio members of this council.

The remaining members are to be chosen by the inhabitants at a general meeting by means of a secret vote.

The Council shall assist the Head Missionary in the administration and control of the Pella farm.

The Chairman of the Council shall be the Head Missionary or, in his absence, the foreman of Pella. (Bishop Simon's meaning here is that the Mayor of Pella village—foreman of Central Pella—will act as chairman).

V. A portion of the pasturage is to be set aside for the use of transport riders and in time of drought. Fines are levied for trespass in this area. (See Regulations of 1927).

VI. Tax. This is to be levied on each household, and not according to the number of occupants. I can find no record of the collection of taxes before 1927, either on houses or livestock. I assume that Bishop Simon thought of these as contributions rather than taxes.

VII. An inhabitant of Pella, absent for some time, is allowed to retain his privilege to live here on his return, but if he had a grant of land for gardens, etc., then this lapsed on his departure.

The other Regulations of which Bishop Simon writes are those included in the Regulations of 1927, viz. Nos. III, IV, VII, VIII, IX and X.*

(sgd) + F. Esser

22/10/1957

Source: RCMU/14

* Bishop Esser made no reference to the regulations contained in Appendices C and D in his reconstruction, possibly on the assumption that the missionary at Pella would in any case be aware of them. The reconstruction is unlikely to have much resemblance to Bishop Simon's original regulations owing to differences in style, but the content is correct according to the references to them in the documents used by Bishop Esser.

APPENDIX F

V + J

REGULATIONS TO BE OBSERVED BY ALL LIVING ON PELLA MISSION GROUND

I. A part of the grazing at Pella is reserved to large Cattle. Small cattle, like sheep and goats, found grazing in the reserved part, shall be fined 10/– each time they are caught therein by a member of the ruling Council. Out of these 10/– five shall be deposited in the Institute's Cash Box; the other 5/– shall be given to the man who has caught the trespasser.

II. Pella people who keep live stock on the mission ground shall pay every year 10/– per 100 small stock, up to 400, and 10/– per 10 large stock up to 40. This money goes to the Institute's Cash Box and must be paid during the first month of the year. If allowed to keep more, they shall pay an additional yearly tax of £1. per 100 sheep or goats and per 10 large stock exceeding the 400 and 40 generally allowed. These amounts are also deposited in the Mission Cash Box.

III. With the consent of the Head-missionary, the members of the ruling Council may assist outsiders with grazing on Pella, at the rate of 2/6 per month for 100 sheep or goats or for 10 heads of large stock. The money must be paid in advance to the Foreman who shall Deposit same in the Institute's Cash Box.

IV. Are called Outsiders all who belong to another Denomination, also Catholics who possess their own farm or who, having no ground of their own, live outside of Pella. However, these Catholic outsiders may be admitted on the Mission property, when Pella has abundant grazing and at the rate of 1/– per month for 100 sheep or goats or 10 heads of large stock.

V. The £10 paid yearly by the two Stores at Pella go also to the public Cash Box.

VI. The tenth part of the amounts collected in the public Cash Box belongs to the Church. The rest shall be used to improve the place, to clean public Dams, repair public buildings, Church, Schools, Cemetery, Dipbath or to assist very poor members of the Congregation, with the approval of the Chairman and the members of the ruling Council.

VII. Catholics living within three miles from the Church must attend Divine Services every Sunday. Others living at greater distance and yet on Pella ground ought to attend the Sunday Services at least once a month.

VIII. All children must begin to attend school when six years old, and they must stay at school until they pass the VI Standard or have completed their sixteenth year.

IX. People or Parents who fail to comply with Articles VII & VIII or who send their children to Schools unapproved by the Church are liable to lose their rights on the mission ground.

X. All stray animals, whose owner is unknown, shall be impounded. When the owner is known, he shall be notified to take his live stock away from Pella. If he takes no notice of the warning the animals shall be impounded.

XI. The permission formerly given to have a space of grazing for lambs, calves, etc. is withdrawn.

Pella, January the 4th 1927
(sgd) + J. Simon

Source: RCMP/1

APPENDIX G

V + J

GENERAL REGULATIONS FOR THE ADMINISTRATION OF THE PELLA MISSION GROUND

I. A Council (or 'Raad') shall be appointed to assist the Head of the Mission.

This Council shall consist of six members to be elected by the Occupiers of the Pella Mission Grounds, and a Chairman who will always be the Bishop of the Vicariate of Keimoes, or his authorised representative.

By Occupiers is here meant all persons of whom the Council may demand the payment of fees, as set out below.

Councillors are to be appointed for a period of three years. A member can nevertheless make himself available for re-election after this period.

The Chairman may at any time ask a member for his resignation.

II. A Secretary shall be appointed by the Council.

The Secretary will be responsible for ordinary secretarial work as well as for financial affairs concerning the Council.

His salary will be determined by the Council.

A Councillor may hold this office.

III. Ordinary meetings of the Council shall be held every two months on the second Wednesday of the month.

Extra-ordinary meetings may be held at any time when it is considered necessary.

Members who do not attend these meetings must give the reasons for their absence in writing to the Chairman.

IV. Further Regulations may be made by the Council on the majority of votes.

The Chairman, however, reserves the right to approve or reject any motion or proposed Regulation, even when the majority of votes is in favour of or opposed to such.

V. All regulations approved by the Council and the Chairman and properly made known to the Public by the Secretary must be carefully adhered to by all the persons concerned.

VI. Subject to the approval of the Chairman, the Council shall have the right to apply the following punitive measures when the Regulations are broken or ignored:-

(a) Fines.

(b) Withdrawal of rights to pasturage.
(c) The Offender obliged to leave the Pella Grounds.

VII. A portion of the pasturage on Pella, as determined by the Council is to be reserved for largestock.

The owners of smallstock found in this portion shall be fined ten shillings (10/–) each time such livestock is caught trespassing in the reserved portion by any inhabitant of 17 years or older.

Of these ten shillings, five shall be placed Cashbox of the Council, and the other five shall be handed to the person who caught the offender.

VIII. Approved inhabitants of Pella may keep largestock and smallstock on the Pella pasturage, according to the Regulations and subject to the following conditions and rates.

The Rate for smallstock, i.e. sheep and goats, is as follows:-
Up to 400 – one penny per head per year
From 400 to 1,000 – threepence per head per year
From 1,000 to 2,000 – one penny per head per month
A maximum of 2,000 smallstock may not be exceeded.

The Rate for largestock, i.e. cattle and donkeys, is as follows:-
Up to 40 – nine pence per head per year
From 40 to 80 – two shillings per head per year
From 80 to 100 – one shilling and sixpence per head per month
A maximum of 100 cattle and/or 30 donkeys may not be exceeded.

All rates for rights to pasturage must be paid to the Council during the first month of the year, but the Council may arrange otherwise in special circumstances.

IX. The Council may hire pasturage to Outsiders, i.e. to Catholics or non-Catholics who are not inhabitants of Pella or who possess their own land, according to the following rates:-

10/– per month or portion thereof, per 100 smallstock or portion of 100
1/6 per month or portion thereof, per head of largestock
The maximum number of animals for which a hirer can obtain pasturage is to be 1,000 smallstock and 50 largestock

Pasturage shall not be hired to outsiders for periods longer than three months.

X. All stray animals of whom the owner is unknown shall be impounded. If the owner is known he shall be notified and warned to remove his livestock from Pella. If he should pay no attention to the warning the animals shall be impounded.

XI. The permission previously given to keep calves and lambs in a specially reserved portion is withdrawn. Lambs which are definitely over the age of three months will not be allowed in the reserved portion to be determined by the Council.

XII. That district of the Mission Grounds known as Central Pella (or 'Pella Sentraal') shall be defined and marked out with beacons by a committee to be appointed by the Council. Only the inhabitants of Central Pella may hold and make use of rights to pasturage in this defined area. Smallstock belonging to other inhabitants may be impounded if found in this District.

The committee may inspect and define the other Districts if so desired by the inhabitants, and in such cases these provisions on trespass of livestock will also be applied.

XIII. The Secretary shall be responsible for keeping an accurate account of the correct number of animals which each Occupier has on the Pella Mission Grounds.

The Council shall appoint a committee at least twice a year to assist the Secretary and enable him to conduct a thorough census of the livestock.

The committee shall consist of at least two members, one european and one coloured, and if more members are deemed necessary there shall be equal numbers of Europeans and Coloureds.

The committee shall have the right and duty to count the animals of every Occupier and make its report thereon to the Secretary.

Any Occupier who resists the counting of his livestock, or who in any manner attempts to hinder or prevent the duly appointed and empowered committee from performing its task, or who refuses to give the members the necessary assistance, shall be guilty of an offence, and will be dealt with under Articles V and VI.

The Council shall pay a reasonable salary to those appointed to carry out the census and counting of livestock.

XIV. The owners of shops or other business or trading establishments must pay an annual fee of £6 to the Council.

Cases concerning itinerant traders (or 'smouse') and speculators shall be dealt with separately by the Council.

XV. The Secretary of the Council shall hand over his Books to the Chairman at the end of the months of June and December of each year, when the Chairman may, if he thinks fit, audit them.

The Secretary shall also at the said times hand one tenth of the cash balance in the Council Cashbox and/or the Bank to the Roman Catholic Church of Pella.

The remaining money shall be used for local improvements, such as the cleaning of public dams, the repair of public buildings (Cathedral, schools, cemetery, diptank and pens), or to assist extremely destitute members of the congregation and/or the community.

XVI. All Catholics who live within three miles of the Cathedral must attend Divine Services every Sunday. Others who live at a greater distance and yet on the Pella Grounds must attend the Sunday service at least once a month.

XVII. All children who have passed their sixth year must attend school until they have either passed Std. VI or have reached the age of 16 years.

XVIII. Parents or others who fail to comply with the provisions of Articles XVI and XVII, or who send their children to schools other than those approved by the Church, may be deprived of their rights of residence on the Pella Mission Grounds.

XIX. Those guilty of committing public scandals may at any time be compelled to leave the Pella area.

Approved by the Chairman and Council,
at Pella, on the 27th day of January, 1941

(sgd) + H. J. Thünemann
Vicar Apostolic

Vicariate of Keimoes

Source: RCMP/3

APPENDIX H

V + J

NEW GENERAL REGULATIONS FOR THE ADMINISTRATION OF PELLA MISSION RESERVE

I. Preambulatory Explanation.
In the past the Bishop-in-Office had supreme authority in the management of the affairs of the Pella Mission Reserve. In view of the unavoidable delays in negotiations with the Government regarding the future of the Pella Mission Reserve, the Bishop-in-Office has resolved to resume the said supreme authority for the temporal management of the Pella Mission Reserve.

II. Council (or 'Raad') to advise and assist the Bishop-in-Office.
1. Representation of Councillors ('Raadsmanne')
   a. One European.
   b. One Non-european for each of the following districts:
   Pella Central, Kouroe & Annakoppe, Nougab and vicinity, Mik & Orange River.
2. Councillors shall be nominated by the Community, and appointed by the Bishop-in-Office, who may also reject any so nominated.
3. Councillors shall be appointed for a period of one year.
4. Councillors have no casting votes in the Council, and act only in an advisory capacity.
5. The Chairman of the Council shall be the Bishop-in-Office.
6. The Secretary and Treasurer shall be the Priest-in-charge.
7. The Council shall meet every three months. The Bishop-in-Office may at any time call an extra-ordinary meeting.

III. Funds.
1. Communal funds shall be obtained as follows:
   a. Levying of fees for rights of occupation (similar to the hut tax and taxes on squatters.
      i. All occupiers (or 'burgers'), i.e. those more less permanently residing on Pella, shall be taxed as follows:
      All males over 16 and below 65:24/– p.a.
      All females over 18 and below 60: 12/– p.a.
      Schoolgoing children over 16 are excluded.
      Teachers and lay personnel of the Mission are also required to pay this tax.
      ii. Traders and shop-owners shall pay £10 p.a.

iii. The mine-owners shall pay £20 p.a.

b. Levying of fees for rights of occupation to gardens.
   i. Gardens of less than one morgen:5/– p.a.
      Gardens larger than one morgen : 10/– p.a.
      The R.C. Mission is subject to this tax.

c. Levying of fees for Pasturage.
   i. Smallstock

1–5	free
6–50	5/– p.a.
51–100	10/– p.a.
101–200	20/– p.a.
201–300	30/– p.a.
301–400	40/– p.a.
Over 400:	For each 100, or portion of 100, exceeding 400—£10 p.a.

   ii. Largestock (Cattle and Donkeys)

Cattle:	£1 per head p.a. (or any portion of a year exceeding one month)
Donkeys:	1–166/– a head p.a. (or any portion of a year exceeding one month)
	Over 16 24/– a head p.a. (or any portion of a year exceeding one month)

   iii. Hiring of Pasturage by Outsiders.
      For Smallstock: 3d per head per month (or part)
      For Largestock: 2/6 per head per month (or part)

2. These fees are payable half-yearly: on or before the 30th of March and the 30th of September.
3. With the exception of 1(b), the R.C. Mission is not subject to these taxes, in view of the fact that the secretarial work will be handled by its personnel, and this is to be regarded as adequate payment.

IV. Use of Funds.

Money in the Communal Funds shall be used as follows:

1. Payment of the Ranger, to cover travel costs, etc.
   (The Secretary will not be paid)
2. Improvements in the Reserve, such as fencing, the repair of buildings, roads, diptank and pens, limekiln, cemetery, etc.
3. Charity, to destitute persons in exceptional circumstances, and in cases of sickness and death.
4. Funds may be used at a later date for the erection of a clinic, purchase of equipment, and for the salary of a nurse.

V. Ranger.

1. The appointment and duties of the ranger remain unchanged.

VI. Other Regulations.

1. The General Regulations for the Management of the Pella Mission Ground of 1941, as amended and supplemented, shall remain valid and apply to all persons residing on Pella, insofar as they are not superseded by these New General Regulations.
2. As provided for in Article 4 of the General Regulations of 1941, the Council may introduce new regulations subject to the approval of the Bishop-in-Office.
3. The Bishop-in-Office does not require the approval of the Council before introducing new regulations.

(sgd) + H. J. Thünemann
Bishop of Keimoes
25/5/1953

Source: RCMP/3

6. SYSTEMATIC papers must conform to the International code of zoological nomenclature (particularly Articles 22 and 51).

Names of new taxa, combinations, synonyms, etc., when used for the first time, must be followed by the appropriate Latin (not English) abbreviation, e.g. gen. nov., sp. nov., comb. nov., syn. nov., etc. The name of the taxon should be followed, without intervening punctuation, by the author's(s') name(s) (not abbreviated) and the year of publication; a comma must separate author's(s') name(s) and year. The author's(s') name(s) and date must be placed in parentheses if a species or subspecies is transferred from its original genus. The name of a subsequent user of a scientific name must be separated from the scientific name by a colon.

Synonymy arrangement should be either according to chronology of names, i.e. all published scientific names by which the species previously has been designated are listed in chronological order, with all references to that name following in chronological order (see example 1), or according to chronology of bibliographic references, whereby the year is placed in front of each entry, and the synonym repeated in full for each entry (see example 2). The author should adopt one style or the other throughout a paper.

Family **Nuculanidae**
Nuculana (Lembulus) bicuspidata (Gould, 1845)
Figs 14–15A

Example 1

Nucula (Leda) bicuspidata Gould, 1845: 37.
Leda plicifera A. Adams, 1856: 50.
Laeda bicuspidata (Gould) Hanley, 1859: 118, pl. 228 (fig. 73). Sowerby, 1871, pl. 2 (fig. 8a–b).
Nucula largillierti Philippi, 1861: 87.
Leda bicuspidata (Gould): Nicklès, 1950: 163, fig. 301; 1955: 110. Barnard, 1964: 234, figs 8–9.

NOTE punctuation in the above example: comma separates author's name and year; semicolon separates more than one reference by the same author; full stop separates references by different authors; figures of plates are enclosed in parentheses to distinguish them from text-figures; dash, not comma, separates consecutive numbers.

Example 2

1845 *Nucula (Leda) bicuspidata* Gould, p. 37.
1856 *Leda plicifera* A. Adams, p. 50.
1859 *Laeda bicuspidata* (Gould) Hanley, p. 118, pl. 228 (fig. 73).
1861 *Nucula largillierti* Philippi, p. 87.
1871 *Laeda bicuspidata* (Gould): Sowerby, pl. 2 (fig. 8a–b).
1950 *Leda bicuspidata* (Gould): Nicklès, p. 163, fig. 301.
1955 *Leda bicuspidata* (Gould): Nicklès, p. 110.
1964 *Leda bicuspidata* (Gould): Barnard, p. 234, figs 8–9.

In describing new species, one specimen must be designated as the holotype; other specimens mentioned in the original description are to be designated allotype (if applicable) and/or paratypes; additional material not regarded as paratypes should be listed separately. The complete data (registration number, depository, description of specimen, locality, collector, date) of the holotype and paratypes must be recorded, e.g.:

Holotype. SAM–A13535 in the South African Museum, Cape Town. Adult female from mid-tide region, King's Beach, Port Elizabeth (33 51 S2 5 39 E), collected by A. Smith, 15 January 1973.
Note standard form of writing South African Museum registration numbers and date.

7. SPECIAL HOUSE RULES

Capital initial letters

(a) The Figures, Maps and Tables of the paper when referred to in the text, e.g. '... the Figure depicting *C. namacolus* ...', or '... in *C. namacolus* (Fig. 10) ....'

(b) The prefixes of prefixed surnames in all languages, when used in the text, if not preceded by initials or full names: e.g. Du Toit, but A. L. du Toit; Von Huene, but F. von Huene

(c) Scientific names, but not their vernacular derivatives e.g. Therocephalia, but therocephalian

Punctuation should be loose, omitting all not strictly necessary. Reference to the author should preferably be expressed in the third person. **Roman numerals** should be converted to arabic, except when forming part of the title of a book or article, e.g. 'Revision of the Crustacea. Part VIII. Amphipoda.'. A **specific name** must not stand alone, but be preceded by the generic name or its abbreviation to initial capital letter (except at the beginning of a sentence or paragraph), provided the same generic name is used consecutively. The name of **new genus or species** should not be included in the title; it should be included in the abstract, counter to Recommendation 23 of the Code, to meet the requirements of *Biological Abstracts*.

8. GENERAL. Once referees' reports have been received by the editor, these will be discussed by the editorial committee. If the paper is considered acceptable after minor or major revision, the reports will be forwarded to the author who must then thoroughly revise in accordance with the referees' suggestions. Final acceptance of the revised manuscript will be considered by the editorial committee. In the case of major revision being necessary, the committee reserves the right to consult one or more referees regarding the revised manuscript.

G. P. KLINGHARDT

STRUCTURE AND PROCESS IN THE LOCAL GOVERNMENT OF PELLA, 1874–1980

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