1842

**Monographies d'Échinodermes vivans et fossiles. Échinites.
Famille des Clypéasteroides. 4. (Quatrième Monographie). Des
Dysaster: A translation of *Desors, E. 1842. Monographies
d'Échinodermes vivans et fossiles. Échinites. Famille des
Clypéasteroides. 4. (Quatrième Monographie). Des Dysaster***

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ÉCHINITES.

FAMILLE DES CLYPÉASTROIDES.

Quatrième Monographie.

DES DYSASTER.

PAR

ED. DESOR.

1842.

Desors, E. 1842. Monographies d'Echinodermes vivans et fossiles. Échinites. Famille des Clypéasteroides. 4. (Quatrième Monographie). Des Dysaster. A translation of *Desors, E. 1842. Monographies d'Echinodermes vivans et fossiles. Échinites. Famille des Clypéasteroides. 4. (Quatrième Monographie). Des Dysaster. Author. Neuchâtel.* (J. M. Lawrence and J. C. Fletcher, Trans.).

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Pierre Jean Édouard Desor Born 13 February 1811, Friedrichsdorf, Grand Duchy of Hesse. He died in Nice on 23 February 1882.

Translators' notes:

1. Dysaster

In his monograph, Desor used Dysaster for the genus that Agassiz called Disaster.

<https://www.biodiversitylibrary.org/page/10596479>

The first use of Dysaster was by Agassiz (1839) in "Description des Echinodermes Fossiles de la Suisse. Vol. III, Memoires de la Societ helvetique des Sciences naturelles.

<https://www.biodiversitylibrary.org/item/51096#page/5/mode/1up>

Agassiz used Disaster in the text throughout this memoir except in the Conspectus (summary, in Latin. p. 95) in which he used Dysaster.

Definition of *di-*

twice : twofold : double

"Twi." *Merriam-Webster.com Dictionary*, Merriam-Webster,

<https://www.merriam-webster.com/dictionary/Twi>. Accessed 31 Oct. 2021.

Definition of *dys-*

1 : abnormal

2 : difficult

3 : impaired

"Dys-." *Merriam-Webster.com Dictionary*, Merriam-Webster, <https://www.merriam-webster.com/dictionary/dys->. Accessed 31 Oct. 2021.

We interpret Agassiz' use of "disaster" in the sense of abnormal.

The Echinoid Directory of the British Museum of Natural History gives this information on Disaster and Dysaster:

<https://www.nhm.ac.uk/our-science/data/echinoid-directory/taxa/taxon.jsp?id=122>

Disaster Agassiz, 1836, p. 183.

The genus Dysaster is considered invalid:

[=*Dysaster* Agassiz, 1839, p. 95 (*nomen vanum*)]

The genus was never described under the name Dysaster. Agassiz apparently simply preferred it.

2. Units of length.

Desor usually used qualitative terms for dimensions as in his first monograph on Galerities. He quantified the dimension in several instances in this monograph using the units of the period. The *ligne*, or line, was a unit of length used in France prior to the adoption of the metric system in the late 18th century after the Revolution. The law of 19 frimaire an VIII (Law of 10 December 1799) states that one meter is equal to exactly 443.296 lines. One ligne equals 2.56 mm. The *pouce* (meaning *thumb*) was the next higher unit of length. The pouce is equal to 2.7 cm. We have converted the French units to metric units.

We thank Andreas Kroh for his helpful comments.

INTRODUCTION

For a long time, the type of *Dysaster* was unknown as such to naturalists. The few species that they described were ordinarily placed in the *Anachytes* or the *Spatangues*, in which they approached in fact by their external form. But this resemblance is only superficial, and it is sufficient to glance at the details of their test to recognize the great differences of organization that led Agassiz to separate them from the *Spatangus* under the name of *Dysaster*, while DesMoulins was making at nearly the same time his genus *Collyrites*.

The most striking character of these Urchins consists in the present of two ambulacral tops, i.e., that the five ambulacra, instead of all converging together to the top of the test, as seen in nearly all other Echinites, meet in two more-or-less distant points on the dorsal surface, the three anterior ambulacra ordinarily a little before the top, the two posterior ambulacral pairs above the anus. Such a disposition of the ambulacra necessarily implies great modifications in the respiratory system of these animals that, instead of uniting, as usual, at the top, are found relegated to the anterior and posterior sides and consequently separated from the genital system with which it is more-or-less in contact in all the other genera. However, if we have been able to think we can separate the *Galerites* from the other *Clypeasteroids* because of the particular form of their ambulacra on the dorsal surface, there is even greater reason not to hesitate to make *Dysaster* a separate group, whose cachet also is in the nature of its ambulacra.

A difficult question to resolve is to know to which family *Dysaster* belongs. Agassiz, in his *Prodrome*, places them at the head of the *Spatangoids*. Lamarck made them *Anachytes*; Goldfuss, *Spatangues*; and Desmoulins placed them as a separate genus between the *Nuocleolites* and the *Anachytes*. Later, Agassiz returned to this first opinion and in his *Catal. Syst. des moules de Echin.*, he places the *Dysaster* among the *Clypeasteroids*. Such a great diversity of opinion in regard to the Urchins, very characteristic, proves that the essential parts of their organization are unknown to us. In fact, the question is summarized as this: Do the *Dysaster* have a masticatory apparatus similar to that of *Clypeaster* or is this apparatus completely missing as in the *Spatangoids*? Unfortunately, all the species are fossils and it has been impossible for us to recognize any trace of an organ that we can envisage as being part of the digestive system. The internal molds are perfectly united. It is scarcely possible to distinguish the articulations of the plates and the impressions of the ambulacral pores. The periphery of the mouth is especially very uniform. We are consequently reduced to exterior characters that alone can give only probabilities that are more-or-less conclusive. After having considered them all, I am led to think that the *Dysaster* have in reality more of an affinity with the *Clypeasteroids* than with the *Spatangoids* because they have the exterior physiognomy of the latter. The mouth is made in a completely different fashion. Instead of being elongated transversely and bilabiate, as in the *Spatangoids*, it is angular as in the *Galerites*. This makes me presume that there is at least some relation between the digestive system of these two groups.

When we consider that all the *Dysaster*, except three, are fossils of the Jurassic formation, i.e., they lived in a period where the type of *Spatagus* still did not exist, we are in a way tempted to consider them, like the *Hyboclypus*, as one of those primitive types in which are found united characters that, in other periods, belonged only to very different groups. We would say that in the *Dysaster*, the type of *Spatangus* is still not separated from that of the *Galerites*. Up to now, this very remarkable group is still composed of only a single genus, the genus *Dysaster*.

GENUS DYSASTER

The Dysaster are in general Urchins of medium size. Some species reach a size a little greater and are five cm in length. Their appearance is uniform, and their tubercles are little developed and sparse. We conclude they are, like the Galerites, Urchins with few spines. The mouth is central or subcentral in front, without however being as eccentric as that of Spatangus. But what is a more important character than the position of the mouth, is its form that, although in general of circular appearance, is however, in principle, decagonal. If it appears pentagonal in some species, it is usually because the edge of the opening corresponding to the interambulacral areas is so narrow that it nearly completely disappears¹.

The anus is of medium size and invariably located on the posterior surface, ordinarily above a flared groove that occupies the middle of the unpaired interambulacral area. Its form is elliptical from top to bottom.

It is regrettable that the genital system is usually so badly preserved. However, all that I have been able to learn from some better-preserved specimens is that this system has a particular structure. We note, near the anterior ambulacral top, four pores forming an irregular lozenge. Two are located in front of the anterior ambulacral pairs and two behind. I have not been able to assure myself if the plates in which these pores open are particular plates. But according to all that I have seen, they differ in nothing exteriorly from the plates of the interambulacral areas. As for the ocellar plates, I have discovered no trace of them whatever the effort that I made.

The ambulacral areas are scarcely a third of the width of the interambulacra. Also, their plates are much smaller. There are five and even six of them for one interambulacral plate. However, despite their smallness, it is easy to know the number because each plate has only one pair of pores, at least on the dorsal surface. On the ventral surface, the ambulacral plates are higher which makes the pores appear more distant. It is only on the immediate periphery of the mouth that we sometimes see double pores that form four rows instead of two (Pl. 1, fig. 21). The two ambulacral tops of the dorsal surface are not always equal distance to each other. Their more-or-less considerable distance and the manner in which they arch are important specific characters. It is thus that *D. bicordatus*, the posterior ambulacra are encountered immediately above the anus, while in *D. semiglobus* (Pl. 4, fig. 10–12), they go higher and are very near the anterior ambulacra.

¹It is for having too much confidence in the often incorrect descriptions and figures of authors who represented Dysaster as having a round mouth that DesMoulins was led to refer to his genus Collyrites, urchins far from this group. In this, DesMoulins has been consistent with his principle that the plates that form of the mouth are in the first line of generic characters. But to even suppose that the Dysaster have a round mouth, which is an error, it still would not be possible for me to associate Dysaster with Urchins whose ambulacra converge at the top. For the genus Collyrites of DesMoulins to correspond exactly with the genus Dysaster, it would be necessary to separate *Collyrites amygdala*, *C. brissoïdes*, *C. heteroclyta*, *C. canaliculata* and *C. depressa*. The first three are Spatangoids of the genera Micraster and Holaster. *C. canaliculata* is our *Hyboclypeus canaliculatus* and *C. depressa*, *Pygaster costellatus* Ag. I do not know what *Collyrites trigonata* is.

The tubercles are uniformly distributed on all the surface of the test. They have no regular disposition. Those of the ambulacral areas differ in nothing from those of the interambulacral areas. Only those of the ventral surface are denser and in general a little more developed than those of the dorsal surface.

As for the general form, it more-or-less varies with species, but always in narrow limits that, along with the direction of the ambulacra, constitute the physiognomy of *Dysaster*. Some species are very depressed. Others are swollen. Some are truncated posteriorly, others pointed, others rounded. The ventral surface is more-or-less curved, according to how the ambulacra are lodged in the more-or-less deep grooves. But a particularity that is found in all species, even in those whose ventral surface is the most uniform and that seem to recall the type of *Spatangues*, is that the interambulacral area is always more swollen than the rest of the test. The groove of the anterior ambulacra is not only limited to the ventral surface. In many species, it is still very marked on the dorsal surface and makes the anterior side appear bilobed.

The number of species known to this day is twenty. In this number, there are several that are found in very great numbers in some terrains, in groups of six, ten, twenty individuals and even more. This indicates the living animals live in a society. Until now, all species with the exception of three, are of the Jurassic period. As a result, we can correctly envisage *Dysaster* as characteristic of this formation. The Marl with *Ostra acumulata* (stage of the Lower Oolite in the Swiss and French Jura), the Oxfordian and more particularly the terrain with chailles have given until now the greatest number. *D. ovulum* is found in the Neocomian, *D. excentricus* and *D. munsteri* in the chalk. Tertiary deposits have no trace of them.

I. DYSASTER BICORDATUS Ag.

Pl. 2, fig. 1–4.

SYN. *Dysaster bicordatus* Ag. Catal. syst. Ectyp. Suppl.

Anachytes bicordatus Lam. III. p. 317 (excl. syn.)— E. Desl. Enc. V. 2, p. 162.

Spatangites ovalis Leske, p. 233, Pl. 41, fig. 5.

Collyrites elliptica DesMoul. Tabl. syn. p. 364.

D'Annone in Miner. Belus. V. 3, p. 161, Pl. 4, fig. 1, 2, 3.

Knorr. II, p. 182, Pl. E. III, n° 6.

Van Phelsum p. 32, sp. 3 (*Egelschuitje twee top*).

There are few species whose synonymy is as confused as the of *D. bicordatus*. We find the name of *bicordatus* in most of the modern authors, and nearly all applied to a different species, or associated with other synonyms. Leske first gave the name of *Spatangites bicordatus* to a mold from the vicinity of St. Jacques on the shore of the Birse, a mold that, if the ambulacra are correct, is nothing other than our *Dysaster propinquus*. Lamarck placed this species in his genus *Anachytes* with most of the other *Dysaster*. But we do not understand how Goldfuss was able to figure, under the name of *bicordatus*, in citing the figure of Leske, an Urchin so completely different from that of this author. This is a particular species that we shall describe below under the name of *D. Munsteri*. Agassiz, when he published his *Descr. des Ech. foss. de la Suisse*, still thought that *Spatangus ellipticus* Lam. and *Sp. bicordatus* could well be only varieties of the same species. But

he later returned from this opinion and accepted two distinct species in his Catalogue des Mollusques d'Echinodermes.

However, beside his *Spatangites bicordatus*, Leske had described and figured, after Knorr, under the name of *Spatangites ovalis*, another species from Muttens near Basel that Parkinson and Phillips identified incorrectly with a similar species of the Middle Jura of Kelloway. This false identification was the cause that we forgot little by little the original of Leske and of Knorr and that took the habit of representing under the name of *Spatangus* or *Dysaster ovalis* a species from the Middle Jura. However, the two species are quite distinct, as already suggested by the difference in their deposits. It then becomes necessary to differentiate them. To be rigorous, the name *ovalis* should be restricted to the species of Leske. But in order to avoid new confusion, Agassiz preferred to keep it for the English species. On the other hand, not wanting the old name of *bicordatus* to be eliminated from the nomenclature, he gave it to the species that Leske had described originally as *Spatangites ovalis*.

The species that we now call *Dysaster bicordatus* is of medium size and differs in its higher form from *D. analis* that is found in the same terrain. The anterior side is especially high and subtruncate (fig. 2). The posterior side is less elevated and narrower, but equally truncated obliquely. The anus opens on the upper edge of the posterior surface and below is a flared groove that extends nearly to the base (fig. 3). The ventral surface is nearly flat. The mouth is located in the anterior third of the length and separated from the anterior side by a flat groove. The anterior ambulacra meet a little before the top (fig. 1). The posterior ambulacra join immediately above the anus (fig. 3). As the details of the test are very well preserved in several specimens of this species, I have taken advantage of this circumstance to give magnified figures. Fig. 2 *a* represents a plate of the posterior interambulacral area seen with the magnifying glass. Fig. 2 *b* represents some tubercles of this same plate seen with the microscope. Fig. 4 *c* finally shows some tubercles of the ventral surface seen with the microscope. As usually, they are more developed than those of the dorsal surface. This is a particular species of Marn with *Ostrea acuminata* (Lower Oolite) and, as the only specimens that I know come from the same locality that Knorr and Leske assigned to theirs, there can be no doubt about the identity of the species.

II. DYSASTER ANALIS Ag.

Pl. 2, fig. 8–10.

SVN. *Dysaster analis* Ag. Descrip. des Echin. foss. de la Suisse, 1st part, p. 6, Pl. 1, fig. 12–14. —
Catal. syst. Ectyp. p. 3. — Gressly, Jura solenois, p. 76.
Collyrites analis DesMoul. Tabl. syn. p. 368.

This species is the most widespread in Switzerland, where we find it especially where the Marl with *Ostrea acuminata* are uncovered. Its form is oval, depressed, widened in front, narrowed behind. The posterior side is truncate. The sub-anal groove is scarcely sensible. The anterior groove, corresponding to the unpaired ambulacral area, is a little more pronounced. The ventral surface is nearly flat because only the posterior interambulacral area is a little more swollen. The mouth is in the anterior third. I have even been able to examine the periphery in several intact specimens and I have found it pentagonal (fig. 10 *b*). This form is determined by the smallness of

the edge corresponding to the interambulacral area relative to the edge of the ambulacrals. If the edge of the interambulacral areas were a little less narrow, the mouth would be decagonal, as in the Galerites and the Discoideans. But it is rare to encounter individuals whose mouth is intact. The anus is nearly circular and is located on the upper edge of the posterior surface. It is immediately covered by the posterior ambulacra that converge in arching above its upper edge. The anterior ambulacra meet in front of the top and consequently leave a very large space to the posterior interambulacral area pairs. Also, their plates are much wider than those of the anterior ambulacral areas. Fig. 8 *a* represents one of these plates seen with a magnifying glass in order to show the disposition of the tubercles. Fig. 8 *b* is an isolated tubercle seen with a microscope. Like all the tubercles of *Dysaster*, it is mamelonated, perforated and has a collar of very accentuated ridges at the base of the mamelon. The miliary tubercles that surround them are also mamelonated. The tubercles of the ambulacrals differ in nothing from those of the interambulacral areas. Fig. 9 *a* represents the left anterior ambulacrum seen with the magnifying glass, showing the articulation of the plates and the disposition of the pores that are invariably located at the base of the latter.

The genital system is rarely preserved. It is composed of four pores forming a rhomboidal square. Two are in front and two behind the anterior ambulacra.

D. analis, thus determined, can be seen as one of the most characteristic fossils of this layer of Lower Oolite that the Swiss geologists call Marl with *Ostrea acuminata*. We usually find groups of four, eight, ten specimens and more that suggests that these animals live in a group. It is the same layer that contains also *Discoidea depressa*, *Dysaster ringens* and *Dysaster bicordatus*. These two latter are however less common.

III. DYSASTER ELLIPTICUS Ag.

Pl. 2, fig. 5–7.

SVN. *Dysaster ellipticus* Ag. Prodr. p. 16. —Catal. syst. Ectyp. p. 3.

Ananchytes elliptica Lam. III, p. 318. (exclud. syn.) —E. Desl. Enc. V. 2, p. 63.

Collyrites elliptica DesMoul. Tabl. syn. p. 364.

Lamarck gave this name to a species very near *D. analis* and *bicordatus*, but however different from both. It is depressed like *D. analis*, but with the difference that the anterior side, instead of being widened, is, on the contrary, very narrow. The anterior ambulacra also are higher and, moreover, there is a free space between the posterior ambulacra and the anus, so that the paired posterior interambulacral areas filling the space between the two ambulacral tops are less wide than in the preceding species. This is in my opinion, the essential character of *D. ellipticus*. The posterior border is rounded. There is scarcely the slightest trace of the sub-anal groove. The anterior notch, corresponding to the unpaired interambulacral area is only weakly indicated. The anterior ambulacral pairs form a graceful curve in meeting near the top (fig. 5). Fig. 5 *a* represents the left anterior ambulacral area, seen with the magnifying glass. Now as there is only one pair of pores per plate on the dorsal surface and the plates decrease in height near the top, the pores appear closer together nearer the top than on the circumference. The ventral surface has no particular character. It is nearly flat as in *D. analis* and the mouth is located in the anterior third.

I have seen several specimens of this species coming from the department of Sarthe. They are evidently Jurassic fossils, but I do not know the stage from which they came. The specimen figured is part of the collection of Michelin.

IV. DYSASTER EXCENTRICUS Des.

Pl. 4, fig. 1–3.

SYN. *Nucleolites excentricus* Munst. (in Goldfuss Petref. p. 140 Pl. 41, fig. 7.)

Catopygus excentricus Ag. Prodr. p. 18.

D. excentricus, described and figured by the Count of Munster under the name of *Nucleolites excentricus*, has completely the appearance of a Jurassic Dysaster, and yet it came, according to the indication of the author, from the Marl chalk of Essen, on the Rœhr. By its general form, it is closest to *D. bicordatus* and *ellipticus*, and has even been confused by authors with the latter, described above. It is, like *D. bicordatus*, short and wide. Its posterior ambulacra are very arched and meet immediately above the anus. Its anterior ambulacra are not elevated until the middle of the test so that the areas of posterior ambulacral pairs between the two tops are very wide. But what distinguishes our *D. excentricus* from the species we just mentioned is its much less elevated form. Because it is very short, its height scarcely equals more than half its length and the anterior side, instead of being abruptly truncated, is, on the contrary, very gradually rounded. The anus is at the upper end of the posterior surface. The sub-anal groove is wide and very flared. The ventral surface is flat. The mouth is in the anterior third. The groove that fills the space between this opening and the edge is very little marked. Finally, the test is very thin as in all Dysaster. The tubercles and the pores of the ambulacra have nothing in particular. Fig. 2 *a* represents some tubercles seen with the magnifying glass. The magnification is too weak to distinguish the perforation of the tubercle, but we can be assured that they are really perforated by examining a tubercle with the microscope.

The Count of Muster kindly sent Agassiz the original of this figure, so it is the same individual that is figured in both works.

V. DYSASTER PROPINQUUS Ag.

Pl. 3, fig. 24–26.

SVN. *Dysaster propinquus* Ag. Descript. des Echin. foss. de la Suisse, 1st part, p. 2, Pl. J, fig. 1–3.

— Catal. syst. Ectyp. p. 3.

Spatangites bicordatus Leske p. 244, Tab. 47, fig. 6.

Andréa; Litt. Helv. p. 10, Pl. II, fig. c.

This species has completely the exterior appearance of *D. analis*, and it is for this reason that in describing it for the first time in his *Description des Echinodermes fossiles de la Suisse*, Agassiz gave it the name *propinquus*. It is, like *D. analis*, depressed and narrower behind than in front. The posterior side is sub-truncate. The ventral surface is more-or-less curved. The unpaired

interambulacral area there is especially swollen (fig. 25)/ The anal groove is scarcely indicated. In contrast, the anterior groove is very marked. The mouth is very near the anterior edge as it is located at a fourth of the longitudinal diameter. Despite this external conformity, *D. propinquus* is distinguished by an essential character that it is sufficient to indicate the importance of the posterior ambulacra. Instead of converging immediately above the anus, it goes much higher and meets only in the posterior third (fig. 24). Moreover, these ambulacra are much wider than in the species described above and the left ambulacrum is higher than the right ambulacrum. This latter character at first appeared insignificant to me. But having found it later in a large number of specimens of this species, I think I can list it among the particular traits of the species.

D. propinquus, very little known for some years, is found now in considerable numbers in several Swiss collections to a point that we can envisage it as a characteristic fossil of the Oxfordian stage, and more particularly of the terrain with chailles or siliceous coral that forms the upper part. Gressly has collected numerous specimens in the terrain with chailles from Fringeli, in the canton of Soleure; near Liesberg in the Bernois Jura; at Largue in the department of Haut-Rhin, and at Wahlen in the Soleurois Jura. The Museum of Basel has a complete series coming from the same terrain. Finally, Parandier has also found it in the terrain with chailles of Mont-de-Bregille near Bresaçon. In the number, we find some that have a size twice that I have figured. We note also that the old specimens are in general more depressed than the young. We have said, in describing *D. bicordatum*, that it is very probably this species that Leske first called *Spatangues bicordatus*.

VI. DYSASTER OVALIS Ag.

Pl. 3, fig. 21–23.

SYN. *Dysaster ovalis* Ag. Catal, syst. Ectyp. p. 3.

Spatangus ovalis Park. Org. Rem. — Phill. Geol. of Yorkshi. p. 127, Pl. 4, fig. 23.

Collyrites ovalis DesMoul. Tabl. syn. p. 368.

Parkinson and Phillips have described, under the name *Spatangus ovalis*, a species of *Dysaster* from the Calcareous Grit of Scarborough that they relate incorrectly to the *Spatangites ovalis* of Leske that is, as we have seen above, our *D. bicordatus*. The figure of Phillips is not fine enough to permit a rigorous determination, especially when, as is the case here, the differences refer to characters of organization of imperceptible appearances. Studer, having sent Agassiz a specimen from Kelloway, apparently coming from the same terrain, I have believed it possible to identify with the species of Phillips. It is after this specimen that I have made the attached figures. In comparing these to those of *D. propinquus* we are struck by their very great resemblance. The differences refer only to the form of the test. The English specimen is a little more swollen and flatter at its base. As for the ambulacra, they have the same disposition that we have described for *D. propinquus*, i.e., the posterior ambulacra go considerably above the anus and at the same time are very wide. It could thus be that *D. ovalis* is only a variety of *D. propinquus*. But as I have only a single specimen, I prefer to wait for more information to make a decision in this regard.

The specimen figured being very well preserved in several of its parts, I have been able to recognize there a distinct manner of articulation of the plates, not only in the interambulacral areas

but also in the ambulacral areas. The ambulacral plates are much higher on the ventral surface than on the dorsal surface, particularly in those of the posterior ambulacra and as there is only one pair of pores per plate, these are much more separated below than above.

VII. DYSASTER MALUM Ag.

Pl. 2, fig. 11–13.

SYN. *Dysaster Malum* Ag. Catal. syst. Ectyp. p. 3.

The disposition of the ambulacra gives us the most important character of this species. The anterior ambulacra reach nearly half the length and as, for their part, the posterior ambulacra are also go very high. The posterior interambulacral areas, or the space between the two ambulacral top, are proportionally narrower. This space is scarcely more than a quarter of the length, while in other species, it is nearly equal half the length. The general form of the test is regularly ovoid. The ventral surface is nearly flat. The anterior groove is scarcely indicated. The unpaired interambulacral area itself is nearly level with the other parts of the test. The mouth, located in the anterior third (fig. 13), is proportionally very small. We also note that the pores are close together on its periphery, without doubt because the plates are less high. It is nearly the same at the top, as seen in fig. 12 *a*, which represents the upper part of the left anterior ambulacral area seen with the magnifying glass. Fig. 11 *b* represent a plate from the left posterior interambulacral area. We distinguish there the primary tubercles and the miliary tubercles. The latter fill the space between the primary tubercles. Fig. 11 *c*, finally, represents an isolated tubercle seen with the microscope with the miliary tubercles that surround it.

The principal difference that exists between this species and *D. propinquus* that it approaches most, consists of the direction of the anterior ambulacra that go higher. The posterior ambulacra are also proportionally narrower.

I know this species only by the magnificent specimen that is figured here. It is part of the collection of DesHayes. It comes, according to all appearances, from the Jurassic terrain of France. I do not know its deposit more precisely.

VIII. DYSASTER TRUNCATUS DuBois.

Pl. 13 Galérites, fig. 8–11.

SVN. *Dysaster truncatus* DuBois. Voy. au Caucase Sér. géol. Pl. I, fig. 1.

DuBois has figured under this name, a mold of a *Dysaster* he collected in the Jurassic terrain of Popilani in Lithuania. But as the test is still unknown, it is quite difficult to identify with any of the better-known species, especially as we are nearly completely ignorant of the relation of the molds with the test in *Dysaster*. The figure that I give here of *D. truncatus* is made after the original of DuBois. Although the mold is not entire, it gives however a sufficient idea of the general form

that is oval and slightly swollen. The posterior side is truncated. We note below the anus that is in the center, a flared groove (fig. 9). The two ambulacral tops are close together. The ambulacra themselves have nothing in particular in their direction. The posteriors meet some distance above the anus. The ventral surface appears to have been strongly curved. The ambulacral area, at least, forms a very pronounced relief. In summary, it is *D. ovalis* and *propinquus* that this mold approaches most. Perhaps one day we shall recognize, when we have studied all the varieties of age of these Urchins, that these three *Dysaster* form only one species.

IX. DYSASTER GRANULOSUS Ag.

Pl. 3, fig. 18–20.

SVN. *Dysaster granulatus* Ag. Prodr. p. 16. — Catal. syst. Ectyp. p. 3.

Collyrites granulosa DesMoul. Tabl. syn. p. 364.

Nucleolites granulatus Münster. (in Goldf. Petr. p. 138, Pl. 43, fig. 4).

This species, described and figured for the first time by Münster in the great work of Goldfuss, has a most characteristic physiognomy as it is scarcely possible to confuse it with any of its congeners. The very abrupt truncation of the posterior edge is sufficient alone to distinguish it from all other *Dysaster*. Its general form is elongated and sensibly swollen. Its ventral surface is perfectly flat. There is no trace of an anal groove and even the anterior groove is scarcely recognizable. The anterior ambulacra do not reach the top. The posterior ambulacra meet immediately above the anus so that the intermediary space is very considerable and contains more than a third of the total length. Fig 19 *a* represents some tubercles from the dorsal surface seen with the microscope and showing the manner in which they are surrounded by miliary tubercles.

The deposits of this species are known until now only in a vague way. Goldfuss reported them in the Upper and Middle Jura of Amberg, Streitberg and Vurgau, in Bavaria. Recently, the Count of Mandelslohe sent me several specimens coming from the lower Corallian or terrain with chailles of the Bernois Jura at Liesberg in the valley of Laufon.

X. DYSASTER SEMI-GLOBUS Des.

Pl. 4, fig. 10–12.

SVN. *Nucleolites semi-globus* Münster. (in Goldf. Petref. p. 139. Pl. 49, fig. 6.)

Collyrites semi-globus DesMoul. Tabl. syn. p. 368.

Catopygus semi-globus Ag. Prodr. p. 18.

If there is a species that can produce the idea of a relation between *Spatangues* and *Dysaster*, it is, undoubtedly, the one that concerns us here. When we examine the figure that Goldfuss gave under the name of *Nucleolites semi-globus* and seeing the ambulacra converge to a single point on the top as in *Spatangue* while the ventral surface is neither bilabiate nor near the anterior edge as it should if it were really a *Spatangue*, I wonder if it would not be appropriate to make this exceptional species the type of a new genus. But it is important for this to know the original. Agassiz asked the Count of Munster who had the kindness to send it to him. I am thus assured that the ambulacral tops, although very near each other, are however really distinct. But as they are quite obliterated near the top, the designer doubtlessly got them too close together because, in reality, the anterior ambulacra are separated from the posteriors by a space of at least 4.5–6.8 mm (fig. 11). It is thus really a *Dysaster* that we have here and thus the nearly central position of the mouth and its form, that I think is angular, although the contour is rather damaged, are very normal. It is useless to say that this is a small distance that separates the two ambulacral tops that constitutes the pertinent character of this specie. Apart from that, it is still to be noted by its swollen and semi-globular form that gave it its specific name. The anterior side is a little wider than the posterior side. The anus is located on the posterior surface and is not visible from above. The ventral surface is concave and the mouth, which is a little eccentrically forward, appears to have been of medium size. The details of the surface have, for the most part, disappeared. The test is thin, as we can judge by the fragments that adhere there.

The Count of Munster indicates the deposit is Jurassic limestone of Pappenheim and Monheim in Bavaria.

XI. *Dysaster acutus* Des.

Pl. 3, fig. 15–17.

This species is in some ways between the cordiform species such as *D. carinatus*, *capistratus*, *Buchii* etc., and the more elliptical and flatter species such as *D. analis*, *propinquus*, etc. It is depressed and widened anteriorly as in the latter while the posterior side is pointed as in the first. The posterior side is sensibly more swollen than the anterior side (fig. 16). The ventral surface is nearly flat. The anterior groove is very marked. The mouth is located in the anterior quarter. The anus is at the posterior end in a way to be visible from both below and above (fig. 15 and 17). The anterior ambulacra go rather high so that the space between the two ambulacral tops equals barely a third of the length of the test.

I know this species only by a single specimen that is part of the Museum of Neuchâtel. Its origin is unknown. However, I do not doubt that it is a Jurassic fossil.

XII. *DYSASTER CARINATUS* Ag.

Pl. 3, fig. 1–4.

SYN. *Dysaster carinatus* Ag. Prodr. p. 16. — Descr. Des Echi. foss. de la Suisse[^] p. 4, Pl. 1, fig. 4–6. — Catal. syst. Ectyp. p. 3. — Lam. III, p. 349.
Ananchytes carinata Lam. III, p. 318, — E. Desl. V. 2, p. 63.
Echinus carinatus L. Gm. p. 3299.
Spatangites carinatus Leske apud Klein p. 245, Pl. 51, fig. 3, 4.
Spatangus carinatus Gldf. Petref. p. 150, Pl. 46, fig. 4. — DeBl. Zooph. p. 185. — Bronn Lethæa, p. 286, Pl. 17, fig. 7.
Collyrites carinata DesMoul. Tabl. syn. p. 366.
Echinus cordatus Val. Expl. des pl. de l'Encycl. inéth. Pl. 158, fig. 1–2.
Echinus paradoxus Schloth. p. 318.
Oursin en cœur BOSCH. Délerv. V. 24, p. 282.
 Baier Oryct. noric. Pl. 3, fig. 43.
 Valentin Mus. V. 2, Pl. 3, fig. 7, N° 1.

We find this species, if not figured and described, at least mentioned by nearly all the authors. Its very characteristic form permits easy recognition. It has the form of a heart of card games, i.e., that it is notched anteriorly and pointed posteriorly. Its thickness is medium. Its name comes undoubtedly from the longitudinal ridge that extends on the posterior part of the dorsal surface from the middle of the test to the anus. The ventral surface is strongly rounded. The unpaired interambulacral area in particular forms a very protruding relief. The mouth is located in the anterior fourth of the length. The anterior groove strongly accentuated. The anus occupies the end of the posterior edge so that it is not visible from above (fig. 1). The anterior ambulacra meet nearly opposite the mouth, i.e., in the anterior third. The posterior ambulacra are separated from the anus by a rather considerable space (fig. 1). Most often, they are very difficult to recognize.

This is a species particular to the Oxfordian stage. It is an error that it is cited in the *Echinodermes fossils de la Suisse* by Agassiz, as belonging to the Lias. The Count of Mandelslohe has recently sent me a very well-preserved specimen coming from the Lower Corallian of Urach, in the Wurtembergois Alps, where it is found with *Dysaster granulosus* and *Discoidea Mandelslohi*. Gressly has collected several specimens in the terrain with chailles of Günsberg in the canton of Soleure where it appears to replace *D. propinquus*.

XIII. DYSASTER CAPISTRATUS Ag.

Pl. 3, fig. 12–14.

SVN. *Dysaster capistratus* Ag. Prodr. p. 16. — Descr. des Echi. foss. de la Suisse, 1st part. p. 7, Pl. 4, fig. 1–3. — Catal. syst. Ectyp. p. 3. — Lam. III, p. 350.
Spatangus capistratus Munst. (in Gldf. Petref. p. 151, Pl. 46, fig. 5.)
Collyrites capistrata DesMoul. Tabl. syn. p. 366.
Spatangus carinatus var. β . Bronn Lethæa, p. 287.

The general form of this species is very similar to that of *D. carintus*, i.e., the anterior side is wide and notched and the posterior side pointed. However, an attentive examination will soon

make us know the differences that exist between the two species. First, *D. capistratus* does not have at all this remarkable ridge of the posterior edge that constitutes one of the characters of *D. carinatus* and, as a necessary consequence, the anus instead of being visible from below, is only visible from above (fig. 13). The ventral surface is not very accentuated, with the exception of the anterior groove, which is very pronounced (fig. 14). The posterior interambulacral region is only slightly rounded. The anterior ambulacra go quite high, and the same for the posterior ambulacra. This makes the intermediary space narrower than in many other species as it measures scarcely more than a fourth of the total length. The posterior ambulacra are not perfectly equal. I have found that of the left is a little more elevated than that of the right. Fig. 13 represents some tubercles seen with the microscope.

This species does not appear to be very common. The Museum of Carlsruhe has several rather well-preserved specimens, but their origin is unknown. All leads me to believe however that this is a fossil of the Middle Jurassic, probably from the terrain with chailles. Munster is content to say that it is a Jurassic fossil.

XIV. DYSASTER BUCHII Des.

Pl. 3, fig. 9–11.

This small species is near both *D. carinatus* and *D. capistratus*. We can have very strong doubts about its specific value. Perhaps it is, in fact, only the young age of one or the other of these two species. However, it is necessary not to lose the view that its form is more swollen, and that the anterior groove is nearly absent. The mouth is placed in the anterior third. The anus is at the posterior end in a way to be visible only from below, as in *D. carinatus*. There is also, on the posterior part of the dorsal surface, a kind of ridge as in this latter species.

The specimen figured was sent to Agassiz by de Buch. It came from the limestone with nerinean gastropods of Stockach in the Grand Duchy of Bade. There exists in the collection of de Mandelslohe several very similar small Dysaster, coming from the Corallian of Sirchingen that appear to belong to the same species.

XV. DYSASTER OVULUM

Pl. 3, fig. 5–8.

This species is distinguished by a particular physiognomy that is notable at first glance from all the Dysaster and that comes essentially from its very swollen form (fig. 6). Not being able to discover, at first, the ambulacra, I have had for a long time doubts about the genus to which this species should be referred. It was only after exposing a specimen to the action of acid that I was successful one day to see these organs. I am thus assured that they are arranged as in Dysaster and proportionally much wider than in all the other species. This contributes without doubt to making them more imperceptible. The intermediary space between the two ambulacral tops is very narrow. It is scarcely equal to a quarter of the length of the test. The anterior groove is not very deep. The

ventral surface is slightly rounded. The mouth is located in the anterior fourth. The anus is at the end of the posterior edge and is not visible from above.

The small specimen of fig. 5, 6 and 7 was found, as well as several other similar ones by C. Nicolet in the Neocomian stage from the valley of Chaux-de-Fonds. Fig. 8 represents a large specimen that is part of the collection of DeLuc at Geneva.

XVI. DYSASTER AVELLANA Ag.

Pl. I, fig. 1–4.

SYN. *Dysaster Avellana* Ag. Catal. svst. Ectyp. p. 3.

This small species is usually very swollen. This gives it the appearance of a nut, from its specific name. Its height equals at least three quarters of its length. The anterior side is not only higher but is also wider than the posterior side. The ventral surface is flat. The posterior side is truncated (fig. 4), especially when examined from below. But it is no less provided with a wide flared groove that extends from the anus up to the lower edge (fig. 3). The posterior ambulacra are seen immediately above the anus and, like those of the anterior ambulacra do not reach the middle of the test. As a result, the space between the posterior ambulacra and the anterior ambulacra is proportionally larger than in any other species, equivalent to half the length of the test (fig. 1). As a result, in addition, the plates of the posterior interambulacral areas are much larger than those of the anterior interambulacral areas. As for the unpaired interambulacral area, as it is very narrow, its plates are naturally very small. Fig. 1 represents some tubercles seen with the magnifying glass.

This species is still known only by some species from limestone with corals from Normandy. It is not found, it seems, either in the Swiss Jura or in the French Jura.

XVII. DYSASTER EUDESII Ag.

Pl. I, fig. 5–12.

SYN. *Dysaster Eudesii* Ag. Catal. syst. Ectyp. p. 3.

This species seems to be representing *D. ringens* in the ferruginous oolite of Normandy. It has been reported up to now only in the limestone with coral of this region. As it is to Eudes Deslongchamps to whom this discovery belongs, Agassiz has given it the name of this indefatigable geologist. *D. Eudesii* has a very rounded ventral surface. The ambulacra are lodged in very marked grooves. The general form of the test is elongated, ovoid and strongly swollen (fig. 5, 7 and 8). But we also find more depressed and nearly circular specimens such as those of fig. 11 and 12 that, having a physiognomy a little different, belong none-the-less to all appearances to the same species. A very marked groove extends from the anus to the ventral edge, and as the interambulacral area here forms a very swollen pad (fig. 9), the groove is only more apparent. The

posterior ambulacra meet immediately above the anus and are elegantly arched (fig. 7, 9, 11). The anterior ambulacra reach nearly the middle of the test. The intermediary space between these two points is equivalent to more than a third of the length (fig. 7). Fig. 7 represents some tubercles in the circular variety, where they are a little more developed.

XVIII. *Dysaster ringens* Ag.

Pl. 1, fig. 13–17.

SYN. *Dysaster ringens* Ag. Descr. des Echi. foss. de la Suisse, 1st part. p. 5, Pl. 1, fig. 7–11. —
Catal. syst. Ectyp. p. 3.
Collyrites ringens DesMoul. Tabl. syn. p. 368.

This species is striking at first glance by the unequal and strongly rounded appearance of its ventral surface and by the extraordinary swelling of the unpaired interambulacral area above the anus (fig. 14 and 15). Its form is subcircular because of the difference in width of the posterior side and the anterior side is only slightly sensible. Its thickness is not great, especially if we disregard the inequalities of the ventral surface. Perhaps it is even the flattest species of all the genus. The dorsal surface is very uniformly rounded. The anterior ambulacra meet in general in the middle of the length. The posterior ambulacra immediately cover the anus (fig. 13, 15). The first are proportionally very narrow and were there only this character, it would suffice to distinguish this species from the circular variety of *D. Eudesii*. The posterior ambulacra are wider. I have been able to observe the gonopores in several specimens. I have always found them disposed in the same manner, i.e., four in number, of which two in front and two behind the anterior ambulacra, forming a more-or-less regular rhombus (fig. 13). Fig. 13 shows the disposition of the tubercles seen with a magnifying glass. The primary tubercles there are numerous and surrounded by a large number of miliary tubercles.

XIX. *DYSASTER VOLTZII* Ag.

Pl. 1, fig. 18–21.

SYN *Dysaster Voltzii* Ag. Descr. des Ech. foss. de la Suisse, 1st part. p. 8, Pl. 4, fig. 11–13.

We easily distinguish this species with its circular form. Its dorsal surface is uniformly swollen and, in this regard, it has the greatest resemblance with *D. ringens*, but its ventral surface is far from being as accentuated. With the exception of the posterior rostrum, it is even a little flatter. The mouth is nearly central, which does not occur in any other species. The anterior ambulacra go up to the middle of the dorsal surface. The posteriors cover the anus. Both, very narrow on the dorsal surface, widen considerably on the ventral surface (fig. 21). I have been able to assure myself, by the specimen figured, that the pores in approaching the mouth, multiply considerable, nearly as in many Cidarids. The tubercles have nothing in particular, neither in their structure nor in the disposition (fig. 19 a). It was with heat that Voltz was able to discover this species. It has

been reported up to now only in the Oxfordian of Voirons, near Geneva. Among the specimens that I have seen, is found one that is 8.9 cm in diameter, i.e., twice the length of the specimen figured.

XX. DYSASTER MUNSTERI Des.

Pl. 4, fig. 4–7.

SYN. *Spatangus bicordatus* Goldf. Petref. p. 151, Pl. 46, fig. 6.

The species that concerns us here has, in Goldfuss, the name of *Spatangus bicordatus*, but we have already had the opportunity to make the observation that it resembles in nothing the *Spatangus bicordatus* of Leske. Consequently, we have had to change the specific name. So that it was not confused with the *Dysaster bicordatus* of Agassiz, which is from the Lower Oolite, we have called it *D. Munsteri*, the name of the celebrated and indefatigable paleontologist who first discovered it. *D. Munsteri* is the best characterized species of the genus. It resembles in no way any of the other species we have described up to now. First, it is nearly as high as long while in no other *Dysaster* does the vertical diameter exceed two thirds the longitudinal diameter. Its anterior side is truncated nearly vertically and represents a nearly right triangle. In its middle is the anterior groove that is especially deep near the ventral edge. The dorsal surface is compressed and ends in a roof. The posterior side is much narrower than the anterior side. The anus is located at the top of the posterior surface but is covered by the dorsal ridge so as not to be visible from above (fig. 6). The sub-anal groove is deep and, in passing to the ventral surface has two small marginal protuberances. On the ventral surface, the interambulacral area is greatly swollen, especially posteriorly (fig. 7). The mouth is very near the anterior edge.

The anterior ambulacra are farther from the middle of the test than in any other species. Because the posterior ambulacra almost immediately cover the anus, the paired posterior interambulacral areas that fill the space between the two ambulacral tops are also much wider than those of any other *Dysaster*.

This species appears to be of Cretaceous origin, according to the indication of the Count of Munster. The specimen figure, which is the very original of Munster, comes from Mecklenburg.

TABLE OF THE GEOLOGICAL DISTRIBUTION OF THE SPECIES IN THE GROUP OF DYSASTER.

1. SPECIES OF THE JURASSIC PERIOD.

a) Lower stage.

Dysaster ringens Ag.	Marl with Ostrea acuminata ...	Swiss Jura.
“ bicordatus Ag.	Marl with Ostrea acuminata ...	Valley of the Birse.
“ analis Ag.	Marl with Ostrea acuminata ...	Swiss Jura.
“ Avellana Ag.	Limestone with coral	Normandy.
“ Eudesii Ag.	Limestone with coral	Normandy.
“ Malum Ag.	Jurassic terrain	France.
“ truncatus DuB.	Jurassic terrain	Popilani (Lithuania).
“ ellipticus Ag.	Jurassic terrain	Department of Sarthe.

b) Middle stage.

Dysaster Voltzii Ag.	Oxfordian	Near Geneva.
“ carinatus Ag.	Oxfordian , terrain with chailles	Günsberg (Solerois Jura).
“ propinquus Ag.	terrain with chailles	Liesberg (Bernois Jura), Fringeli, Wahlen, (cant. of Soleure), Largue (départ, of Haut-Rhin), Besançon.
“ granulosus Ag.	terrain with chailles	Urach (Wurtemberg).
“ capistratus Ag.	Middle Jura	Swiss Jura.
“ ovalis Ag.	Calcareous Grit	Scarborough, Kelloway.
“ acutus Des.	Jurassic terrain	?

c) Upper stage.

Dysaster Buchii Ag.	Upper Jura	Stockach (cant. of Schaffhouse).
“ semi-glohus Des.	Jurassic limestone	Pappenheim and Monheim (Bavaria).

SPECIES OF THE CRETACEOUS PERIOD.

Dysaster Miinsteri Des.	Marl chalk	Mecklemburg.
“ excentricus Des....	Marl chalk	Essen on the Rœhr.
“ ovulum Des.	Neocomian	Chaux-de-Fonds.

CONSPECTUS GENERUM ET SPECIERUM DYSASTERORUM.

CHARACTERES GENTIS DYSASTERORUM E FAMILIA CLYPEASTROIDEORUM.

Ambulacra simplicia, ad peripheriam divergentia, in vertice disjuncta, tria in summo vertice, duo postice convergentia.

Genus **DYSASTER**. Ambulacra disjuncta; ambitus ellipticus, subcordiformis; os angulosum, obsolète decagonum, plus minusve excentricum ; anus posticus; tubercula non seriata, sed perforata et crenulata; testa tenuissima.

1. *Dysaster bicordatus* Ag. (Pl. 2, fig. 1–4). D. inflatus, antice subtruncatus, postice depressus, obtusus; ambitu ovato; basi plana; ambulacris anticis non ad verticem usque porrectis; ambulacris posticis arcuatis, ano incumbentibus.

2. *Dysaster analis* Ag. (Pl. 2, fig. 8–10). D. depressus, antice dilatatus, postice angustatus, subtruncatus; ambitu ovato; basi plana; ambulacris posticis ano incumbentibus, ab anterioribus maxime recedentibus.

3. *Dysaster ellipticus* Ag. (Pl. 2, fig. 5–7). D. subinflatus antice depressus, postice obtusus; ambitu ovato; basi plana; ambulacris posticis supra anum convergentibus, anticis in summo vertice conjunctis.

4. *Dysaster excentricus* Des. (Pl. 4, fig. 1–3). D. depressus, postice oblique truncatus; ambitu subquadrato; basi plana; ore a margine remoto; ambulacris posticis ano incumbentibus.

5. *Dysaster propinquus* Ag. (Pl. 3, fig. 24–26). D. subinflatus vel depressus, antice truncatus, emarginatus; ambitu ovato; basi undulata, ad anum tumida; ambulacris posticis rectis, ab ano remotis.

6. *Dysaster ovalis* Ag. (Pl. 3, fig. 24–26). D. inflatus, antice subtruncatus; ambitu ovato; basi undulata; ore excentrico; ambulacris posticis angustis, rectis, ab ano remotis.

7. *Dysaster Malum* Ag. (Pl. 2, fig. 11–13). D. inflatus; ambitu ovato; basi plana; ore parvo; ambulacris anticis summum verticem adtingentibus ; ambulacris posticis rectis, ab ano remotis.

8. *Dysaster truncatus* DuBois (Pl. 13 Galeritarum fig. 8–11). D. inflatus, elongatus, postice truncatus; basi undulata, ad anum tumida; ambulacris posticis rectis, ab ano remotis. Nucleus.

9. *Dysaster granulatus* Ag. (Pl. 3, fig. 18–20). D. inflatus, elongatus, antice rotundatus, postice truncatus, quadratus; ambulacris posticis arcuatis, ano incumbentibus.

10. *Dysaster semi-glohus* Des. (Pl. 4, fig. 10–12). D. inflatus, subhemisphaericus; ambitu ovato; basi plana; ore subcentrali; ambulacris posticis rectis, ab ano remotissimis, sed ambulacris anterioribus proximis.

11. *Dymster acutus* Des. (Pl. 3, fig. 15–17). D. inflatus, antice subdepressus, submarginatus, postice tumidus, subovatus; basi undulata; ambulacris posticis angustis, ab ano remotis.

12. *Dysaster carinatus* Ag. (Pl. 3, fig. 4–1). D. cordatus, inflatus, postice acuminatus, superne carinatus; basi undulata; ambulacris posticis arcuatis, ab ano remotis.

13. *Dysaster capistratus* Ag. (Pl. 3, fig. 12–14). D. inflatus, elongatus, antice subtruncatus, emarginatus, postice acuminatus; basi undulata; ambulacris posticis latis, rectis, ab ano remotis.

14. *Dysaster Buchii* Des. (Pl. 3, fig. 9–11). D. inflatus, altus, cordatus, antice truncatus, submarginatus, postice coarctatus, acutus; superne rotundatus; ambulacris posticis rectis; basi undulata.

15. *Dysaster ovulum* Des. (Pl. 3, fig. 5–7). D. altus, tumidus, rotundato-ovatus, antice submarginatus, postice subrostratus; ambitu cordato; basi undulata; ambulacris posticis latis, rectis, ab ano remotis, subinconspicuis.

16. *Dysaster Avellana* Ag. (Pl. 1, fig. 1–4). D. inflatus, postice subtruncatus, subdepressus; ambitu suborbiculari; ambulacris anticis summum verticem non adtingentibus, posticis ano incumbentibus; basi subplana.

17. *Dysaster Eudesii* Ag. (Pl. 1, fig. 5–12). D. inflatus, ovalis; basi valde undulata, sulcata, area postice tumida, sulco infraanali amplo; ambulacris anticis ad verticem summum porrectis, posticis arcuatis, ano incumbentibus; variât ambitu ovato, vel orbiculari.

18. *Dysaster ringens* Ag. (Pl. 1, fig. 13–17). D. depressus, superne subrotundatus, ambitu suborbiculari; basi maxime undulata, sulcata area; postica tumida, subcarinata; ore submedio, poris creberrimis cincto; sulco infraanali amplo; ambulacris anticis angustis, ad summum verticem porrectis; posticis arcuatis ano incumbentibus.

19. *Dysaster Voltzi* Ag. (Pl. 1, fig. 18–21). D. depressus, superne subrotundatus; ambitu orbiculari; basi subplana, area postica tumida; ore submedio, poris creberrimis circumdata; ambulacris posticis ano arcuatis incumbentibus.

20. *Dysaster Münsteri* Des. (Pl. 4, fig. 4–7). altissimus, subcarinatus, antice et postice truncatus et utrumque sulcatus, lateraliter declivus; basi undulata, ad posticum marginem tumida; ore antico, inframarginali; ano altissimo; ambulacris anterioribus anticis, posterioribus supra anum convergentibus, inde ab anterioribus remotissimis.

Diekmann a. n. in Lap. del.

Lith. de Nicolet et Jeanjaquet à Neuchâtel.

Fig. 1-4. DYSASTER AVELLANA Ag. • Fig. 5-12. DYS. EUDESII Ag.
Fig. 13-17. DYS. RINGENS Ag. • Fig. 18-21. DYS. VOLZII Ag.

Diekmann ad. nat. in Lap. del.

Lith. de Nicolet et Jeanjaquet à Neuchâtel.

Fig. 1-4. DYSASTER BICORDATUS A. G. Fig. 5-7. DYS. ELLIPTICUS A. G.
Fig. 8-10. DYS. ANALIS A. G. Fig. 11-13. DYS. MALUM A. G.

Diekmann a. n. in l. ap.

Lith. de Nicolet et Jeanjaquet à Neuchâtel.

Fig. 1-4. DYSASTER CARINATUS Ag. = *Fig. 5-8.* DYS. OVULUM Ag.

Fig. 9-11. DYS. BUCHII Ag. *Fig. 12-14.* DYS. CAPISRATUS Ag.

Fig. 15-17. DYS. ACUTUS Ag. = *Fig. 18-20.* DYS. GRANULOSUS Ag.

Fig. 21-23. DYS. OVALIS Ag. *Fig. 24-26.* DYS. PROPINQUUS Ag.

Diekmann a. n. Lap. del.

Lith. de Nicolet et Jeunjaquet à Neuchâtel.

Fig. 1-3 DYSASTER EXCENTRICUS Des. *Fig. 10-12* DYS. SEMIGLOBUS Des.
Fig. 4-7 DYS. MUNSTERI Des. *Fig. 8-9* HYBOCLYPUS CANALICULATUS Des.