

NOTE ON *CYCLOLOBUS HAYDENI*, DIENER, by PROFESSOR
C. DIENER, PH.D., University of Vienna.

Among the rich variety of ammonites collected by the late A. V. Krafft and H. Hayden in the uppermost division of the permian Kuling shales of Spiti in the years 1898 and 1899, the genus *Cyclobus* was represented by four species, namely *Cyclobus cf. Oldhami*, Waagen, *C. insignis*, Diener, *C. Krafti*, Diener, *C. Haydeni*, Diener. These four species have been described and figured by myself in Volume I, Part 5, of the "Himalayan Fossils" (*Palaeontologia Indica*, ser. XV). Although our knowledge of the characters of *Cyclobus* had been considerably enlarged by studying these materials, I felt obliged to confess my inability to give a complete diagnosis of any of my four species, either chambered nuclei of inner volutions or body-chambers of full-grown individuals alone being available for examination. My Himalayan materials being too precious, I was unwilling to sacrifice any specimen by destroying its body-chamber in order to develop its inner nucleus.

Cyclobus Haydeni was the only species in which the two most important stages of development, chambered nuclei and full-grown individuals with body-chambers, were both known to me. On Plate VI of my above-quoted memoir views of both stages have been figured. Unfortunately, the sutural line of my specimens was too imperfectly visible to describe it in a satisfactory manner. Thus even in this species I was obliged to leave its description to a certain extent incomplete.

During his last season in Spiti, Mr. H. Hayden collected a few more ammonites from the Kuling shales, and he found among them the inner whorls of a small *Cyclobus*, which in its external characters exactly corresponds with my type-specimen of *C. Haydeni* from Kuling (Pl. VI, fig. 8). After having succeeded in developing the sutural line, which he found to differ considerably from that of *C. Krafti*, he sent me the specimen, together with my type-specimen of *C. Haydeni*, wishing me to add a note on the sutures to the description I had already written of the species.

Complying with Mr. Hayden's wishes I feel, however, bound to
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state, that the merit of the exact determination of the specimen and of the careful preparation of the sutures, a drawing of which (Fig. 5) has been made by means of the camera lucida, is entirely to his credit.



FIG. 5.—Suture-line of *Cyclolobus Haydeni*, Diener. Enlarged by 4.

The new specimen of *C. Haydeni*, from the Kuling shales of a nullah south of Pomerang, exactly agrees with my type-specimen from Kuling (Pl. VI, fig. 8) in all its external features. Both specimens are of similar dimensions, provided with a narrow, funnel-shaped umbilicus, and with three varices which run parallel to the lines of growth and are strongly bent backward in crossing the siphonal area. The measurements of the new specimen are as follows:—

Diameter of the shell	21'5	mm.
" " umbilicus	2	"
Height of the last { from the umbilical suture . . . 12	"	
{ from the siphonal part of the preceding whorl 6	"	
Thickness of the last volution 13	"	

Sutures.—The vertical projection of the periphery of the penultimate whorl touches the third lateral saddle in the last volution. Thus three lateral lobes and saddles are present in this species, exactly as in *C. Kraffti* and *C. Walkeri*.

In the details of the sutural line remarkable differences from the sutures of *C. Kraffti* are noticed. The principal lateral lobe, which in the latter species stands far behind the siphonal lobe in size and depth, is nearly as deep as, and only a little less broad than, the siphonal lobe. All the lateral and auxiliary lobes are distinctly

tripartite, not bipartite, the central denticulation being deepest. Four auxiliary lobes and three saddles are noticed outside the umbilical suture. The outer branch of the siphonal saddle is very large and situated on a level with the inner branch, thus imparting to this saddle a decidedly bipartite character, as in *C. Walkeri*.

As has been stated in my memoir on the permian fossils of the Central Himalayas (p. 169), *Cyclolobus Haydeni* must be classed among the group of *Cyclolobi*, which, by the peculiar character of their siphonal saddles, differ from *C. Oldhami*, the prototype of the genus, and might perhaps be united in the sub-genus *Krafftoceras*.
