

wall (almost always convex) covered by a smooth dermal layer usually with a few irregularly spaced wrinkles, ostia spaced about 1 mm apart and can have a raised border that encircles either a single incurrent opening or groups of two to five (rarely more) incurrent openings; internally ostia lead into radially arranged canals that pass in middle of sponge wall into a system of cross-connecting canals that lead into very closely spaced radially arranged openings that feed into spongocoel (Figure 2.9), cross-connecting canals in middle of sponge wall 0.1 mm in diameter, may be up to 0.5 mm long before bending, without distinct radial pattern but may form elongate or irregularly shaped rigid expansions where adjacent tracts join; spongocoel wall (almost always concave) irregularly wrinkled and consisting of a porous texture; base of sponge with a small attachment area.

*Discussion.*—*Elasmostoma* belongs to a heterogeneous group of calcareous sponges, known commonly as the pharetronids, whose skeletons are rigid (de Laubenfels, 1955; Rezvoi et al., 1971; Hartman, 1983). Hartman's (1983) classification is used in this present report.

Previously *Elasmostoma* has been reported only from Jurassic and Cretaceous strata of Western Europe (de Laubenfels, 1955, Rezvoi et al., 1971). The presence of *E. bajaensis* n. sp. in the Bateque Formation extends the geologic range of the genus into the early Eocene and extends the geographic range of the genus into the Western Hemisphere.

The ostia of *Elasmostoma* are reportedly common to both convex and concave walls (de Laubenfels, 1955), but only one (Figure 2.5–2.8) out of about 30 specimens of *E. bajaensis* has ostia on the concave wall.

*Elasmostoma bajaensis* n. sp. most closely resembles *E. normanianum* (d'Orbigny, 1850) from Upper Cretaceous strata of East and West Germany and Northwestern France (Römer, 1864; Geinitz, 1871–1875). Römer (1864, p. 45, Pl. 16, fig. 6a, b) and Geinitz (1871–1875, p. 36–37, Pl. 7, figs. 7–12) also figured this species. *Elasmostoma bajaensis* differs from *E. normanianum* in the following features: smaller ostia, more ostia, and more complicated ostial areas that may include groups of two to five (rarely more) openings.

*Etymology.*—The species is named for Baja California.

*Material.*—Thirty specimens showing excellent preservation. Twenty of these are complete. Holotype, LACMIP 7982; paratypes, LACMIP 7983, 7984, and 7985.

*Occurrence.*—Lower Eocene (P8 or P9 planktonic foraminifera Zone as used by Berggren et al., 1985) portion of the Bateque Formation, Mesa La Salina, Baja California Sur, Mexico, locality CSUN 1220a.

#### ACKNOWLEDGMENTS

R. S. Vernis and R. R. Quintana (Departamento de Geología, Universidad Autónoma de Baja California Sur, La Paz) kindly

arranged for permission for geologic studies and paleontologic collecting in Baja. E. J. Enzweiller and R. M. Cote (California State University, Northridge) provided collecting assistance in the field. J. K. Rigby (Brigham Young University) provided important comments regarding the identification of the sponge and reviewed an early draft of the manuscript. M. V. Filewicz and R. W. Fulwider (Unocal Corporation) processed several rock samples and identified the foraminifera and calcareous nannofossils.

#### REFERENCES

- BERGGREN, W. A., D. V. KENT, J. J. FLYNN, AND J. A. VAN COUVERING. 1985. Cenozoic geochronology. Geological Society of America Bulletin, 96:1407–1418.
- FROMENTEL, M. E. 1860. L'étude des éponges fossiles. Mémoires de la Société Linnéenne de Normandie, 11:1–50.
- GEINITZ, H. B. 1871–1875. Das Elbthalgebirge in Sachsen. Der untere Quader. Palaeontographica, 20:1–320.
- HARTMAN, W. D. 1983. Modern Calcareous, p. 40–54. In T. W. Broadhead (ed.), Sponges and Spongiomorphs—Notes for a Short Course. University of Tennessee, Department of Geological Sciences Studies in Geology 7.
- LAUBENFELS, M. W. DE. 1955. Porifera, p. E21–E112. In R. C. Moore (ed.), Treatise on Invertebrate Paleontology, Pt. E, Archaeocyatha and Porifera. Geological Society of America and University of Kansas Press, Lawrence.
- MCLEAN, HUGH, B. P. HAUSBACK, AND J. H. KNAPP. 1985. Reconnaissance geologic map of part of the San Isidro quadrangle, Baja California Sur, Mexico. U.S. Geological Survey, Miscellaneous Field Studies Map MF-1799.
- ORBIGNY, A. D. D'. 1850. Prodrome de paléontologie stratigraphique universelle des animaux mollusques et rayonnés. Vol. 2. Paris, 427 p.
- REZVOI, P. D., I. T. ZHURAVLEVA, AND V. M. KOLTUN. 1971. Phylum Porifera, p. 5–97. In Y. A. Orlov (ed.), Fundamentals of Paleontology, Vol. 2, Porifera, Archaeocyatha, Coelenterata, Vermes. Israel Program for Scientific Translations, Jerusalem.
- RIGBY, J. K. 1987. Phylum Porifera, p. 116–139. In R. S. Boardman, A. H. Cheetham, and A. J. Rowell (eds.), Fossil Invertebrates. Blackwell Scientific Publications, Palo Alto.
- RÖMER, F. A. 1864. Die Spongitarier des norddeutschen Kreidegebirges. Palaeontographica, 13:1–64.
- STAINWORTH, R. M., J. L. LAMB, H. LUTERBACHER, J. H. BEARD, AND R. M. JEFFORDS. 1975. Cenozoic planktonic foraminiferal zonation and characteristic index forms. University of Kansas Paleontological Contributions, Article 62, 425 p.
- VACELET, J. 1981. Éponges hypercalcifiées ("Pharétronides," "Sclérosponges") des cavités de récifs coralliens de Nouvelle-Calédonie. Museum National d'Histoire Naturelle Paris, Bulletin, 4(3):313–351.

ACCEPTED 10 FEBRUARY 1989

R. L. Squires provided \$100 in support of this article.