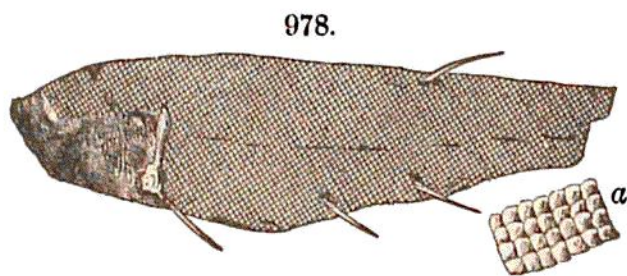


like arrangement, but less perfectly, for the lower part of the caudal fin. They gave the posterior part of the body great strength for sculling. It is further to be observed that the open space along the center of the vertebral column indicates a persistent notochord (cartilaginous), the spinous processes being the only calcareous portions of the column. Fig. 974 represents a Canada species of *Chirolepis*, a genus of the family Palæoniscidæ. *Palæoniscus Devonicus* of Clarke is another Devonian Ganoid, from the Portage of New York. The species, Figs. 970, 971, 974, are from Scaumenac Bay.

Selachians, or Sharks, were represented not only by fin-spines and teeth, but also, in the Cleveland shale of Ohio, by impressions or remains of the



SELACHIAN. — Fig. 978, *Acanthodes affinis*; a, scales, natural size. Whiteaves.

nearly entire body. Two specimens of the latter are shown, much reduced, in Figs. 975, 977. The largest yet found, *Cladodus Kepleri*, had a length of six feet. Newberry's figure of *C. Fyleri*, in his *Paleozoic Fishes of North America*, gives it a length of 22 inches. It is referred to a new genus, *Cladoselacha*, by B.

Dean. The tooth, Fig. 976, is of the species *Cladodus Clarki* of Claypole.

Remains of a species of another genus, *Acanthodes*, related to the Sharks, but having minute square or rhombic scales, has been found at Scaumenac Bay. A small specimen is represented in Fig. 978. Other species of the genus have been reported from New York and Pennsylvania.

Characteristic Species.

Genesee shales. — *Orbiculoidea Lodensis*, *Discina truncata*, *Lingula spatulata* (also Portage), *Chonetes lepidus* (also Hamilton), *Ambocælia umbonata* (also Ham. & Mar.), *Leiorhynchus quadricostatum*, *Strophalosia truncata* (also Marcellus), *Lunulicardium fragile* (Marcellus to Portage), *Cardiola* (*Glyptocardia*) *speciosa* (Ham. to Chemung), *Styliolina fissurella*, *Tentaculites gracilistriatus* (also in the Marcellus), *Orthoceras subulatum* (also Marcellus), *Goniatites complanatus* (also Upper Ham. and Portage), *G. discoideus* (Marc., Ham. also), *G. intumescens* (= *G. Patersoni*) (also Portage and Chemung).

Portage group. — *Ambocælia umbonata*, *Grammysia subarcuata*, *Lunulicardium fragile*, *L. acutirostrum*, *L. ornatum*, *Cardiola speciosa*, *Styliolina fissurella*, *Bellerophon natator*, *Coleolus acicula*, *Tentaculites gracilistriatus*, *Orthoceras pacator*, *Goniatites complanatus*, *G. intumescens*, *G. bicostatus*, *G. sinuosus*.

Ithaca beds (noted for the number of Brachiopods). — *Lingula spatulata*, *Atrypa reticularis*, *Spirifer mesacostalis* and *S. mesastrialis*, *Cryptonella eudora*, *Stropheodonta mucronata*, *Rhynchonella pugnus*, *R. eximia*, *Productella speciosa*, *Leiorhynchus mesacostale*, *Orthis impressa*, *Chonetes setigerus*, *C. scitulus*, *Crania*; *Lunulicardium fragile*, *Schizodus quadrangularis*, *Palæoneilo filosa*, species of *Leptodesma* and *Aviculopecten*, *Grammysia subarcuata*, *Tentaculites spiculus*, *Orthoceras bebryx*, *O. fulgidum*. *Spathiocaris Emersoni* Clarke, of the Portage, is described and figured in *Am. Jour. Sc.*, xxiii., 1882. The *Palæopalæmon* was first described by Whitfield, in *Am. Jour. Sc.*, xix., 1880.

The Naples beds, in the Portage, containing the *Clymenia* (Fig. 949), have afforded also, according to J. M. Clarke (1891, '92), *Palæoniscus Devonicus* Clarke, *Acanthodes*