

## III.—ZOOLOGICAL SOCIETY OF LONDON.

December 7th, 1886.—Prof. W. H. Flower, LL.D., F.R.S., President, in the chair.—The following communication was read:—

“On the Anatomy and Systematic Position of the Liassic Selachian, *Squaloraja polyspondyla*, Agass.” By A. Smith Woodward, F.G.S.

After a brief notice of previous researches, the author attempted an almost complete description of the skeletal parts of *Squaloraja*, as revealed by a fine series of fossils in the British Museum. He confirmed Davies' determination of the absence of the cephalic spine in certain individuals (presumably females), and added further evidence of its prehensile character, suggesting, also, that the various detached examples afforded indications of one or more new species. The cartilages of the skull were, as far as possible, described in detail, and special attention directed to the palatine region, which appeared remarkably similar to that of the Myxinoids: there is a long forwardly-directed process on either side, evidently representing a pre-palatine element, and if the conclusions suggested by the present genus can be substantiated by an examination of other forms, the Selachian antorbital cartilage must fall under the denomination of post-palatine. A well-marked hyomandibular was noted, resembling that of typical Rays; and each ramus of the jaw was shown to be provided with a single dental plate, exhibiting the ordinary Selachian mode of growth, and having the grinding surface rendered more efficient by a series of longitudinal rugæ; to the latter there probably correspond some slight sutures, which allow of the shedding of the outer edge at intervals during growth. The pectoral fin shows but two basal cartilages, the preaxial being only about one-fourth the size of the postaxial; and the pectoral girdle is of the Ray-type. The pelvic girdle is remarkable for the enormous size of the prepubic process, and there appear to have been no sutures in the basal cartilage of the pelvic fin, which passes, in the male, directly into the large clasper of either side. The author concluded with some general remarks on the affinities of the genus, and proposed to institute the new family of Squaloraiidæ, which may be placed near the Pristiophoridæ and Rhinobatidæ, and is conveniently defined as follows:—Body scarcely depressed, elongate. Head produced into a long flat rostrum, without lateral teeth. Males with a prehensile spine on the upper part of the snout. Dentition sharply divided at the symphysis. Pectoral fins with small propterygium, free.

## CORRESPONDENCE.

## GLACIATED AND FACETTED BOULDERS IN THE PUNJAB.

SIR,—The statement of the case of the glaciated (?) rock-fragments of the Punjab has been thus far all from one side. As the “arch-heretic” who ventured to suggest that the four “Indian geologists,” who took part in the discussion of the subject at Birmingham, had overlooked some important physical agencies, when they asserted

that no agency other than moving-ice could produce the effects observed, perhaps I may venture to ask for space for a few lines. I wish to point out that there appears to be considerable confusion of thought on this matter.

The rock-fragments are described now as "pebbles," now as "boulders," which are surely representatives of very different sets of mechanical forces. The term "pebble" is certainly a misnomer if applied to the two specimens which were exhibited at Birmingham. I saw and handled them both. The felsitic block had portions of its original surface somewhat smoothed, the sharper lines of its fracture somewhat rounded off in a fashion suggestive of the way in which the more flinty sarsens of this district acquire a certain degree of polish. The striated "facets" on this block are certainly difficult of explanation by reference to glacial agencies: they seemed to me very different from the ice-striations of blocks, of which I have had rather extensive observation in Alpine regions; nor can the necessary retention of the block in a fixed position in resistance to great and long-continued pressure be reconciled with the known physical properties of ice (see Q. J. G. S. February, 1883, pp. 62 *et seq.*).

The other block exhibited was more of a basaltic character, and was no doubt a slightly water-worn fragment of a basaltic column, as Prof. Carvill Lewis pointed out in the discussion at Birmingham. I do not recollect that this block was striated.

The question as to how the blocks came into their present position is entirely distinct from that of the agencies by which their present surface-character was given to them; and we have *no right to assume that these agencies acted upon them simultaneously*. On the contrary, Mr. Oldham's description<sup>1</sup> of the beds in which they occur affords, I think, convincing evidence to show that these facets and striations were produced by some agency or other *prior* to their deposition in the beds in which they now occur. This disposes at once of that writer's objection to the landslip theory (miscalled "soil-cap movement"), which I urged as the most likely explanation of the phenomena. In the discussion I referred to the objections of so excellent a physical geologist as Prof. Heim<sup>2</sup> of Zürich, to which I have on a previous occasion drawn attention in the pages of this MAGAZINE (Decade II. Vol. X. pp. 160 *et seq.*), where it was also pointed out that the polishing and striations of the surfaces of fragments of rock by the slow grinding movement, which often goes on for years, was worthy of some consideration from their resemblance to some of the effects of glacial action. As I fail to see that this explanation has been met as yet by any insuperable objection, it will not be from mere obstinacy if I still adhere to it as upon the whole the most probable.

Mr. Oldham remarks on the origin of the name "Olive Group," and then a few lines further on says there is not "any sign of carbonaceous matter in the bed." Has chemical analysis decided this?

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WELLINGTON COLLEGE, BERKS,  
January 8th, 1887.

<sup>1</sup> *Vide* GEOL. MAG. January, 1887, p. 32.

<sup>2</sup> "Ueber Bergstürse."