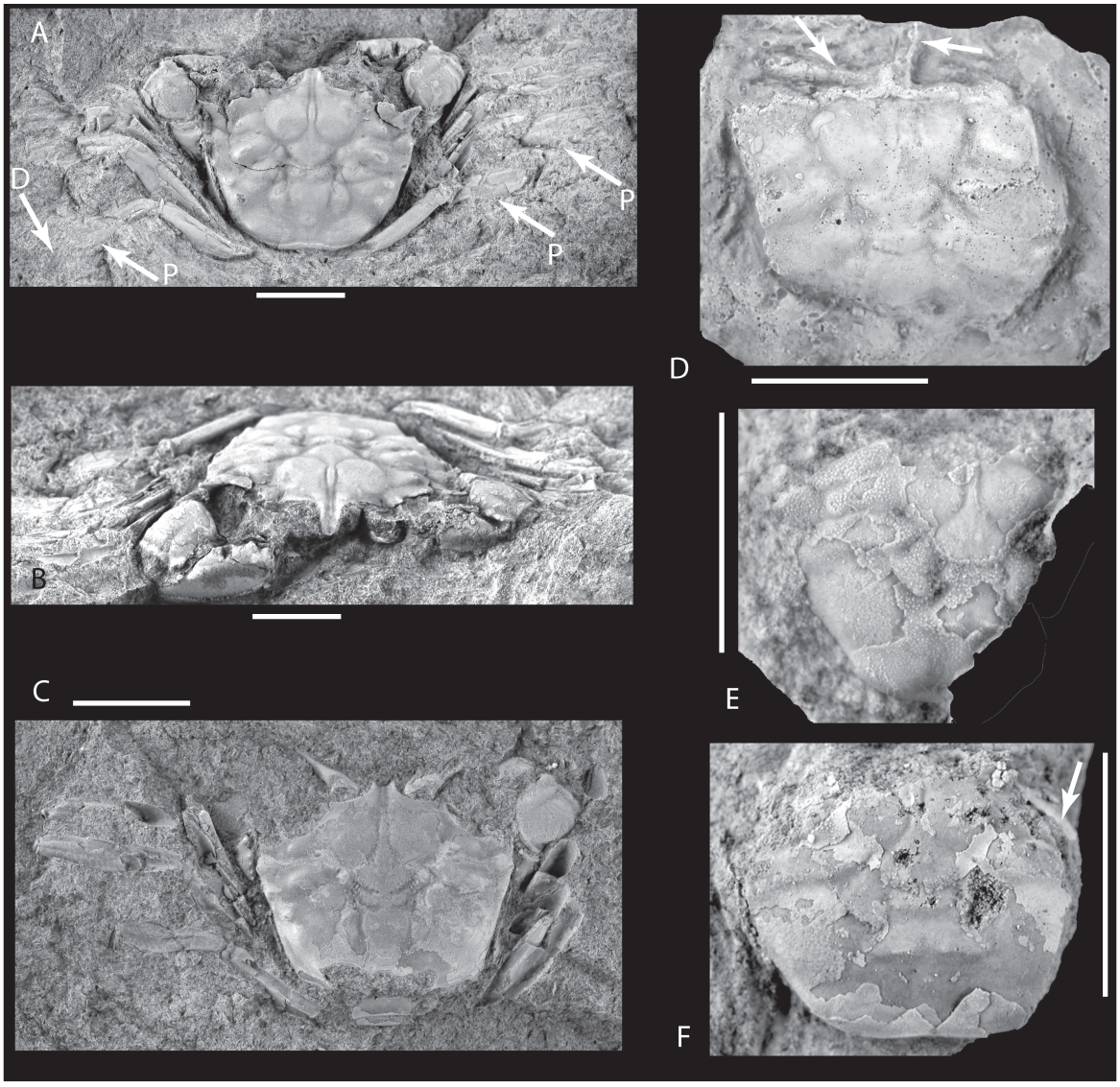

Fig. 2.—**A–C:** *Longusorbis cuniculosus* Richards, 1975. **A,** dorsal and **B,** frontal views of KSU D746 showing of the nature of region development and the strongly downturned, sulcate rostrum. Arrow D indicates styliform dactylus of fifth pereiopod, and arrows P indicate paddle-like propodi of fourth and fifth pereiopods. **C,** dorsal view of PRI 55177, showing well-calcified and well-preserved eyestalks. **D:** *Cancrixantho pyrenaicus* Van Straelen, 1934, plaster cast of holotype, KSU D204, showing the development of regions and the extremely long left eyestalk. Eyestalks indicated by arrows. **E, F:** *Longusorbis eutychius* new species. **E,** Exaflex® cast of holotype (CM 55277) showing dimpled surface of cuticle and relatively smooth mold of the interior of the cuticle. **F,** dorsal view of holotype (MHN-UABCS/Te8/68-413) showing transversely ridged carapace regions. Arrow indicates elongate, transverse orbit. Scale bars = 1 cm.

straight segment. The front in *Longusorbis* is not straight as in the Goneplacidae; it is composed of concave segments laterally and a long, spatulate, downturned projection medially. The sterno-abdominal cavity in the Goneplacidae reaches the anterior of sternite 4, whereas in *Longusorbis*, it reaches to the middle of sternite 4. The sternum of goneplacids is usually broad and ovate; in *Longusorbis*, it is narrow and obovate. *Longusorbis* also possesses a flattened, ovate propodus of the fifth pereiopod and flattened proximal articles of the fourth and fifth pereiopods, not seen in any goneplacids.

The Euryplacidae possess a subquadrilateral carapace, very broad orbits, a well-calcified eyestalk that can be fossilized, an anterolateral margin not well-differentiated from the posterolateral margin; and a male abdomen with all free somites and completely covering the space between the coxae of the fifth pereiopods, all of which are shared with *Longusorbis*. However, the front of members of the Euryplacidae is notched, whereas that of *Longusorbis* possesses a spatulate downturned projection. The orbits of euryplacids possess fissures, which *Longusorbis* lacks. Sternite 8 is visible in ventral

view in the euryplacids, which is not true in *Longusorbis*. The sterno-abdominal cavity in the Euryplacidae reaches the anterior of sternite 4, whereas in *Longusorbis* it reaches to the middle of sternite 4. *Longusorbis* also possesses a paddle-like propodus of the fifth pereiopod and flattened proximal articles of the fourth and fifth pereiopods, not seen in most euryplacids (an exception is *Psopheticoides* Sakai, 1969).

Longusorbis shares many similarities with extant portunids, but does not appear to be referable to an existing subfamily. The only portunid subfamily in which sternite 8 is regularly not visible is the Carcininae; however, members of that subfamily possess male somites 3–5 fused, whereas those somites in *Longusorbis* are free. In addition, the sternum of many carcinines is very narrow, much longer than wide, which is not the case in *Longusorbis*. No members of the Carcininae have the extremely broad orbits of *Longusorbis*. *Coenophthalmus*, referred to the Polybiinae although it lacks ovate or paddle-like elements of the fifth pereiopods, has all male somites free and sternite 8 is obscured in ventral view, both characters shared with *Longusorbis* and neither of which is typical of the Polybiinae. *Coenophthalmus* possesses a relatively broad fronto-orbital width, but the orbits themselves are not wide as in *Longusorbis* (Rathbun 1930, pl. 20, USNM 22050). In addition, the sternum of *Coenophthalmus* is broad and ovate, whereas that of *Longusorbis* is narrower and obovate.

Longusorbis also exhibits many similarities with members of the Geryonidae. Members of that family possess all free male somites, although 3–5 may exhibit some degree of fusion; sternite 8 is obscured in ventral view; and the chelae are xanthoid in shape and may have black finger tips; all features shared with *Longusorbis*. However, extant geryonids do not have any flattened or ovate articles of the fifth or fourth pereiopods, as in *Longusorbis*. It is notable that the extinct *Chaceon peruvianus* (d'Orbigny, 1842) has a flattened and rather ovate propodus and a lanceolate dactylus of pereiopod five. Further, the orbits are not broadly spaced and are not themselves broad in the Geryonidae as they are in *Longusorbis*.

Because *Longusorbis* is as different from the various families and subfamilies within the Portunoidea as they are from one another, we suggest at this time that *Longusorbis* represents its own evolutionary grade, probably within the Portunoidea. Its exact family-level position is currently under study by the authors; at this time we are uncertain as to whether it should be placed as a subfamily within the Portunidae or as a unique family within the Portunoidea.

Genus *Longusorbis* Richards, 1975

Type species.—*Longusorbis cuniculosus* Richards, 1975, by monotypy.

Other species.—*Longusorbis eutychius* new species.

Diagnosis.—Carapace wider than long, maximum length ranging from 70 to 80 percent maximum width, widest at position of hepatic region, posterior to outer-orbital angle, about 30 percent the distance posteriorly; lateral margins of carapace converging posteriorly; front interpreted to lie between interior-most orbital notches (Fig. 2B), axially produced into long, blunt-tipped rostrum, rostrum axially sulcate, strongly downturned distally so that distal part is nearly perpendicular to dorsal carapace (Fig. 2B); frontal width about 40 percent maximum carapace width; orbits extremely broad, sinuous, with notches, spines, or blunt protuberances; orbits angling posteriorly; eyestalks apparently well calcified (Fig. 2C); fronto-orbital width about equal to maximum carapace width; mesogastric region merging with rostral sulcus; gastric regions short; branchial regions long; urogastric region about as wide as mesogastric and cardiac regions; epibranchial region arcuate; metabranchial region with inflated oblique ridge parallel to margin; sternum about as long as wide, sternites 1/2 fused, no evidence of suture; sternal suture 2/3 entire; sternal suture 3/4 expressed as a marginal notch and weak groove; sternite 4 long; sternal sutures 4/5 and 5/6 not parallel; sternal suture 4/5 at high angle; sternite 8 not visible in ventral view; male abdomen extending to about middle of sternite 4 and about middle of coxae of pereipods 1; all male abdominal somites free, entirely filling space between coxae of fifth pereiopods; chelae stout, markedly heterochelate, fingers with black tips; meri and carpi of fourth and fifth pereiopods flattened; propodi of fourth and fifth pereiopods elliptic; dactylus of fifth pereiopod narrow, lanceolate (Fig. 2A).

Material examined.—*Longusorbis cuniculosus*: PRI 55177, KSU D746, collected from near Shelter Point (Vancouver Island, British Columbia, Canada; latitude 49°54'21.7"N; longitude 125° 10'41.0")W, late Campanian Northumberland Formation (Schweitzer et al. 2003); *L. eutychius*: MHN-UABCS/Te8/68-413, holotype.

Discussion.—Prior to this report, *Longusorbis* had been known only from one late Campanian locality on Vancouver Island, British Columbia (Richards 1975; Schweitzer et al. 2003). However, the new species described below is clearly congeneric with *Longusorbis cuniculosus*, as discussed. Thus, the geologic range of *Longusorbis* is extended into the Eocene, and the geographic range is extended southward to Baja California Sur. The genus is one of many to survive the Cretaceous-Tertiary boundary event(s) (Schweitzer and Feldmann 2005).

Longusorbis cuniculosus is characterized by a triangular, axially sulcate front; very broad, sinous orbits; an anterolaterally directed outer-orbital spine; a mesogastric region extending into the rostral sulcus; a short hepatic region; an arcuate epibranchial region with a portion paralleling the hepatic region; a maximum width at the position of the hepatic region; orbits angling posteriorly; lateral margins converging posteriorly; and granular carapace ornament (Fig. 2A–C). All of the features are shared by the new species, *Longusorbis eutychius*. *Longusorbis eutychius* differs from *L. cuniculosus* in lacking orbital notches and spines and lacking the spherical swellings on the hepatic, epibranchial, and mesobranchial regions typical of *L. cuniculosus*. *Longusorbis eutychius* also narrows more considerably posteriorly than does *L. cuniculosus*. However, we view these differences primarily in ornament as species-level variations and refer the two species to the same genus.

Unfortunately, the sternum of *L. eutychius* is not preserved; however, the marked similarity in dorsal carapace features makes the referral to *Longusorbis* possible.

Longusorbis eutychius, **new species**
(Fig. 2E, F)

Description.—Carapace wider than long, length about 70 percent maximum carapace width, widest at position of outer-orbital angle, about 30 percent the distance posteriorly; regions moderately defined by grooves; carapace very weakly vaulted both transversely and longitudinally; carapace surface finely granular in all areas where cuticle is preserved including orbital rim and branchial regions.

Front interpreted to lie between interior-most orbital notches, axially produced into triangular or blunt tipped-projection, axially sulcate; frontal width about 42 percent maximum carapace width. Orbits extremely broad; with broad, granular rim; sinuous; angling posteriorly to blunt outer-orbital spine which is directed anterolaterally; fronto-orbital width occupying maximum carapace width. Lateral margins converging posteriorly, sinuous, appearing to have been rimmed. Posterior margin rimmed, weakly concave centrally, about 42 percent maximum carapace width.

Protogastric regions equant, weakly inflated. Mesogastric region with long anterior process, process extending into rostral sulcus where it narrows considerably, with concave lateral margins; broadened posteriorly, with rounded posterior margin. Urogastric region somewhat narrower than either posterior portion of mesogastric region or anterior portion of cardiac region, with concave lateral margins, raised transversely. Cardiac region pentagonal, apex directed posteriorly, with two transversely inflated swellings anteriorly, small swelling at apex. Intestinal region weakly inflated, narrow. Hepatic region short, very wide, paralleling orbital rim, giving it a ridge-like appearance. Epibranchial region composed of two segments; anterior-most segment ridge-like, parallel and about as long as hepatic region; inner segment triangular, apex directed obliquely at cardiac region; two segments taken together yield arcuate appearance for entire region. Mesobranchial region broadly inflated, equant; metabranchial region triangular, inflated, shorter than wide.

Remainder of carapace and appendages unknown.

Measurements.—Measurements (in mm) taken on the holotype and sole specimen of *Longusorbis eutychius*: maximum carapace width = 17.0; maximum carapace length = 11.6; fronto-orbital width = 17.0; posterior width = 7.0; length to position of maximum width = 3.2.

Type.—The holotype and sole specimen is deposited in the Museo de Historia Natural, Universidad Autónoma de Baja California Sur, La Paz, Baja California Sur, Mexico (MHN-UABCS/Te8/68-413). A cast of the holotype is deposited in the Carnegie Museum of Natural History, Pittsburgh, PA (CM 55277).

Etymology.—The trivial name is derived from the Greek word *eutychia*, meaning good luck, referring to the chance finding of a single, but readily identifiable, specimen of *Longusorbis* in Eocene rocks, spurring the re-evaluation of the genus and the family Carcineretidae.

Occurrence.—WP 39.

Discussion.—The specimen is not well preserved, but the details visible in both the part and counterpart make it possible to frame a relatively complete description of the dorsal carapace of *Longusorbis eutychius*. The new species extends both the geographic range of *Longusorbis* to the southern Pacific coast of North America and the geologic range into the Eocene.

Superfamily Goneplacoidea MacLeay, 1838
Family Goneplacidae MacLeay, 1838

Discussion.—Bishop (1988, p. 247) originally placed *Icriocarcinus* Bishop, 1988, within the Carcineretidae, based upon its shape, long eyestalks, transverse ridges, and carapace region development, allied with *Longusorbis* among other genera. Later, it was suggested that *Icriocarcinus* might be better placed among the Xanthidae *sensu lato* (Vega and Feldmann 1991; Vega et al. 1997), and it was finally assigned to the Goneplacidae (Schweitzer et al. 2002). Schweitzer et al. (2002) provided several lines of reasoning for placing *Icriocarcinus* within the Goneplacidae, and we concur with their decision. Most compelling among these reasons is the similarity of *Icriocarcinus* with the extant *Ommatocarcinus* White, 1851, and other goneplacid genera, which we expand upon here.

Icriocarcinus possesses most of the diagnostic characters of the Goneplacidae *sensu stricto* (Karasawa and Schweitzer 2006). These characters include broad orbits; a broad fronto-orbital width that may encompass the entire anterior margin of the carapace; a very narrow front that may be widened distally; a male abdomen filling the entire space between the coxae of the fifth pereiopods and with all somites free; a broad, ovate sternum with sternite 8 not visible in ventral view, and a sterno-abdominal cavity reaching the anterior of sternite 4. *Icriocarcinus* possesses black tips on the fingers and obovate propodi on the fifth pereiopods, not typical of many extant goneplacids. However, the overwhelming majority of the characters clearly allies *Icriocarcinus* with such extant genera as *Goneplax* Leach, 1814, and *Ommatocarcinus*; thus, we are confident in referring it to the Goneplacidae. *Ommatocarcinus* is known from fossils and is extant in the western Pacific Ocean (Jenkins 1975).

The similarities between *Icriocarcinus* (Fig. 3A–D) and *Ommatocarcinus* (Fig. 3E, F) are particularly striking. Both genera possess a trapezoidal dorsal carapace in which the position of maximum width occurs at the outer-orbital angle; extremely broad orbits and apparently well-calcified eyestalks that are readily fossilized; spiny or granular ornamentation of the orbital margin; a narrow front that widens distally; an arcuate epibranchial region positioned quite far anteriorly on the dorsal carapace; well-developed posterolateral reentrants; a broad, ovate sternum, a sterno-abdominal cavity reaching to the anterior of sternite 4; all male somites free and male abdomen covering the space between the coxae of the fifth pereiopods; long, spined meri of the chelipeds; long, keeled mani of the chelipeds; long fingers of the chelae with blunt denticles on the occlusal