puberulent or glabrate, the lateral nerves inconspicuous; cymes lateral, dense, few-flowered, the peduncles very slender, 2.5–3.5 cm. long, pilosulous with whitish subappressed hairs; flowers sessile or subsessile, ebracteolate, obscurely or not at all secund; hypanthium and calyx cylindric, 2–2.5 mm. long, appressed-pilosulous, the lobes minute, obtuse; corolla densely appressed-pilosulous outside, the slender tube 15 mm. long, the lobes oblong-ovate, obtuse, 2.5 mm. long; anthers semiexserted; fruit white, 2-celled, oblong, glabrate, 1–1.5 cm. long.

Type in the U. S. National Herbarium, no. 1,110,841, collected in the vicinity of Chacahua, Distrito de Juquila, Oaxaca, Mexico, altitude 5 meters, Dec. 17, 1921, by C. Conzatti (no. 4475).

Related to *C. microloba* Donn. Smith, of Costa Rica, which differs in its small flowers and scant pubescence.

ZOOLOGY.—*A revision of the recent representatives of the crinoid family Pentacrinidæ, with the diagnoses of two new genera.*[1] AUSTIN H. CLARK, National Museum.

A detailed study of the recent representatives of the crinoid family Pentacrinidæ shows that these are by no means so closely allied to the fossil species in the same family as has been supposed. None of them can be considered as congeneric with *Isocrinus pendulus* with which most of them have been associated, and their relationships with other fossil types are still more remote.

The following disposition of the living forms is suggested.

KEY TO THE RECENT GENERA OF PENTACRINIDÆ

a^1 Second post-radial ossicle not an axillary
  b^1 fourth post-radial ossicle an axillary
    Saracrinus
  b^2 first axillary beyond the fourth post-radial ossicle
    Metacrinus
a^2 Second post-radial ossicle an axillary from which two arm trunks arise
  b^1 elements of the IBr series (the first two post-radial ossicles) united by syzygy
    c^1 at least the outer division series of more than 6 elements; proximal pinnules with a strongly serrate profile
      Cenocrinus
    c^2 none of the division series of more than 4 elements; proximal pinnules with a smooth profile
      d^1 division series beyond the first entirely, or at least mostly, of more than 2 elements
        e^1 division series beyond the first variable, but never 3(1+2); distal edges of the post-radial ossicles everted and produced
          Teliocrinus
        e^2 all the division series beyond the first 3(1+2); distal edges of the post-radial ossicles not produced
          Endoxocrinus

[1] Received December 6, 1922.

d^2 all of the division series 2(1+2)

e^1 cirri long and stout, composed of more than 20 (usually more than 30) segments, the whorls of cirri being separated by 1–10 pentagonal to bluntly stellate internodals

Diplocrinus

e^2 cirri short, consisting of about 18 segments, the whorls separated by 30–40 or more rounded internodals

Annacrinus

b^2 elements of the IBr series not united by syzygy

c^1 more than 10 arms

Neocrinus

c^2 ten arms only

Hypalocrinus

Genus Metacrinus P. H. Carpenter

Metacrinus P. H. CARPENTER, Bull. Mus. Comp. Zoöl., vol. 10, No. 4, 1882, p. 167 (no species included).—P. H. CARPENTER, "Challenger" Reports, Zoölogy, vol. 11, part 32, 1884, p. 344.

Diagnosis.—A genus of Pentacrinidæ in which the first axillary is beyond the fourth, and is usually the seventh, post-radial ossicle.

Genotype.—*Metacrinus wyvillii* P. H. Carpenter, 1884 (cf. A. H. Clark, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 527).

Geographical range.—From southern Japan to the Kermadec Islands and southeastern Australia, and westward to the Kei Islands.

Bathymetrical range.—From 119 to 1133 meters.

Included forms.—*Metacrinus costatus* P. H. Carpenter, *M. cyaneus* H. L. Clark, *M. interruptus* P. H. Carpenter, *M. moseleyi* P. H. Carpenter, *M. nodosus* P. H. Carpenter, *M. rotundus* P. H. Carpenter, *M. stewarti* P. H. Carpenter, *M. wyvillii* P. H. Carpenter, and *M. zonatus* A. H. Clark.

Saracrinus, gen. nov.

Diagnosis.—A genus of Pentacrinidæ in which the fourth post-radial ossicle is the first axillary.

Genotype.—*Metacrinus nobilis* P. H. Carpenter, 1884.

Geographical range.—From the Korean Straits and the Bonin Islands to the Kermadec Islands and southeastern Australia,[2] and westward to Sumatra.

Bathymetrical range.—From 55 to 1133 meters.

Included forms.—*Saracrinus acutus* (Döderlein), *S. angulatus* (P. H. Carpenter), *S. batheri* (A. H. Clark), *S. batheri* var. *gracilis* (A. H. Clark), *S. cingulatus* (P. H. Carpenter), *S. nobilis* (P. H. Carpenter), *S. nobilis* var. *borealis* (A. H. Clark), *S. nobilis* var. *murrayi* (P. H. Carpenter), *S. nobilis* var. *nobilis* (P. H. Carpenter) (= var. *typica* [Döderlein]), *S. nobilis* var.

[2] It is evident from Dr. H. L. Clark's description of *Metacrinus cyaneus* (Biol. Results Fishing Experiments F. I. S. "Endeavour," vol. 4, part 1, 1916, p. 9) that some of his specimens belonged to a species of this genus; the figure, however, represents a true *Metacrinus*.

sumatranus (Döderlein), *S. nobilis* var. *tenuis* (Gislén), *S. nobilis* var. *timorensis* (Döderlein), *S. nobilis* var. *tuberculatus* (A. H. Clark), *S. serratus* (Döderlein), *S. superbus* (P. H. Carpenter), *S. suluensis* (Döderlein), *S. tuberosus* (P. H. Carpenter), and *S. varians* (P. H. Carpenter).

Genus Cenocrinus Wyville Thomson

Cenocrinus WYVILLE THOMSON, The Intellectual Observer, vol. 6, No. 31, August 1864, p. 2.

Diagnosis.—A genus of Pentacrinidæ in which the first two post-radial ossicles are united by syzygy and the second is axillary, the following division series consist of numerous segments, more than 6 in the outermost, and the segments of the proximal pinnules have strongly projecting distal angles so that these pinnules have a strongly serrate outline.

Genotype.—*Pentacrinites caput-medusæ* Miller, 1821 (= *Encrinus caput-medusæ* Lamarck, 1816 = *Isis asteria* Linné, 1766).

Geographical range.—West Indies; Cuba to Barbados.

Bathymetrical range.—From shallow water (it has been found on the beach at Barbados) to 585 meters.

Included species.—*Cenocrinus asteria* (Linné).

Remarks.—Although this species, which is so frequently figured in text-books, was first described by Guettard so long ago as 1761, and by Ellis in 1762, only sixteen specimens of it have so far come to light; but three undetermined specimens mentioned by early writers may also belong to it.

Genus Teliocrinus Döderlein

Teliocrinus DÖDERLEIN, Wiss. Ergebn. d. deutsch. Tiefsee Exped., vol. 17, Heft 1, 1912, p. 22.

Comastrocrinus A. H. CLARK, Crinoids of the Indian Ocean, 1912, p. 252.

Diagnosis.—A genus of Pentacrinidæ in which the first two post-radial ossicles are united by syzygy and the second is axillary, the division series beyond the first are variable, but never of 3(1+2), rarely of two, and never of more than six elements, and the ossicles of the division series and brachials have everted and strongly produced distal borders.

Genotype.—*Teliocrinus asper* Döderlein, 1912 (= *Hypalocrinus springeri* A. H. Clark, 1909).

Geographical range.—From western Sumatra northward to the Gulf of Martaban and westward to the Laccadive Islands and the western coast of India.

Bathymetrical range.—From 366 to 1280 meters.

Included forms.—*Teliocrinus liliaceus* (A. H. Clark), *T. ornatus* (A. H. Clark), and *T. springeri* (A. H. Clark) (= *T. asper* Döderlein).

Genus Endoxocrinus A. H. Clark

Endoxocrinus A. H. CLARK, Proc. Biol. Soc. Washington, vol. 21, 1908, p. 151.—A. H. CLARK, Proc. U. S. Nat. Mus., vol. 35, 1908, p. 131.

Diagnosis.—A genus of Pentacrinidæ in which the first two post-radial ossicles are united by syzygy and the second is axillary, all the following division series are 3(1+2), and the first two brachials are united by syzygy.

Genotype.—*Encrinus parræ* Gervais, 1835 (= *Encrinus milleri* Guilding, 1828 [not *Encrinites milleri* von Schlotheim, 1822] = *Pentacrinus mülleri* Oersted, 1856).

Geographical range.— West Indies; Cuba to St. Vincent.

Bathymetrical range.—From shallow water (whence it is occasionally brought up by fishermen) down to 526 meters.

Included species.—*Endoxocrinus parræ* (Gervais).

Remarks.—In the "Challenger" report Carpenter confused this species with *Diplocrinus maclearanus* and his account of "*Pentacrinus mülleri*" is based upon specimens of both species. This explains the discrepancy between the original diagnosis of *Endoxocrinus* and the characters of the type species, and also Döderlein's confusion regarding *parræ* at the time he proposed the genus *Diplocrinus*.

Genus Diplocrinus Döderlein

Diplocrinus DÖDERLEIN, Wiss. Ergebn. d. deutsch. Tiefsee Exped., vol. 17, Heft 1, 1912, p. 21.

Diagnosis.—A genus of Pentacrinidæ in which all of the division series are 2(1+2), the first two brachials are united by syzygy, and the cirri are long and stout with more than 20 (usually more than 30) segments, the whorls being separated by 1–10 pentagonal to stellate internodals.

Genotype.—Here designated as *Pentacrinus maclearanus* Wyville Thomson, 1877.

Geographical range.—From Florida to Brazil, and from Timor to the Philippine and Meangis Islands.

Bathymetrical range.—From 154 to 1097 meters.

Included forms.—*Diplocrinus alternicirrus* (P. H. Carpenter), *D. maclearanus* (Wyville Thomson), and *D. sibogæ* (Döderlein).

Annacrinus, gen. nov.

Diagnosis.—A genus of Pentacrinidæ in which all of the division series are 2(1+2), the first two brachials are united by syzygy, and the cirri are short with about 18 segments the whorls being separated by 30–40 or more rounded internodals.

Genotype.—*Pentacrinus wyville-thomsoni* (Jeffreys, *nomen nudum*) Wyville Thomson, 1872.

Geographical range.—From the Bay of Biscay to Morocco and the Canary Islands.

Bathymetrical range.—From 1330 to 2002 meters.

Included species.—*Annacrinus wyville-thomsoni* (Wyville Thomson).

Genus Neocrinus Wyville Thomson

Neocrinus WYVILLE THOMSON, The Intellectual Observer, vol. 6, No. 31, August 1864, p. 7.

Diagnosis.—A genus of Pentacrinidæ in which the first two post-radial ossicles are united by synarthry and the second is axillary; IIBr and often further division series are present.

Genotype.—*Pentacrinus decorus* Wyville Thomson, 1864.

Geographical range.—West Indies; from Florida to Grenada.

Bathymetrical range.—From shallow water (sometimes brought up on Fishermen's lines) down to 1219 meters.

Included forms.—*Neocrinus blakei* (P. H. Carpenter), and *N. decorus* (Wyville Thomson).

Genus Hypalocrinus A. H. Clark

Hypalocrinus A. H. CLARK, Proc. Biol. Soc. Washington, vol. 21, 1908, p. 152.—A. H. CLARK, Proc. U. S. Nat. Mus., vol. 35, 1908, p. 130.

Diagnosis.—A genus of Pentacrinidæ in which the first two post-radial ossicles are united by syzygy and the second is axillary; there is no further arm division.

Genotype.—Pentacrinus naresianus P. H. Carpenter, 1882.

Geographical range.—From the Kermadec Islands and Fiji to the Philippines and Celebes.

Bathymetrical range.—From 621 to 2468 meters.

Included species.—Hypalocrinus naresianus (P. H. Carpenter).