

Headquarters Department of the Missouri,

OFFICE OF THE CHIEF ENGINEER.

Fort Leavenworth, Kas., April 20th, 1877.

Prof O.C. Marsh

Dear Sir:

I send you by mail today the fossils spoken
of as found on the Staked Plains. I shall send in a
few days a copy of my map of the Indian Territory
with the localities marked. You will find that the
specimens come from three localities. Cañoncito
Blanco is a side Cañon near the head of Red River in
Lat. $34^{\circ}45'$ nearly, longitude $101^{\circ}40'$ nearly. The fossils
are all small, much waterworn and were found in small
pockets at the bottom of a bed of gravel, some 20 to
30 feet thick. Some twenty feet lower in the forma-
tion the same were found sparingly in a conglomerate.

These fossils were near the general level of the Staked
Plains and were at most not 200 feet below these level

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They are interesting solely because a careful search through this whole region of the head waters of the Red River has not discovered other varieties nor even these in abundance. At the mouth of Pleasant Valley as marked on the map the Red River issues from its Cañon and has a difference of level of over 1000 feet with the upper level of the Staked Plains.

In tracing the strata composing this descent I found the general level throughout the region to be the same and unless I am very much mistaken the chalky limestone which is the first decided stratum under the alluvium and drift, forms the general top of the whole country unless stepped by denudation and is the same as shown near Fort Dodge Kansas 260 miles N. W. Co.

I am quite sure that the deep gypsum formations & red sandstones of the mouth of Pleasant Valley are the same as found near Camp Supply P. T. and that Sand Creek some nine miles north of Camp Supply and which was the lowest barometric point on the line from Fort Dodge to Pleasant

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Valley is also the lowest geological point and is only a short bit below the mouth of Pleasant Valley. Hence travelling on this line we are going with the strike through the whole distance (I think) from the specimens sent you and collected from Cañoncito Blanco and Bear Creek come from the same strata and those from Camp Supply are a few hundred feet lower down. Now at a certain other spot on Red River just above Pleasant Valley I found a conglomerate giving the same worn fossils as the Cañoncito Blanco ones and of the same age exactly as the Camp Supply ones. So I think I identify the top and bottom of the exposed formations; top Cañoncito Blanco & Bear Creek; bottom, Camp Supply & the stratum near head of Pleasant Valley. The two separated about 600 feet or more in relative altitude in the series and I think the same fossils. Unless I am deceived therefore we determine the age of the Staked

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Plains from the better defined fossils of Bear Creek
& Camp Supply. If we find any Triassic or
Jurassic indications so far I am mistaken and
I doubt if there be any other spot where the species
of *Stenota* is so good as in that scanned by
me on my trip. I went largely over the
region reported by Marcy & McClellan in 1852

Another observation occurs authorized by my
notes. The Camp Supply & northern region are
nearer the margin of the Cretaceous sea and
the Cañoncito Blanco is out in the deep water
of that period. There are plenty of the worm
fossils here in case you want more in hopes of
finding a marking or two.

I trust I have not exhausted your
patience.

Yours truly

E. H. Ruffner.

1st Lieut. Engineers.