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XI. *Notes on the Geographical Distribution of Organic Remains contained in the Oolitic Series of the Great London and Paris Basin, and in the same Series of the South of France.* By HENRY T. DE LA BECHE, F.R.S. &c.*

AT the present time, when rocks, so dissimilar in their mineralogical character and thickness, are referred to the same geological epochs, from the nature of their organic remains, it becomes important to ascertain, as far as our information will permit, to what extent the opinions usually entertained on this head are well founded; and if they should appear to be only partially correct, to determine to what distances, fossils, supposed characteristic, may be available. Many serious difficulties attend an examination of this nature. 1st, Very able observers of rocks may not be good zoologists, or may not have had the fossils obtained by them from particular strata, determined by those that are. 2ndly, We want synonyms for the same shells to which different names have been assigned by different authors. 3rdly, We do not possess complete lists, even of the fossils found at various known places. And 4thly, We cannot state that any given fossil discovered in one rock may not occur in another because not yet found in it. We are however in general furnished with lists of those fossils which occur most abundantly at any given place; and the organic remains, supposed characteristic, are most frequently detailed, from the very general desire, now existing among geologists, to adopt this mode of identifying strata, so that, notwithstanding the difficulties above enumerated, we may, by comparing the lists of those on whose accuracy we can depend, arrive at some useful conclusions respecting the geographical distribution of organic remains in a given group of rocks.

* Communicated by the Author.

M. Elie de Beaumont has already remarked on the constancy of the geological facts observable in the oolitic belt of the great geological basin which contains London and Paris*;—and M. Dufrénoy† has shown that in the South of France appearances are not very materially different. Therefore we may conclude that, though there may be many subordinate differences, there is a general resemblance in the mass of the oolite series in England and a large part of France, leading to the supposition that the rocks of which it is composed were formed under similar general circumstances.

It would appear that the three systems into which Mr. Conybeare‡ has divided the oolite series of England, will be available in the parts of France comprehended within this sketch; therefore, in treating of the organic remains, we shall first consider the lower oolitic system, then the middle, and afterwards the upper.

As data whence to draw conclusions respecting the geographical distribution of the organic remains in the rocks under consideration, I shall avail myself, for the North of England, of the very excellent work of Mr. Phillips§. For the South of England I shall be compelled to use scattered information, as we have not any very detailed and published description of the organic remains contained in the oolite of this part of our island||. For Normandy I shall have recourse to M. de Caumont's work on Calvados¶. For the North of France, to the memoir of M. Boblaye**. And for the South of the same country, to the observations of M. Dufrénoy††.

In order that the reader may judge of the general character of the oolite series of which the fossils will be noticed in the sequel, I have brought together the views of the geologists above named respecting the different portions of which they have particularly treated.

*Note sur l'uniformité qui regne dans la constitution de la ceinture Jurassique du grand bassin géologique qui comprend Londres et Paris.—*Annales des Sciences Naturelles*. Juillet 1829. † *Annales des Mines*, 1829.

‡ Outlines of the Geology of England and Wales.

§ Illustrations of the Geology of Yorkshire.

|| The lists of organic remains of the oolite contained in the well known "Outlines," &c. of Conybeare and Phillips, are much too general to be of service in inquiries of the present kind; but when local information could not be obtained, I have employed them for the midland and South of England, which principally afforded the materials for their construction.

¶ Essai sur la Topographie Géognostique du département du Calvados. Caen 1828.

** Mémoire sur la formation Jurassique dans le Nord de la France.—*Ann. des Sci. Naturelles*. Mai 1829.

†† Des formations secondaires qui s'appuient sur les pentes méridionales des montagnes anciennes du centre de la France.—Part entitled "Formations Jurassiques du Sud-ouest de la France".—*Annales des Mines*, tom. v. 1829.

General View of the Oolite Formation of Yorkshire (according to Mr. Phillips).*

a. Kimmeridge clay	depth uncertain.
b. Upper calcareous grit	60 feet.
c. Coralline oolite.....	60
d. Lower calcareous grit	80
e. Oxford clay	150
f. Kelloways rock.....	40
g. Cornbrash limestone	5
h. Upper sandstone, shale, and coal.....	200
i. Impure limestone (Bath oolite)	30
k. Lower sandstone, shale, and coal.....	500
l. Ferruginous beds (inferior oolite).....	60
m. Upper lias shale.	200
n. Marlstone series	100
o. Lower lias shale	500

Under the heads of different districts Mr. Phillips presents us with more detailed tabular views, from whence the following are selected :

In the Tabular Hills.	1. Upper calcareous grit, containing fossils resembling those in No. 3.
	2. Coralline oolite, marked by corals, echini, plagiostomæ, melaniæ, &c.
	3. Lower calcareous grit, pinnæ, gryphææ, ammonites, &c.
	4. Gray argillaceous earth, containing many fossils at the bottom.
	5. Ferruginous or argillaceous sandstone, with remarkable gryphææ, ammonites, &c. (Kelloways rock of the S.)†
Moorland District.	6. Impure, sometimes oolitic limestone, full of shells, (the cornbrash of geologists).
	7. Sandstone, shale, ironstone, and coal, with carbonized wood, ferns, and other fossil plants.
	8. Impure, often oolitic limestone and ironstone, with many fossil shells (oolite of Bath).
	9. Sandstone, shale and coal, with carbonized fossil plants.
	10. Subcalcareous, irony sandstone, often containing shells, called <i>dogger</i> (inferior oolite).
	11. Upper lias shale, or alum shale, with nodules of argillaceous limestone, ammonites, belemnites, &c.
	12. Ironstone and sandstone strata, with terebratulæ, pectines, cardia, aviculæ, &c.
	13. Lower lias shale, with gryphææ, pinnæ, plagiostomæ, &c.‡

* Illustrations of the Geology of Yorkshire, pp. 32, 33.

† Ibid. p. 35.

‡ Ibid. p. 43.

General View of the Oolitic Series in Somersetshire and Wiltshire.

It would be quite out of place to present a general view of this part of our island, as the labours of Smith and Conybeare are well known, and as the rocks in question constitute the type of the oolitic series generally, if we except the Portland beds.

It may be remarked that the Bath oolite does not occur on the coast of Dorsetshire. A series of clays with limestone, resembling forest marble and cornbrash largely developed, there separate the inferior oolite from the Oxford clay.

The coral rag, as is often the case, is also wanting on the same coast; that is to say, the beds containing such an abundance of corals, whence the name, do not occur, though an equivalent to the Oxford oolite does.

General View of the Oolite Rocks of Normandy (according to De Caumont).*

1. Argile de Honfleur (Kimmeridge clay). Glos sandstones, considered subordinate.
2. Calcaire de Blangy.
3. Coral Rag, consisting of a series of beds containing many oolites

* In my paper "On the coasts of France, and of the inland country adjoining; between Fecamp to St. Vaast:" inserted in the 1st volume of the Geological Transactions, New Series, and written from observations made in the spring of 1821, deceived by the mineralogical resemblance of this limestone, as developed at Hennequeville cliff, to some of the Portland stone, I attributed the Calcaire de Blangy to that rock: but I now perfectly agree with the French geologists, that the Honfleur and Havre clay is equivalent to the Kimmeridge. Subsequent examinations have shown me that this is very probable; consequently it was an error to refer the limestones in question to the Portland stone.

The following section, by M. de Caumont, of Hennequeville cliff, shows the superposition of the Kimmeridge (Honfleur) clay, the Calcaire de Blangy, and the coral rag.

- | | |
|--|-----------------|
| 1. Chalk with gray flints, and numerous alcyonia | about 100 feet. |
| 2. Green earth. | 40 |
| 3. Argile de Honfleur | 60 |
| 4. The same, alternating with many beds of ferruginous sandstone full of quartz grains and globules of oolitic iron. } | 20 |
| 5. The same, alternating with many beds of more compact sandstone, and full of broken shells forming a kind of lumachella. } | 10 |
| 6. Sandstone more siliceous than the preceding, containing fewer shells } | 6 |
| 7. Siliceous limestone, very hard, containing globules of oolitic iron } | 1 |
| 8. Whitish and slaty siliceous limestone. | 3 |
| 9. Limestone resembling No. 7 | 2½ |
| 10. The same, full of the interior casts of trigoniæ. | 1½ |
| 11. Many beds more or less hard, resembling the preceding . . . | 3 |
| | 12. Bed |

oolites and corals, passing, in the lower part, into a ferruginous and calcareous sandstone (calcareous grit of the English).

4. Argile de Dives (Oxford clay). Black blue clay, rarely yellowish: in the upper part, subordinate beds of oolitic limestone; in the lower, marly limestone of a gray, yellowish or blue colour, apparently represents the Kelloway rock.
5. Cornbrash?
6. Forest Marble, consists of a series of beds more or less oolitic, and more or less sublamellar, is very often fissile, and contains fragments of shells and corals.
7. Great Oolite. Upper beds sometimes resemble forest marble; middle and lower beds of a finer grain, rarely oolitic, not sublamellar, often as soft as chalk. Caen stone belongs to this division. M. de Caumont considers the clay of Port-en-Bessin as equivalent to the Caen stone.
8. Inferior Oolite. Upper part resembles the Caen stone; connection between the great and inferior oolite. In the lower part, two or three beds of yellowish or gray calcareous sandstone, containing ferruginous oolites; full of shells.
9. Lias. Upper part contains belemnites; and the lower, the *Gryphæa incurva*.—There seems an equivalent of the sand and marlstone of Smith upon the top of the lias.

The above is condensed from the general descriptions contained in the *Essai sur la Topographie Géognostique du Département du Calvados*. It will be found not to differ materially from the general view I presented in my paper on Normandy, if the Portland beds be withdrawn and the marl and marlstone there noticed be considered equivalent to the Kimmeridge clay, except indeed that M. de Caumont considers the Port-en-Bessin marls as representing the Caen stone.

General View of the Oolite of the North of France (according to M. Boblaye).

The rocks of this class which M. Boblaye had occasion to observe,

12. Bed of black flint, passing into a gray sandstone, and finally into the limestone	}	½ feet.
13. Many limestone beds passing into sandstone.....		4
14. Yellowish limestone without shells, many beds		5
15. White marl.....		1
16. Yellowish white limestone containing casts of spiral shells...		6
17. Whitish marl		1
18. Limestone resembling No. 16.....		2
19. Limestone full of corals (coral rag).....		6
20. The same, more compact		5
21. Oolite of the coral rag.		

“constitute

"constitute a nearly equal thickness, about 500 metres (1640 English feet) from the lias to the coral rag inclusive.

"The maximum of absolute height is 350 metres (1148 English feet) in England, and 400 metres (1312 English feet) in the Ardennes.

"1. The marls of Florenville, Houldizy, &c. are characterized by the *Gryphæa incurva*, *plagiostomæ*, &c. as the lias.

"2. The sandy limestones, the micaceous marls, the ferruginous limestones of Florenville, Orval, Carignan, Dreux, &c. perfectly represent that great sandy and ferruginous zone so well described by the English geologists, under the names of sand, marly sandstone, and inferior oolite. The *Gryphæa cymbium* and *Plicatula spinosa* are its most characteristic fossils.

"3. The fullers' earth is easily recognised in the blue marls of Lamouilly, Vaux, &c. It is also in their lower part that the fullers' earth of the Ardennes is found.

"4. The great oolite appears with all its characteristics in the extensive quarries of Chauvaney, Brouesnes, Luzy, Ballon, &c.

"5. The white marls of La Jardinette near Stenay, of Luzy, &c. offer the most perfect analogy with the Bradford clay of the English geologists; the fossils are the same; we more particularly mention the following: *Turritella*, *Ostrea acuminata*, *Terebratula digona*, *T. coarctata*, *Cydarites ornatus*, &c.

"6. Above this well-defined geological horizon there reigns some uncertainty. If the forest marble is not recognisable with certainty in the coarse *lumachella* which covers the marls, in the compact *madrepore* limestones, and sandy limestones of Stenay; and if, moreover, the beds which, from their fossils and mineralogical composition, have appeared to me equivalent to the Stonesfield slate, do occupy a somewhat different position, and will not permit us to sustain the analogy;—it is not the same with *cornbrash*. Its fossils (*Avicula echinata*, *Terebratula subrotunda*), and its mineralogical characters, are found in the coarse limestones of Stenay, Beaumont, &c.

"7. The marls of Stonne, Belval, Dun, &c. present us in their composition, their thickness and their fossils (*Gryphæa dilatata*, *Pinna lanceolata*, &c.), with the most perfect resemblance to the Oxford clay.

"8. The sandy and ferruginous oolite corresponds with the calcareous and ferruginous sandstone which the English place at the base of the coral rag (calcareous grit).

"Lastly, the coral rag appears with its distinctive characters near Belval, Dun, &c. We have there found numerous univalves, *Melania*, *Turritella*, &c. *Ostrea gregaria*, *Lima* disis, and the numerous *echinites*, mentioned by the English*."

* *Annales des Sciences Naturelles*, tom. xvii. pp. 79, 80.

General View of the Oolitic Series of Burgundy (according to M. Elie de Beaumont).

"If we proceed from Flogny to Ancy-le-Franc, we observe the following rocks rise successively from beneath the green-sand and chalk.

"1. Compact limestone which corresponds in its position with the Portland stone of English geologists.

"2. A system of marly limestone and gray marl characterized by the *Gryphæa virgula* (Kimmeridge clay).

"3. A very thick series of compact limestones with a conchoidal fracture, of limestones with an earthy and cretaceous fracture, and oolite (Oxford oolite, coral rag).

"4. Beds of a gray marly limestone with an earthy fracture, (calcareous grit, Oxford clay).

"From beneath these last rise the limestones, often oolitic, which form the plains and plateaux on the South of Ancy-le-Franc, limestones which are precisely the same with those of the Chamennes d'Avenay, and the Vallée de l'Ouche, near the Pont d'Ouche.

"If the facts above mentioned are correctly stated, and if the long cliff or escarpment (the course of which through the north-eastern provinces and centre of France was noticed fifty years since by Guettard,) really contain the Oxford clay and coral rag among the beds of which it is composed, we may see the Bath oolite and *Calcaire à polypiers* in the oolite limestone, the beds of which rise on all sides from beneath those of the cliff. The yellowish-white and marly limestone of Burgundy would then represent the Fullers' earth of the English, and the Banc bleu of Caen; the entrochite limestone would be the inferior oolite; and the second marly stage, which rests immediately on the gryphite limestone, would correspond with the thick marls which in England cover the lias. We should then see that the constancy of the geological facts, noticed in Great Britain, Normandy, in the Bas Boulonnais, and in the Ardennes, is preserved in Burgundy, as might be expected *à priori**."

General View of the Oolite of the South of France (according to M. Dufrénoy).

"In the secondary basin of the S.W. of France, separated from that of Paris by the mountains of Auvergne, Limousin, and La Vendée, the oolite series may be divided into three distinct groups, corresponding with the three systems of the same formations in England. The separation of these groups

* *Annales des Sciences Naturelles*. Juillet 1829.

is, however, not nearly so well pronounced; the beds corresponding with the Oxford and Kimmeridge clays are but rarely observed in this part of France, and appear to be replaced by marly limestone: this is most commonly the case between the middle and superior systems.

“ The numerous subdivisions noticed by the English geologists are but very imperfectly seen in the secondary basin under consideration; there are nevertheless some sufficiently constant.

“ The lower is the only part of the oolite which appears on the eastern extremity of the basin; it forms a considerable mass on the N. of the department of the Hérault, which advances into the sea near Montpellier and Cette.

“ The oolite formations are greatly developed on the W. of the basin; from Cahors to the ocean they form a chain with a mean breadth of twelve leagues: they are more than twenty-five between the mountains of Limousin and La Vendée.

“ Between the two extreme points we have named, the three systems of the oolite may nearly always be seen; the inferior frequently resting on the marls and limestone which we have referred to the lias.

“ In some localities (Milhau, near Villefranche, &c.) the inferior system presents micaceous marls containing *Gryphæa cymbium*, *belemnites*, &c. which may be compared to the sand of the inferior oolite: we also find sublamellar limestones, compact limestones containing beds of oolitic iron, and beds of a white oolite, furnishing excellent building-stone; the latter beds, well developed only at Mauriac, in the Aveyron, represent the great or Bath oolite. They are associated with polypifers as at Caen. In other parts of the basin, principally in the east, this system is composed of compact limestones of a yellowish-gray colour, containing an abundance of *silex*, (environs of Nontron, Poitiers, &c.) and beds of slightly oolitic limestone. The beds of compact earthy limestone containing many ammonites and *terebratulæ* appear to form the upper part of this system: by comparing these fossils with those found in the cornbrash in England, we are led to assimilate the rocks. The lower system is the thickest; it forms by itself more than three quarters of the whole depth; it occupies more than twelve leagues of the fifteen or sixteen which this formation covers between the Sables d'Olonne and Rochefort.

“ The middle oolite system is in a great measure composed of marly limestone beds: yet in many places (Marthon, forest of La Braconne, Pointe de Duché, Pointe d'Angoulin, &c.) considerable masses of polypifers are associated in it with thick beds of irregular and earthy oolite. The prodigious abundance of polypifers, the nature of the oolite, and the occurrence of
many

many fossils, lead us to assimilate these beds with those named Coral Rag by the English, and the oolite which accompanies them to the Oxford oolite. These are the only two subdivisions which can be made in the middle group, and even these so pass into each other that, at the Pointe d'Angoulin and Marthon, numerous polypifers are found in the midst of the oolite beds. Beds of very marly limestone cover this system. We already find some of the *Gryphæa virgula*, the presence of which with us (France), characterises the clay separating this system from the upper. This group of the oolite covers a space about two leagues and a half broad between La Rochelle and Rochefort; it is more considerable between Poitiers and Angoulême, and between the last town and Confolens."

"The upper system is the most uniform in this basin; it is often reduced to a few marly beds, containing a prodigious quantity of the *Gryphæa virgula*, attached to one another, and nearly forming by themselves a bed of lumachella. In some localities this is covered by compact marly limestone forming very thick beds (Cahors), in which this little gryphite, so characteristic in France, is found here and there disseminated. From the environs of Angoulême to the ocean, beds of oolite are observed nearly constantly to cover these marls containing the *Gryphæa virgula*; they reappear in other places (Pointe du Rocher), and are immediately in contact with the greensand. By comparing this system with that which exists in England, we may assimilate the oolite of which we have spoken with the Portland stone, while the lower beds of marl, containing the *Gryphæa virgula*, correspond with the Kimmeridge clay*."

The reader being now in possession of what may be termed the mineralogical character of the oolitic series at the various places above noticed, I shall proceed to examine the organic character of the same series derived from the same authorities, commencing with the inferior system.

* Formations Jurassiques du Sud-ouest de la France. — *Annales des Mines*, tom. v. p. 430—434.

Organic Remains of the Inferior System of the Oolitic Series.—Subdivision. LIAS.

[The Species marked in Italics occur in more than one locality.]

North of England. Yorkshire.—Phillips.	South of England. Lyme Regis.—De la Beche.	Normandy. Calvados.—De Caumont.	South of France. Bruniquel Villefranche } Dufrénoy.
Dicotyledonous Wood.....	Plants, Dicotyl. Wood, & Lignite	Lignite.....	Coal.
Crocodyle	Pterodactylus macronyx (Buckl.) Crocodyle?	Plesiosaurus. Ichthyosaurus.	
Ichthyosaurus.....	Plesiosaurus dolichodeirus..... — platyodon. — tenuirostris. — intermedius.		
Crustacea	Crustacea.	Fish.	
Fish	Fish	<i>Dapedium politum.</i>	
	Ichthyodolulites (Buckl. & De la B.) <i>Dapedium politum</i> (Many other fish.) Copolites (Buckl.) Polypifers (<i>rare</i>)	Polypifers (<i>rare</i>). Echinites.	
Polypifers (<i>rare</i>).....	Echinites		
Echinites.....			
Cidaris (smooth spine).			
Ophiura Milleri (Phil.).			
Pentacrinites <i>Caput Medusæ</i>	Pentacrinites <i>subangularis</i>	Pentacrinites <i>Caput Medusæ</i> ? ... — <i>subangularis</i> ?	Pentacrinites <i>Caput Medusæ</i> .
— <i>Briareus</i>	— <i>Briareus</i>		
Belemnites tubularis (Y. & B.) ...	— <i>basaltiformis</i> .		
— compressus (Y. & B.)	Belemnites <i>pistilliformis</i>	Belemnites (2 or 3 species).....	Belemnites <i>pistilliformis</i> .
— <i>elongatus</i> (Miller).....	— <i>elongatus</i>		— sulcatus.
Nautilus astacoides (Y. & B.).....	— acutus		— apicicurvatus.
— lineatus.....	Nautilus striatus.....	Nautilus truncatus.	
— annularis (Phil.).	— intermedius.		
Ammonites <i>Walcotii</i>	Ammonites <i>Walcotii</i>	Ammonites <i>Walcotii</i>	Ammonites <i>Walcotii</i> .

Ammonites <i>fimbriatus</i>	Ammonites <i>fimbriatus</i>	Ammonites <i>fimbriatus</i> .
heterophyllus.	Henlei.	
Henlei.....		
subcarinatus(Y. & B.).		
heterogeneus(Y. & B.).		
crassus (Y. & B.).		
communis		
angulatus.		
annulatus.		
fibulatus.		
subarmatus.		
maculatus (Y. & B.).		
gagatus (Y. & B.).		
planicostatus		
balteatus (Phil.).		
arcigerens (Phil.)		
brevispina.		
Jamesoni.		
erugatus (Bean.)		
nitidus (Y. & B.).		
anguliferus (Phil.).		
lenticularis (Phil.).		
crenularis (Phil.).		
Clevelandicus(Y. & B.)		
Turneri.		
geometricus (Phil.) ...		
vittatus (Y. & B.)		
signifer (Phil.)		
Hawskerensis(Y. & B.)		
Conybeari.		
Bucklandi.		
obtusus		
striatulus.		
ovatus (Y. & B.)		
Mulgraveus (Y. & B.).		

TABLE continued.

North of England. Yorkshire.—Phillips.	South of England. Lyme Regis.—De la Beche.	Normandy. Calvados.—De Caumont.	South of France. Bruniquet } Villefranche } Dufrénoy.
Ammonites excavatus (Y. & B.) ... — concavus?	Ammonites Birehii. — Bechei.	Ammonites concavus. — elegans.	
Gryphæa incurva (Sow.)	Gryphæa incurva (Sow.)	Gryphæa incurva (Sow.)	Gryphæa { arcuata, Lan. — incurva, Sow.
— depressa (Phil.)	— (another species).	— dilatata.	— obliquata.
— Maccullochi.			— Maccullochi.
			— cymbium.
Spirifer Walcotii	Spirifer Walcotii	Spirifer Walcotii	— gigantea.
Terebratula punctata	Terebratula ornithocephala	Terebratula ornithocephala	Spirifer Walcotii.
— resupinata	— crumena	— acuta	Terebratula tetraëdra.
— trilineata (Y. & B.) ..	— serrata	— quadrifida.	— obsoleta.
— acuta.			
— bidens.			
— triplicata (Phil.).			
— tetraëdra.			
Plicatula spinosa			
Pecten sublaevis			
— equivalvis	Pecten	Plicatula spinosa.	Pecten equivalvis.
— lens.		Pecten barbatus	— (other species).
Plagiostoma gigantea	Plagiostoma gigantea	Plagiostoma gigantea	Plagiostoma sulcata.
— pectenoides			— punctata.
— rustica?			Avicula inaequivalvis.
Avicula inaequivalvis	Avicula inaequivalvis		
— cygnipes	— lanceolata.		
Crenatula ventricosa	Crenatula?		
Cucullæa (smooth)	Cucullæa.		
Nucula ovum	Nucula.		
Pinna folium (Y. & B.)	Pinna	Pinna lanceolata	Nucula clariformis.
			Pinna.

<i>Modiola scalprum</i>	<i>Modiola scalprum</i>	<i>Modiola scalprum</i> .
— <i>Hillana</i>	— <i>Hillana</i>	
<i>Trigonia literata</i> (Y. & B.)	<i>Trigonia</i>	<i>Trigonia striata</i> .
	<i>Cytherea</i>	— (another species).
<i>Unio concinnus</i>	<i>Unio</i>	
— <i>crassiusculus</i> .		
— <i>Listeri</i> .		
— <i>abductus</i> (Phil.).		
<i>Pholadomya obliquata</i>		<i>Pholadomya</i> .
		<i>Trochus imbricatus</i> .
<i>Trochus anglicus</i>	<i>Trochus anglicus</i>	
	— <i>imbricatus</i> .	
<i>Turbo undulatus</i> (Phil.)	<i>Turbo</i>	
<i>Inoceramus dubius</i> .	<i>Helicina expansa</i> .	<i>Pleurotomaria anglica</i> .
<i>Hippopodium ponderosum</i> .		
<i>Cardium truncatum</i> .		
— <i>multicostatum</i> (Bean.)	<i>Melanea</i> .	
<i>Corbula</i> ? <i>cardioideum</i> (Phil.).		
<i>Corbis</i> ?		
<i>Crassina minima</i> (Phil.).		
<i>Venus</i>		
<i>Pullastra</i>		
<i>Amphidesma donaciforme</i> (Phil.).		
— <i>rotundatum</i> (Phil.).		
<i>Sanguinolaria elegans</i> (Phil.).		
<i>Mya literata</i> .		<i>Lima antiqua</i> .
<i>Orbicula reflexa</i> .		— (another species).
<i>Rostellaria</i> ?		
<i>Actæon</i> .		
<i>Natica</i> .		
<i>Serpula capitata</i> (Phil.)	<i>Serpula</i> (very rare).	
<i>Dentalia giganteum</i> .		

List of Organic Remains in the Lias of the North of France, according to M. Boblaye.

Shells :—Belemnites (abundant); Ammonites (species not enumerated); Gryphæa *arcuata* Lam., (*incurva* Sow.); Ostrea or Gryphæa *nana*; Pecten (large); Plagiostoma *gigantea*; Plagiostoma *punctata*; Cytherea (abundant); Pleurotomaria *ornata*; Cirrus.

From the foregoing Lists the following Table of Lias Organic Remains which occur in more than one situation may be constructed :

Name.	North of England.	South of England.	Nor- mandy.	North of France.	South of France.
Plants, Lignite or Coal.....	*	*	*	...	*
Plesiosaurus	*	*
Ichthyosaurus	*	*	*
Crustacea	*	*
Fish	*	*	*
Polypifers	*	*	*
Echinites	*	*	*
PentacrinitesCaputMedusæ	*	...	*	...	*
----- Briareus	*	*
----- subangularis	*	*
Belemnites (abundant).....	*	*	*	*	*
Ammonites Walcotii .	*	*	*	...	*
----- fimbriatus	*	*	*
----- Henleii	*	*
----- communis	*	*
----- planicostatus ..	*	*
----- falcifer	*	...	*
----- Turneri	*	*
----- stellaris
----- Bucklandi	*	*	*
----- obtusus	*	*
Gryphæa incurva Sow. }	*	*	*	*	*
----- arcuata Lam. }	*	*	*	*	*
----- Maccullochii ...	*	*
Spirifer Walcotii	*	*	*
Terebratula ornithocephala	...	*	*
----- acuta	*	...	*
----- tetraëdra	*	*
Plicatula spinosa	*	...	*
Pecten equivalvis.....	*	...	*	...	*
Plagiostoma gigantea	*	*	*	*	...
----- punctata	*	*
Avicula inæquivalvis .	*	*	*
Modiola scalprum .	*	*	*
----- Hillana	*	*
Trochus anglicus	*	*
----- imbricatus	*	*

Unfortunately

Unfortunately M. Boblaye has not furnished us with a list of the ammonites in the district noticed by him, otherwise we might probably have seen that some of those discovered elsewhere, were also found in the North of France. Ammonites concavus and A. elegans are marked as questionable in the North of England, but they are stated to occur in the lias of Normandy. The Dapedium politum is found in the South of England and in Normandy.

Of the organic remains above enumerated, the Gryphæa incurva Sow. (G. arcuata Lam.) appears the most characteristic fossil.—Belemnites are also abundant. Unfortunately the synonyms of the fossils are not well understood; so that the species cannot be determined with precision. Ammonites Walcotii, Spirifer Walcotii, Pecten equivalvis, Plagiostoma gigantea, Avicula inæquivalvis, Modiola scalprum, have also a wide range. Ammonites Turneri and Terebratula tetraëdra occur in localities widely separated from each other.

Ammonites Bucklandi is extensively found, though, by the accompanying lists, it is only noticed in the North and South of England and in Normandy.

Of the 90 species of fossil shells enumerated by Mr. Phillips in the lias of Yorkshire, 26 occur in the same rock in the other localities; of these 15 are discovered at Lyme Regis, 9 in Normandy (belemnites not being specified), 2 in the North of France (neither ammonites nor belemnites being specified), and 8 in the South of France.

Of the 36 species mentioned as found at Lyme Regis, 19 have been observed in the other places; of these 15 occur in Yorkshire, 8 in Normandy, 2 in the North of France, and 7 in the South of France.

Of the 25 species enumerated in Calvados, 12 are discovered in the other localities; of these 9 occur in Yorkshire, 8 at Lyme Regis, 2 in the North of France, and 5 in the South of France.

Of the 5 species noticed by M. Boblaye in the North of France, who unfortunately does not mention the species of either ammonites or belemnites, 3 are found in the other localities; and of these 2 occur in Yorkshire, Lyme Regis, and Normandy, and 3 in the South of France.

Of the 26 species noticed in the South of France, 13 are found in the other localities; and of these 8 occur in Yorkshire, 7 at Lyme Regis, 5 in Normandy, and 3 in the North of France.

[To be continued.]