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XVI.—Contributions to the Palæontology of Gloucestershire: — A description, with figures, of some new species of Echinodermata from the Lias and Oolites

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[SECOND SERIES.]

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XVI.—*Contributions to the Palæontology of Gloucestershire:—A description, with Figures, of some new Species of Echinodermata from the Lias and Oolites.* By THOMAS WRIGHT, M.D. &c., Professor of the Natural Sciences in the Cheltenham Grammar School*.

[With two Plates.]

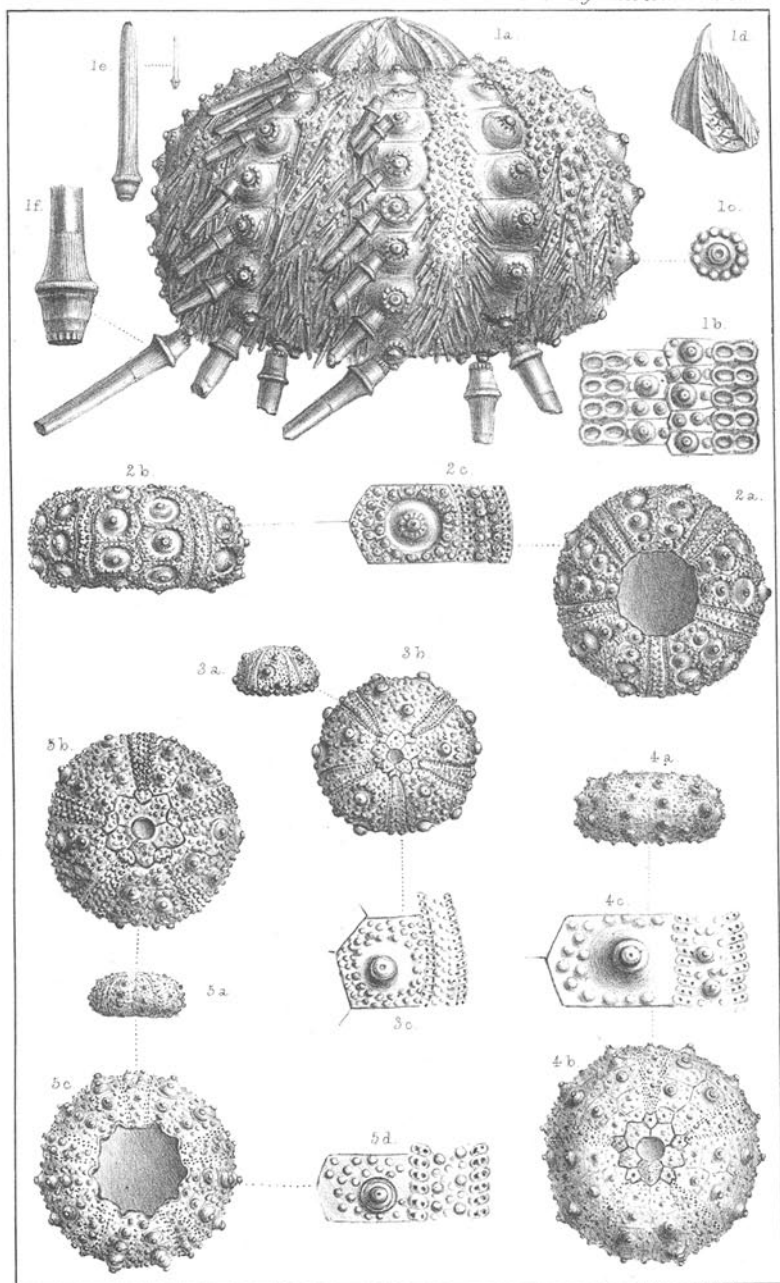
Cidaris Edwardsii, Wright. Pl. XI. fig. 1, a-f.

Test crushed, the form therefore unknown. Ambulacral areas narrow, with two rows of small perforated tubercles, and smaller perforated ones interspersed amongst them; interambulacral areas about four times the width of the ambulacral, having two rows of large tubercles with confluent areolas; the primary spines long, with a compound structure; the secondary spines short with blunt apices, the surfaces of both sculptured with delicate longitudinal lines; mouth armed with powerful jaws, each with three prominent tricarinated ridges. Upper part of the test and ovarial disc unknown.

Description.—It is much to be regretted that no other specimen of this noble Urchin but the one before us has been obtained from the Lias of Gloucestershire, and as the specimen exhibits only the lower half of the test, many points of its anatomy remain unknown; enough of its structure, however, is shown to enable us to point out some important affinities and differences in this rare species.

The narrow ambulacral areas are provided with two rows of small perforated tubercles, amongst which smaller tubercles are irregularly scattered; these tubercles all support short stout spines with a minutely sculptured surface, and which are abun-

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W.H. Bailey

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|--------|-------------------------|---------|
| 1 a-f. | <i>Cidaris Edwardii</i> | Wright |
| 2 a-c. | " <i>Bouchardii</i> | " |
| 3 a-c. | <i>Hemiodaris minor</i> | Agassiz |
| 4 a-c. | <i>Pedina Bakeri</i> | Wright |
| 5 a-c. | " <i>Etheriadii</i> | " |

dantly preserved *in situ* on the specimen. The wide poriferous avenues are occupied with large oblong pedal pores with very thin partition-walls between them, a circumstance which forms a good diagnostic character between *C. Edwardsii* and *C. Fowleri*, which it very much resembles in many points of structure, the pores in *C. Fowleri* being small and separated by thick partition-walls. The interambulacral areas are four times the width of the ambulacral, and are occupied by two rows of large tubercles set closely together in a vertical direction, so that the areolas above and below are quite confluent throughout.

The imperfect condition of the shell prevents us from ascertaining the precise number of these tubercles there were in each row, but judging from the number (eight) contained in an imperfect column, we suppose there could not have been less than from twelve to fourteen; they increase gradually in size from the mouth upwards, and are of a moderate magnitude when compared with the shell they adorn. The areolas are small and not prominent, and the tubercles are deeply perforated. The space between the two rows of tubercles is wide and filled with close-set miliary tubercles, most of which are raised on elevations, and have their summits perforated; these all support small spines, which are well preserved *in situ* in our specimen.

The spines are of two kinds—those articulated with the large tubercles (the primaries), and those articulated with the small tubercles (the secondaries). The primary spines exhibit a peculiar structure: the head is large, increasing gradually in diameter from the articulating cavity to the circular band; the rim of the acetabulum is coarsely and deeply crenulated, and the raised band is prominent, narrow, and finely milled; the neck tapers gradually from the band to the point where it joins the stem, which has the same structure as the head, and its surface is delicately sculptured with fine longitudinal lines; the stem is united to the neck by an oblique harmonia suture. The structure of this part of the spine differs from that of the head and neck; in the spines denuded of their external layer, it has a horny semi-transparent appearance; in those in which this layer is present the surface is sculptured with longitudinal lines of microscopic delicacy, and there are numerous small processes, having their points directed forwards, arranged with some regularity in rows. The stem is circular or slightly compressed; but as none of the spines are complete, a part having been broken off, we are unable to ascertain their length. The secondary spines are very uniform in size and structure, and are abundantly preserved *in situ*; they measure from $\frac{6}{20}$ ths to $\frac{7}{20}$ ths of an inch in length and are round, and have their surface ornamented with fine longitudinal lines. The mouth is armed with

a powerful dental apparatus: three of the jaws are very prominent; the external surface of each is strengthened by three prominent ridges; the teeth are large, but are fractured. As the under surface of the test only is shown, we are unable to describe the ovarial disc and the dorsal surface thereof.

Affinities and differences.—This Urchin belongs to the same group as *C. Fowleri* and *C. maxima*, Goldf. It resembles the former in the form and structure of both areas, and in the gradual development of the primary tubercles from the mouth upwards. It is distinguished from that species, however, by the greater size and uniform perforation of the miliary tubercles, but above all by the form and structure of the primary spines. Having ascertained that our conjecture* relative to the spines of *C. Fowleri* is correct, from having seen a specimen recently found with some spines attached to it, we can speak positively upon this point.

Locality and stratigraphical range.—Found by Mr. G. E. Gavey, C.E., in the upper shale beds of the Lower Lias at Mickleton Tunnel near Chipping Campden. It was associated with *Pentacrinus Goldfussii*, Wright, *Ophioderma Gaveyi*, Wright, *Uraster Gaveyi*, Forbes, and *Ammonites planicosta*, Sow.

History.—Isolated plates of this species have been found in beds of the same geological horizon in other localities of the county of Gloucester, but the specimen before us is the only one from which the anatomy of the Urchin could be made out. We dedicate this species to Prof. Milne-Edwards, of the Museum of Natural History at the Jardin des Plantes, Paris, as a tribute of gratitude for the pleasure and profit derived from the study of his admirable monograph on British Fossil Corals.

Cidaris Bouchardii, Wright. Pl. XI. fig. 2, a-c.

Test circular, depressed; ambulacral areas narrow and flexuous; interambulacral areas with two rows of primary tubercles, 5-6 in each row; the areolas of the small mammillary eminences deeply excavated, and surrounded by an elevated ridge, on which a distinct circle of granules for each areolar space is disposed.

Dimensions of the largest specimen. Height $\frac{1\frac{3}{8}}{10}$ ths of an inch, transverse diameter 1 inch and $\frac{7}{10}$ ths.

Dimensions of a moderate-sized specimen. Height $\frac{1\frac{1}{2}}{10}$ ths of an inch, transverse diameter 1 inch and $\frac{2}{10}$ ths.

Description.—It was for some time doubted whether the young forms of this Urchin were not the *C. elegans*, Goldf., but a com-

* Annals of Nat. Hist. Oct. 1851.

parison of several individuals of our fossil with a typical specimen of Goldfuss's species, kindly sent us by our friend Dr. Roemer of Bonn, which he had identified with the original *C. elegans* in the Bonn Museum now under his care, has convinced us of their distinctness. The test of our Urchin is circular and much depressed from the great flattening of both poles; the ambulacral areas are narrow and slightly flexuous, and have two rows of small marginal granules set nearly opposite to each other throughout the areas. The poriferous avenues are much depressed, and the pairs of pedal pores are disposed in a single file. The interambulacral areas are about five times the width of the ambulacral, and have two rows of primary tubercles of moderate size, with from five to six in each row. The mammillary eminences on which the tubercles are supported are surrounded by areolas deeply excavated out of the substance of the test plates; the margin bounding the areolas is raised into a ridge on which a distinct row of close-set granules is disposed, so that each tubercle is thereby separated from its fellow; the elevation of the marginal ridges produces a zigzag depression down the centre of the areas, which is covered with a small close-set granulation. The mouth-opening is small and circular, and lies in a slight depression; the apical disc is absent in all the specimens that have yet been found. The crenulations on the mammæ are small, but distinct, and the tubercles are of moderate size and not deeply perforated.

Affinities and differences.—This Urchin has many affinities with *C. coronata*, Goldf., and *C. propinqua*, Münt., and has been catalogued as the former by some authors; it is therefore important that we should point out the diagnostic characters by which it is distinguished from them. In both these corallian forms the ambulacral areas have four rows of granules, whilst in *C. Bouchardii* there are only two rows. From *C. propinqua* and *C. coronata* it is further distinguished by having more rows of primary tubercles in the interambulacral areas, in having the areolas smaller and more deeply sunk, the tubercles proportionately smaller, and the marginal circle of granules smaller and set closer together. With *C. marginata*, Goldf., it has some affinity in the excavated style of its areolar spaces, but it is distinguished from this beautiful form in having the tubercles smaller and more numerous. In *C. marginata* the ambulacral areas moreover are broader and more prominent, and they support four rows of small granules, whilst in *C. Bouchardii* there are only two. With *C. elegans*, Goldf., it has no resemblance whatever; it belongs therefore to a different group of Cidarites than these foreign corallian forms. From *C. Fowleri*, nobis, it is distinguished by having narrower and more deeply concealed poriferous avenues, fewer

primary tubercles in the interambulacral areas, and deeper excavated areolar spaces with a more elevated marginal rim around them: these characters serve to distinguish *C. Fowleri* from *C. Bouchardii* at a glance, and the same diagnostic traits separate it from *C. Edwardsii*, nobis.

Locality and stratigraphical range.—We have found this species in the Pea-grit of the Inferior Oolite of Crickley, Leckhampton, and Birdlip Hills, Gloucestershire, but have never met with any traces of it in the Upper Ragstone beds so rich in Urchin forms. Some separate plates collected from the Bradford clay near the Tetbury Road Station, Great Western Railway, closely resemble this form; but as no entire specimen, that we are aware of, has been found, it is impossible to state whether it has a wider range in the higher beds of the lower division of the Oolites or not.

We dedicate this species to our friend M. Bouchard Chantreaux of Boulogne, to whom we are indebted for some beautiful and rare specimens of Echinoderms and other fossils from the rocks of the Boulonnais, most kindly contributed by him to aid us in the composition of these memoirs.

Hemicidaris minor, Agassiz. Pl. XI. fig. 3, *a-c*.

SYN. *Hemicidaris minor*, Agassiz, Catalogus Systematicus, p. 9; Agassiz and Desor's Catalogue raisonné des Echinides, Annales des Sci. Nat. tom. vi. p. 339.

Acrosalenia rarispina, M'Coy, Ann. of Nat. Hist. 2nd Series, vol. ii. p. 411.

Test hemispherical above, flat at the base; ambulacral areas slightly flexuous, not prominent, with six large tubercles at their base, and four rows of small unequal-sized granules in the middle, diminishing to two rows in the upper part of the areas; interambulacral areas three times the width of the ambulacral, with three primary tubercles on the upper surface and three smaller ones at the base; the wide intertubercular spaces are covered with small distinct nearly equal-sized granules, which form complete circles around the margins of the areolas of the primary tubercles; the apical disc is of moderate size, and its ovarian plates are covered with a delicate granulation; base flat, mouth-opening large and decagonal; pores arranged in the avenues in a single file throughout.

Height $\frac{5}{10}$ ths of an inch, transverse diameter $\frac{9}{10}$ ths of an inch.

Description.—This beautiful little Urchin was first discovered in the étage Bathonien of Langrune, Calvados, the true equivalent of the Great Oolite of English geologists; it was entered

in M. Agassiz's 'Catalogus Systematicus*' as *Hemicidaris minor*, from specimens sent to him by M. Michelin; it afterwards found a place in the 'Catalogue raisonné des Echinides' of Agassiz and Desor, accompanied with this remark: "Se distingue entre tous les *Hemicidaris* par les tubercules très espacés, dont il n'y a que deux out rois dans une rangée.—Terrain Jurassique de France.—Michelin." Professor M'Coy, in his paper "On some new Mesozoic Radiata†," afterwards described this Urchin under the name *Acrosalenia rarispina*, giving the Great Oolite of Minchinhampton for its locality. As that gentleman has kindly favoured us with pen-and-ink sketches of the species described as new in that paper, we have no difficulty in deciding on the identity of his specimen. Moreover we have ascertained the collection from whence it originally came. The error committed by this learned author in the genus must have arisen from the disc in his specimen having been covered with "adhering siliceous matrix," and from his having overlooked the very remarkable character pointed out by Agassiz, "les tubercules très espacés." We have been fortunate to receive a typical specimen of the original species from the Great Oolite of Langrune, through the kindness of our friend Professor Deslongchamps; we have compared the French Urchin with specimens obtained from the same locality as that from whence Prof. M'Coy's was collected, and there is not a shadow of a doubt about their perfect identity. We have figured in detail this beautiful and singular form, to prevent the possibility of mistakes occurring about it in future.

This pretty little *Hemicidaris* is very distinct from all others of the group to which it belongs: the test is nearly hemispherical, and the few primary tubercles stand prominently at great distances apart from the surface of the test. The narrow ambulacral areas are slightly flexuous above, and have from four to six large perforated tubercles at their base only, the sides and upper part of the areas having first four, and then two rows of small imperforate granules upon their surface about equal in size to the granulation which covers other parts of the test. The poriferous avenues are depressed, and the pedal pores are disposed in pairs throughout. The interambulacral areas depart considerably from the typical structure of this portion of the test in other Echinidæ; they are three times the width of the ambulacra, and have at their base three large primary tubercles, two on one side and one on the other, with a smaller tubercle above the single large one; on the sides and upper part of the areas there are only three primary tubercles, two on one side and one on the other, making

* Catalogus Systematicus Ectyporum Echinoderm. Foss. Mus. Neocomensis, 1840.

† Annals of Natural History, 2nd Series, vol. ii. p. 411.

only three pairs of primary tubercles in the interambulacral areas, those of the base being closely set together, and those on the sides at great distances apart; the tubercles are large and hemispherical and only slightly perforated; the mammillary eminences which support them are small and ring-like with faintly marked crenulations, and the areolas are rather wide and only slightly grooved, so that the tubercles project prominently and abruptly from the surface of the test. The margin of the areolas is encircled by a row of granules rather larger than those which cover the rest of the intertubercular surface of the plates; here the granules are close-set and disposed without much regularity. The apical disc is of moderate size and slightly prominent; the five ovarian plates are large and of a heptagonal form, the ocular plates are small and heart-shaped, and the surface of both is covered with a close-set delicate granulation; the anal opening is nearly central and circular; the base is flat; the mouth-opening is large and widely decagonal from the great span of the ambulacral arches, and the comparative smallness of those of the interambulacra. The spines are as yet unknown.

Affinities and differences.—This remarkable little Urchin is so entirely different from its congeners, that it is impossible to mistake it for any other of the group to which it belongs. The presence of tubercles at the base of the ambulacral areas only, and of granules on the sides of these spaces, associate it with *H. diademata*, but the small number of the primary tubercles on the interambulacra, added to the great distance at which they are placed apart, serve to distinguish it from the young of that species; in fact, these characters alone are perfectly diagnostic of *H. minor* among all other forms of *Hemicidaris*.

Locality and stratigraphical range.—It was first found in the "Grand Oolite" of Langrune, Calvados, from whence the beautiful specimen before us was obtained, and kindly sent by Professor Deslongchamps of Caen. We take the present opportunity of recording our grateful acknowledgements to that eminent naturalist for his kindness and courtesy, not only in contributing specimens to our cabinet for comparison and reference, but likewise for communicating many rare species of oolitic Echinidæ which served as the types of several of M. Agassiz's species, and which specimens have been of much service in clearing up doubts as to the identity of some other English forms. *H. minor* was collected in this country by W. Walton, Esq., from the Great Oolite of Hampton near Bath.

History.—First named by M. Agassiz from specimens in M. Michelin's cabinet; afterwards described as *Aerosalenia rarispinia* by Prof. McCoy from specimens in the Cambridge Museum, which came from Mr. Walton's series collected near Bath; it has

never yet been found either by Mr. Lycett or ourselves in the Great Oolite of Minchinhampton.

Acrosalenia Crinifera, Wright. Pl. XII. fig. 1, *a-d*.

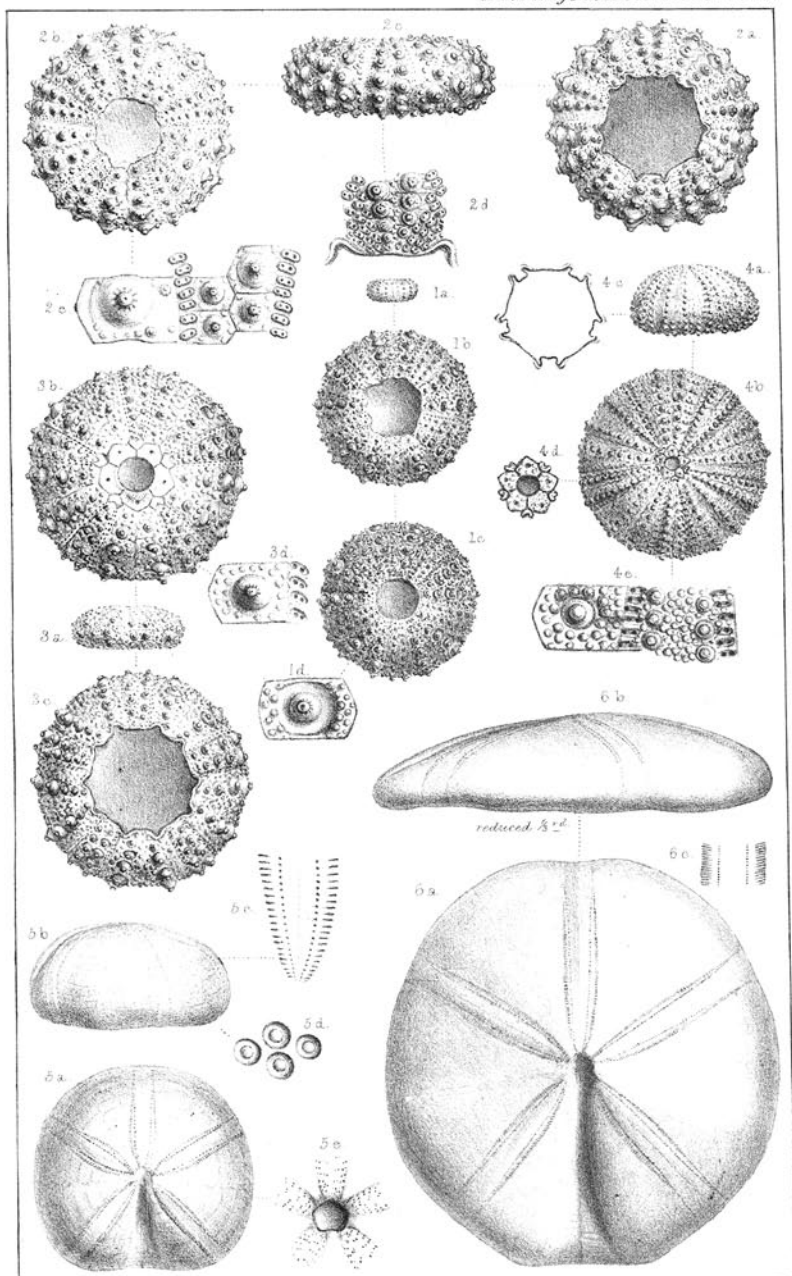
SYN. *Echinus minutus*, Buckman, Geology of Cheltenham, 2nd ed. p. 95.

Cidarites criniferus, Quenstedt, Handbuch der Petrefactenkunde, tab. 49. fig. 32. p. 574.

Test circular, depressed; ambulacral areas narrow, with two rows of microscopic tubercles placed at some distance apart on each side of the areas, those of the right side alternating with those of the left; interambulacral areas with two rows of primary tubercles, 9-10 in each row, so disposed that the test appears to possess only ten rows of primary tubercles nearly equidistant from each other; spines long, numerous and hair-like.

Height $\frac{5}{10}$ ths of an inch, transverse diameter $\frac{6}{10}$ ths of an inch.

Description.—This singular little Urchin has been long known to collectors, and has been often a puzzle to them, for although a few specimens have been collected in a tolerable state of preservation, still for the most part the test is much injured by pyrites; under the most favourable circumstances, it requires a good lens and much patient study to make out the details of its structure. It was first found in the black shales of the lower Lias near this town, and recently, with its hair-like spines attached to the test, from the same bed near Gloucester, when excavating the new docks of that city; it was there associated with *Ammonites oxynotus*, Quenst. It is difficult to say whether this tiny Urchin is a *Hemicidaris* or an *Acrosalenia*, and the absence of the apical disc leaves the question unsolved; we incline to the opinion that it is an *Acrosalenia* from the structure of the ambulacral areas, the shape, length and development of the spines when compared with the diameter of the test, the spines being more than four times the diameter of the latter; be this however as it may, it is neither an *Echinus* nor a *Cidaris*, as previous authors have supposed. The ambulacral areas are narrow, with two rows of small marginal tubercles not much larger than the common granulation of the test; these tubercles are placed in each row at some distance apart, and the tubercles of the one side alternate with those of the opposite side; between these rows of tubercles the surface of the plates is adorned with a delicate granulation, which is arranged into a zigzag line; the tubercles are very uniform in size and distribution throughout the areas, and do not increase at the base thereof, as is the case in the genus *Hemicidaris*. The interambulacral areas are wide, and have two rows of primary tubercles, from 9-10 in each row; their



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- 1 a.d. *Acrossalenia crinifera*.
 2 a.c. *Diadema Davidsoni*.
 3 a.d. *Moorei*.
 4 a.c. *Polysynus Deslongchampsii*.
 5 a.c. *Nuculolites Woodwardii*.
 6 a.c. *Michelinii*.

mammillary eminences have well-defined areolas, the summits of the mammæ are deeply crenulated, and the tubercles are small and widely perforated; the areolas are confluent above and below; between the two rows of tubercles an elevated band extends from the mouth to the apical disc, composed of from 4-6 rows of unequal-sized granules. When viewed at the equator with the naked eye, this Urchin appears to possess only ten rows of tubercles placed nearly equidistant from each other; but when examined with an inch object-glass under the microscope its true structure is disclosed,—the narrowness of the ambulacral areas, the closeness and smallness of their rows of tubercles, the granular band down the centre of the interambulacra, and the unequal size of its component tubercles, alike contribute to make the deception almost complete.

The most remarkable parts of the structure of this tiny fossil are the spines, which in some crushed specimens are preserved *in situ*; they are long, delicate and hair-like, and have large articular heads; these spines look like so many bristles laid down in all directions upon some slabs of the Lias shales; in a crushed test of four-tenths of an inch in diameter the spines measured an inch and a half in length.

Affinities and differences.—The only *Cidarites* for which *A. crinifera* is likely to be mistaken are *Diadema Moorei* and *Pedina Etheridgii*; from the former it is easily distinguished by the narrowness of the ambulacral areas and the smallness of the tubercles thereof; from the latter it differs in the comparative smallness of its ambulacral areas, and above all in having the mammillary eminences of its tubercles deeply crenulated, a character which is absent in all the *Pedinas* we know; at present we know of no other Urchin in the Lias for which it can be mistaken.

Locality and stratigraphical range.—*A. crinifera* has been found only in the lower shales of the lower Lias near Lansdowne, Cheltenham, and in the same stratum near Gloucester; it is associated with *Turritiles Valdani*, D'Orbig., and *Ammonites oxynotus*, Quenstedt. It has been collected by Prof. Quenstedt in the lowest schist of the "Posidonienschiefer von Pliensbach bei Boll" in Würtemberg. We have before us now two slabs of this curious bed; one surface of the slab is covered over with the long hair-like spines strewed about in all directions, with here and there the crushed test of one of these Urchins with its spines attached and *in situ*.

History.—Described by Mr. Buckman under the name *Echinus minutus*, but previously noticed by M. Quenstedt in his work on the Flötzgebirge of Würtemberg; it has been recently figured by him in his 'Handbuch der Petrefactenkunde,' under the name *Cidarites criniferus*.

Diadema Davidsoni, Wright. Pl. XII. fig. 2, a-e.

Test depressed, circular; tubercles elevated upon prominent mammillary eminences; pores in a single file throughout; a few small secondary tubercles in the interambulacra; the primary ambulacral tubercles nearly as large as those of the interambulacra.

Height $\frac{9}{20}$ ths of an inch, transverse diameter 1 inch and $\frac{6}{20}$ ths.

Description.—This beautiful Urchin has a regular circular test, not at all inclined to the pentagonal form of many of its oolitic congeners. The ambulacral areas are three-fourths the width of the interambulacral areas, and are nearly of a uniform width throughout, tapering slightly and gracefully inwards towards their superior third; the contraction assumes the form of a gentle curve slightly inclined towards the centre. The double row of tubercles gradually increases in size from the mouth to the equator, where three pairs are about the same size; from this point upwards they gradually decrease, and terminate in two pairs of minute rudimentary tubercles at the disc. A single row of granules, arranged in a zigzag form, separates the primary tubercles from each other, a larger granule marking each of the angles. There is no granulation or other sculpture between the mammillary eminences of the tubercles and the poriferous avenues. There are from twelve to thirteen pairs of tubercles in each area. The interambulacral areas are nearly $\frac{4}{10}$ ths of an inch in width, and $\frac{1}{4}$ th wider than the ambulacral areas; they retain their width uniformly throughout, and are occupied by two rows of primary tubercles, nine to ten in a row, the mammillary eminences of which are large and prominent, and separated from each other by two rows of small granules which extend only a short distance beyond the equator; the remaining space between their termination and the disc being destitute of sculpture, where likewise the areas are slightly depressed; and a single row of granules rises on the external side of the tubercles, with here and there a secondary tubercle towards the basal portion of the test.

The poriferous avenues are very narrow: the pedal pores are arranged in a single file, only three or four additional pairs being introduced in the increased spaces around the circumference of the mouth. The tubercles of both areas are of moderate size, but exceedingly prominent, in consequence of being elevated upon large mammillary eminences, the apices of which are deeply crenulated. The tubercles of the ambulacral areas at the equator are not much less than those of the interambulacral areas, but upon the upper surface of the test they become much smaller and more numerous.

The mouth is decagonal and of moderate size : the arches over the bases of the ambulacral areas are about one-third greater in span than those across the interambulacra. The disc is absent in all the specimens, four in number, we have seen.

Affinities and differences.—This species resembles *Cidarites* (*Diadema*) *manillanus*, Roemer, in the prominence of the tubercles and depression of the test ; but Roemer's figure* is so indistinct and devoid of details, that it is impossible to institute a strict comparison between our Urchin and the one figured by him. The difference between *D. Davidsoni* and *D. subangulare* is so marked that it is impossible to mistake them—the pentagonal outline, large tubercles, wide granulated space between the primary tubercles of both areas, with the pores arranged in double files on the upper surface of the test, form a group of characters which distinguish *D. subangulare* from our Urchin. From *D. pseudodiadema* it is distinguished by the tubercles in *D. Davidsoni* of the ambulacral equalling in size those of the interambulacral areas, whilst in that species they are unequal. The rudimentary condition of the secondary tubercles in our species forms a striking contrast to the size they attain in *D. pseudodiadema*. The naked condition of the central parts of the interambulacral areas connects it with *D. subnudum*, Ag., of the Chalk, and the neatness of its outline allies it with other cretaceous forms.

Locality and stratigraphical range.—We have collected this species in the clays of the Coral rag near Calne, Wilts ; it is a very rare Urchin, as we only know four specimens of it.

We dedicate this species to our friend Thomas Davidson, Esq., whose learned monographs on the Brachiopoda have earned him the gratitude of all palæontologists. We take this opportunity likewise of recording our deep obligations to Mr. Davidson for many friendly acts of assistance given during the preparation of these memoirs, by which we have been enabled to compare a considerable number of foreign Echinidæ with those of our own island, and thereby have been enabled to obtain a better knowledge of the affinities existing among the Echinoderms of the European Oolitic fauna.

Diadema Moorei, Wright. Pl. XII. fig. 3, *a-d*.

Test circular, depressed ; ambulacral tubercles smaller than those of the interambulacral areas ; plates of the test covered with a small wide-set prominent granulation ; mouth large and decagonal ; anal opening large ; apical disc of moderate size.

Height $\frac{5}{8}$ ths of an inch, transverse diameter $\frac{1}{2}\frac{2}{8}$ ths of an inch.

* Die Versteinerungen des Norddeutschen Oolithen Gebirges, pl. 2. fig. 1.

Description.—There is much difficulty in distinguishing some of the smaller Diademas from each other, inasmuch as the young condition of many of the larger species so closely resembles the adult state of others, that it is only after one obtains a number of individuals of different species in their various phases of growth, that the naturalist feels himself upon sure ground when he endeavours to distinguish the affinities and differences that exist among them.

After a diligent search for Urchins in the Lias of Gloucestershire, we have succeeded in collecting only a very few examples of this group from these rocks. In addition to those found here, our friend Mr. Moore of Ilminster kindly presented us with a few specimens which he collected from the Upper Lias near Ilminster, and from these collective materials the species under consideration was discovered. *Diadema Moorei* has a circular outline slightly inclining to a pentagonal contour; it is much depressed at the upper surface and is flattened at the base. The ambulacral areas are very narrow, being less than one-third the width of the interambulacral; their margins are occupied by two rows of tubercles about eight in each row, which, at the base and up to the equator, are nearly as large as those of the interambulacra; but from that region to the apex of the area they rapidly diminish in size, and are here very disproportionate in magnitude to them; a zigzag line of single granulation separates the two rows of tubercles from each other. The interambulacral areas are wide and well developed, and have two rows of tubercles, from 8–9 in each row, which occupy the centre of the plates; the areolas of the tubercles on the upper surface are surrounded with a circle of granules which separates them from each other, but those of the base are confluent above and below. The intertubercular surface at the base of the test has a number of granules scattered over it, whilst on the upper surface, the plates are destitute of any other ornament beyond the faint circles that surround the tubercles. The pedal pores are arranged in pairs in a single file; the avenues are, however, rather flexuous below; the basal tubercles of both areas are nearly alike in size, but on the dorsal surface those of the ambulacra dwindle into large granules, whilst those of the interambulacra maintain their size up to the last pair, which are small near the margin of the disc. The mouth-opening is large, and its margin is divided into ten nearly equal-sized lobes. The apical disc is partly preserved in the specimen here figured; it consists of five large ovarian plates of a heptagonal form; two of the sides unite with the interambulacral plates, two with the ocular, two with the adjoining ovarials, and the single surface contributes to form the boundary of the anal opening, which is of moderate size; the

five ocular plates are small and heart-shaped, their apex is directed towards the anal opening, and their base to the area; the madreporiform tubercle is slightly elevated on the single ovarian plate, and the surface of the discal plates is almost destitute of sculpture or granulation.

Affinities and differences.—*D. Moorei* resembles *D. depressum*, Ag., in the depression of its upper surface and the flatness of its base, likewise in having the tubercles of both areas of nearly a uniform size around the base; but it is readily distinguished from *D. depressum* by the number and greater development of the tubercles of the ambulacra, which maintain their size throughout; whilst in *D. Moorei* the ambulacral tubercles are fewer in number and rudimentary in size in all the upper part of the areas. The contour of the test moreover does not assume the pentagonal outline of *D. depressum*, nor has the upper surface of the interambulacral areas the median depression seen on the test of the latter. The mouth-opening is larger, and the decagonal lobes are more equal in size in *D. Moorei* than in *D. depressum*.

Locality and stratigraphical range.—We have collected *D. Moorei* in the Upper Lias of Gloucestershire. Mr. Moore found it in the same stratum near Ilminster with *Ammonites communis* and *A. serpentinus*. Professor Deslongchamps has communicated a specimen of this Urchin which he found in the Lias supérieure of May, Calvados, associated with *Leptæna Davidsonii* and *Thecidea Bouchardii* and several other species.

We dedicate this species to Mr. Moore, of Ilminster, whose assiduous researches have brought to light so many interesting forms from the Upper Liassic beds of Somersetshire.

[To be continued.]

XVII.—*Descriptions of some newly discovered species of Araneidea.* By JOHN BLACKWALL, F.L.S.

Tribe OCTONOCULINA.

Family SALTICIDÆ.

Genus *Salticus*, Latr.

Salticus promptus.

Length of an immature female $\frac{5}{20}$ ths of an inch; length of the cephalo-thorax $\frac{1}{10}$; breadth $\frac{1}{24}$; breadth of the abdomen $\frac{1}{20}$; length of a posterior leg $\frac{1}{10}$; length of a leg of the second pair $\frac{1}{12}$.

The cephalo-thorax is large, glossy, nearly quadrilateral, ab-