

SHORTER CONTRIBUTIONS TO GENERAL GEOLOGY, 1926

A COMPARISON OF THE GENERA METAPLACENTICERAS SPATH AND PLACENTICERAS MEEK

By JOHN B. REESIDE, Jr.

In a recent examination of a considerable suite of specimens from the Western Interior of the United States belonging to the Cretaceous ammonite genus *Placenticeras* Meek the writer made comparisons of the species from the Interior with those from the Cretaceous of the Pacific coast ordinarily designated *Placenticeras pacificum* J. P. Smith, *P. californicum* Anderson, and *P. sanctaemonicae* Waring. The two groups of species differ widely in their characteristics, though each is a fairly homogeneous assemblage in itself. It was the writer's intention to propose a new name for the group of *P. pacificum*—indeed, one was proposed and in type, when the publication by Spath¹ of the name *Metaplacenticeras* met the need adequately, and that name is of course used here. Spath's name is based on the citation of Smith's original figure and a notation that *Metaplacenticeras* differs from *Placenticeras* in its falcoid ribbing and distinct suture line. Inasmuch as there has been some divergence of opinion as to the scope and probable derivation of the genus *Placenticeras*, based on the study by different writers of members of one or the other of the two groups, the writer has thought it worth while to record his observations and deductions and to give a fuller account of the new genus.

Smith^{1a} investigated the young stages of the species *pacificum* and on the basis of his findings expressed the opinion that *Placenticeras* as represented by it was derived through *Hoplites* from *Cosmoceras*. He found the second, third, and fourth lobes of the adult suture to arise from the subdivision of the first lateral lobe of the primitive suture shown in the very early stages and the first lateral lobe of the adult to arise as a marginal lobe dividing the primitive first lateral saddle. Douvillé² had already placed the genus in the Hoplitidae on the basis of similarity of the early sutures to that of *Hoplites*, interpreting the first, second, and third lateral lobes of the adult *Placenti-*

ceras as direct descendants of the primitive first lateral lobe and homologous to the trifold first lateral lobe of *Hoplites*. Hyatt³ later interpreted the ontogeny of *Placenticeras meeki* Böhm (= *P. whitfieldi* Hyatt, *P. placenta* (DeKay) of Meek, the type of the genus) as not showing any real relationship with *Hoplites*. He considered the first and second lateral lobes of the adult suture as derived from marginal lobes of the primitive first lateral saddle and only the third lateral lobe of the adult as a lineal descendant of the first lateral lobe of the early suture. Pervinquier⁴ doubted the generic identity of the forms examined by Smith and Hyatt because of the very marked differences between *P. pacificum* and *P. californicum*, on the one hand, and *P. meeki*, *P. intercalare*, and other typical species, on the other, though accepting both groups as descended from *Hoplites*. Sommermeier⁵ attempted to reconcile the divergent views by interpreting the suture as showing a small lobe dividing the primitive first saddle, two adventitious lobes arising on the siphonal flank of the primitive first lateral lobe as forming the first and second lateral lobes of the adult, and only the third adult lobe as being a direct descendant of the primitive first lateral lobe. He considered the primitive second lateral lobe to be variable and in *P. pacificum* to exceed the first lateral in length and become the large fourth adult lobe, whereas in *P. meeki* it is relatively small. The sutures in this view are therefore essentially the same and prove a generic identity. He suggests as another possibility that the sixth adult lobe is really the primitive second lateral lobe and that the fourth and fifth adult lobes are adventitious.

The writer examined the inner whorls of typical individuals of the species *pacificum* Smith and *meeki* Boehm. He found that he could add nothing to Smith's description of the young of the first species and agrees with it entirely. For the second species

¹ Spath, L. F., On new ammonites from the English chalk: Geol. Mag., vol. 63, p. 79, 1926.

^{1a} Smith, J. P., The development and phylogeny of *Placenticeras*: California Acad. Sci. Proc., 3d ser., vol. 1, pp. 181-231, 1900.

² Douvillé, Henri, Classification des cératites de la Craie: Soc. géol. France Bull., vol. 18, p. 288, 1890.

³ Hyatt, Alpheus, Pseudoceratites of the Cretaceous: U. S. Geol. Survey Mon. 44, p. 192, 1903.

⁴ Pervinquier, Léon, Études de paléontologie tunisienne, Céphalopodes des terrains secondaires, p. 197, 1907.

⁵ Sommermeier, L., Die Fauna des Aptien und Albien im nördlichen Peru, Pt. I: Neues Jahrb., Beilageband 30, pp. 319-321, 1910.

several interpretations are plausible. Hyatt's figures⁶ of isolated early sutures of *P. meeki* agree with those found by the writer at the same stages, and Hyatt's interpretation may well be true. However, a more complete series such as that figured in Plate 1 of this paper permits a somewhat different and equally plausible explanation. Apparently the first of the three large adult lateral lobes is a marginal of the primitive first lateral saddle, and the second and third are divisions of the primitive first lateral lobe. The fourth adult lateral lobe is the second primitive lateral lobe. The writer could detect no sculpture on the whorls below 6 or 7 millimeters, though Hyatt found faint ribs. At about 10 millimeters obscure rounded radial folds and sigmoid striae are present. At greater diameters only striae were seen. Whatever interpretation of the suture is accepted, it is not very strongly suggestive of *Hoplites*.

The development of the suture is strikingly different from that found in the species *pacificum* Smith and combined with the persistent difference in sculpture is sufficient to put the two series of forms into different genera—perhaps even into different families. Smith's specimens are strongly ornamented from even the very early stages throughout their growth and have for a time a very distinct median keel in addition to the ventrolateral keels. At certain stages, particularly at about 20 millimeters in diameter, the species *pacificum* has a suture exceedingly like true *Placenticeras* in that the lobes and saddles lie nearly on a line and the parts of the first lateral lobe have become practically independent. At earlier and later stages the primitive first lateral lobe still shows its identity in the arrangement of the parts of the suture and is strongly reminiscent of *Hoplites*. In Plates 1 and 2 of this paper adaptations of Smith's figures are given for comparison with sutures of *Placenticeras meeki*.

Paulcke⁷ proposed to place such forms as *Placenticeras pacificum*, which have evident relationship to *Hoplites*, and certain species of *Hoplites* that show a transition toward *Placenticeras* in a group with the name *Hoplitoplacenticeras*. For the forms nearer *Hoplites* he would italicize the first half of the name; for those nearer *Placenticeras*, the second half of the name; for truly intermediate forms he would italicize the entire name. The writer believes it less complicated to use an entirely distinct name where a generic distinction is necessary.

The writer therefore approves and accepts Spath's proposal of the name *Metaplacenticeras* to include the forms now called *Placenticeras pacificum* J. P. Smith, *P. californicum* Anderson, and *P. sanctaemonica* Waring,⁸ from the Cenomanian part of the Chico for-

mation of California, and probably also some of the forms included by Paulcke⁹ under the names *Hoplites plasticus-costatus* and *H. plasticus-laevis*, from the Senonian of Patagonia. The essential characters of the genus and its differences from *Placenticeras* are shown in the following tabular comparison based on Smith's description of *P. pacificum* and the writer's study of *P. meeki* and other material from the Montana group and the Chico formation.

Metaplacenticeras Spath.

Genotype *M. pacificum* J. P. Smith. Shell large, discoidal, involute, compressed. Whorls stout, rounded to diameter of 4.5 millimeters (2 whorls); higher than wide with channeled venter at diameter of 7 millimeters (3 whorls); very high, compressed, with narrow tricarinate venter to diameter of 100 millimeters; large adults have compressed whorl with venter narrow, flat or slightly concave, bordered by finely nodose keels.

Umbilicus relatively wide, one-fifth the diameter of the shell, with shoulder rounded in young and angular with steep inner wall in later stages.

Sculpture of distinct, fairly strong numerous ribs in all stages above a diameter of 2 or 3 millimeters. Ribs striated and sigmoid in form. Umbilical shoulders and ventrolateral keels with numerous tubercles.

Suture in adult has four prominent lateral lobes and three or four smaller lateral lobes. First prominent lateral smaller and arises as a marginal in the primitive first lateral saddle; next three arise by division of the primitive first lateral lobe, which in the growth of the individual first loses and then regains its identity. Even in the adult it retains to some extent its individuality. The fifth lateral lobe of adult is a direct descendant of the primitive second lobe.

Placenticeras Meek

Genotype *P. placenta* De Kay. Shell large, discoidal, involute, compressed. Whorls stout, rounded to diameter of 3 millimeters (1½ whorls); higher than wide with flat venter at diameter of 4 millimeters (1¾ whorls); very high, compressed, with narrow channeled venter bordered by sharp continuous or nodose keels or with narrow flat venter to diameter of perhaps 200 millimeters; large adults of most species have rounded venters. In some species the adult whorls are stout, even subquadrate (*Stantonoceras* Johnson).

Umbilicus narrow in typical forms, one-seventh the diameter, with rounded shoulder; gentle inner slope in the young and steep in later stages. Stout species have relatively wide umbilicus, much as in *Metaplacenticeras*.

Sculpture weak; faint ribs in the very young stages and none or only low obscure coarse ribs in the later stages. Surface with sigmoid striae. Tubercles when present not usually strong nor numerous.

Suture in adult has three prominent lateral lobes and six or seven smaller lateral lobes. First prominent lateral develops from a marginal of the primitive first lateral saddle; next two arise by division of the primitive first lateral lobe, which very early loses its identity. The fourth lateral lobe is the direct descendant of the primitive second lateral lobe.

⁶ Hyatt, Alpheus, op. cit., pl. 45, figs. 11-14, 1903.

⁷ Paulcke, Wilhelm, Die Cephalopoden der oberen Kreide Sudpatagoniens: Naturf. Gesell. Freiburg Ber., vol. 15, pp. 178-183, 1907.

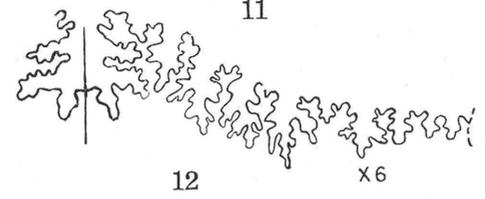
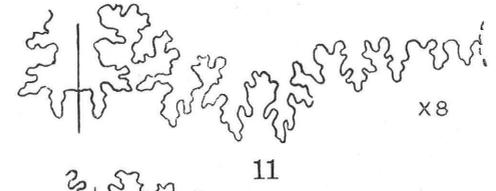
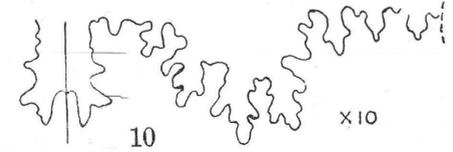
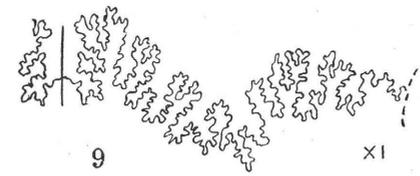
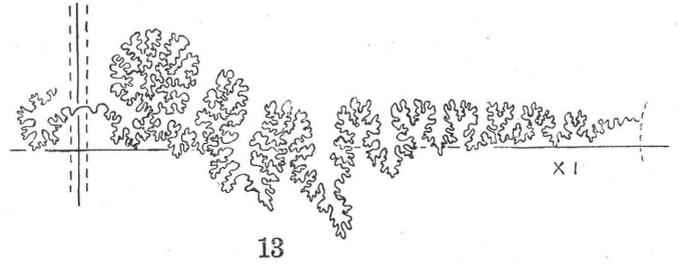
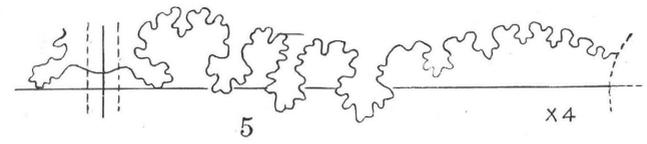
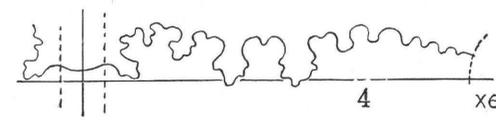
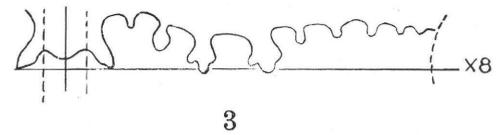
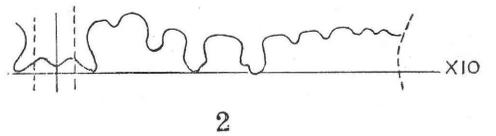
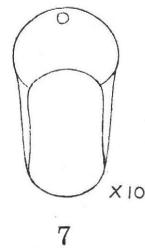
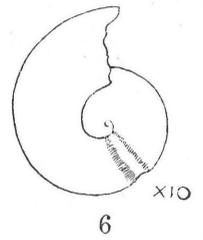
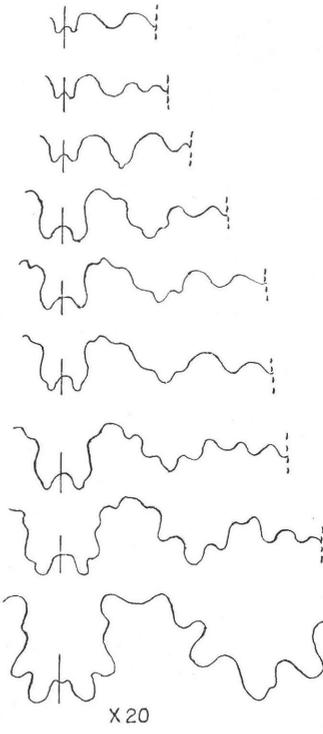
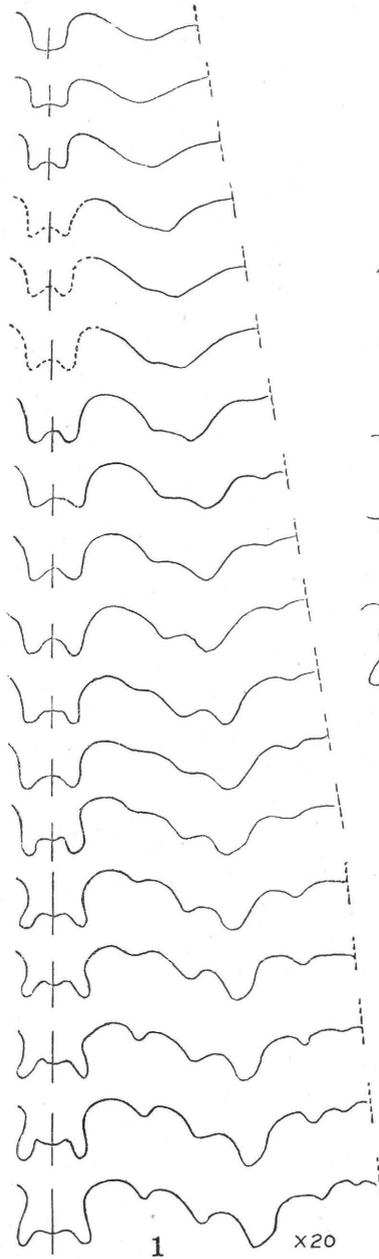
⁸ Waring, C. A., Stratigraphic and faunal relations of the Martinez to the Chico and Tejon of southern California: California Acad. Sci. Proc., vol. 7, p. 70, pl. 9, figs. 20, 21, 1917.

⁹ Paulcke, Wilhelm, op. cit., pp. 178-183.

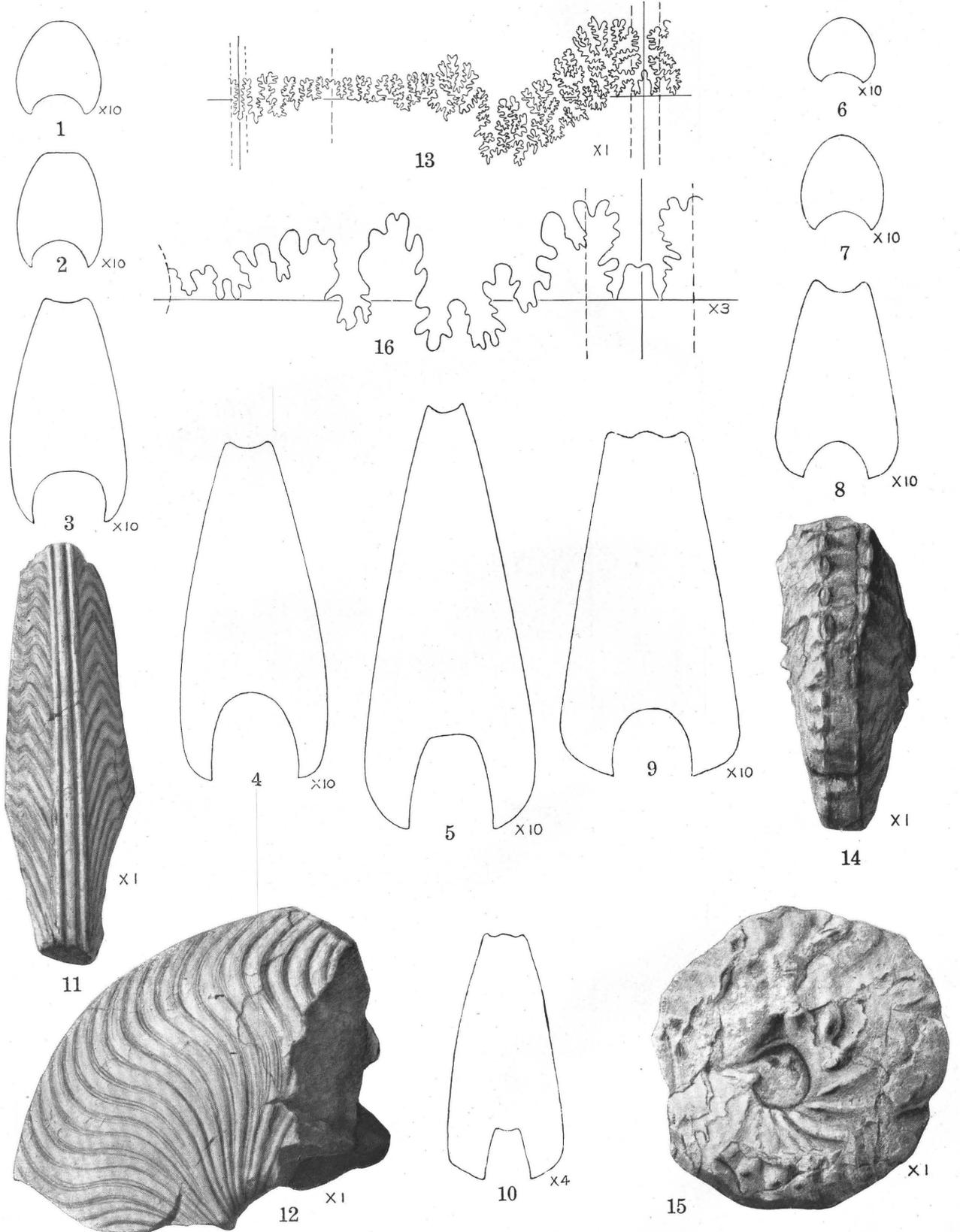
PLATES 1-2

PLATE 1

- FIGURES 1- 7. *Placenticerus meeki* Boehm, from a locality near the center of sec. 2, T. 32 N., R. 86 W., Natrona County, Wyo. (U. S. Nat. Mus. catalog No. 73133.)
1. Group of 18 consecutive sutures from a diameter of 1.4 millimeters to a diameter of 4.0 millimeters.
 2. Suture at diameter of 7 millimeters.
 3. Suture at diameter of 10 millimeters.
 4. Suture at diameter of 14 millimeters.
 5. Suture at diameter of 25 millimeters.
 - 6, 7. Side and front views of the nucleus.
- 8-12. *Metaplacenticerus pacificum* (Smith). Figures adapted from J. P. Smith, California Acad. Sci. Proc., 3d ser., vol. 1, pls. 27 and 28.
8. Nine sutures at diameters of 0.8, 1.16, 1.32, 1.70, 2.2, 2.4, 2.7, 3.0, and 4.1 millimeters for comparison with Figure 1.
 9. Mature suture.
 10. Suture at diameter of 8.5 millimeters for comparison with Figures 2 and 3.
 11. Suture at diameter of 12.0 millimeters for comparison with Figures 3 and 4.
 12. Suture at diameter of 14.1 millimeters for comparison with Figure 4.
13. *Placenticerus meeki* Boehm, mature suture at diameter of 110 millimeters, of a specimen from the Bearpaw shale 2 miles southwest of McLean's ranch, on Sage Creek, Alberta, Canada; for comparison with Figure 9 and with Plate 2, Figures 13 and 16. (U. S. Nat. Mus. catalog No. 73134.)



SPECIES OF PLACENTICERAS AND METAPLACENTICERAS



SPECIES OF PLACENTICERAS AND METAPLACENTICERAS

PLATE 2

- FIGURES 1- 5. *Placenticerus meeki* Boehm, from a locality near the center of sec. 2, T. 32 N., R. 86 W., Natrona County, Wyo. (U. S. Nat. Mus. catalog No. 73133.) Five cross sections of the whorl at diameters of 3, 4, 7, 10, and 14 millimeters.
- 6-10. *Metaplacenticerus pacificum* (Smith). Figures adapted from J. P. Smith, California Acad. Sci. Proc., 3d ser., vol. 1, pl. 28. Five cross sections of the whorl at diameters of 3, 4.5, 7, 12, and 21 millimeters for comparison with Figures 1 to 5.
- 11-13. *Metaplacenticerus pacificum* (Smith). Side and peripheral views and suture of a specimen from the Chico formation in Silverado Canyon, Orange County, Calif. (U. S. Nat. Mus. catalog No. 73135.)
- 14-16. *Metaplacenticerus californicum* (Anderson). Side and peripheral views and suture at diameter of 50 millimeters of a specimen from the Chico formation in Bowers Canyon, in the Santa Susana Mountains, about 4 miles southwest of Chatsworth Park, Los Angeles County, Calif. (U. S. Nat. Mus. catalog No. 73136.)