

V.

MEMORANDUM

ON

THE FOSSIL SHELLS

DISCOVERED IN THE HIMALAYAN MOUNTAINS.

BY THE REV. R. EVEREST.

I HAVE ventured to say a few words respecting the Fossils sent down from the *Himalaya* mountains, by Dr. GERARD, because nobody else is about to do so; and it is a pity that they should remain unnoticed.

In doing this, I shall make no remark upon the general difficulty of identifying fossil shells with recent genera, as that is well known to any one who has ever attended to the subject. But to one who lives at a distance from means of reference, such a difficulty is greatly increased, since, in many cases, he must speak from recollection alone. Upon this ground I must plead for the indulgence of my hearers towards such imperfections as they may observe in this paper—my purpose in entering upon a branch of Geology, not the most familiar to me, will have been answered, if I can induce others to join in a pursuit, which circumstances will no longer permit me to continue.

To begin, then, with the specimens before us, in the relative order of their abundance, we have—

1. *First.* Numerous blocks of a compact greyish silicious limestone, (in some parts passing to sandstone), filled with shells and casts of a small inequivalve, eared bivalve, which do not appear to differ from the small *Pecteus* imbedded in the lias blocks from the Coast of Yorkshire, which we owe to the liberality of Mr. TAYLOR. The shells themselves are changed to a black colour as they are in that formation. As they are mostly mutilated, it is not improbable that other genera may hereafter be distinguished among them. One such I have recognized—a very transverse bivalve, not unlike *Unio*, in external shape—but, as I could only find one cast of it, I have not attempted to give it a name—with this genus of *Pecteus* must be ranged two mutilated specimens, which we have in a dark bluish black limestone, and which are only a variety—possibly only the same shell in a more advanced stage of growth—The generic marks are wanting, but by comparing them with a beautiful English specimen of Mr. TAYLOR'S, no doubt can remain as to their identity.

2ndly. Many specimens of an inequivalved bivalve, which has been changed into a white crystalline substance, and from its hardness probably contains much silex. They are imbedded in a hard slate of the same bluish black colour, which is covered with small scales of mica—They appear to belong to the genus *Producta*, and may be compared with a specimen of the same genus, the *Producta Scotica*, in Mr. CALDER'S collection, and a plate of the same in URE'S *Geology*. They differ somewhat from this species by the greater flatness of the lower valve; but as most of the specimens have suffered from compression, it is difficult to ascertain what has been their natural shape. Besides the larger and more abundant variety of which we have been speaking, there is a smaller one, or rather some casts of one of its valves—the depression in

it is large and deep, and towards the beak appears some trace of a perforation and its operculum.

3rdly. Several pieces of a bluish grey limestone, abounding in a plaited variety of *Terebratula*, and loose specimens of the same. The limestone has imbedded in it some calc spar of a yellowish white colour, and is partly covered with a yellowish earthy powder, of the colour we see in the oolitic countries. The shells themselves differ little from those which are so abundant in the inferior oolite near Bath and elsewhere, and which may be referred to in Mr. CALDER's collection—but without Mr. SOWERBY's *Mineral Conchology* to refer to, it is impossible to add the specific name. These blocks also contain No. 1.

4thly. Many specimens of an equivalve transverse bivalve, transversely striated, and the valves crenulated on their interior margin. Its external shape is similar to that of a short variety of *Unio*, to which it has been referred, but internally it has no lateral teeth, nor any remnant of a lateral ridge; and though the specimens we have are too much worn to shew what the teeth really were, they appear to have been situated directly under the beak. Its flattened and acute beaks, and form approaching to that of a variety of fossil *Trigonia* of Mr. CALDER's, once made me incline to reckon it with that genus. Its shape too a good deal resembles a *Venus*, but its characters are not satisfactorily made out, and I have not access to any plate or specimen with which I can identify it. With these are some larger specimens of a triangular or rather suborbicular bivalve, which, in external shape, resembles a *Venus* or perhaps a *Donax*, but the characters are not distinct enough for me to venture to give it a name.

5thly. Several small very transverse equivalved bivalves, about three-fourths of an inch in length, and of a black colour; they appear to be of the genus *Modiola*.

6thly. Two small specimens of a variety of *Arca*.

7thly. Several specimens of Ammonites in black limestone, sometimes filled inside with calcareous spar. There is but one species distinguishable, which appears to differ little, if at all, from one of the English ones of Mr. TAYLOR; but unfortunately I cannot refer to any book for the specific name.

8thly. Belemnites—the furrow appears to be rather more distinctly marked than in the English ones.

9thly. Orthoceratites, which do not appear to differ from the English ones.

10thly. A cast of a Patelliform shell—but whether one of the real *Patellæ*, or the upper valve of one of those species of bivalves, which have sometimes been confounded with them, we have no means of determining. Its shape is conical, and somewhat obliquely curved.

11thly. Two fragments of the back of a testudinous animal, also in black limestone.

We have, then, genera determined—of

BIVALVES.	UNIVALVES.
Producta.	Ammonites.
Terebratula.	Orthoceratites.
Pecten.	Belemnites.
Modiola.	
Arca.	
	Total,.... Three Genera.
Altogether,..... 5	
Undetermined,..... 4	
Total,..... 9	

Testudinous remains of one kind.

Let us now see to what conclusions these genera will lead us.

The three Chambered Univalves are all extinct genera, and the *Nautilus*, the only living analogue to the Ammonite, is wanting.

Of these, the Orthoceratite has usually been considered the oldest, and characteristic of the so-called transition strata.

The Ammonite comes next in age, and occurring sparingly in the transition strata, is deposited most abundantly in the Lias, and the other more ancient of the secondary strata; then becoming more and more rare, as we advance to more recent deposits, it finally disappears in the strata above the chalk, that go by the name of Tertiary.

The species we have, though apparently coinciding with one of Mr. TAYLOR's from the Lias of Yorkshire, is not one of those which has the siphuncle in a raised ridge between two furrows, which are considered as characteristic of this formation. I have several times looked for such among the Salagrams in the *Hindoo* temples, but without success.

The Belemnite is found from the Lias to the Chalk, both inclusive.

On the other hand, the Spiral Univalves, which increase both in number and variety as we approach the more recent formations, are with us totally wanting, nor have we as yet any other indications of such formations.

Of the bivalves, the *Producta* is considered as the oldest genus, and is most abundant in the transition formation. The slate in which it is imbedded, is probably, therefore, a transition slate—the same which is the repository of the Orthoceratite.

The Terebratula, if not identical in species with those of Mr. CALDER, from the lower Oolite, is very similar to them, and totally unlike any from the newer formations.

The Pecten, at least the larger variety, do not appear to differ from the common Scallop which is found recent.

The shell I have called Trigonina, cannot be compared with any fossil specimens we have. The genus is, with one exception, a fossil one.

The generic characters of the Arca and Modiola, are tolerably well marked; but we have neither plate nor specimen from which to identify the species. They are not, however, important.

The testudinous remains seem to point to the Lias, or some of the secondary strata, that being the deposit in which the remains of reptiles occur most abundantly. In strata more ancient than that, they are nearly (if not quite) wanting. It is to be hoped that the spot where these two fragments were found, will be again diligently searched—we must forbear from indulging in too sanguine anticipations—but such a search can hardly fail of rewarding us with some interesting discoveries.

Now, if we consider the Orthoceratite and Producta, as peculiar to one formation, and the rest of our specimens to another, (the Terebratula, perhaps, being common to both) and compare them with the list of Lias fossils, we have,—of Chambered Univalves—two genera the same, out of four; viz. Ammonites and Belemnites—of Bivalves, four genera the same out of eighteen; viz. Terebratula, Pecten, Arca, Modiola. We may now then consider this position as established. That *there exist, in the Himalaya range, strata analogous to the early secondary and transition*

formations of Europe. How far that analogy may be complete or not, must be left to future investigation. But the wonderful similitude which has, as yet, obtained in fossils from different parts of the world, leads us to hope that the principal members of each group will be hereafter supplied. While we are on the subject, however, we cannot so well estimate the real amount of progress we have made in the question, as by recapitulating, on the other hand, the leading names in each division, which are as yet wanting to us.

We have nothing either of *Encrinal* or *Coralline* remains, which are so abundant in the transition rocks of Europe, that their absence here seems remarkable. We have none of the extinct order of *Trilobites*, the presence of which is peculiar to transition rocks.

We have no remains of the two vast marine lizards, the *Ichthyosaurus* and *Plesiosaurus*, the bones of which every where mark the presence of *Lias*, and (I speak from authority in saying) without the discovery of which, we must not attempt to use the term *Lias* in Indian Geology. We have neither of the three shells, the *Ammonites Bucklandi*, the *Plagiotoma Gigantea*, and the *Gryphœa Incurva*, which are also considered as characteristic of that formation—nor have we any of its vegetable remains, which are both numerous and interesting.

I must now again beg to be excused for the imperfections of this paper, and the great length to which it has been extended.

NOTE.—Since the above was written, SIR CHARLES GREY has kindly put into my hands some specimens he has just received from the same quarter—Mr. JAMES PRINSEP has also favoured me in a similar manner.—They are as follows :

1st. The two former varieties of the shell I have called *Producta*—a third, which can hardly be said to differ from the *Producta Scotica*—besides what appears to have been the larger valve of an inequivalved *Bivalve* resembling *Producta*—the hinge straight linear; the shell marked with longitudinal furrows and ridges, and a deep depression, as

in that genus, but at the beak is a large angular sinus, with what appears to have been an operculum, and ligament protruding—Spirifer?

2dly. Terebratulites, the same as the others, and at least two new varieties—both of the plaited kind.

3dly. Repetitions of the Bivalve, I have before spoken of under the third head.

4thly. Another impression of the same patelliform shell, as before mentioned.

5thly. Three broken pieces of a Bivalve shell, greatly resembling the Inoceramus, for which I beg to refer to the plates in CUVIER.

6thly. Two casts of Spiral Univalves, which appear to be Cirrus and Helix. The first may be compared with a Cirrus from the chalk, and another from the Oolite formation in Mr. CALDER'S collection, so that no doubt can well be entertained as to the name.—The one I have called Helix resembles the elongated variety, which is called Helix vivipara. It may be compared with the casts in a piece of Petworth marble, which we have. But there are other genera to which it may be ascribed—perhaps Turbo, for one of them.

7thly. Two small varieties of Ammonites, both much worn, and we have nothing to refer to for the specific name. One of them has the Siphuncle in a raised ridge at the back. There is also an imperfect cast of another variety, which hardly differs from one we have from Mr. TAYLOR, and named in his list as Ammonites Planicosta. We have then here three additional genera, Cirrus, Helix, and Inoceramus (?)—besides a multitude of broken and worn impressions of the genera before described, with many nodules of what I believe to be clay ironstone; but I have not yet had time to examine them sufficiently.

Dr. FALCONER has found the specific gravity of some of these nodules to be 3.00, or nearly so; one or two that we have broken, have shewn us Ammonites covered with a thin coating of Pyrites. It would always be better for Collectors to split these nodules as carefully as possible, when they are found, instead of sending them down whole.

REFERENCE TO PLATES I. AND II. OF HIMALAYAN FOSSIL SHELLS.

Figure 1. Orbulite. Fig. 2. Ammonite. Fig. 3. Ditto. Fig. 4. Orbulite. Fig. 5. Ammonite. Fig. 6. Ammonite. Fig. 7. Orbulite. Fig. 8. Helix or Turbo? This Shell is represented rather too large in the drawing. Fig. 9. Oobulite. Fig. 10. Cast of a Patelliform Shell. Fig. 11. a, b, Cirrus. Fig. 12. Turritella? Fig. 13. Undetermined. Fig. 14—15. Orthoceratites. Fig. 16—17. Belemnites. Fig. 18. Fragment of a Testudo. Fig. 19. Fragment of Rock, containing small mutilated Pectens and other genera imbedded. Fig. 20—21. Pectens. Fig. 22—23. Producta. Fig. 24. Terebratula. Fig. 25. Spirifer? Fig. 26. a, b, c, d, The supposed Unio. Fig. 27. Arca. Fig. 28. a, b, and c, Modiola. Fig. 29. Fragment of an Inoceramus?

Himalayan Fossil Shells.

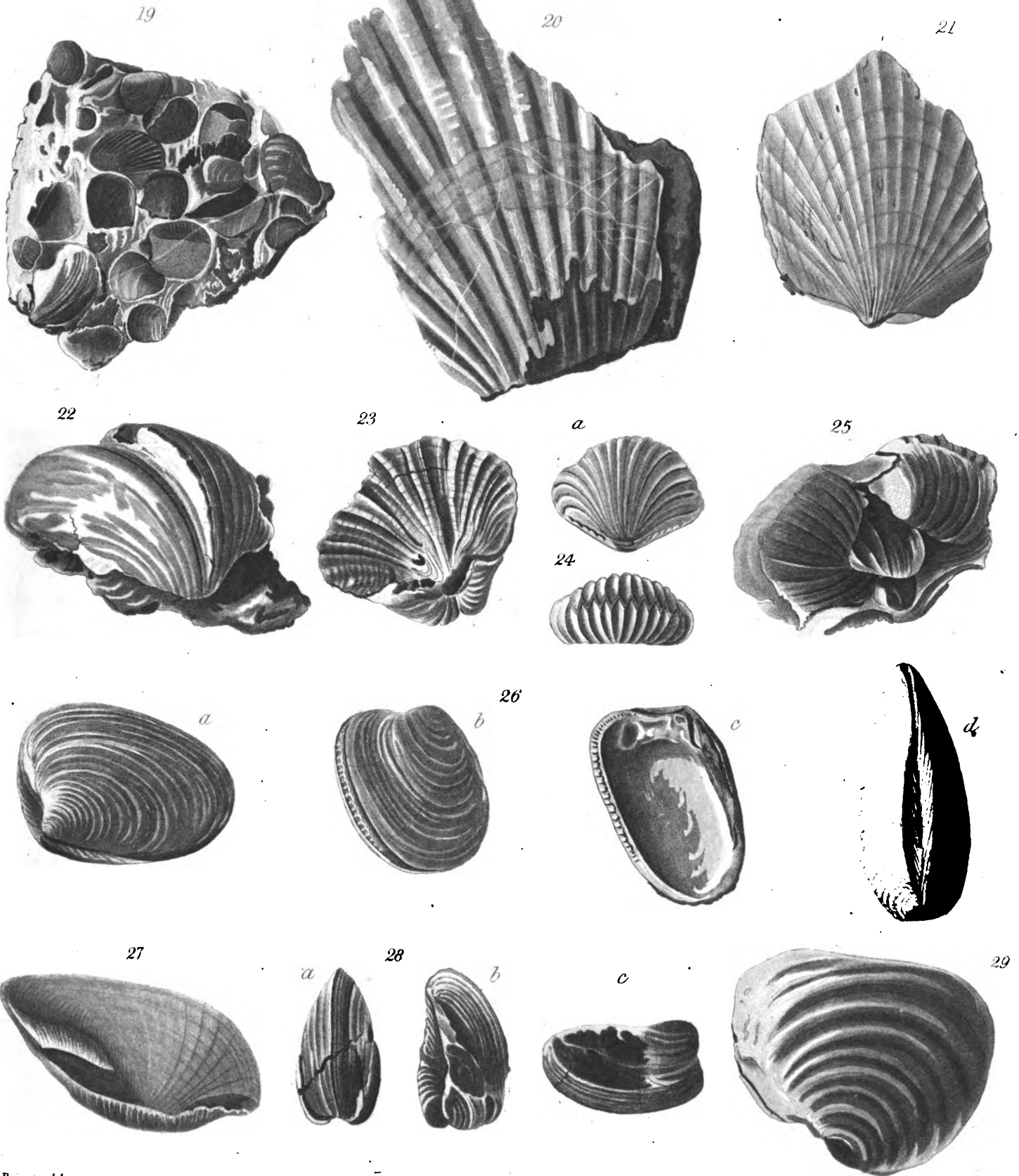
UNIVALVES.



J. Prinsp. del.

Kasrath Sculp.

Himalayan Fossil Shells.
BIVALVES.



J. Prinsop del.

Kasinati Sculp.

