and compound corals from that locality to assume a flat and expanded form.* All those which I have seen from Oxfordshire are flattened and expanded also, with the exception of *Montlivaltia trochoides*, and *Thecosmilia Wrighti*, but there is a marked dissimilarity between the corals of the Inferior Oolite of Oxfordshire and Gloucestershire, in the almost total absence in the former of simple apices. The only simple corals I have yet seen from the Inferior Oolite of Oxfordshire, are *Montlivaltia lens* and *Montlivaltia trochoides*.

I wish, in conclusion, to take this opportunity of rendering my very hearty thanks to Mr. Beesley, Mr. Walford, and Mr. James Windowes, for the very great readiness with which they have at all times placed at my disposal all the information they possessed respecting the species in their several collections, as well as the free use of the specimens themselves; without which assistance from them this paper could not have appeared.

NOTE.—Since the foregoing was written I have been favoured with a considerable and very interesting series of fossil corals from the Coralline Oolite of Gray, Haute Saône, by M. de Fromentel. Amongst them are some species of *Clausastræa*, and the examination of these has confirmed me in my decision respecting some English species which I had placed in this genus. One of these is the *C. Conybeari* of the present paper.

2. NOTE ON THE REV. J. F. BLAKE'S PAPER ON THE CHALK OF YORKSHIRE.†

By DR. CHARLES BARROIS.

An interesting contribution to our knowledge of the Yorkshire Chalk has been recently made by the Rev. J. F. Blake. His paper contains a good description of the beds as to their succession and fauna, and very accurate observations on their real thickness. The divisions recognised by Mr. Blake, as stated at p. 262, are six in number. I had formerly pointed out eight divisions in the same area.

A comparison of the zones I had indicated in the Yorkshire Wolds, with the recent divisions of Mr. Blake, as exhibited in the following table, will perhaps be of interest to some :—

* Geol. Mag., July, 1878.

† Proc. Geol. Assoc., Vol. v, p. 232.

<i>Dr. Barrois' Yorkshire Divisions.</i>	<i>Mr. Blake's.</i>
Zone of <i>Belemnitella mucronata</i> (wanting).	
Bridlington Chalk { many sponges { few sponges }	1. Zone of Marsupites.
Flamborough Head Chalk	2. Zone of Micrasters.
Chalk of Breil Point	3. Barren Zone.
Grey flinty Chalk of North Sea.....	
Hessle Chalk	4. Zone of <i>Inoceramus</i>
Hard Speeton Chalk, with red bands.....	<i>Mytiloides.</i>
Zone of <i>Belemnites plenus</i> (unrecognized.)	
Speeton Chalk, with red bands	5. Zone of <i>Holaster sub-</i> <i>globosus.</i>
Sponge Bed (wanting).	
Zone of <i>Pecten asper</i> (wanting).	
Red Chalk of Speeton.	6. Zone of <i>Belemnites</i> <i>minimus.</i>

Mr. Blake sums up, on page 262, the results arrived at in his paper as follows :—" It will be seen, on comparison of this table with that of Dr. Barrois' before given, that I suggest the use, in the present state of our knowledge, of larger subdivisions than he admits. It may be true, perhaps, that the smaller ones may be adequately recognized when more work has been done upon this district, and the map of it carefully worked out by stratigraphical observations, but the first step seems to be to mark out the more easily recognized portions before proceeding to the more minute. . . . Those subdivisions of Dr. Barrois' that I do not recognize are, 1st, the Zone of *Micraster cortestudinarium* (Chalk of Breil Point); 2ndly, the Zone of *Holaster planus* (Chalk, with grey flints of North Sea); 3rdly, that of *Terebratulina gracilis* (Hessle Chalk)."

I do not think it useless, even from a general scientific point of view, to support the divisions I had proposed. These palæontological zones gave evidence of the homogeneity of the English Cretaceous system, and showed that the *Mer-du-Nord* was at the time of the Chalk a great gulf—a limited zoological province, and not an abysmal ocean, as previously supposed.

I will examine in succession the six zones of Mr. Blake.

Zones 6 and 5. The description of these zones is very valuable, and full of new information on the changes of the beds inland.

Zone 4 of Inoceramus mytiloides. This division, according to Mr. Blake, comprises my three zones of *Inoceramus labiatus*, *Terebratulina gracilis*, and *Micraster breviporus*; he adds (p. 262),

"These zones may also be recognised in what I have characterized as one, but in that case the *Inoceramus mytiloides* will be found to characterize the middle one rather than the lowest." In fact, we perfectly agree; my three zones (of *Holaster planus*, *T. gracilis*, *I. labiatus*) are united in my paper in the same "assise" (Turonian). Thus the question is, whether the Turonian series of Yorkshire will be subdivided or not? But, *à priori*, it will certainly be divided—the proof being that the recent papers on English Cretaceous geology (Meyer, Jukes-Browne, Price) have adopted even more minute divisions than I had myself, and I confidently hope that the first zones that will be recognised will be those I have followed all over England.

In reality, Mr. Blake's zone of *I. mytiloides* corresponds only to my zones of *I. labiatus* and of *T. gracilis*. The lower zone (of *I. labiatus*) has afforded me only this single species of *Inoceramus*, the higher zone (with *T. gracilis*) has afforded me numerous *Inocerami*, as stated on p. 195 of my Memoir. I did not venture to name them at the time, with the exception of *Inoc. Brongniarti*, but I have since then again studied my Speeton *Inocerami* on the occasion of a paper now in the press on the Chalk of the Ardennes. They much resemble *I. labiatus*, and I agree in thinking that several of my specimens from that zone may be merely varieties of that species, though there are other specimens far more numerous in that zone, which will be easily found there by any geologist, viz., *Inoceramus cf. cuneiformis* (d'Orbigny, Pal. Franc., p. 512, pl. 407), and *I. undulatus* (Mantell, *fide* Goldfuss. "Petrefacta Germaniæ," pl. 112, fig. 1). The figures of this last-named species are very imperfect, and I named them by comparison with typical specimens from the *Scaphiten Pläner* of Hanover, given to me by the late Mr. Schlönbach.

I will keep, then, the name of Zone of *Inoceramus labiatus* for the lower division of the Turonian, where I found this *Inoceramus* alone; while in the upper division—the zone of *I. gracilis* there are, with *I. Brongniarti*, several other species allied to *I. labiatus*. I may add here, that this zone of *T. gracilis* is typically represented in the large quarry at Hessle. The zone of *I. labiatus* was only seen by me at Hessle, in a small abandoned pit below the beds now worked for whiting, road-stone and lime, which are the true *T. gracilis* zone. The uppermost beds, with thick bedded flints, are the only representative of the *In. breviporus* zone in this dis-

trict; it is in this portion of the series that *In. undulatus* is more common.

I do not think Mr. Blake is right when he calls the form I had named *I. labiatus*, by the names *I. mytiloides* and *I. Cuvieri*. I must say a few words about this species. *Inoceramus mytiloides*, according to Mr. Blake, is named from Mantell (Mantell, "Geology of Sussex," 1822, *Mytiloides labiatus* of Brongniart). I gave to this species the name of *I. labiatus* because it was first described under this name by Schlotheim, in 1813, before Mantell's book was published (Schlotheim, in "Leonhard, Mineral Taschenbuch," 1813, vii., p. 93), and there can be no doubt therefore as to priority. This species is very well illustrated—Sowerby's Min. Conch., Pl. 442; and better still, in Goldfuss' "Petrefacta Germaniæ," which is still the chief work on the *Inocerami*. (Pet. Germ., p. 118, tab. 113, fig. 4.)

It is also in Goldfuss' work that I look, with many authors, for the type of *I. Cuvieri* (Sow.) the figure in Goldfuss (Pet. Germ., ta. 111, fig. 1), agrees exactly with Sowerby's description (Min. Con., Pl. 441, fig. 1; and Linn. Trans., 1823); but I cannot consider as the same species that described by Mantell under the same name (Pl. 27, fig. 4, and Pl. 28, figs. 1 and 4). The *Inocer. Cuvieri* of Sowerby and Goldfuss has only been found by me as yet in the zone of *Micraster cortestudinarium*. In the Barren Zone of Mr. Blake, I met with fragments of *Inocerami* which I might have named *I. Cuvieri*, if I had not limited my identifications to specimens sufficiently well preserved to be recognised with some certainty.

Zone 3, or Barren Zone. This zone, lithologically characterized by the maximum of siliceous matter, and which is so well exposed in North Sea Bay, as stated at p. 196 of my Memoir, has afforded, as yet, but few fossils, either to Mr. Blake or to myself. It is, however, worthy of a very careful study; a further knowledge of it is a desideratum, which it is desirable to indicate.

Let us, for a moment, embody in Mr. Blake's *Barren Zone* the beds I had described as the zones of *Holaster planus* and *Micraster cortestudinarium*, in the North of England. My recent studies in the Cretaceous rocks of the Ardennes have shown me that the beds of this district that must be compared with the *Barren Zone* can be subdivided as follows:—

Zone of *Micraster cortestudinarium*.

Zone of <i>Epiaster brevis</i>	} Assise of <i>Micraster</i>
Zone of <i>Holaster planus</i> (Chalk-rock) }	

breviporus.

It now remains to be seen whether the zone of *Micraster cortestudinarium*, of whose existence in the North of England, from Norfolk to Yorkshire, I did not find any sufficient evidence is wholly wanting there, as it is in parts of the Ardennes—and whether it is represented, as there, by the zone of *Epiaster brevis*? The sections of these beds in Yorkshire and Norfolk remind me rather of those in the Ardennes district, than of those in the South of England, where a well-developed *Micraster cortestudinarium* zone rests on the Chalk-rock.

Zone 2 of Micrasters. This is an exact equivalent of my *Micraster coranguinum* Zone (Chalk of Flamborough Head). I had found but few fossils in this division, but the interesting discoveries by Mr. Blake and Mr. Mortimer of *Inoceramus involutus*, *In. digitatus*, *Inoc. nov. sp.*, *Micraster coranguinum*, *Pleurotomaria cf. perspectiva*, (compare *Pleurotomaria merceyi*, nov. sp.) and numerous sponges, *Ventriculites*, *Brachiolites*, *Scyphia* in this zone, show that it has the same character in Yorkshire as in other parts of England.

Some of the *Inocerami* referred by Mr. Blake to *In. involutus* should be otherwise named. These he describes (p. 251), “like two Nautili with their mouth opposed,” but such is not the form of the true *In. involutus* of Sowerby, described by him as “sub-globose valves very unequal, one gibbose, even, with a large incurved beak and very hollow sides, the other nearly flat, with deep concentric waves.” . . . (Min. Con., Vol. vi., p. 160, Pl. 583). The species referred to by Mr. Blake, with both valves gibbose, is not unknown to me. I found a very good example of it at Compton House (Hampshire), in the zone of *Marsupites*, and I take it to be a new species.

Zone 1 of Marsupites. This is my Bridlington Chalk. The interesting fossils recorded in this division by Mr. Blake as *Nautilus lævigatus*, *Scaphites binodosus*, *Sc. inflatus*, *Sc. compressus*, *Hamites cylindricus*, and *Avicula tenuicostata*, clearly indicate that several minor subdivisions could be traced in this mass of Chalk 300 ft. in thickness, which might easily be compared with those of Prof. Schlüter, who found the same fauna in the North-west of Germany.