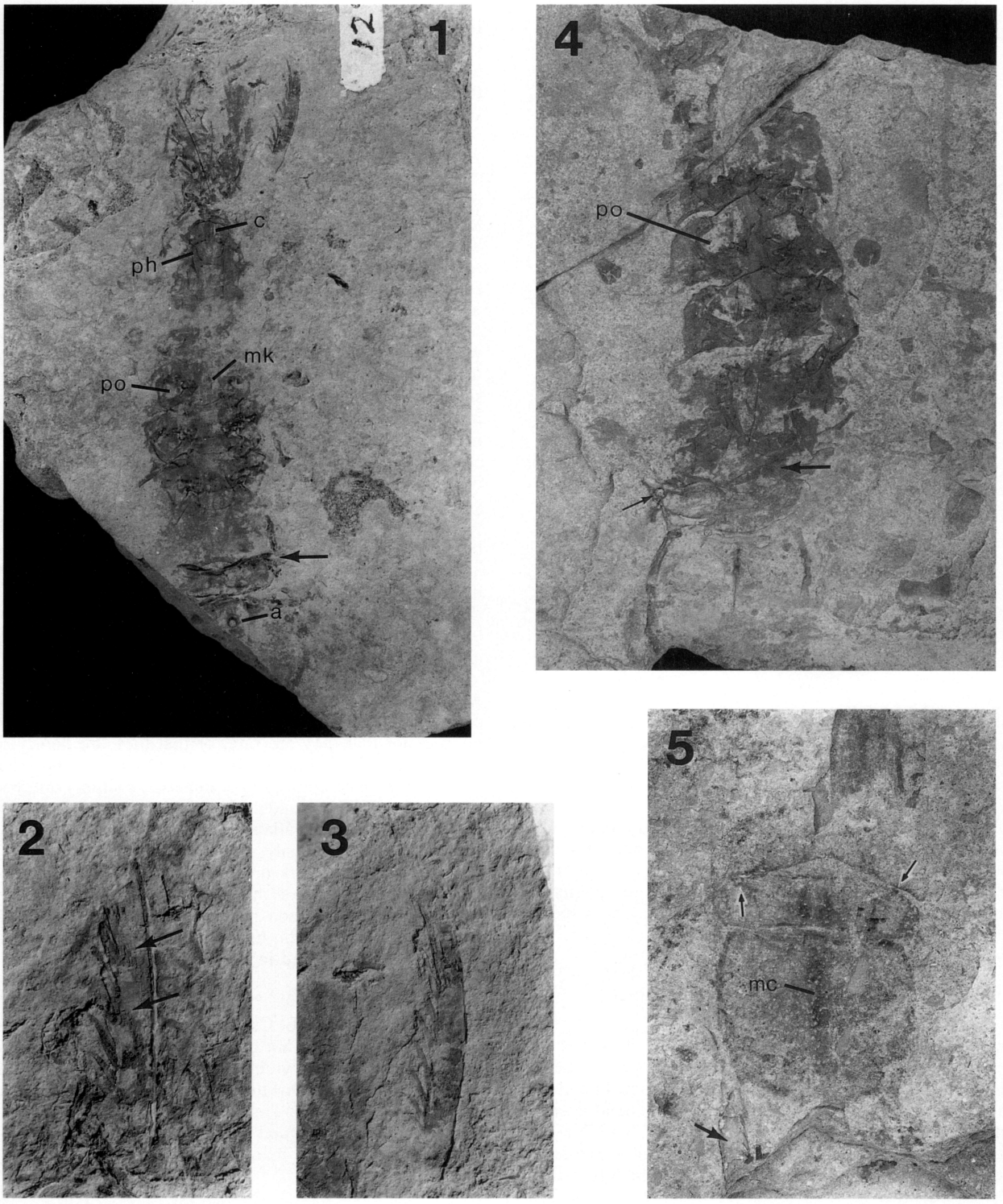

FIGURE *10*—Indeterminate stomatopod remains from the Topanga Formation. *1–3,* LACMIP 7963, lysiosquilloid; *1,* venter of whole body, c = carinae on thoracic somite, ph = endophragmal arches, po = pleopodal opening of an abdominal sternite, mk = outline of base of median keel, a = anus, large arrow = anterior margin sixth abdominal sternite, ×1.2; *2, 3,* close-up views of second thoracopod dactyls, arrows = fragments of the cuticular lining on inner side, ×3.5; *4,* LACMIP 7964, squilloid abdomen and part of telson, po = pleopodal openings, small arrow = articulating sockets, large arrow = anterior margin sixth abdominal sternite, ×1.8. *5,* LACMIP 7965, squilloid posterior abdomen and telson, mc = median carina, small arrows = articulating sockets, large arrow = stray second thoracopod dactyl, ×2.

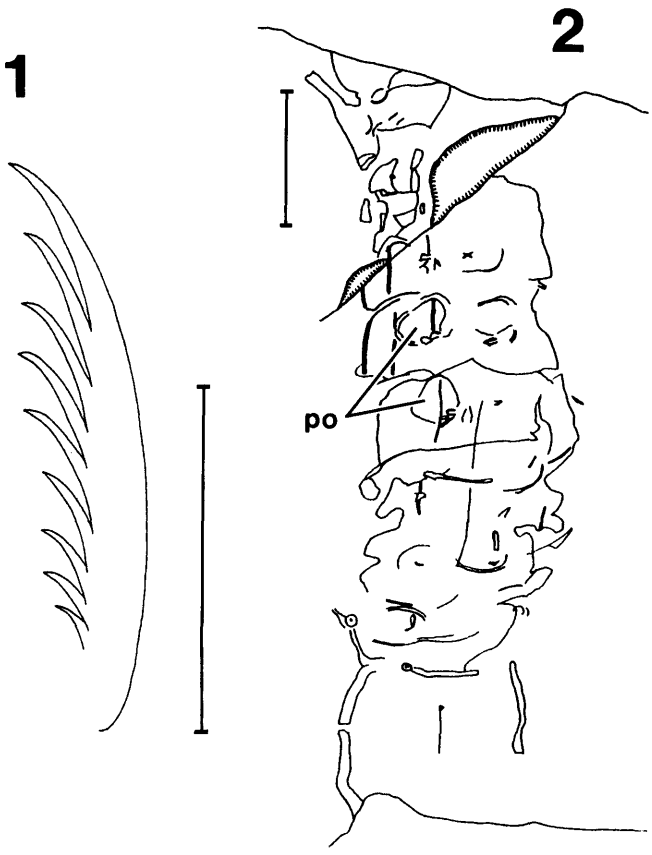

FIGURE *11—1*, Reconstruction of dactyls in Figure 10.2 and 10.3. *2*, Line drawing of Figure 10.4., po = pleopodal opening of abdominal sternites. Scales = 1 cm.

difficult to determine. The presence of the longitudinal abdominal carinae and the shape of the telson, make accommodation within the superfamily Squilloidea the most likely position. The moderate size of the animal indicates that we are dealing with a member of the family Squillidae rather than with a member of the large Harpiosquillidae.

Superfamily SQUILLOIDEA Latreille, 1803
Family, genus, and species indeterminate
Figure 10.5

Description.—LACMIP 7965 (Figure 10.5) preserves only the posterior abdomen and the telson. The carination of the sixth abdominal tergite consists of inflated, paired submedian carinae, intermediate carinae (of which the anterior parts bend laterally), and lateral carinae. Like in *Squilla laingae* (LACMIP 7959), the sockets of the pivoting connection between tergites five and six are recognizable (Figure 10.5, small arrows). The telson is provided with a distinctive median carina, preserved as a darkened band (Figure 10.5, mc). The margin of the telson is partly missing and vaguely preserved. No marginal teeth or denticles can be clearly discerned. The outline of the posterior margin of the telson only suggests the presence of intermediate teeth.

Just posterior to the remains of the telson lies a fragment of a second thoracopod dactyl (Figure 10.5, big arrow). Not much can be discerned concerning this and it is not clear whether it even belongs to the individual it is next to.

Measurements.—LACMIP 7965, telson width 1.7 cm; length 1.5 cm.

Remarks.—Lacking almost all the diagnostic characters used in stomatopod identification, taxonomic accommodation of this specimen is a problem. However, based on the presence of a clear median carina on the telson, the shape of the telson and the carination on the sixth abdominal tergite, this specimen resembles a squilloid.

DISCUSSION

Fossilized stomatopods can be characterized as rare, based on their record to date, yet these animals live in habitats that should lend themselves to easy fossilization. Many of them prefer muddy or sandy bottoms into which they burrow or lie covered with sediment as they patiently wait for their prey. In these circumstances, the apparent scarcity of stomatopod fossils becomes difficult to explain.

On the other hand, in one relatively small area in the southwestern corner of the United States, in a series of closely linked formations in the Miocene, we encounter a series of good to superbly preserved mantis shrimp specimens. The quality of most of this material even allows detailed comparison with living forms. Not only that, the occurrence of stomatopods in these Miocene formations reveals a modicum of diversity, since the best four specimens at hand are clearly arrayed in three separate genera in two distinctive superfamilies of Stomatopoda. If we include the fossil stomatopod *Pseudosquilla adelaidensis* Rathbun 1926, also originating from the Californian Monterey shales and belonging to the superfamily Gonodactyloidea, our California record embraces the three large stomatopod superfamilies. A similar fossil stomatopod richness is known from the Miocene of Korea (Yun, 1985), although the five species from this locality all belong to the family Squillidae.

It seems clear, based on the experience documented here, as well as other discoveries made in collections around Europe (descriptions in preparation), that the problem with fossil stomatopods is not that they are rare, or that they are poorly or infrequently preserved. Rather, the proper facies are not adequately examined by paleontologists or material is simply not recognized as such by collectors and collection managers. Material of striking preservation is available and that material, linked with rigorous phylogenetic analysis of the group, will provide a time-stratigraphic framework upon which we can strive to better understand the history of the Stomatopoda. This will hopefully include not only the pace of morphologic evolution among mantis shrimps, but also the historic aspects of their biogeography, especially if considered in a plate tectonic context.

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