THE STRUCTURE OF THE VERDEN SANDSTONE*

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ABSTRACT

The Verden sandstone is a long, narrow body of rock extending from 10 miles east of Marlow, Oklahoma northwest nearly to Calumet, a distance of some 70 miles. Throughout a considerable part of its length, it stands out prominently as a series of buttes and ridges, and has been mentioned by many writers on Oklahoma geology.

In shape, it somewhat resembles the buried shoestring sands of Kansas and Oklahoma that are thought by many to be buried offshore bars. Bass (1939), in his study of the Verden, explains it as a series of spits and bars extending across the mouth of an ancient bay on the shore of a shallow sea. Others have attempted to explain it as a deposit in a stream that was subject to tidal bores.

In any explanation of the origin of the Verden sandstone, the following outstanding characteristics must be taken into consideration:

1. The persistent and continuous cross-bedding in a northwest direction.

2. The character of the ripple marks.

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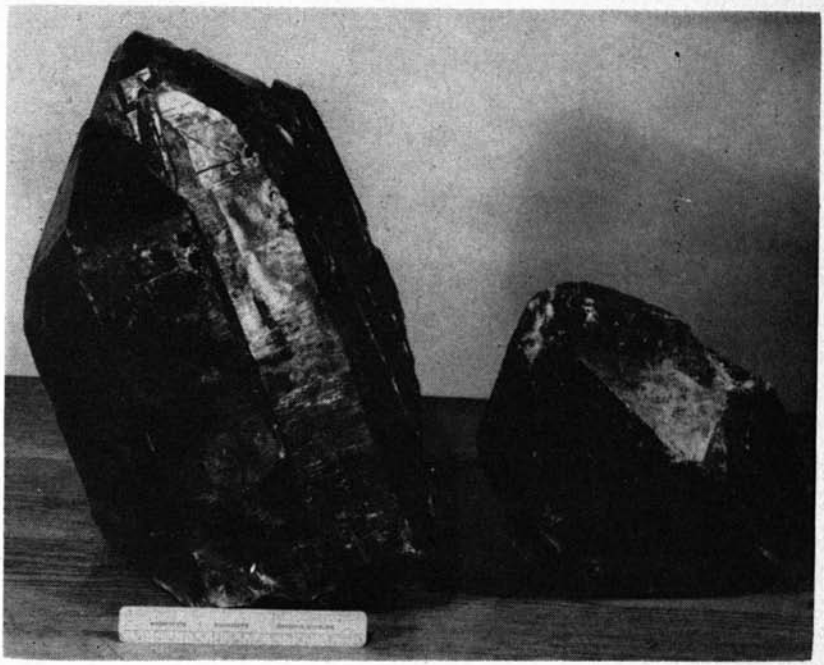

FIGURE 1. Large Smoky Quartz Crystals from the Wichita Mountains, Oklahoma

3. The increasing fineness of the sediment to the northwest.
4. The thin, horizontal layers of fine sand, silt, and clay that lie between the cross-laminated sand beds.
5. The position and condition of the fossils in the sandstone.

The Verden sandstone is clearly not a stream deposit, and more recent information regarding the formation of spits and bars shows that their structure is much more complicated and involved than was formerly believed to be the case.

Recently, it has been found, that in some straits and passes, both tidal currents and salinity currents flow always in the same direction although they vary considerably in velocity. Since the conditions of deposition in such straits and passes agrees closely with the conditions that must have prevailed during the formation of the Verden sandstone, it is probably a channel deposit rather than a stream deposit or a series of spits and bars.

BIBLIOGRAPHY

Bass, N. W. 1939. Verden sandstone of Oklahoma—an exposed shoestring sand of Permian age. Bull. Am. Assoc. Petroleum Geol. *23(4)*:559-581.