

Correlation of the Sulphur River Formation

JOHN A. DOERING

Figure one shows the position of the Late Pleistocene Sulphur River Formation beneath the Recent floodplain sediments of the North Fork of the Sulphur River near Ben Franklin in Delta County, northeast Texas. The formation and its mammalian fauna are described by Slaughter and Hoover elsewhere in this symposium. As they have indicated, the age of the formation is probably around 10,000 to 11,000 B.P.

The geologic relations here exhibited and the radiocarbon dates obtained suggest a correlation of the Sulphur River Formation with the Prairie Formation, of the Red River terrace sequence, and with the Holloway Prairie Formation of the Gulf Coastal Plain. Radiocarbon dates of 8,000 and 12,000 B.P. have been measured on materials presumably taken from the latter (Bray and Nelson, 1956; Stevens *et al.*, 1956).

The lowest terrace in the Sulphur River valley stands about 35 feet above the floodplain. At Hagansport, and farther upstream, it has been observed in reconnaissance mapping. From Basset downstream this terrace is well developed and clearly exhibited by the excellent topographic maps of that area.

Near the mouth of Sulphur River the terrace has a reverse slope, as shown in Figure 1, and rises to join the Montgomery terrace of the Red River valley. This reverse slope is due to a relatively more rapid aggradation along the Red River, which has spread its deposits upstream into the valley of the Sulphur. Thirty miles upstream, the valley of another tributary, Little River, exhibits the same reverse slope with relation to the Montgomery terrace. Similar reverse slopes are also noticeable on the Recent floodplains at the junction of each of these tributaries with the Red River.

The coastal equivalent of the Montgomery, the Eunice formation, provides several radiocarbon dates, as indicated on Figure 1 (Bray, Stevens, *Op. cit.*).

In the Red River valley the Prairie formation can be traced upstream as far as Benton, Louisiana. Farther upstream it appears to have been removed by erosion. A terrace at Direct, Lamar County, Texas, about 150 miles upstream from the Sulphur-Red junction may, however, be a remnant of the Prairie.

In the valley of the Sulphur River no terrace remnants have been

noted which could definitely be recognized as the Prairie. The equivalents of the Prairie have either been removed by erosion, or, like the Sulphur River Formation, have been covered by Recent floodplain sediments.

The Pleistocene trench of the Red River is reported (Fisk, 1944) to be cut to about 100 feet below sea level near Alexandria, Louisiana. This trench and the trench in which the Sulphur River Formation was deposited near Ben Franklin were probably cut to their present depths after the deposition of the Montgomery terrace. Since the radiocarbon measurements appear to date the Eunice and the Montgomery as Sangamon in age, the trenching would correspond to an interval of lowered sea level accompanying the early Wisconsin glaciation.

A subsequent rise of the sea to a position near that of its present level is indicated by the shelly muds of the Holloway Prairie Formation, dated at 8,000 and 12,000 B.P., and by the Prairie alluviation of the Red River valley. The radiocarbon dates of the Sulphur River Formation indicate deposition during this period of higher sea level.

A later time of lower sea level—possibly that of the late Wisconsin glacial advance and/or isostatic warping—was required to cause the renewed trenching which permitted the cutting of the Recent Red River valley and the development of the Recent floodplain. This trenching was apparently of sufficient depth to affect the base level of the North Sulphur River, with the result that Recent sediments in that part of the Sulphur River valley were deposited on top of the Sulphur River Formation. Lateral migration of the Recent stream removed an upper part of the formation in an irregular pattern and replaced it with Recent sediments.

REFERENCES CITED

- Bray, E. E., and Nelson, H. F., 1956, Radiocarbon age determinations of Recent-Pleistocene contact in Block 126 field, Eugene Island, Gulf of Mexico: *Am. Assoc. Petroleum Geol.*, B., v. 40, p. 173-177.
- Fisk, H. N., 1944, Geological investigations of the alluvial valley of the lower Mississippi River: Vicksburg, Mississippi River Comm.
- Stevens, N. P., Bray, E. E., and Evans, E. D., 1956, Hydrocarbons in sediments of the Gulf of Mexico: *Am. Assoc. Petroleum Geol.*, B., v. 40, p. 975-983.