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Late graptoloid faunas and the problem of graptoloid extinction

Hermann Jaeger
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Discoveries of Early Devonian graptoloids have been continued in the past ten years in ever increasing areas, but particularly in Asia. All continents, except South America arid Antarctica, have so far yielded Devonian graptoloids. Devonian graptoloid faunas appear to have a uniform composition all over the globe; there is no conclusive evidence for any biogeographic differentiation. The hitherto known morphological spectrum has broadened only insignificantly. About 25-30 Devonian graptoloid species and subspecies may be recognized at present, belonging to four genera: *Monograptus* (some 20 species), *Linograptus* (1), *Abiesgraptus* (3) and *Climacograptus* (1; represented by a sole specimen from the *hercynicus* Zone in the Carnic Alps). The *Monograptus* species are small to mediumsized, having 20-40, rarely over 60 thecae in a rhabdosome. They are robust and straight, except fora few moderately curved forms. The thecae vary from almost uniform to strikingly biform; typically they are of the type of *M. uncinatus* , at least proximally, becoming simpler towards the distal end. A minor distinctive feature of most Pragian species is the strong development of the dorsal sicular tongue. The giant *Linograptus posthumu*s and *Abiesgraptus*, both of which may house up to several thousand zooids, are not found above the Lochkovian. The demonstrably highest occurrence, of Devonian graptoloids is in the uppermost Pragian, though some faunas may turn out to be somewhat younger, i.e. the latest graptoloids may straddle the Siegenian-Emsian boundary only slightly. The causes for graptoloid extinction remain obscure. Extindion was a slow, stepwise historical process which - starting off at the end of the Wenlock-was marked by a number of rather sudden incisions that in summa resulted in a progressive reduction of faunal diversity. It would appear that graptoloid evolution was somehow, perhaps intimately, connected with the history of-euxinic or poorly aerated seas.

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