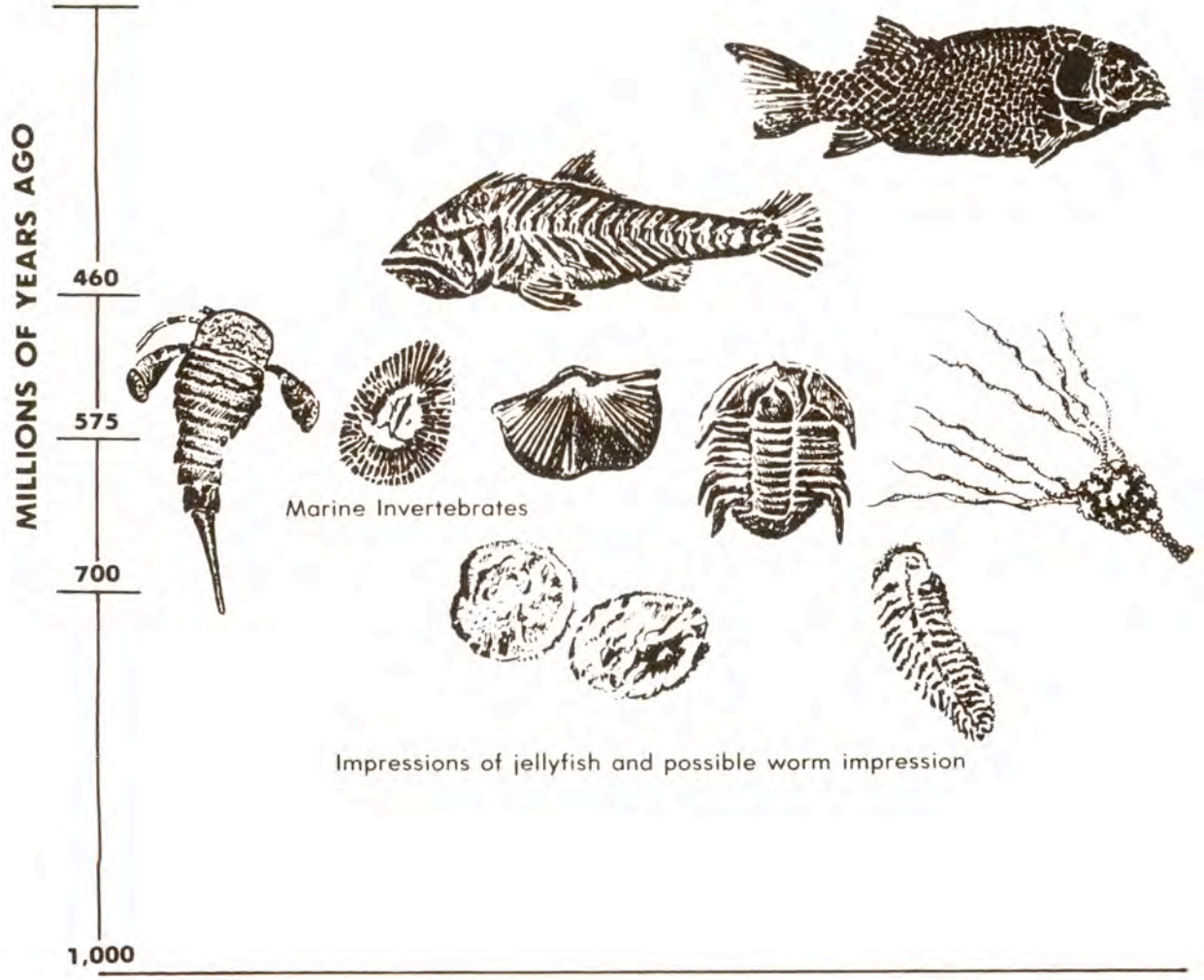

I suspect the latter is true, for the mechanistic causes of these major transformations are not worked out. There isn't a definitive theory or standard model that can be tested. We can consider major environmental changes, such as an increase in the oxygen supply, or the creation of new ecological niches to be occupied. We can also consider the possibility of major genetic changes brought about by cosmic radiation. We can envision species in isolated locations becoming better adapted to specialized environments and subsequently radiating geographically outward to displace existing worldwide populations. But a single cell to a fish? There ought to be some sort of transitional record somewhere in 400 million years of sedimentary deposits.

In the next chapter, dealing with animal life on the land, we will encounter fossil evidence for transitional forms and for changes in

FIGURE 8.12.
The Cambrian explosion. Virtually all the major categories of marine invertebrate animals appear in the Cambrian period (575 to 500 million years ago). Primitive fish appear shortly thereafter. Three mysteries remain: there are no fossil transitional forms leading from single cells to the completely formed, multi-celled animals; none between the invertebrate animals; and none leading to the fish. There are 400 million years of sedimentary deposits with no transitional forms whatsoever.