

May 28, 1941

Dr. F. Stearns MacNeil
U. S. National Museum
Washington, D. C.

Dear Dr. MacNeil :

Your letter has been very interesting to me. These problems have been on my mind for over ten years. The first publication of mine that treats these Gulf Coastal Plain disconformities is "A New Formation in the Claiborne Group." I am sending you this publication and the one on the nautiloids. For the sake of accuracy would it not be good if you could check the Aeturia from Vicksburg and see whether you can identify the exact formation by the matrix? Concerning the Gulf Coastal Plain disconformities, the one which I know best and which has been investigated most is the boundary between the Stone City and the Cook Mountain. I have seen this contact for a distance of several hundred miles now and have been able to trace it more or less continuously through a large part of Texas. In essential form the contact of the Stone City described in "A New Formation ----" is very similar to the one at Creole Bluff. Conditions at Stone City, however, are much more clear because the same contact is exposed in numerous other localities near by. In all cases the fauna in the Stone City is very similar to the fauna of the Cook Mountain and many species range from one formation into the other. However, there are quite a few species which are restricted to only one of the two formations and among these species are species which belong to the same genus, that is, the species characteristic of the Stone City belongs to the same genus as the species which replace it in the Cook Mountain. Assuming that all species of the same genus lived under approximately the same conditions, this would prove that it is not mere facies which produces the disappearance of one species and its replacement by another species of the same genus. It is clear that the differences between Stone City and Cook Mountain are largely facies differences but there nevertheless is a large body of fact presented by fossils which shows clearly that there is a gap in the evolution represented by the hiatus between the two formations. At Stone City and the other localities, the Stone City fauna can be traced to the very top to right under the basal conglomerate of the Cook Mountain and the pebbles of the basal Cook Mountain are made of Stone City materials and contain Stone City guide fossils. I presume, just like you did, that conditions in the contacts you have investigated are essentially similar and if you find Mint Spring fossils below the basal conglomerate it does not prove, to my mind, that that 3.8-foot bed which contains these fossils must belong to the Mint Spring formation. Obviously the fossils which lived at Mint Spring time must have had their ancestors living at Forest Hill time and if there is anywhere the marine facies of the Forest Hill sand exposed it will obviously contain fossils which look as if they were Mint Spring fossils. I think the case of the Forest Hill-Mint Spring contact is very similar in theory to the Yegua-Moodys marl contact. The reason certain *Turritellas* were thought to be Moodys marl guide fossils was that we had found these *Turritellas* in many places in the Moodys marl but obviously not in the Yegua which was not known to be fossiliferous.

To many paleontologists this proved immediately that these Turritellas are absolutely reliable Goodys marl guide fossils. Now this is not necessarily the case because our conclusion was based on the fact that the Yegua was not known in marine facies and naturally the ancestors of the Goodys marl Turritellas must ~~have~~ be found in marine Yegua deposits unless they immigrated from far away coasts. The same applies, in my opinion, to your Mint Spring-Forest Hill sand. Certain fossils are considered Mint Spring guide fossils because we had found them abundantly in the Mint Spring and, due to facies, not in the Forest Hill. If you now find these fossils also in the top portion of the Forest Hill sands it does not prove that these top portions should be classed with the Mint Spring. It simply means that our previous conclusions concerning the range of these fossils must be changed. To go back once more to the Stone City-Cook Mountain contact, I believe this contact is the best known one and can be checked accurately in many different ways. The marine glauconitic and fossiliferous lenses in the Stone City formation are local and pinch out laterally so that in some regions non-fossiliferous sands extend up to the very base of the Cook Mountain formation whereas in other regions the basal Cook Mountain rests on fossiliferous Stone City lenses. The position of the contact in these cases can be checked against the top of the Weches. I have drawn a diagram to show you what I mean in this latter statement. I think the diagram contains the proof that the only possible place for the base of the Cook Mountain is the basal conglomerate and disconformity. Were one to draw the base at a lower level than that it would produce an impossible stratigraphic boundary. If I understand your diagrams correctly and if the conclusions that I have reached are applicable in your problems, the base of the Red Bluff formation and the base of the Mint Spring formation have to be put at the largest regionally traceable disconformity.

I wish I could take you on a short trip to show you the base of the Cook Mountain in several places. I believe it would clear up your problems.

You are entirely right in assuming that there is the same principle involved in all these contact relations. I have been working on that problem for sometime. It leads to the consideration of sedimentary cycles. I hope to get enough materials together to write these things up in the near future.

With best wishes,

Sincerely yours,

H. B. Stenzel, Geologist

HBS:MJC
Enclosure