**Origination, extinction, and mass depletions of marine diversity by** Richard K. Bambach, Andrew H. Knoll, and Steve C. Wang

This article takes a look at what made the end-Ordovician, end-Permian, and end-Cretaceous extinctions so devastating to diversity compared to the other two extinctions of “the big five”. The authors use several statistical methods to show that our perception of the loss of diversity at these intervals may have as much to do with actual extinction as a lower rate of origination. They conclude that the end-Devonian and end-Triassic extinctions, although marked by higher extinction rates, were more greatly effected by the lack of origination following these time intervals. The extinction rates during these time intervals were above average, but not on the same scale as the end-Ordovician, end-Permian, and end-Cretaceous mass extinctions. They even noted that during the Eifelian interval an overall 37% of genera went extinct, but the origination rate was 33% which resulted in a net loss of only 4% of the biodiversity of this time period. They showed that turnover rates can have a greater impact on our understanding of extinction in that low turnover rates give the appearance of a far more severe loss of diversity and high turnover rates lessen the appearance of the loss of diversity.

I like that this article, at least in my view, is very thorough. I want to learn more about the statistical methods they used, and why they used them. The thought never occurred to me that a reduction in the rate of origination could have as much of an impact as the extinction of key ecological players, but it now seems intuitive. I kind of want to write my grant proposal about something to do with origination, but I can save that for some other time. I also thought it was interesting that they commented on whether or not these reductions in diversity could be artifactual due to incompleteness of the fossil record. I just found it interesting since we were talking about it in class, and they referenced two of Shanan’s papers, one of which we read for class.

To be honest, I felt like it was a little long. I just have a hard time sitting down and reading a ten-page scientific paper. I guess graduate school might be a drag. It also felt like it was too far-reaching for a single paper, and I would have liked to see one of the intervals taken into greater detail as opposed to covering several different ones. I would have liked to see how marine and terrestrial origination and extinction compared. Overall, though I found this paper useful and interesting.

I had a couple of issues with the figures, and it is mostly due to format and a lack of understanding. I also did not look at the figures while reading the paper initially, but after giving them a once over, I think it helped to clarify some of the ideas brought forth. Figure 1 helped to illustrate the turnover rates observed through time, and that made the visualization of origination much easier. Figure 2 was useful for showing the proportion of gains and losses of diversity through time. I particularly found the end-Permian drop and early Triassic rebound to be kind of cool to see. In Figure 3 I would be interested to know what the other points were ad if there is some correlation with time. My issue with Table 1 is that it is sideways, and I am on a computer. Other than that, I like to see the data used. Figure 4 is the answer to my issue with Figure 3 I guess. Figure 5 is a bit confusing to me; I am not familiar with a lowess regression. Figure 6 would benefit from some color. It is way too busy and difficult to read, but I get the gist of it from reading the rest of the paper. Table 2 is, again, impossible to read well on a computer. Figures 7 and 8 showcase the relationships of origination and extinction in each of the “big five” mass depletions, as they call them. I think these two figures are the most telling of what the entire paper is about. Figure 9 showed two intervals of the Cambrian with significant diversity depletion caused by a reduction in origination rather than a marked increase in extinction. The figures were very useful and followed the text fairly well.