

i18 Early Permian pelycosaurs < primitive synapsids, equatorial >

And we're a small segment in time; a transition from when we weren't to when we won't be.
—Everett Claire (Ole) Olson (1910-1993).¹

Synapsids (*recall Topic h1*) include mammals and primitive synapsids. The latter include advanced mammallike reptiles that achieved a worldwide distribution and primitive mammallike reptiles, called *pelycosaurs*, that were restricted in the range of their habitat to the equatorial climatic zone of Southern Laurasia (their fossils have not been found in Gondwanaland strata). The implication is that the pelycosaurs were cold-blooded. Pelycosaurs are not known with certainty after the Early Permian.

Advanced pelycosaurs appeared during the Early Permian. Of these, the “fin-back” pelycosaurs are well known for their unusualness. The fin was constituted of greatly elongated neural spines rising high over the back. In some species, the spines are studded with small cross bars. The fin specialization was confined to a few fully-terrestrial pelycosaur genera. In life, the fin is thought to have been covered by skin and, with circulating blood under that, the fin could have been a heat-regulator sail. (Edge on to Sun, the sail could radiate away body heat that exertion produces. Sideways to Sun at morn, it could rapidly heat the blood of a night-chilled, torpid, cold-blooded animal.) Pelycosaurs include the first reptilian herbivores. Of these, both short-spined (as *Casea*) and sailed (as *Edaphosaurus*) genera occurred. Without specialized teeth, they foraged with batteries of reptilian teeth. By contrast, both the short-spined and the sailed (as *Dimetredon*) carnivorous pelycosaur genera, can be recognized by their daggerlike teeth that *are* differentiated (a mammalian characteristic) to function as incisors, stabbing canines, and molars.

Primitive pelycosaurs were small (1.5 m long) and semi-aquatic. Like many other life forms that the Permian climate brought to fore, these were already in existence during the Pennsylvanian.²

The oldest synapsids are middle Pennsylvanian ophiacodontids: *Archaeothyris* found near Florence, Nova Scotia, and (~320 My) *Protoclepsydraps* (?) from Joggins, Nova Scotia.³ □

Figure i 19.1 Permo-Carboniferous Southern Laurasia realm coal fields:¹ Coal (outcrops black, subsurface very dark gray), land (gray), mountains (dark gray), epeiric seas (pale gray)

