

1847

Catalogue Raisonné of Species, Genera and Families of Echinoids: A translation of *Agassiz, Louis, Desor, E. 1847. Catalogue raisonné des espèces, des genres et des familles d'Echinides Annales des sciences naturelles*

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Z. D.

ANNALES

DES

SCIENCES NATURELLES

COMPRENANT

LA ZOOLOGIE, LA BOTANIQUE,
L'ANATOMIE ET LA PHYSIOLOGIE COMPARÉES DES DEUX RÈGNES,
ET L'HISTOIRE DES CORPS ORGANISÉS FOSSILES;

RÉDIGÉES

POUR LA ZOOLOGIE

PAR M. MILNE EDWARDS,

ET POUR LA BOTANIQUE

PAR MM. AD. BRONGNIART ET J. DECAISNE.

Troisième Série.

ZOOLOGIE.

TOME HUITIÈME.



PARIS.

VICTOR MASSON,

LIBRAIRE DES SOCIÉTÉS SAVANTES PRÈS LE MINISTÈRE DE L'INSTRUCTION PUBLIQUE,
PLACE DE L'ÉCOLE-DE-MÉDECINE, 1.

1847.

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Translator's note:

I reproduce here for the reader's convenience the description that is given in Agassiz and Desor (1846) of each species. The habitat for the living species, and the deposit for the fossil species, is indicated in a separate paragraph after the description with the museum or collection where the species is found. Here is the key to the geological abbreviations.

Tert.	Tertiary.	Portl.	Portlandian.
Calc. gr.	Large chalk.	Séquan.	Sequanian.
Terr. numm.	Nummulitic deposit.	Kimmer.	Kimmeridian.
Terr. cré.	Cretaceous deposit.	Coral.	Corallian.
Cr. bl.	White chalk.	Argov.	Marne.
Dan.	Danien.	Oxford.	Oxfordian.
Terr. pisol.	Pisolitic deposit.	Kellov.	Kellovian.
Cr. marn.	Chlorite chalk.	Ool. Inf.	Lower oolite.
Marn. néoc,	Marly chalk.	Vésul	Vesulian.
Néoc.	Neocomian.	Marn. vésul.	Vesulian marl.
Terr. jurass.	Jurassic deposit.	Ool. Ferrug.	Ferruginous oolite.

The uppercase numbers placed after the names of the authors in the fossil species indicate the numbers of order of the collection of mussels of the Museum of Neuchâtel. This collection exists in addition to the Museum of Paris, the British Museum, the museums of Berlin, Turin, Montpellier, and of MM. Michelin at Paris and Charles Desmoulins at Bordeaux, etc.

I have not changed apparent misspellings or diacritical marking. Sometimes the genus name when it is alone is italicized, sometimes it is not. Agassiz was not consistent in his abbreviations, which are often idiosyncratic. He frequently used *yeux* (eyes) for the ocellar pores.

The figures are at the end of the memoir by Agassiz and Desor, Vol. 6.

I thank Thomas Saucedo for his help with 19th century anatomical terms that are now obsolete.

ANNALES
DES
SCIENCES NATURELLES

ZOOLOGICAL PART

CATALOGUE RAISONÉE
OF THE SPECIES, GENERA AND FAMILIES OF ECHINOIDS
BY MM. L. AGASSIZ AND E. DESOR

--- Following¹ ---

FAMILY OF SPATANGOIDS

Form elongated or sub-circular, bilateral. No masticatory apparatus. Mouth bilateral or sub-angular. Anus posterior. Five ambulacra, sometimes disjointed, sometimes united at the summit. The anterior or unpaired ordinarily located in a groove, and differing, in general, from the four paired ambulacra by its simpler structure. Test generally thin, covered with short spines, sometimes longer, supported by crenelated and perforated tubercles. Four genital pores, sometimes very close together, sometimes separated. Five ocular pores. A part of the spatangoids is covered, in addition, with small bands that appear smooth. We call them fascioles. They have very fine spines that, seen with a microscope, have the same structure as pedicellariae².

¹ See, for the first part of the work, v. VI, p. 303, and, for the second part, v. VII, p. 129, 3^e series.

² The position of these fascioles or bands varies with genera. We call them *peripetalous* when they surround the ambulacral petals (in *Hemiaster*, *Schizaster*, etc.); *internal* when they circumscribe the unpaired ambulacrum (in *Amphidetus*); *lateral* when they extend, anteriorly and posteriorly, on the sides (in *Schizaster*); and *sub-anal* fasciole when it is limited at the base of the anus. Most often there are several of these fascioles in a single genus. The peripetalous fasciole and the sub-anal fasciole are found especially associated.

FIRST GROUP. — *Ambulacra petaloid, convergent at the summit. Fascioles of different species. Mouth always bilobed. The species belong to deposits of the Cretaceous, Tertiary and present epoch.*

LXXI. SPATANGUS KLEIN (AGASS.).

Urchins of large size, inflated; test thin with ambulacral pairs composed of large petals, wider than in the other spatangoids. The anterior border of the ambulacral pairs is obliterated towards the summit. Unpaired ambulacrum lodged in a wide and deep groove. Large perforated and crenelated tubercles on the interambulacral area. No peripetalous fasciole. A deeply notched sub-anal fasciole below the anus. Four genial pores, of which the two anteriors are nearer each other than the posteriors. Five ocellar pores in the form of a regular pentagon around the genital pores. A tube or hollow cone on the internal surface of the unpaired interambulacrum Upper lip of the mouth composed of polygonal small plates. A wide, flat, blade vertical to the internal surface of the test on the left side of the mouth. The species are of the present epoch and Tertiary deposits.

FIRST TYPE. — *Large species with wide ambulacral petals.*

purpureus Müll. Zool. dan. Tab.6. — Forbes, Brit. Starf. p. 182. — Species depressed and obtuse posteriorly.

Western and northern coasts of Europe: Cherbourg, Rochelle, Abbeville, Sweden, Norway. — Mus. Paris, Stockholm, Copenhagen, Michelin.

spinosissimus Desor. Species depressed like the preceding, from which it differs by a much greater number of tubercles on the dorsal surface.

Seas of Europe. — Michelin.

meridionalis Risso. inflated species with a keel on the posterior interambulacral areas.

Mediterranean, Algeria, Red Sea. — Mus. Paris.

Fossil species

siculus Agass. — S 92. — Park. Rem. III, Pl. 3, fig. 9. — Species very near *Sp. meridionalis*, if not identical.

Tert. of Palermo. Pliocene of Monte-Mario near Rome. — Duluc, Verneuil.

Philippii Desor. — S 63. — The ambulacra are proportionally narrower than in *Sp. siculus*.

From Cape Safran near Palermo. Pliocene of Monte-Mario near Rome. — Deluc, Verneuil.

Desmarestii Münster. — 3 — Goldf, Petref. p. 153, Tab. 47, fig. 4. — *Spatangus ornatus* Agass, (non Deifr.). Cat. syst. p. 2.

Tert. (molasse) of Venasque, Vedennes, Bordeaux, Nice. Sands of Astesan. — Mus. Paris, Avignon, Turin.

corsicus Desor. — R 78. — Near *Sp. Desmarestii*, with the anterior surface more sloping and closer posteriors.

Tert. of Italestro (Corsica), Saint-Paul-Trois-Châteaux (Drôme). — Michelin, Mus. Paris (gal. geol.).

Delphinus Desor. — M 20. — Dic. Sc. nat. — Agass. Cat. syst. 00. 2. — Species inflated, with tubercles little projecting, Ambulacra very narrow.

Molasse of Saint-Paul-Trois-Châteaux. — Mus. Paris, Avignon, Defrance, Desmoulins.

Requieni — T 38. — Remarkable for the extreme narrowness of the ambulacra that are very long. The anterior paired ambulacra are arced anteriorly.

Tert. ? deposits. — Mus. Avignon.

Asterias Agass — 2 — Cat. syst. p. 2. — Large, elongated species, with short and wide ambulacra.
Tert. of Morée. — Deshayes.

ocellatus Deifr. — S 42 — Dict. Sc. nat. — *Spatangus Nicoleti* Agass. Echin. suiss. I, p. 23, Tab. 4, fig. 7 and 8. —
Cat. syst. p. 2.
Molasse of Saint-Paul-Trois-Châteaux, Neuchâtel. — DeFrance, Mus. Neuchâtel.

Pareti Agass. — P 97 — *Spatangus ocellatus* Agass. (non Deifr.) Cat. syst. p. 2. — Very large depressed species, with
numerous tubercles.
Tert. of Italy. — Michelin.

petalodes Agass. Posterior ambulacra very elongated and widened posteriorly, where they are strongly rounded.
Tert. deposits. — Mus. Paris.

SECOND TYPE. — *Small flat species with narrow and elongated ambulacra.*

plannulatus Lamk. Flat species; very numerous large tubercles, regularly spaced, extending to the borders. The
plastron is smooth, as if it been used, even in the specimens in wine spirits. Mouth in the form of a broken
croissant.
Southern seas (Pérou and Lesueur), Java (Quoy and Gaimard, Waigiou (Lesson and Garnot). — Mus. Paris.

Fossil species

Hoffmanni Goldf. — Q 52, — Petref. p. 152, Tab. 47, fig. 3. — Agass. Cat. syst. p. 2.
Tert. of Bünde. — Mus. Bonn.

Arehiaei Agass. Species near *Sp. planulatus*, but more inflated, with ambulacra more rounded and more petaloid.
Differs from *Sp. Hoffmanni* in that it is not in the form of a roof.
Calc. gr. of Ouichi-le-Château. — D'Archiac.

grigonensis Agass/ — 1. X 20. — Cat. syst. p. 2. — Differs from *Sp. Hoffmanni* by its form more flattened and by a
considerably larger number of tubercles.
Tert. of Grigon. — Mus. Paris (gal. geol.). Michelin, Deshayes.

depressus Dub. Voy. au Caucase, Tab. 1, fig. 16. Species very near *Sp. grigonensis*.
Numm. deposits of Crimea. Appear to be found in Sinai, after a bad specimen reported by M. Lefebvre. —
Dubois, Mus. Paris.

pendulus Agass. Flat species, with sub-circular mouth; Anterior ambulacra very narrow. Anus nearly dorsal. Differs
from *Sp. depressus* by the absence of notches on the anterior bord and the groove on the ambulacrum.
Numm. ? deposits of Sinai (Lefebvre). — Mus. Paris.

simplex Agass. — M 23. R 40. Cat. syst. p. 2. — Species very depressed, with very broad anterior groove.
Tertiary of Corsica. — Michelin.

chitonosus E. Sism. Echin. foss. Piem. p. 33, Tab. 1, fig. 6 and 7.
Tert. moy. of hill of Turin. — Mus. Turin.

LXXII. MACROPNEUSTES AGASS.

(P. 16 [volume VI] fig. 2)

Form inflated. Test thick. Ambulacral petals elongated, open or imperfectly closed. Poriferous zones equal in width to the intermediary space. Some tubercles in the ambulacral areas, but however less protruding than in spatangoids. A lateral fasciole at the end of the ambulacra and passing above the anus. The species known until now belong to Tertiary deposits.

Deshayesii — P 90. P 92. — *Micraster Deshayesii* Agass. Cat. syst. p. 2. — *Micraster major* Agass. Cat. syst. p. 2. — Large depressed species, with long and narrow ambulaca, located in very wide grooves. Tertiary of Paris. Calc. gr. of Vivray. — Deshayes, Graves.

pulvanatus Agass. — T 41. — *Micraster pulvanatus* of d'Arach. Mém. Soc. géol. Fr. 2^e sér., v. II, p.201, Pl. 6, fig. 1. Species near *M. Deshayesii*, but shorer, and with ambulacra a little shorter. Numm. deposits of Biaitz. — D'Archiac.

Beaumonti Agass. — X 10 — *Micraster Beaumonti* Agass. Cat. syst. p. 2. — Species very near *M. Deshayesii*, but the ambulacra are shorter and the tubercles larger. The anterior groove is very wide. Pisol. deposits of Montechio-Maggiore. — Élie de Beaumont.

crassus Agass. — T 20 — Species very inflated, with very long ambulacra. Test thick. Differs from *M. Deshayesii* in that it is much more inflated. Cret. deposits of Egypt. — Mus. Paris.

Ammon Desor. — T 22 — Species inflated. Anterior paired ambulacra nearly reach the border. Space between the poriferous zones equal to their width. Numm. deposits of Egypt. — Mus. Paris.

Marmorsæ Desor. — R 92. — Species very inflated, gibbose, with wide ambulacra. Tert. of the island of Corsica. — Michelin.

gibbosus Agass. (Mer.) — R 26. — Species remarkable by its very elevated and truncated anterior border. Tert.? Mus. Basel.

LXXIII. EUPATAGUS AGASS.

(Pl. 16 [volume VI], fig. 13.)

Form elliptical, more or less depressed. Paired ambulacral petals wide. Unpaired ambulacrum in a wide groove. Large crenelated tubercles in the interambulacrals of the dorsal surface, as in the true spatangoids, but with this difference that they are limited by the peripetalous fasciole that also surrounds the ambulacral petals. A very marked sub-anal fasciole surrounds the cordiform crest. Mouth ample, semi-circular. Wide naked bands on the ventral surface correspond to the posterior ambulacra. Cup-shaped tubercles in the interambulacral spaces of the ventral surfaces. Little marked and very spaced ambulacral tubes around the mouth. The species are living and from Tertiary deposits.

Valenciennesii Agass. The large tubercles are not numerous and near the peripetalous fasciole. Form oval. Australia (Verreaux). — Mus. Paris.

Fossil species

- ornatus** Agass. — X 90. M 26. M 27. — *Spatangus ornatus* Defr. Dict. Sc. nat. — Cuvier, Oss. foss. II, 2^e part. Tab. V, fig. 6. — Goldf. Petref. p. 152, Tab. 7, fir. 2. — *Spatangus tuberculatus* Agass. Cat. syst. p. 2. Numm. deposits of Biaritz. — Mus. Paris, Michelin, d'Archiac, Duclos.
- lateralis** Agass. — X 24. P 83. — *Spatangus lateralis* Agass. Cat. syst. p. 2. — Species more elongated and less depressed than in the preceding, in form of a roof. Ambulacral summit eccentric anteriorly. Tert. moy. of Superga. — Mus. Turin.
- nummulinus** Agass. Species oval, flat, with peripetalous fasciole near the border. Tubercles little numerous. Calc. gr. of Paris. Parues. — Mus. Avignon.
- naviella** Agass. Species elongated, narrowed posteriorly, slightly notched anteriorly. Numm. deposits environ Nice. — Mus. Turin.
- elongatus** Agass. — X 86. — *Spatangus elongatus* Agass. Cat. syst. p. 2. — E. Sism. Mém. Ech. foss. Nizza, p. 35, Tab. 2, fig. 1. — Species near *E. ornatus*, but more elongated. Numm. deposits of Nice and Switzerlad. — Mus. Turin and Neuchâtel.
- veronensis** Agass. — M 21. — *Spatangus veroensis* Mer. in Agass. Cat. syst. p. 2. — Species inflated, sub-cylindrical. Pisol. deposits of Vérone. — Mus. Zurich and Strassbourg, Defrance.
- brissoides** Agass. — T 98. — *Spatangus brissoides* Desml. Tabl. syn. p. 392. — Pl. 1, fig. 11. Distinguished by its very inflated form. Numm. deposits of Montfort, near Dax. — Desmoulins, Grateloup.
- minor** Agass. — R 74. — Small species, sub-cylindrical, with small tubercles. I have never been able to assure myself that a fasciole exists. Calc. gr. of Vernon. — Michelin.
- Duvalii** Desor. Species near *E. ornatus*; but the tubercles are small and more numerous than any other species. Calc. gr. of Mouchy-le-Châtel near Paris. — Duval.

LXXIV. GAULTIERIA DESOR.

(Pl. 16 [v. VI], fig. 11.)

Large tubercles on the dorsal surface, as in the genus *Spatangus*; but the petaloid part that encloses them is circumscribed by a fasciole that cuts the end of the posterior ambulacra. In this part of the ambulacra, the conjugated pores are clearer and more distinct than in the interior of the fasciole. The sub-anal fasciole as in the spatangids. Large irregular tubercles around the mouth. Four genital pores. Mouth surrounded by large folds, in the intervals of which are seen the lower ambulacral pores. The only species known of this genus is from the Tertiary epoch.

- Orbignyana** Agass. — T 31. — Form elongated, ovoid. Ambulacral summit in the middle of the back. Numm. deposits of Saint-Palais near Royan. — D'Orbigny.

LXXV. LOVENIA DESOR.

(Pl. 16 [v. VI], fig. 11.)

Paired ambulacral peals juxtaposed, like two croissants connected by their convex sides. Large tubercles on the dorsal surface that are supported by wide ampoules in the interior. An internal fasciole (surrounding the anal region) advances between the posterior ambulacra, as in the genus *Amphidetus*. A sub-anal fasciole surrounds the anal region, and even penetrates into the beak, at the base of which the anus opens. Four genital pores. Five ocellar pores arranged in the form of a pentagon around the pores. Pores of the unpaired ambulacral area are very small and nearly confounded. The large tubercles have very long spines arced at their base.

Hystrix Desor. — Descript. Egypt. Zool. Pl. 7, fig. 4. — Species flat, narrow posteriorly. Tubercles having very long spines.

Red Sea (Botta). — Mus. Paris.

LXXVI. AMPHIDETUS AGASS.

(Pl. 16 [v. 6] fig 8.)

Test cordiform, very thin. Mouth less eccentric than in the other species. Anus at the dorsal part of the posterior border, supported by a cordiform and very protruding shield. Paired ambulacra very prominent, composed of a small number of very spaced pores corresponding to wide smooth zones of the ventral surface. The unpaired ambulacrum located in a more or less deep groove with very small pores. Ventral interambulacral area narrow. An internal fasciole (surrounding the unpaired ambulacrum) that is extended at its summit between the ambulacra in a way to interrupt the convergence of the ambulacra³. Sub-anal fasciole surrounding the cordiform shield and is extended sometimes in the form of two branches up to above the anus. Four genital pores very close together. Very small ocellar pores outside the genital pores. Fine striations on the perforated tubercles, larger on the ventral surface than on the dorsal surface, and usually rising from the border and end of the smooth zone. The species are living and from Tertiary deposits.

cordatus Agass. — *Spatangus cordatus* Pennant, Brit. Zool. iv, p. 69, Tab. 34, fig. 73. — Forbes, Brit. Starf. p. 190. — *Spatangus arcuarius* Lamk.

The Channel, Copenhagen, Sicily, Palermo, Cete, Algeria. — Mus. Paris.

gibbosus Agass. — *Amphidetus pusillus* (young). — Differ from *A. cordatus* by the absence of an anterior ambulacral groove. Anterior border very elevated. Internal fasciole narrow at the summit.

The Channel, Palermo, Bone (African exped.). — Mus. Paris, Deshayes.

ovatus Agass. *Spatangus ovatus* Leske.

Var. minor: *Amphidetus roseus* Forbes, Brit. Starf. p. 194.

Coasts of Sweden, England, Algeria. — Mus. Stockholm, E. Forbes, Deshayes.

mediterraneus Forbes. Ann. nat. Hist. vol. XIV, 1844. p. 413.

³ These are extended nevertheless up to the genital system in the form of very small pores visible only on the ventral surface.

Mar. Egée.

Fossil species

Sartorii Agass. — R 34. — Very near *A. cordatus*, but a little more elongated. The area surrounded by the internal fasciole is narrower.

Tertiary of Palermo. — Marquis of Northampton. Mer. Egée. —Forbes.

depressus Agass. Very short, with sunken ambulacra; but the unpaired ambulacrum is narrower. The posterior ambulacrum is not prolonged so far.

Tert. (molasse) at La Couronne. — Michelin.

subcentralis Agass. Visible only by its ventral surface. Posterior interambulacral area short and triangular. Form depressed. Mouth nearer the center than in the other species.

Tert. inf. of Saint-Palais near Royan. — D'Archiac.

Note. Goldfuss has described a fossil species from Maëstrich that he considers identical with *A. cordatus*, but that I have not seen myself.

LXVII. BREYNIA DESOR.

(Pl. 16 [volume 6], fig. 14.)

Two fascioles on the dorsal surface: one internal, as in the genus *Lovenia*; the other petapetalous. Large tubercles on the dorsal surface, but only in the space circumscribed by the peripetalous fasciole. The ampoules that support the tubercles do not protrude to the exterior. A sub-anal fasciole. Eyes and genital pores as in the genus *Lovenia*.

Crux-Andræ Agass. *Spatangus andræ* Lamk.

Southern seas (Péron and Lesueur), Red Sea (Desmoulins). — Paris.

LXXVIII. BRISSUS KLEIN.

Form oval, with eccentric summit anteriorly. Narrow paired ambulacra located in shallow groove. The anterior, nearly transverse, the posterior, nearly longitudinal. Unpaired ambulacra flush with the test. Peripetalous fasciole very sinuous. Mouth very near the anterior border. Anus very large, located in the middle of the posterior surface.

PREMIER TYPE. — Sub-genus *PLAGIONOTUS* Agass. — *Large tubercles distinctly mamelonnated. Peripetalous fasciole not sinuous in circumscribing the tubercles.*

(Pl. 16 [volume VI], fig. 15.)

pectoralis Lamk. Encycl. méth. Zooph. Pl. 159, fig. 2 and 3.

Mexico, Bahia. — Mus. Paris.

SECOND TYPE. *Brissus* strictly speaking. — *without large tubercles on the upper surface.*

(Pl. 16 [volume VI], fig. 9.)

ventricosus Lamk. *Encycl. méth.* Pl. 158, fig. 11. — Gaultieri, Tab. 109, fig. B. — Species of very large size, with the apical summit nearly median.
Saint-Dominic, Antilles. — Mus. Paris.

sternalis Agass. — *Spatangus sternalis* Lamk. — Sub-anal cordiform and radiated area. Except for this, near to *B. ventricosus*.
Southern Ocean (Péron and Lesueur). — Mus. Paris.

bicinctus Val. Differs from *B. sternalis* in that the fasciole is double in the anterior ambulacral area, as well as the posterior border of the paired ambulacral areas.
Red Sea (Botta). — Mus. Paris.

carinatus Agass. — *Spatangus carinatus* Lamk. *Encycl. méth. Zooph.* Pl. 139, fig. 1. — Gaultiera, Tab. 108, fig. G — Species well characterized by the keel of the unpaired interambulacral area and by the oblique section of the posterior border.
Ile-de-France and Bourbon. — Mus. Paris and Stockholm.

Seillæ Agass. — *Spatangus ovatus* β Lamk. *Encyl. méth. Zooph.* Pl. 158, fig. 7. — *Brissus placenta* Philippi. — Species more depressed than *B. carinatus*. Posterior border vertical, while the section of the anus is oblique in *B. carinatus*.
Mediterranean, Palermo. — Mus. Neuchâtel and Paris.

dimidiatus Agass. High and crenelated species as in *B. carinatus*, but anus vertically truncated as in *B. Seillæ*. Tubercles of the anterior half of the body larger than those of the posterior half.
Canaries. — D'Orgibny, Mus. Paris.

columbaris Agass. — *Spatangaris columbaris* Lamk. *Ecycl. Zooph.* Pl. 158, fig. 9 and 10. — Gaultiera, Tab. 109, fig. A. — Differs from *B. Seillæ* in that the anterior pairs of ambulacra are slightly inclined posteriorly while they fall a little anterior in *B. Seillæ*,
Island of Cuba (d'Orbigny), Guadeloupe (living and in the state of petrification), — Mus. Paris, d'Orbigny.

compressus Agass. *Spatangus compressus* Lamk.
Ile de France. — Mahieu.

areolatus Val. Species near *B. columbaris* but having the borders of the coronal plates smooth. Anterior pairs of ambulacra sensibly bent anteriorly. It is perhaps only a variety of *B. sternalis*.
Southern seas. — Mus. Paris.

Fossil species

cylindricus Agass. — R 35. — Species elongated, very near *B. columbaris*, but cylindrical. The apical summit is very anterior.
Tert. of Palermo. — Marquis of Northampton.

dilatatus Desor. — V10. — *Spatangus columbaris* Desml. *Tabl. syn.* p. 396. — Species near *B. Seillæ*, but very enlarged posteriorly.
Calc. gr. of Rions (Gironde). — Desmoulins, d'Orligny.

Cordieri Agass. Fossil species very near *B. carinatus* (very bad specimen.)
Tert. (molasse) of Saint-Paul-Trois-Châteaux. — Mus. Paris (gal. geol.).

antiquus Desor. Large flat species. Anterior ambulacra slightly curved anteriorly.
Numm. deposits of Aurillac near Bagnene-et-Bigorre. — Desmoulins.

subacutus Desor. — T 45. — *Micraster subacutus* d'Arch. Mém. Soc. géol. Fr. 2^e sér. Vol. II, p. 201, Tab. 7, fig. 5.
— Small, cylindrical species, with pointed anal rostrum.
Numm. deposits of Biaritz. — D'Aarchiac.

helveticus Agass. — 9. — *Micraster helveticus* Agass. Echin. suiss. I, p. 27, Tab. 3, fig. 19 and 20. — Cat. syst. p. 2.
Numm. deposits (cr. alpine) of Einsiedeln (cant. of Schwytz). — Mus. Bern.

cruciatus Agass. — G 75. — Large, flat species. Anterior groove very deep. Anterior ambulacral pairs very oblique anteriorly. Anterior border much more notched than in *B. carinatus*.
Tert. moy. of Caprée. — Mus. Paris. (gal. geol.).

LXXXIX. BRISSOPSIS AGASS.

(Pl. 26 [volume VI], fig. 12.)

Form elongated, sub-cylindrical. Ambulacra short and wide, nearly convergent at the summit of the test. A sinuous peripetalous fasciole surrounding the ambulacral petals very closely. Three or four genital pores. Five eyes equally spaced in the form of a pentagon around the genital openings. The posterior ovaries are much larger than the anteriors. A sub-anal fasciole spreads out rather distant from the anus. The apical part of the unpaired ambulacrum and around the mouth having the largest ambulacra tubes. The tubercles are crenelated. The ventral ambulacra are very large and naked. It differs from *Brissus* by the sub-median summit, the short and wide ambulacra, and the considerable space that separates the anus from the sub-anal shield.

lyrifera Agass. — *Brissus lyrifera* Forbes, British Starf. p. 187. Species inflated. Fasciole peripetalous little sinuous, crosses the two posterior ambulacra. On the ventral surface, the posterior ambulacra are very wide and the first shield is narrow.
Seas of the north (Loven), England. — Mus. Stockholm, Forbes.

cavernosa Agass. — *Tripylus⁴ cavernosus* Philippi, Erichs. Arch. 1846,
South America.

australis Agass. — *Tripylus australis* Philippi, Erichs. Archiv. 1846.
South America.

Fossil species

elegans Agass. — P 81. V 1. — Cat. syst. p. 3. — *Spatangus grigonensis* Desmar. in Desml. Tabl. syn. p. 390. — Species near *B. lyrifera*; but the anterior ambulacra are deeper and the posteriors more arced.
Numm. deposits of Royan, of Motrott near Dax. Tert. of Saint-Estèphe (Gironde). — D'Orbigny, Desmoulins, Delbos.

⁴ The Genus *Tripylus* rests on a character too transient to be maintained. The number of genital pores, far from being a character of the genus, cannot even serve as a distinction of the species. I know of individuals of the same species (*Schizaster lacunosus*) in which some have three, others four, and others two.

Genei Desor. — T 46. — *Schizaster Genei* E. Sism. Echin. foss. Piem. p. 24, Tab. 2, fig. 4. *Schizaster ovalus* E. Sism. Echin. foss. Piem. p. 29, Ta. 2, fig. 3. — Flat species, with a very small ambulacral star. Peripetalous fasciole wide.

Tert. moy. of Turin, Castel Nuovo near Asti, Perpignan. — Mus. Turin, Avignon.

Borsoni Aass. — T 32. — *Schizaster Borsoni* E. Sism. Echin. foss. Piem. p. 23, Tab. 1, fig. 8–12. — Narrow species with very little divergent ambulacra.

Marly sands of Castiglione, in the Artésan. — Mus. Turin.

Roninli Desor. Species very near *B. Borsoni*, but much smaller size. The ambulacra are narrower.

Pliocene of Monte-Mario near Rome. — Verneuil.

angusins Desor. — T 13. — Very small species narrowed in front, near *B. Borsoni*; but the ambulacra are not as deep. Anus supra-marginal.

Numm. deposits of Egypt (Lefebvre)l — Mus. Paris.

oblonga Agass. Species long, the narrowest and most tapered of the genus.

Numm. deposits of Fontaine-du-Jarrier. — Vandenecke.

contractus Desor. Species very elongated and narrow.

Numm. deposits environ Nice. — Mus. Turin, Michelin.

Simondæ Agass. — R 65. — Large species characterized by the scale of the posterior ambulacra that are wider than the unpaired ambulacrum.

Tert. of Corsica. — Mus. Turin.

LXXX. HEMIASTER DESOR.

(Pl. 16 [volume VI], fig. 7.)

Urchins of small size, inflated. Ambulacral summit eccentric posteriorly. Ambulacra located in wide and shallow grooves. The posteriors sensibly shorter than the anteriors. Peripetalous fasciole angular surrounding the ambulacral star. No sub-anal fasciole. Differs from the genus *Micraster* by its more inflated form and by its peripetalous fasciole, and from the genus *Brissopsis* by its more unequal ambulacra and by the absence of a sub-anal fasciole. All the species of chalk and nummulitic deposits.

FIRST TYPE. — *Posterior ambulacra very short, barely half the length of the anterior ambulacra.*

Bufo Desor. — S 13 — *Micraster Bufo* Agass. Cat. syst. p. 2. — *Spatangus Bufo* Al. Brongn. Gèol. Par. p. 84 and 389, Tab. 5, fig. 4, a, b, c. — Goldf. Petref. p. 184, Tab. 47, fig. 7. — Large species and very high posteriorly. Buccal lip surrounded by a calcareous ring.

Cr. chlor. of Villers, Cr. of Saint-Chriophe, Vaches-Noires, Fécamp, Gacé, Sainte-Maure-sur-Loire. — Mus. Paris, Michelin, d'Orbigny.

Prunella Desor. — S 19. — *Micraster Prunella* Agass. Cat. syst. p. 2. — *Spatangus Prunella* Lamk. — Goldf. Petref. p. 153, Tab. 48, fig. 6. Differs from *Hem. Bufo* by its less sloping dorsal surface and by its mouth in the form of a croissant, of which the border is simply inflated but without being annular.

Dan. (Maéstricht). Cr. of Talmont, Orglande, Royan. Cr. tufau superior of Camouillag (Char.-inf.), — D'Orbigny, d'Archiac.

- Nucula** Desor. — S 86, — Species very inflated, near *Hem. Prunella*, but shorter and wider. Anterior ambulacra very divergent.
Cr. bl.?
- minima** Desor. — 4. 5. — *Micraster minimus* Agass. Cat. syst. p. 2. — Echin. suiss. I, p. 26, Tab. .3, fig. 16–18. Gaulte of the mouths of the Rhône, Reposoir, Cluses, Nozeroy (Jura). — Mus. Neuchâtel, Bern, Gressly, Marcou.
- Phrynus** Desor. Species near *Hem. Bufo*; But the dorsal surface is horizontal and not sloping anteriorly. Gault of the mouths of the Rhône, the mountains of Fis, of Martigues. — Mus. Neuchâtel, Michelin.
- Leymerii** Desor. — T 43. — The posterior ambulacra are very short. Peripetalous fasciole narrow.
Cr. of Saint-Cristophe. (Indre-et-Loire). — D'Orbigny.
- nucleus** Desor. — T 55. — Very near *Hem. Leymerii* and *Hem. Prunella* but flatter anteriorly. Anterior ambulacra wide and arced outwards.
Cr. tufau of Thains (Charente-Inférieure). — d'Archiac.
- globosus** Desor. — V 8. — *Spatangus gibosus* Risso. — Desml. Tabl. syn. p. 392. — Resembles greatly *Hem. nucleus* by its ambulacra, but the test is much more inflated.
Cret. deposits of France. — Desmoulins.
- Pisum** Desor. — R 97. — Very small species, the size of a pea.
Cr. chlor. from Le Mans. — Michelin.
- elatus** Desor. — T 53. — *Spatangus elatus* Desml. Tabl. syn. p. 406. — Short species, stocky, high, with sunken ambulacra. Interambulacral spaces protruding as five mamelons around the summit.
Cr. chlor. of Le Mans, Fouras. Cr. of Périgord. — Mus. Paris (gal. geol.), d'Archiac, Desmoulins.
- ultissimus** — S 17, — *Micraster globosus* Agass. Cat. syst. p. 2. — Species very high and short.
Pisol. deposits of Saint Mithias, Vérone. — Élie de Beaumont.
- cor** Desor. — T 48. — Near by its form to *Hem. Leymerii*, but it is wider posteriorly. The posterior surface is especially very developed.
Tert. of Bourg (Myocene). — Mus. Paris.
- obesus** Desor. — T 42. — *Spatangus obesus* Leym. Mém. Soc. géol. Fr. 2^e sér., Vol. I, Pl. 13, fig. 15. — Recalls by its form *Schizaster ambulacrum*, but the anterior ambulacra are wider, and the posteriors shorter.
Numm. deposits of the Black mountain at Conques, and of Egypt. — Leymeri, Mus. Paris.
- Bucardium** Desor. — V 2. — *Spatangus Bucardium* Goldf. Petref. p. 157, Tab. 49, Fig. 1.
Cr. of Aix-la-Chapelle. Silix of Lanquais. — Mus. Bonn and Avignon, Desmoulins.
- amplus** Desor. — *Spatangus lacunosus* Goldf. (non Agass.) Petref. p. 158. RV. 49, FIG. 3. — The fasciole is very wide.
Cr. of Aix-la-Chapelle, Quedlimbourg. — Mus. Bonn, Avignon, Bronn.
- tumidus** Desor. — S 30. — Large inflated species, obtuse, truncated posteriorly.
Gault of Jabron (Var). — D'Orbigny.
- Bucklandi** Desor. — *Spatangus Bucklandi* Goldfus. Petref., p. 151. Tab. 47, fig. 6.
Cr. marl. of Essen on the Rœhr. — Mus. Bonn.
- foveatus** Desor. — S 20. — *Schizaster forveatus* Agass. Cat. syst. p. 3. — Species very wide, with very divergent anterior ambulacra. Posterior ambulacra excessively short.
Numm. deposits of Montfort near Dax. — Delbos, d'Orbigny.

SECOND TYPE. — *Enlarged form. Posterior ambulacra nearly as long as the anteriors, which are very divergent.*

Fourneli Desor. — T 7. T 37. T 47. — Form elongated. Posterior ambulacra rather long. Perapetalous fasciole wide. Very apparent tubercles on the dorsal surface.

Cr. with Hippurites from Biskra (Algeria), Egypt, Aleantara (Portugal), Burgos (Spain). — Mus. Paris, Avignon, École des Mines. d'Archiac, Desmoulins, Deshayes.

Verneuilli Desor. — T 34. — Very near *Hem. Fourneli*; but the posterior ambulacra are shorter, the anteriors more divergent, and the unpaired narrower. Some principal tubercles.

Cr. tuffau of Sainte-Maure. — D'Archiac.

subalpinus Desor. — *Spatangus subalpinus* Risso. Near *Hem. Fourneli*, but higher at the summit (bad specimen). Cret. deposits. — Mus. Avignon.

eubieus Desor. — T 6. — Species elongated, inflated, and nearly square.

Var.: *complanata*. — T 12.

Cret. deposits of Egypt. (Lefebvre). — Mus. Paris.

verticalis Desor. — M 44. 91. — *Schizaster verticalis* Agass. Cat. syst. p. 3. — D'Arch. Mém. Soc. géol. Fr. 2^e sér. 2. Vol. II, p. 202, Tab. 6, fig. 1. *Schizaster cultratus* Agass. Cat. syst. p. 3. — Species short and very high. Exterior ambulacra very divergent.

Var. minor. — Q 5. — *Schizaster cerusus* Agass. Cal. Syst. p. 3.

Numm. deposits of Biaritz, Royan. — Deshayes, d'Archiac.

æquifissus Desor. — S 44. — *Schizaster æquifissus* Agass. Cat. syst. p. 3. — Short species, with very deep ambulacra; but the unpaired ambulacrum is not sensibly wider than the others.

Numm. deposits of Kressenberg. — Élie de Beaumont.

subglobosus Deso. — T 9. *Spatangus subglobosus* Lamk. — Short and stocky species, with wide and deep ambulacra. The posteriors are sensibly shorter than the anteriors.

Calc. gr. of Paris. — Graves. Michelin.

intlatus Desor. — T 5. — Species inflated and short, near *Hem. subglobosus*; but the ambulacra are less deep, very divergent and straight.

Deposits around Paris. — Mus. Paris.

acuminatus Desor. — V 19. — *Spatangus acuminatus* Goldf. Petref. p. 188, Tab. 29, fig. 2. — Differs from *Hem. subglobosus* by its anterior ambulacra, which are less separated.

(Myocene). Tert. of Cassel, Calc of Bourg, Bordeaux. — Mus. Bonn, Desmoulins, Delbos.

anticus Desor. — U 85. — Wide and flat species, with a wide unpaired groove. Exterior ambulacral pairs long and shallow.

Deposits.? — Michelin.

stellatus Desor. — *Schizaster stellatus* Dub. Voyage au Caucase (sér. Géol.), Tab. 1, fig. 15. — Species with very homogeneous and narrow ambulacra, as well as the anterior groove.

Tert. of Volhynie. — Dubois de Montpéreux.

complanatus d'Arch. Wide and depressed species. The posterior ambulacra are the same length as the anteriors.

Numm. deposits of Montfort. — Delbus.

latisulcatus Desor. — T 8. — Very wide and very elongated paired ambulacra. Unpaired ambulacrum narrower.

Numm. deposits of Egypt. (Lefebvre). Mus. Paris.

Rana Desor. — *Brissus Rana* (Forbes, Tr. geol. Soc. L. 1846. Vol. VII, p. 161, Tab. 19, fig. 5. — Stocky species, near *Hem. Edwardsii*, but more inflated. Very divergent anterior ambulacra.
Environ Pondichéry. — Cunliffe.

Pomum Desor. — R 72. — Very inflated species. Thick test. Paired ambulacra very with and very long, the anteriors very divergent.
Tert. of d'Orlande. — Michelin.

suborbicularis Desor. — *Spatangus suborbicularis* Goldf. Petref. p. 153, Tab. 47, fig. 6.
Tert. of Kressenberg. — Münstr.

major Desor. — *Schizaster canaliferus* E. Sism. — Very widened species, near by is from to *Hem. amplus*, but the posterior ambulacra are sensibly more elongated. Anus sunken.
Tert. sup. sands of Astésan. — Mus. Turin and Avignon.

Grateloupi Desor. — T 40. — *Schizaster Grateloupi* E. Sism. Echin. foss. Piem, p. 27, Tab. 2, fig. 1 and 2. — Very wide, large species. Remarkable by the considerable length of the posterior ambulacra; the anteriors are alightly arced anteriorly.
Tert. moy. of the hill of Turin. Mollasse of the south of France. Myocene of Malta. — Mus. Turin, Paris (gal. geol.).

inaequalis Desor. — *Brissus inaequalis* Forbes, Tr. geol. Soc. L. 1846, Vol. VII, Tab. 19, fig. 6. — Species very near the preceding, but of smaller size. It is perhaps only a young age.
Environ of Pondichéry. — Cunliffe.

expansus Desor. — *Brissus expansus* Forbes. Tr. geol. Soc. I. 1846, Vol. VII, p. 160, Tab. 19, fig. 7. — Species near *Hem. Grateloupi*; but the anterior groove is deeper, and the posterior ambulacra are less long.
Environ of Pondichéry. — Cunliffe.

THIRD TYPE. — Sub-genus *Pericosmus* Agass. — *A very narrow marginal fasciole around the sides, passing below the anus and making the circuit of the test.*

(Pl. 16 [vol. VI], fig. 4.)

latus Desor. — M 23. — *Micraster latus* Agass. Cat. syst. p. 2. — Wide species and very spread out. Ambulacra deep and straight; the posteriors nearly as long as the anteriors.
Tert. of Bonafaccio (island of Corsica). — Michelin.

brevisulcatus Desor. — S 11. *Micraster brevisulcatus* Agass. Cat. syst. p. 3. — Sub-conical, very spread out, with thin borders. Very short ambulacra.
Pisol. of Monotecchio-Maggiore. — Élie de Beaumont.

Edwardsii Desor. — S 43. — *Micraster Edwardsii* Agass. Cat. syst. p. 2. — E. Sism. Echin. Piem. p. 23, Tab. 1, fig. 1–3. — Inflated species, short and stock; with very divergent ambulacra.
Tert. moy. of Superga (hill of Turin). — Mus. Turin.

LXXXI. AGASSIZIA VAL.

Form ovoid. Test thin. Anterior ambulacral pairs very long but composed of only two rows of pores. A very flexuous peripetalous fasciole, accompanied by a posterior fasciole that passes under

the anus, as in *Schizaster*. Four genital pores very close together. It is still only known in the living state.

scrobiculata Val. Voy. Venus, Zool. Pl. 1, fig. 2.
Pérou. — Mus. Paris.

excavata Desor. *Tripylus excavatus* Philippi, Erichs. Archiv. 1846. The arrangement of the fascioles is the same as in *Agass. scrobiculata*; but I have not been able to assure myself if the anterior ambulacra have two or four ranges of pores⁵
South America.

LXXXII. SCHIZASTER AGASS.

Test wide and depressed anteriorly, high and narrow posteriorly. Apical summit very near the posterior border. Ambulacra very deep; the anterior ambulacra, nearly parallel with the unpaired ambulacrum, are very much longer than the posteriors. The unpaired ambulacrum is very wide, the peripetalous fasciole is very flexuous, surrounding the ambulacra. A second fasciole, the lateral fasciole, leaves from the angle of the peripetalous fasciole, and is directed backwards under the anus. Genital pores usually number two, sometimes three and four. When there are only two, they are the posteriors that are visible. Five ocellar pores. Differs from the genus *Hemiaster* by the posterior fasciole and by its deeper and less divergent anterior ambulacra grooves.

FIRST TYPE. — *Groove of the unpaired ambulacrum very deep.*

canaliferus Agass. — *Spatangus canaliferus* Lamk. — Encyclop. Méth. Zooph. Pl. 156, fig. 1–3. Rumphius, Tab. 14, fig. 2. — Ordinarily two genital pores. Anterior ambulacral pairs near the unpaired groove. Posterior ambulacrals equal to a third of the paired anterior ambulacrals.
Mediterranean. — Mus. Paris, Michelin.

Fossil species

eurynotus Agass. — P 80. — Cat. syst. p. 2. — E. Sism. P. 2. — Mém. Echin. foss. Nizza, p. 31, Ta. 2, fig. 3. — *Spatangus Seillæ* Desmol. Tabl. p. 392. — Species very near *Sch. canaliferus*, but it differs by its anterior ambulacral pairs flexed outwards.

Tert. moy. of Perpignan, Cagliari, Corsica. — Mus. Turin, Michelin, Desmoulins.

Studer Agass. — S 6. — Cat. syst. p. .3. — E. Sism. Mém. Echin. foss. Nizza. p. 32, Tab. 2, fig. 4. — Species inflated, high. Anterior groove deep, but relatively narrow.

Tertiary sands of Nice, Verona. — Mus. Turin and Bern, Michelin, Deluc.

Bellardi Agass. — T 39. — Species near *Sch. Studer*, but the anterior ambulacra are not flexed outward and are wider. The peripetalous fasciole is very wide.

Tert. of Superga. — Mus. Turin.

Seillæ Agass. — Differs from *Sch. canaliferus* by the narrowness and arrangement of the peripetalous fasciole. Anterior groove more flared than in *Sch. eurynotus*.

⁵It is surprising that an author who is so severe in judgement of the works of others, could have passed in silence a character so important.

Tert. of Palermo, Mount Pelegrino, Pliocene of Asti. Tert. sup. ? of Millas near Perpignan. École des Mines, Mus. Paris, Desmoulins.

vielnatus Agass. — X 93. — *Schizaster eurynotis* Agass. Cat. syst. p. c. — Species near *Sch. eurynotis*, but of smaller size. It differs from it by its ambulacra that are not arced outwards.

Numm. deposits of Biaritz. Tert. of Saint-Palais, near Royan. — Deshayes, d'Orbigny.

subincurvatus Agass. — R 22. — Species very near *Sch. vicinalis*, perhaps even identical.

Numm. deposits of the château of Verona, Priobona near Casel Gomberta, Saint-Palais near Royan. Élie de Beaumont, Desmoulins, d'Orbigny.

corsicus Agass. — P 98. — Cat. syst. p. 3. — Species high, truncated in front and in back, anterior ambulacral pairs very separated.

Tert. ? of Corsica. — Deshayes.

latus Desor. — Species nearly as wide posteriorly as anteriorly. Ambulacra very wide. The anteriors slightly flexed outward, as in *Sch. eurynotus*.

Tert. of Blaye. Delbos.

ambulacrum Agass. — 18. — Cat. syst. p. 3. — *Spatangus ambulacrum* Desh. — Stocky species, with deep ambulacral pairs; the posteriors are more than half the length of the anteriors.

Numm. deposits of Biaritz. — Deshayes.

djulfensis Dub. — P 91. Voy. au Caucase (Ser. géol.) Tab. I, fig. 14. — Agass. Cat. syst. p. 2. — Ambulacra divergent, as in *Sch. ambulacrum*.

Numm. deposits of Caucasia. — Dubois of Montpéroux.

rimosis Desor. — R 51. — Large species, with divergent ambulacral pairs. Groove of the unpaired ambulacrum shallow. Nearest *Hem. major*, but it is however very different from it by its ambulacra. Also greatly resembles *Sch. lineatus* of St.-Palais; but it differs from it by the absence of the sub-anal fasciole.

Numm. deposits of Biaritz. — D'Archiac.

Parkinsoni Agass. — P 89. P 91. R 23. R 24. R 82. — *Schizaster Goldfusii* Agass. Cat. syst. p. 3. — *Spatangus Parkinsoni* DeFr. Dict. Sc. nat. — Differs from *Sch. canaliferus* and from *Sch. eurynotis* by its more separated anterior ambulacra.

Tert. (molasse) of Martigues (mouths of the Rhône). — Mus. Paris, DeFrance, Michelin, Desmoulin.

Raulini Agass. — Differs from *Sch. Parkinsoni* by its more divergent anterior ambulacra. The peripetalous fasciole is bent at a right angle on the anterior interambulacral. The lateral fasciole is greatly separated from the first.

Tert. (molasse) of Martigues. — Mus. Paris (gal. geol.).

græcus Agass. — P 95. — Cat. syst. p. 3. — Species with very homogeneous and very narrow ambulacra.

Tert. of Morée. — Deshayes.

SECOND TYPE. — *Unpaired ambulacrum shallow.*

fragilis Agass. — *Brissus fragilis* Dub. and Kor. Zool. Bidr. p. 280, Tab. 10, fig. 47–49.

Coasts of Denmark, at great depths (Lovèn). — Mus. Stockholm.

gibberulus Agass. — Descript. Egypt. Zool. Pl. 7, fig. 6. — Small hunchback species, with shallow ambulacra. Four genital pores, but the anteriors very small. Anterior ocellar pore in front of the anterior genital pores. Anterior ambulacra more divergent than in *Sch. canaliferus*. The unpaired ambulacrum has only one pair of oblique and regular pores on each side of the groove.

Red Sea (Lefebvre). — Mus. Paris.

Cubensis d'Orb. — Small species near *Sch. gibberulus*, but 5 deeper ambulacra. Lateral fasciole very narrow, originating near the middle of the anterior ambulacral pairs.
Island of Cuba. — D'Orbigny.

THIRD TYPE. — *The peripetalous fasciole circumscribes nearly all the ambulacra, which makes it very sinuous.*

(Pl. 16 [volume VI], fig. 10.)

Atropos Agass. — *Spatangus Atropos* Lamk. — Encycl. méth. Pl. 155, fig. 9–11. — All the ambulacra are located in deep grooves. The anterior groove has single pairs of pores. The anterior ocellar pores are further back than the genital pores, of which we see only the posteriors.
South Carolina. — Mus. Paris.

LXXXIII. MICRASTER AGASS.

(P. 16 [volume VI], fig. 3.)

Ambulacra shallow in general. Eccentric summit posterior. No peripetalous fasciole. In contrast, a very distinct sub-anal fascial. Four genital pores always visible and very near each other. Very small ocellar plates. The species are fossils of Creaceous deposits.

cor-anguinum Agass. — S 55. S 84. S 99. — Cat. syst. p. 2. — *Spatangus cor-marinum* Park. Org. Rem. III, pl. 3, fig. 11. — *Echinites cor-anguinum* Gmel. p. 3195 Var.: b, c, d, e. — *Spatangus cor-anguinum* Lamk. III, p. 32, n° 15.

Cr. of Meuson. Woolwich. Rochester, Scanie. Cr. marn. environ Nice. Cr. jaune of Touraine, Les Roches near Vendôme. — Mus. Paris, Bern and Turin.

Var. lata: — S 12. — *Micraster cor-testudinarium* Agass. Cat. syst. p. 2 (small form very wide anteriorly). — *Spatangus testudinarium* Goldf. Petref. p. 156, Tab. 48, fig. 5. — *Spatangus anaticus* Defr.

Cr. tufau of Perigueux. (Cr. bl. of Rochester. Cr. of Schwiegeli near Hildesheim, Maëstricht. Quedlimbourg. — Mus. Neuchâtel and Bonn, Roemer.

Var. major: — X 80. R 70. — *Micraster arenatus* Agass. Cat. syst. p. 2. — E. Sism. Echin. foss. Nizza. p. 28, Tab. 1. fig. 12.

Cr. bl. of England, environ Nice. — Michelin, Mus. Turin.

Michelini Agass. — 6. T 49. — *Micraster cor-anguinum* Agass. Echin. suiss. I, p. 24, Tab. 3, fig. 14 and 15. — Form intermediary between *M. cor-anguinum* and *M. acutus*. The ambulacra are in deeper and wider grooves.

Cr. of Saint-Aignon, La Fléch, Périgord, Meglisalp. — Michelin, d'Orbigny. Mus. Avignon and Bern. Desmoulins.

Renouxii Desh. — Expl. Alg. — Species near *M. cor-anguinum*; but the ambulacra, and notably the poriferous zones, are wider.

Cr. with Hippurites of Chataba, province of Constantine. — Deshayes.

acutus Agass. — 10^b. 11. — Cat. syst. p. 2. — *Spatangus acutus* Desh. Coq. Caract. des terr. p. 255. Tb. 11, fig. 5 and 6. — Desml. Tabl. syn. p. 406. — species elongated, sub-cylindrical, with a very projecting sub-anal rostrum.

Cr. chlor. of Villers-sur-Mer, Gacé, Mortagne, Sainte-Maure-sur-Loire. — Mus. Paris, Deshayes, Michelin, Desmoulins.

distinctus Agass. — P 76. T 44. — Cat. syst. p. 2. — ? *Spatangus crasissimus* Defr. — Remarkable by its long and little divergent posterior ambulacra. Anterior groove deep, as well as the ambulacra.

Cr. chlor. of Villers-sur-Mer. — D'Orbigny, Deshayes, DeFrance.

tropidotus Agass. — S 7. — Cat. syst. p. 2. — Species elongated, near *M. distinctus*, but with flat back. Ambulacra in form of very deep grooves.

Cr. with Hippurites?, Tonnerre. — Deshayes.

cordatus Agass. — Q 36. — Cat. syst. p. 2. — *Anachytes cordata* Lamk. — *Spatangus rostratus* Mant. Geol. suiss. Tab. 17, fig. 10 and 12. — *Spatangus Requini* Risso. — *Scutella pyramidalis* Risso.

Var.: minor. — *Spatangus bituricensis* Desor. Diel.

Cr. bl. of Brighton, Berry, Paderbon, La Palarea near Drap. — Michelin, Deshayes, Defrance.

brevis Desor. — X 92. R 69. *Micraster latus* E. Sisin. Mém. Echini. foss. Nizza, p. 29, Tab. 2, fig. 13. — *Micraster gibbus* Agass. Cat. syst. p. 2. — E. Sism. Mém. Echini. foss. Nizza, p. 25. — *Spatangus gibbus* Goldf. (non Lamk.). Petref. p. 156. Tab. 48, fig. 4. — Species very near *M. cordatus* and *M. cor-anguinum*, but shorter and lowered posteriorly.

Cr. with Hippurites, Corbières. Nice. Ch. Chlor. of Coudrecieux (Sarthe). Chalk marn. of Rouen. Bains de Rennes, Aleth, Saint Remy, Souleye (Corbière), Westphalia, Tercis. — Michelin, Mus. Turin, d'Orbigny, Mus. Bonn, Grateloup.

Var. minor: — *Spatangus anachytoides* Desor. Tabl. syn. p. 406.

Cr. of Périgord. — Desmoulins.

gibbus Agass. — *Spatangus gibbus* Lamk. Encycl. méth Pl. 156, fig. 4–6. — Species very high. Ambulacra very little depressed. Anus nearly marginal.

Cr. of Palarca near Drap, Lunette near Trinitè. — Michelin.

breviporus Agass. — M 10. R 81. — Cat. syst. p. 2. — *Spatangus Leskei* Desml. Tabl. syn. p. 392.

Cr. of l'Oise, Tourtenay (Deux-Sèvres), Fécamp, Caumont near Rouen.

undulatus Agass. — S 8. — Cat. syst. p. 2. — Species short and wide. Ambulacra corresponding to the fairly deep grooves.

Cr. chlor. of Ile-d'Aix (mouth of the Charente), Saint-Aignart (Indre-et Loire). — D'Orbigny.

aquitanicus Agass.. — R 56, T 4. — *Spatangus aquitanicus* Grat. Mém. Ours. foss. p. 74. tab. 2, fig. 17a, b. —

Desml. Tabl. syn. p. 402. — Inflated species, shortened turret, inflated borders, recalling a little, by its form, *Anachytes semiglobus*.

Numm. deposits of Laplante, Montfort. — Mus. Paris, Michelin, Desmoulins.

Matheroni Desor. — R 57. — Obtuse species, very inflated, with sunken ambulacra.

Cr. with Hippurites of Corbières. — Michelin.

trigonalis Desor.. — R 90. — Species flat, triangular, much wider anteriorly than posteriorly.

Gault of Escragnolles. — Michelin, D'Orbigny.

polygonus Agass. (Deluc). — S 59. S 67. — Species flat with angular borders. Anterior ambulacra, wide.

Gault of the mouths of the Rhône. — Deluc.

LXXXIV. TOXASTER AGASS.

(Pl. 16 [v. VI] fig. 4.)

Form elongated. Test thin, covered with miliary tubercles, with some tubercles a little larger. Mouth sub-central, small, transverse, elliptical, no labrum. Ambulacra petaloid, slightly depressed with the exception of the unpaired ambulacral that corresponds with a wide and deep groove. Juxtaposed genital places. Ocellar plates very small, located between the angles of the preceding.

All the known species belong to Cretaceous deposits, with the exception of only one that we are sure of being Jurassic.

FIRST TYPE. — *Internal zone of the ambulacral pairs non-conjugate.*

oblongus Agass. — V 22. — *Spatangus oblongus* Deluc. — Alex. Brongn. Descript. foss. caract. — Species very elongated, depressed, truncated posteriorly, with wide and deep anterior groove.

Gault of the mouths of the Rhône, Alps of Appenzell of Saint-Gall, of Dauphiné, Grande Charreuse, Venasque. — Walchner, Rebsteiner, Deluc, Alb. Gras.

Roulini Agass. — 25. M 42^b. — *Holaster Roulini* Desh. — Agass. Cat. syst. p. 1. — Species very near *T. oblongus*, but more cylindrical.

Cret. deposits of South America. Deshayes.

semistriatus Desor. Large, very enlarged species. Summit convergent at the middle of the dorsal surface. The posterior poriferous zones of the anterior ambulacra are united by the very wide grooves. The anterior zones are composed of single pores.

Chalk of Bethusac (Dordogne). — Graves.

SECOND TYPE. — *The poriferous zones are equally conjugated.*

complanatus Agass.— 87, X 66. M 11. E. Sism. Mém. Echi. foss. Nizza, p. 18. — *Holaster complanatus* Agass. Foss. cré. Jura, Neuch. Mém. Soc. Neuch. I. p. 128, Tab. 14, fig. 1. — Cat. syst. p. 1. — Echin. suiss. I. p. 14, Tab. 2, fig. 10–12. — *Spatangus retusus* Lamk. — Goldf. Petref. p. 149, Tab. 46, fig. 2. — *Echinus complanatus* L. Gmel. — *Spatangus complanatus* Bl. — *Spatangus helveticus* Defr. *Spatangus verrucosus* Defr. (young age).

Néoc. of Wagenlück (Saint Gall), of Neuchâtel, Salève, Channure (Aube), Morteau, le Russey (Doubs), Nozeroy (Jura), Auverre, Dampierre, Vandœuvre, Saint-Dizier, Grasse, Vassy (Haute Marne), Chambéry, Grenoble, Saint-Georges (Yonne), Thieffrain (Aube), Angles, Berrias (Ardèche). Theil (Ardèche). Cluze (Narbonne), Vedennes, Clansayes, Castellane. Balénie, Subligny, Barbantane, Terris, etc. Clay of Speeton, Wilshire, Sussex, Hills (Hanover). — Rebstiner, Mus. Neuchâtel, Defrance, Marcou, Grateloup, Rømer.

Var. ampla: — R 3. H 18.

Environ Nice, Saint-Remy. — Mus. Turin.

Coulouni Agass. — R 87. — *Holaster Coulouni* Agass. Echin. suiss. I, p. 22. Ta. I, fig. 9 and 10. — Poriferous zones very wide.

Néoc. of Lasarraz, Mormont (canton of Vaud), Saint-Jean de Couz (Chambéry), Morteau (Doubs). — Mus. Neuchâtel, Michelin.

Collegnii E. Sism. — R 1. — Mém. Echini. foss. Nizza, p. 21, Tab. 1, fig. 9–11. — Bors. Cat. rais. p. 691, n° 3.

Gault environ Nice. — Mus. Turin.

gibbus Agass. — T 33. — Differs from *T. complanatus* by its more inflated form and by its large tubercles. Anterior ambulacra more enlarged.

Néoc. of Castellane, Grasse, Escragnolles, Martigues (Basse-Alpes), mountains of Veron near Grenoble. — D'Orbigny. d'Archiac, Desmoulins, Alb. Gras.

Verrany E. Sism. — T 50. — Mém. Echin. foss. Nizza, p. 16, Tab. 1, fig. 4 and 5. — Species depressed, truncated posteriorly, with posterior ambulacra curved outward as in *T. oblongus*; but the poriferous zones are homogeneous.

Néoc. of Castiglione near Nice. — Mus. Turin.

nicœensis E. Sism. — V 24. — Mém. Echin. foss. Nizza, p. 19, Tab. 1, fig. 6–8. — Inflated species, near *T. gibbus*, but less tuberculous.

Gault near Nice. — Mus. Turin.

SECOND GROUP.

Ambulacra simple, not petaloid, with summit disjointed, separated by the united genital and ocellar systems. The ocellar plates, instead of intercalating in the angles of the genital plates, are placed with the latter in the same line. It results in an elongated system that determines thus the separation of the ambulacral summits. Mouth sub-pentagonal or imperfectly bilabial. The species are limited to Jurassic and Cretaceous deposits.

LXXXV. HOLASTER AGASS.

(Pl. 16 [volume VI], fig. 3.)

Test cordiform, thin. Convergent ambulacra toward the middle of the back without meeting. The paired ambulacra are flush with the test. The unpaired ambulacrum alone corresponds with a deep groove. Ambulacral pores single, not conjugated by transverse grooves. Genital system elongated in the sense of the antero-posterior axis, because of the position of the paired anterior ocellar plates that are placed between the genital plates on the same line, as in *Ananchytes*. Four genital pores corresponding to the four paired genital plates, the anteriors being separated from the posteriors by an unpaired plate as in *Ananchytes*. Five ocellar pores. All the species belong to the Cretaceous formation.

suborbicularis Agass. — M 8. P 100, — *Spatangus suborbicularis* Defr. (non Münster.). — Alex. Brongn. Descr. Géol. lab. 5, fig. 5. *Spatangus nodulosus* Goldf. Petref. p. 149, Tab. 45, fig. 6. — *Spatangus deletus* Defr. (specimen abraded). — *Spatangus planus* Mant. Géol. Swiss. Tab. 17.

Cr. marn. of Rouen. Cr. of Lewes. — Michelin, DeFrance, Mantell.

Var.: tumida: T 3.

Cr. chlor. of Villers-sur-Mer. — Mus. Paris (and gal. geol.).

Ananchytes Agass. — V 11. — *Spatangus ananchytes* Leske, p. 243, Tab. 53, fig. 1 and 2. — Species flat, wide, with a deep anterior groove. Known to the present only in the state of a mold.

Silex of Périgord. — Desmoulins.

granulosus Agass. — *Spatangus granulosus* Goldf. Petref. p. 148, Tab. 45, fig. 3.

Dan. (Maëstricht). Mus. Bonn, Paris (gal. geol.).

indicus Forbes, Tr. Géol. Soc. L. 1840, vol. VII, fig. 4. — Differs from *H. granulosus* in that it is narrower posteriorly.

Cr. environ Poudichéry. — Cunliffe.

cinctus Agass. — P 88, — Cat. syst. p. 1. *Ananchytes cinctus* Mort. — Species inflated, with a rounded anterior side, a wide and flared groove. Anterior side lowered.

Cr. chlor. of New Jersey. — Deshayes.

Greenonghii Agass. — Species inflated, very near *H. cinctus*; but the anterior groove is deeper and the keel that borders it are sharper. The posterior border of the dorsal surface is lowered.

Gault of Warminster, Blackdown, Cr. tuff of Beuzeville (Calvados). — Mus. Paris (gal. geol.), Agassiz, Desmoulins.

subglobosus Agass. — 7. 17. Q 22. Q 23. S 100. X 94. — Echin. suiss. I, p. 13; Tab. 2, fig. 7–9. Cat. syst. p. 1. — *Spatangus subglobosus* Leske, Goldf. (non Lamk.) Petref. p. 149, Tab. 45, fig. 4. — *Echini* *subglobosus* L. Gmel.

Cr. marn. of Rouen, Fécap (Seine-Inferieure), Sancerre, Maidstone, Cr. of Corbières, Laubraesel (Aube), Giridot, Cassis, Trinité near Nice. Cr. chlor. of Altman (canton of Saint-Gall), Meglisalp, Appenzell. Cr. of Rethen near Hildesheim. — Michelin, Mus. Turin, Rehstiner, Walchner, Mus. Bern, Foemer.

Var. alta: — 8. P 99. — *Holaster altus* Agass. Echin. Suiss. I, p. 20, Tab. 3, fig. 9 and 10. — Cat. syst. p. 1.

Cr. marn. of Rouen, environ Nice. Cr. chlor. of Schratzen (Entlibuch), mountain of Fis. — Deshayes, Mus. Turin, Neuchâtel (Switzerland) and Bern.

latissimus Agass. — 28. Cat. syst. p. 1. — Distinguished by its very enlarged form anteriorly.
Gault of Cape la Héve. — Deshayes, Defrance.

Placenta Agass. — M 2. — Cat. syst. p. 2. — Very large species, depressed and enlarged.
Cr. of France. — Michelin.

L'Hardyi Dub. — 38. — Voy. au Cauc. (sér. géol.), Tab. 1, fig. 8–10. Agass. Cat. syst. p. 1. — Echin. suiss. I, p. 12, Tab. 2m fig. 4–6.

Marn. néoc. of the canton of Neuchâtel, Morteau, Auxerre, Vandœuvre (Aube), Saint-Dizier, Bettancourt, Vassy, Nozeroy (Jura) Fauteuil near Grenoble. — Mus. Neuchâtel, d'Orbigny, Michelin, École normale de Paris, Marcou, Alb. Gras.

cordatus Dub. — S 15. — Voy. au Cauc. (sér. géol.), Tab. 1, fig. 2–4. — Agass. Cat. syst. p. 1. — Small species near *H. L'Hardyi*, but shorter.
Néoc, of Crimea. — Dubois de Montpereux.

Cor-avium Agass, — T 19. — *Ananclytes cor-aium* Lamk. — Species inflated, sub-cylindrical, codiform. Anterior groove hardly indicated. Ambulacra very wide.
Cret. deposigs. — Mus. Paris.

inflatus Desor. — T 31. — Species very near the preceding, but more inflated. The anus is nearer the upper border. There is no anterior groove.
Cret. deposits of Senegal (Hommaire de Hell). — Mus. Paris.

amygdala Agass. — *Spatangus amygdala* Goldf. Petref., p. 135, Tab. 18, fig. 3.
Cr.. Aix-la-Chapelle. — Mus. Bonn.

carinatus Agass. — P 78. Q 43. X 69. — *Holaster nodulosus* Agass. Cat. syst. p. 1 (non *Spatangus nodulosus* Goldf.). *Spatangus surorbicularis* Goldf., Petref., p. 148, Tab. 3, fig. 6. — *Ananclytes carinota* Lamk.)
Cr. chlor. of France, Tournay, Vandœuvre (Aube), Sainte-Maure-sur-Loire, Le Mans, Grand-Pré (Ardennes). — Mus. Paris. Raulin, Deshayes.

lævis Agass. — 27. 31. P 79. P 87. — Cat. syst. p. 1. — Echin. suiss. 1, p. 17, Tab. 3, fig. 1–3. — *Spatangus lævis* Deluc. — *Holaster suborbiculais* (pro parte) Echin. suiss. 1, Tab. 3, fig. 11–13.
Gault of the mouths of the Rhône, Cluses, Sacconet, Escragnolles, Reposoir, Fis, near Nice, Franges near Grenoble. Mus. Bern, Meyer, Michelin, Mus. Geneva and Turin, Alb. Gras.

Sandoz Dub. — P 73. — Voy. au Cauc. (sér. géol.), Tab. 1, fig. 11–13... — Agass. Cat. syst. p. 1. — Echin. suiss. 1, p. 11, Tab. 2, fig. 1–3. It is perhaps only a giant variety of *H. lævis*.
Gault of Souaillon (canton of Neuchâtel), environ Nice. — Dubois de Montpéroux, Mus. Turin.

nasutus Desor. — R 93. — Remarkable by its width and the rostrate protuberance above the anus.
Cr. chlor. of valley of Fauge near Villard-de-Lans (Isère), Berrias, Clansayes. — Michelin, Caillaud.

marginatus Agass. — X 83. — Cat. syst. p. 1. — species very near *H. lævis*, but with very sharp borders.
Gault of Clansayes, Bedouin (Vaucluse), Cap la Héve, mont Ventoux, Franges near Grenoble. — Michelin.

integer Agass. — P 96. — Cat. syst. p. 1. — Large species very widened, nearly as wide as long, with sharp borders.
Cr. with Hippurites of the baths of Rennes, Pyrenees. — Deshayes.

Trencensis Leym. Mém. Soc. géol. Fr., vol. 5, p. 1, pl. 2, fig. 1. — Species very inflated, nearly circular. Anus very low.

Cr. bl. of the department of Aube. — Leymerie.

planus Agass. — *Spatangus planus* Mant. Géol. suss. Pl. 17, fig 9 and 21. — Species inflated, ventral surface very flat. Anterior border round. It perhaps is only a variety of *H. Trencensis*.

Cr. bl. of Sussex. — Mantell.

truncatus Agass. — M 39^b. — Cat. syst. p. 1, — *Spatangus truncatus* Goldf. Petref., p. 152, Tab. 47, fig. 1.

Dan. (Maëstricht), Gacé. — Mus. Bonn.

transversus Agass. — 26. — Echin. suiss. 1, p. 18, Tab. 3, fig. 4 and 5. — Cat. syst. p. 1.

Cr. chor. of the mountain of Fis. — Mus. Bern, Meyer, Michelin.

Perrezi E. Sism. — R 79, — Mém. Echin. foss. Nizza. p. 11, Tab. 1, fig. 1–3. — It is of all the species of *Holaster*, the flattest. It is at the same time very wide and cordiform.

Gault of Nice, Escragnolles, Saint-Pont (Var), environ Grenoble. — Caillaud, Michelin, d'Orbigny. Mus. Turin and Avignon, Alb. Gras.

intermedius Agass. — Q 40, — Cat. syst. p. 1. — Echin. suiss. 1, p. 19, Ta. 3, fig. 6–8. — *Spatangus intermedius* Münster. in Goldf. Petref., p. 149, Tab. 46, fig. 1.

Jura super. environ Neuchâtel and Blaubeuren. — A. de Montmollin, Münster.

Pillula Agass. — 4. — *Holaster rostratus* Desh. — Agass. Cat. syst. p. 1. — *Ananchytes Pillula* Lamk. — Distinguished by its very high and turreted form, which recalls that of *Ananchytes*.

Cr. bl. of Beauvais. Cr. of Peine and Yseburg near Hanover. — Graves, Desmoulins, Roemer.

Var. maxima: — T 52.

Cr. of Rouen. — d'Orbigny.

italiens Agass. — P 84. S 62. — Cat. syst. p. 1. — Species high, with thick test, with deep groove under the anus.

Pisol. deposits of Rovredo (Italy). — Mus. Neuchâtel.

bicarinatus Agass. — 29. — Cat. syst. p. 1. — Large species widened with a wide anterior groove, and a second very flared groove under the anus.

Gault of Le Havre, Cibly. — Michelin, Deshayes.

LXXXVI. ANANCHYTES AGASS.

Test thick, very elevated. No anterior groove. Mouth anterior, bilabiate. Anus inframarginal. Ambulacra wide, convergent at the summit, but not united. Genital system elongated. The two anterior genital plates are separated from the posteriors by the ocellar plates. All the species belong to the Cretaceous formation.

ovata Lamk. — Q 11, Q 67. — Goldf. Petref., p. 145, Tab. 41, fig. 1. — Agass. Cat. syst. p. 2. *Echinites ovatus* Gmel.

Cr. bl. of Meudon, Beauvais, Sarmery near Tonnere, Rouen, Saint-Aignan (Loir-et-Cher), Douvres, Royan, Bougival, Nangtes, Westphalia (Goldf.), Tercis, Angoumé, Scanie, environ Nice. — Everywhere.

striata Lamk. — 14. 15. T 2. — Encycl. méthod. Zoolph. Pl. 1. 154, fig. 11 and 12. — *Ananchytes conoideus* Goldf. Petref., p. 145, Tab. 44. Fig. 2. — *Ananchytes hemisphaerica* Brongn. in Cuv. Oss. foss. 11. 2^e part, v, fig. 8. *Ananchytes striata* Var. *marginata* Goldf. Petref., p. 146, Tab. 44, fig. 3, *d, e, f.* *Ananchytes pustulosa* Lamk. (Moule). Encycl. method. Zooph, Pl. 154. Fig. 14-17. — Species less high and a non-sunken base.

Cr. Brighton, Beauvais, Guiscard, Tercis, Sens, Orglande, mount Jubert near Provins, Lunebourg, Aix-la-Chapelle, Schwiegett near Hildesheim. — Mus. Paris, Rømer, Delbos.

Var. *carinata*: — 16. M 13. — *Ananchytes carinata* Deifr. Dict. Sc. n. — Agass. Cat. syst. p. 2.

Cr. bl. Haut-Boulonnais, Beauvais, Guiscad, Saint-Aignan. — Defrance, Michelin, Graves.

Var. *elato-depressa*. Grat. Ours. foss., p. 63, Pl. 2, fig. 8.

Cr. of Tercis. — Grateloup, Delbos.

Gravesii Desor. — R 66. R 91. — The form of this species recalls a little that of *A. ovata*, but the base is excessively narrow.

Cr. bl. of the Oise. — Graves.

tuberculata Deifr. — 12. 13. S 64. — Dict. Sc. II. — Agass. Cat. syst. p. 2. — The four genital pores are close together as in *Toxaster*, and alternate regularly with the eyes that are in a pentagon.

Pisol. deposits of Monte di Magre. — Deluc, Defrance, Mus. Bern.

semiglobus Lamk. — R 58. S 72. T 9. — *Anachytes corculum* Lamk. (the young age). — Goldf. Petref., p. 147, Tab. 45, fig. 2. — Lowered species, the ventral surface more or less depressed.

Cr. of Tercis, Cibly, Sweden. Sables de Stada. Dan. of Jutland (Furchhammer). — Mus. Paris, Copenhagen, Michelini, d'Archiac.

Var. *maxima*: — P 32. — *Ananchytes crassissima* Agass. Cat. syst. p. 2.

Calc. with Baculites of Picanville (the Channel). — Deshayes.

conica Agass. — M 1. 14. 15. — Cat. syst. p. .1. — Distinguished by its conical and turreted form.

Cr. bl. of Meudon, Picardy, Dax. — Michelin, Graves.

Var. *Anachytes ovata* Agass. (non Lamk.). Echin. Suiss. I, p. 39, Tab. 4, fig. 4-6.

Cr. alpine, Oberland bernois. — Mus. Zurich, Bern.

sulcata Goldf. — P 77. Petref. p. 146, Tab. 44, fig. 1. — Agass. Cat. syst. p. 2. — Species near *A. semiglobus*; but the plates are more inflated, which gives them an irregular appearance.

Dan. of Maëstricht.

LXXXVII. HEMIPNEUSTES AGASS.

Test elevated. A deep anterior groove. Ambulacral pairs flush with the test. Poriferous zones unequal; the exterior having the pores elongated transversely, the interior of single round holes. Anus at the posterior border. Four genital pores separated by an intermediary plate. No trace of fascioles, neither peripetalous nor sub-anal. Two species of Cretaceous formation.

radiatus Agass. — Q 6. Q 9. S 96. — Cat. syst. p. 2. — *Spatangus radiatus* Lamk. — Goldf. Petref. p. 150, Tab. 46, fig. 3. — Fauj. of St.-Fonds. Mountains of St.-Pierre of Mëstr. Tab. 29. — Park. Org. Rem. III, Pl. 3, fig. 4 and 5. — Knorr. II. Tab. E4.

Dan. (of Maëstricht). — Mus. Paris, Deshayes, Michelin.

africanus Desh. — Exp, Alger. — Species very high. The poriferous zones extend nearly to the mouth.

Cret. deposits of Betna (environ Constantine). — Deshayes.

LXXXVIII. DYSASTER AGASS.

Form elliptical or sub-discoidal. Test thin, with very apparent tubercles in the middle of a fine miliary granulation. Mouth sub-central, pentagonal. Ambulacra disjointed, forming two very separated summits, one anterior, the other posterior. Ambulacral plates large and elongated. The known species ae from Jurassic and Cretaceous deposits.

FIRST TYPE. *Form elliptical or sub-discoidal, more or less depressed.*

bicordatus Agazz. — R 15. R 16. — Desor, Mongr. Des Dysasager, p. 9, Tab. 2, fig. 1–4.

Marn. of vésul of Muttentz near Basel, Bysë near Caen, — Mus. Basel and Neuchâtel.

analis Agass. — Q 82, — Echin. Suiss I, p. 6, tab. 2, fig. 12–14. — Cat. syst. p. 2, — Gressly, Jur. Sol. P. 76. — *Colllyrites analis* Desml. Tabl. syn. p. 368. — Desor, Monogr. des Dysaster, p. 10. Tab. 2, fig. 8–10.

Marn. vésul. of Goldenthal, Frigeli (canton of Soleure), Wallenburg, Egg and Burg (Argovie). Mont-Terrible, Saint-Marvant. — Gressly, Hugli, Stromeyer, Mus. Basel, Thurmann, Bronn, d'Orbigny.

ellipticus Agass. — M 12. M 41^b, P 80. — Cat. syst. p. 3. — Desor, Mongr. des Dysaster, p. 12, Tab. 2, fig. 5–7.

Kellov. of Chaufour (Sarthe), Châtillon-sur-Seine, pond of Mèche near Bëfort..— Michelin, Mus. Paris, Marcou.

Var. *brevit.* — M 7. M 40^b.

Var. *maxima.* — P 82. V 29. *Dysaster malum*. Agass. Cat. syst. p. 3. — Desor. Mongr. des Dysaster. P. 16, Tab. 2. Fi. 11–13.

Kellov. of Lefol. Neafr Neuchâtel (Vosges), Vieil-Saint-Remy (Ardennes). — Deshayes, Defrance.

Var. *minor: Ananchytes Monardii* Defr. Diel.

Latreacy (Hauate Marne), Alençon.

excentricus Desor. — R 80. Monogr. des Dysaster, p. 13, Tab. 4, fig. 1–3. — *Nucleolites excentricus* Goldf. Petref. p. 140, Tab. 49, fig. 7.

Cr. marn. of Essen sur la Rœhr. — Münster.

ovalis Agass. — 24. — Cat. syst. p. 3. — Desor, Monogr. des Dysaster, p. 15 Tab. 3, fig. 21–23. — *Spagtangus ovalis* Park. Org. Rem. III, Pl. 3, fig. 3. \

Calcareous grit of Scarboroughh. Kellov. Is-sur-Tille (Côte d'Or). — Studer.

Var. — Q 27. — *Dysaster propinquus* Agass. Echin. suiss. I, p. 2, fig. 1–3. — Cat. syst. p. 3. — Desor, Monogr. des Dysasgter, p. 14, Tab. 3, fig. 24–26.

Argovien du Fringli, Liesberg, Largue, Walen, Délémont, Porrentroy, Salins, Mount Brégille near Bresançon. — Gressly, Marcou, Parandier.

Var. *Dysaster truncatus* Dub. Voy. au Cauc. (Sér. géol) Tab. 1, fig. 1. — Desor, Monogr. des Dysaster, p. 17, Tab. 13 of the Galérites, fig. 8–11.

Jurassic deposits of Popilanni (Lithuania). — Dubois de Montpéreau.

granulosus Agass. — M 33. Q 39. — Cat. syst. p. 3. — Desor, Monogr. des Dysaster, p. 17, Tab. 3, fig. 18–20. — *Nucleolites granulosus* Münt. In Goldf. Petref., p. 138, Tab. 43, fig. 4.

Coral. of Urach (Able wurtembergeoise). Griesshingen, Dettigen, Liesberg (Jura bernois). Mandelsloh, Gressly.

anasteroides Leym. — R 77. — Near *D. granulosus*, but more inflated.

Néoc. of Laties, Grasse, Martigues, Castellane, Escragnoles, Martre (Var), Nerou near Grenoble. — Michelin, Alb. Gras.

semiglobus Desor. — Monogr. des Dysaster, p. 18, Tab.4, fig. 10–12. — *Nucleolites semiglobus* Münt. In Goldf. Petref. P. 139, Tab. 49, fig. 60.

Jurassic calc. (Jura sup.) of Pappenheim and Monheim (Bavaria). — Münster.

acutus Desor. — Monogr. des Dysaster, p. 19, Tab. 3, fig. 15–17.

Origin unknown. — Mus. Neuchâtel.

carinatus Agass. — 88. P 83. — Echin. Suiss. 1, p. 4, Tab. 1, fig. 4–6. — Cat. syst. p. 3. — Desor, Monogr. des Dysaster, p. 20, Tab. 3, fig. 14. — *Spatangus carinatus* Goldf. Petref. p. 130, Tab. 46, fig. 4.

Coral. inf. of Urath, Gunsberg, Scaffouse, Porrentruy. — Mandelsloh, Gressly, Thurmann, Mus. Basel.

capistratus Agass. — Q 2. — Echin. suiss. 1, p. 7, Ta. .4, fig. 1–3. — Cat. syst., p. 3. — Desor, Monogr. des Dysaster, p. 21, Tb. 3, fig. 12–14. — *Spatangus cordiformis* Defr. — *Spatangus capistratus* Goldf. Petref. p. 151, Tab. 46, fig. 5.

Jurassic deposits of Bayreuth. Oxford of Switzerland, Schaffouse, Mont Terrible (canton of Bern). Münster, Gressly, Thurmann, Mus. Carlsruhe, Basel. DeFrance.

Buchii Desor. Monogr. des Dysaster, p. 21, Tab. 3, fig. 9–11.

Coral. with nerineans of Stockach (Grand-Duchy of Baden), Coral. of Sirchengen. — Buch, Mandelsloh.

ovulum Agass. — Desor, Monogr. des Dysaster. P. 22, Tab. 3, fig. 5–8.

Néoc. of Chaux-de-Fonds, Censeau (Jura), Fauteuil near Genoble. — C. Nicolet, Deluc, Macou, Alb. Gras.

Avellana Agass. — X 76. Q 3. Q 83, P 8, — Cat. syst. p. 3. — Desor, Monogr. des Dysaster. p. 23, Tab. 1, fig. 1–4.

Ool. ferrug. of Bayeux in Normandy. Saint-Vigor, Croisille. — Michelin.

Endesii Agass. — 21. 22. 23. X 65. — Cat. syst. p. 3. — Desor, Monogr. des Dysaster, p. 23, Tab. 1, fig. 3–12,

Ool. ferrug. of Bayeux and Moutiers (Normandy), Saint-Vigor and Croisille. — Deslongchamps, Bronn, Michelin.

ringeus Agass. — 19, 20. — Echin. suiss. I, p. 5, Tab. 1, fig. 7–11. — Cat. syst. p. 3. — Desor, Monogr. des Dystaster, p. 24, Tab. 1, fig. 13–17.

Marn. vésul of Goldenthal (Jura. Sol.), Mont-Terrible, Salins, Besançon, Saint-Vigor, Port-en-Bessin. — Gressley, Hugi, Thurmann, Macou, Strohmeyer.

Voltzii Agass. Echin. suiss. I, p. 8, Tab. 4. fig. 11–13. Desor, Monogr. des Dysaster. p. 23. Tab. 1. Fig. 18–21.

Oxford. of Virons near Geneva (Voltz). — Mus. Strasbourg.

æqualis Agass.. Species as high posteriorly as anteriorly.

Ool. inf. of Port-en-Bessin. — D'Orbigny.

dorsalis Agass. Anterior ambulacra flared; posterior ambulacra convergent, very near the anus that is high.

Kellov. of Marolles. — D'Orbigny.

SECOND TYPE. — Sub-genus METAPORHINUS Mich. — *Form very high, keeled.*

micelini Agass. — V 51. — Anterior ambulacra convergent at the border of the anterior surface that is very high and truncated obliquely.

Forest marble of Dryes (Yonne). — Michelin.

Münsteri Desor, Mongr. des Dysaster, p. 23, Tab. 4, fig. 4–7. *Spatangus cordatus* Goldf. Petref. p. 151, Tab. 45, fig. 6. — *Spatangus oviformis* Defr. Dict. Sc. nat.

Cret. deposite of Mecklenbourg of France. — Münster, DeFrance.

ADDENDA

- Cidaris Brandis** Klipst. ⁶ Beitr. geolo. OEstl. Alp. 1843, p. 269, Tab. 18, fig. 2.
Saint-Cassian. — Klipstein. Münster, DeFrance.
- **fasciulata** Klipst. Beitr. geolog. OEstl. Alp. 1843, p. 269, Tab. 18, fig. 3 and 7.
Saint-Cassian. — Klipstein.
- **Meyeri** Klipst. Beitr. geolog. OEstl. Alp. 1843. p. 270, Tab. 18, fig. 4.
Saint-Cassian. — Klipstein.
- **Klipsteini** Marcou. — *Cidarid d'Orbignyana*⁷. Beitr. geolog. OEstl. Alp. 1843. P. 270, Tab. 18, fig. 8.
Saint-Cassian. — Klipstein.
- **Bronnii** Klipstein. Beitr. geolog. OEstl. Alp. 1843, p. 270, Tab. 18, fig. 6,
Saint-Cassian. — Klipstein.
- **ovifera** Klipstein. Beitr. geolog. OEstl. Alp. 1843, p. 271, Tab. 18, fig. 8.
Saint-Cassoam — Klipstein.
- **globifera** Klipstein. Beitr. geolog. OEstl. Alp. 1843, p. 271, Tab. 18, fig. 9
Saint-Cassian. Klipstein.
- **spinulosa** Klipstein. Beitr. geolog. OEstl. Alp. 1843, p. 271, Tab. 18, fig. 10.
- **bicarinata** Klipstein. Beitr. geolog. OEstl. Alp. 1843, p. 272, Tab. 18, fig. 11.
Saint-Cassian. — Klipstein.
- **bispinosus** Klipstein. Beitr. geolog. OEstl. Alp. 1843. p. 272, Tab. 18, fig. 12.
Saint-Cassian. — Klipstein.
- Palaeocidarid Rossica** Desor. — *Cidarid Rossicus* Buch, Karsten Archiv. 1842, p. 523. — Murch. and Vern. Géol de
la Russ. d'Europe, Vol. II, p. 17, Pl. 1, fig. 2.
Calc. carbon. of Russia. — De Verneuil.
- Diadema diatretum** Agass. — *Cidarites diatretum* Mort. Synops. p. 75, Tab. 10, fig. 10.
Cr. chlorigte of New Jersey.
- Cælopleurus infulatus** Agass. — *Echinites infulatus* Mort. Synops. P. 73, Tab. 10, fig. 7.
Nummulitic deposits, South Carolina.

⁶ MM. Agassiz and Desor, not having had knowledge of the memoir of M. Klipstein on the geology of the eastern Alps, of which the last part contains precisely the Radiaires, just appeared quite recently (after the departure of the authors for America), consequently have not had the ability to insert into this catalog the species of *Cidarid* that are described in this memoir. In placing them here in the Addenda, I will remark that M. Klipstein relates all the *cidarid*s of Saint-Cassian to Jurassic deposits, contrary to the opinion of the Count of Münster, who thought that the layers in which one encounters them belong to the Muschelkalk. Moreover, he synchronized the seats containing these echinids with the Oxfordien and Corallien groups of the geologists of Wurtemberg and of the mountains of Jura. (See *Beitrag zur geologischen Kenntniss der OEstlichen Alpen* von D. Klipstein, page 266.) Note of M. J. Marcou.

⁷ I have changed this name because M. Agassiz has already given it to another species in the year 1840 (See Cat. syst., p. 10). J. M.

Microcyphus Girardi Desor. Flat species, naked patches, very narrow, pink color, while the tubucular parts are green.

Origin unknown. — Michelin.

Echinocyanus crustuloides Agass. — *Scutella crustuloides* Mort. Synops. p. 77, Tab. 15, fig. 10.

Nummulitic deposits, South Carolina.

Cassidulus aquoreus Mort. Synops. p. 76, Tab. 3, fig. 14.

Cretaceous deposits of Prairie Bluff (Alabama).

Pygurus florealis Agass. — *Clypeaster florealis* Mort. Synops. p. 76, Tab. 3, fig. 12.

Ferruginous Cretaceous sands of the Chesapeake canal and of the Delaware.

Pygurus geometricus Agass. — *Clypeaster geometricus* Mort. Synops. p. 76, Tab. 10, fig. 9.

Cretaceous deposits of the Delaware canal.

Hemiaster parastatus Desor. — *Spatangus parastatus* Mort. Synops. p. 77, Tab. 3, fig. 21.

Cretaceous deposits of Prairie Bluff (Alabama).

Hemiaster stella Desor. — *Spatangus stella* Mort. Synops. p. 78, Tab. 3, fig. 18.

Calc. Cretaceous of Timber Creek (New Jersey).

Micraster ungula Agass. — *Spatangus ungula* Mort. Synops. p. 78, Tab. 10, fig. 6.

Black Cretaceous sands of Chesapeake and Delaware.

Holaster fimbriatus Agass. — *Ananchytes fimbriatus* Mort. Synops. p. 78, Tab. 3, fig. 20.

Cretaceous limestone of New Jersey.
