circumpolar meshes (each between two polar and one tropical spine, *a b a* and *e d e*); eight quadrangular tropical meshes (each between one polar, one equatorial, and two tropical spines, *a b c b* and *e d c d*); and four rhomboidal equatorial meshes (between two tropical and two equatorial spines, *b b c d*). If the fork-branches be again forked (*Phractaspidium*, Pl. **137**, fig. 3), the number of the sutures and sutural meshes is doubled, and the same is the case in *Stauraspis*, the most simple form of the Tessaraspida.

A peculiar small group, and an interesting transition from the Cladophracta to the Peltophracta, is presented by the Zonaspida among the Tessaraspida (*Zonaspis* and *Dodecaspis*). Here only one part of the radial spines bears lattice-plates, the other part not. In *Zonaspis* the four equatorial spines bear lattice-plates, the sixteen other only free branches of the apophyses. In *Dodecaspis* twelve spines are provided with lattice-plates (four equatorial and eight polar spines), whilst the eight other (tropical) spines are devoid of them.

The Peltophracta exhibit a great variety in the form and composition of their twenty lattice-plates or fenestrated shields. In the most simple case (a part of *Doratasp is* and *Diporaspis*) the shell is composed of four (equatorial) hexagonal plates, and sixteen pentagonal plates (four tropical and four polar); in this case the four polar plates meet on each pole in one common point. More commonly, however, the shell seems to be composed of eight hexagonal plates (four equatorial and the four polar spines of the hydrotomical plane) and twelve pentagonal plates (eight tropical and the four polar spines of the geotomical plane); in this case only two (hexagonal) polar plates meet on each pole in a suture which separates the two other (pentagonal) polar plates (Pl. **138**, fig. 4). In the majority of the Dorataspida the composition of the shell is much more complicated and often very difficult to understand. Often the surface of the plates is covered with a network of elevated crests, by which concave blind dimples are separated (*Ceriaspis*, *Hystrichaspis*, Pl. **138**); and sometimes these dimples become pierced by coronal pores (Pl. **138**, fig. 11, &c.).

Peculiar by-spines or "accessory spines" cover the outer surface of the shell in a great part of Dorataspida, and commonly these most characteristic by-spines are not placed radially, but parallel to the radial spine, from the lattice-plate of which they arise (Pl. **135**, figs. 1, 5; Pl. **137**, figs. 4–8; Monogr. d. Radiol., 1862, Taf. xxi. figs. 8, 9). They are commonly placed perpendicular to the sutural condyles, or the branch-ends of the apophyses; so that close to each suture arises a pair of divergent by-spines, belonging to the meeting apophyses of the two neighbouring spines, which meet in the suture (Pl. **137**, fig. 4). Rarely these thin, bristle-shaped by-spines are quite simple and straight, commonly they undulate or are zigzag and often armed with recurved hooks. Sometimes they are also forked or arborescent (Pl. **138**, fig. 7).

The Central Capsule of the Dorataspida is constantly spherical and about one-third smaller than the enclosing shell, from which it is separated by the spherical calymma.