

LOWER PENNSYLVANIAN EXPOSURES ALONG THE W ROAD ON SIGNAL MOUNTAIN, TENNESSEE

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ABSTRACT

Ferm, Milici and Eason (1972) utilized the Hobday model and established a localized model of early Pennsylvanian sedimentation in southeastern Tennessee. Data from W Road exposures suggest that tidal delta, tidal flat, and tidal channel deposits were extant in this area during deposition of lower Pennsylvanian rocks.

INTRODUCTION

Roadcut exposures of the Pennsylvanian Raccoon Mountain Formation and Warren Point Sandstone, located along the W Road (Fig. 1) on the southeast side of Signal Mountain (Fairmount 7½' Quadrangle), were examined for bedforms presented in the Hobday (1969) model of a regional Pennsylvanian clastic wedge. This model contains marginal marine, barrier beach, barrier bar, lagoonal (bay), tidal delta, tidal channel, and tidal flat paleoenvironments.

It is the purpose of this study to develop a model of sedimentation for these lower Pennsylvanian rocks.

STRATIGRAPHY

The general stratigraphy for lower Pennsylvanian rocks in southeastern Tennessee, as given by the Tennessee Division of Geology (1963), is as follows:

- Signal Point Shale
- Warren Point Sandstone
- Raccoon Mountain Formation

DISCUSSION

Hobday (1969) studied sandstones in seven large Pennsylvanian exposures in northern Alabama. Hobday model bedforms recognized in the Warren Point Sandstone include three types:

Type B Beds: festoon beds with curved bases that are concave upward and are filled with laminated, cross-bedded sediment. Presumably, these beds result from in-filling of large-scale ripple troughs and are thought to form as longshore current deposits or atop tidal deltas.

Type C Beds: horizontally disposed rippled beds averaging about 2½ inches in thickness. The beds occur in solitary sets, and are commonly vertically and laterally gradational into shale, siltstone, and B beds. Thickness of the sets ranges from one foot to several tens of feet. These beds are interpreted as intertidal sandflats.

Type F Beds: these beds are marked by sharp, lower bounding surfaces that are concave upward. They are usually internally structureless, but may contain quartz and siderite clasts in their lower portions. These de-

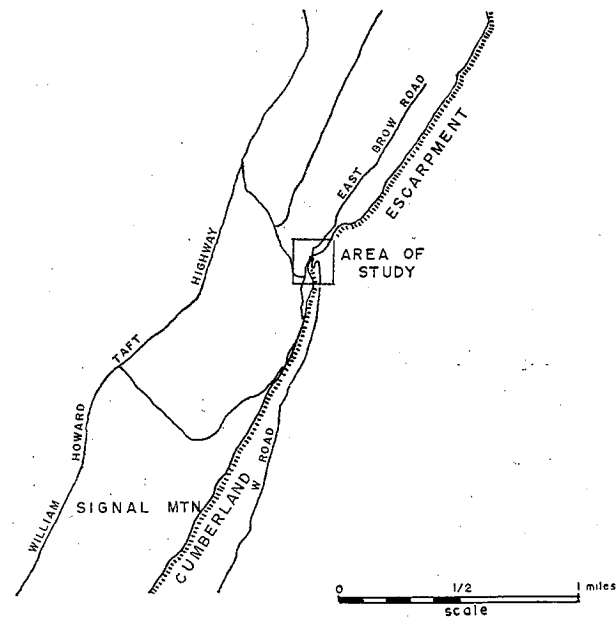


FIG. 1: Location of study area along W Road, Signal Mountain, Tennessee.

posits are interpreted as tidal channel in-fillings.

Rippled, flaser-bedded shales and a thin coal seam in the Raccoon Mountain Formation may be interpreted as tidal flat and tidal marsh deposits. Eason (1972) interpreted a similar vertical sequence, exposed at Norwood Cove on Sand Mountain, Alabama, as tidal flats and tidal marshes that covered several periods of lagoonal in-filling.

Ferm, Milici and Eason (1972) recognized that local distribution of Pennsylvanian sandstones and shales is the result of regional progradation (plus local transgressions and regressions) of a system of litoral environments (including beach-barrier and back-barrier equivalents) over differentially subsiding substrata.

Figure 2 illustrates the location of major barrier deposits within the Warren Point Sandstone.

Figure 3 shows the stratigraphic distribution of Hobday bed forms (types B, C, and F) in Pennsylvanian rocks exposed along the W Road on Signal Mountain, Tennessee. Presumably, W Road exposures are located behind the area of barrier development.

Figure 4 is a sedimentational model of an extremely localized occurrence of back-barrier development during early Pennsylvanian time in Tennessee.

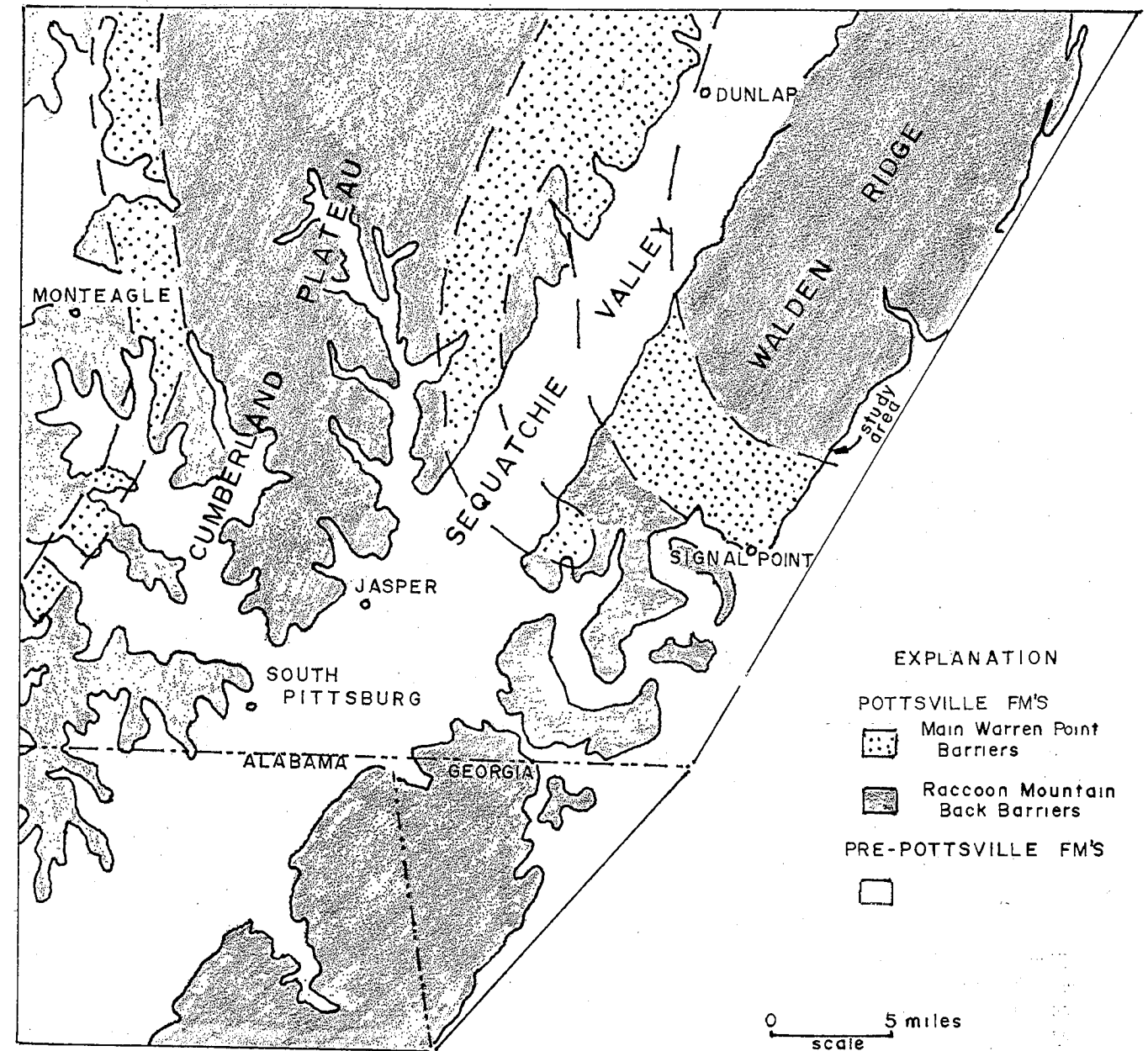


FIG. 2: Generalized geologic map showing location of major Warren Point barriers and Raccoon Mountain back barriers in Tennessee. Barriers and back barriers are not differentiated in Alabama and Georgia. Adapted from Milici (1972).

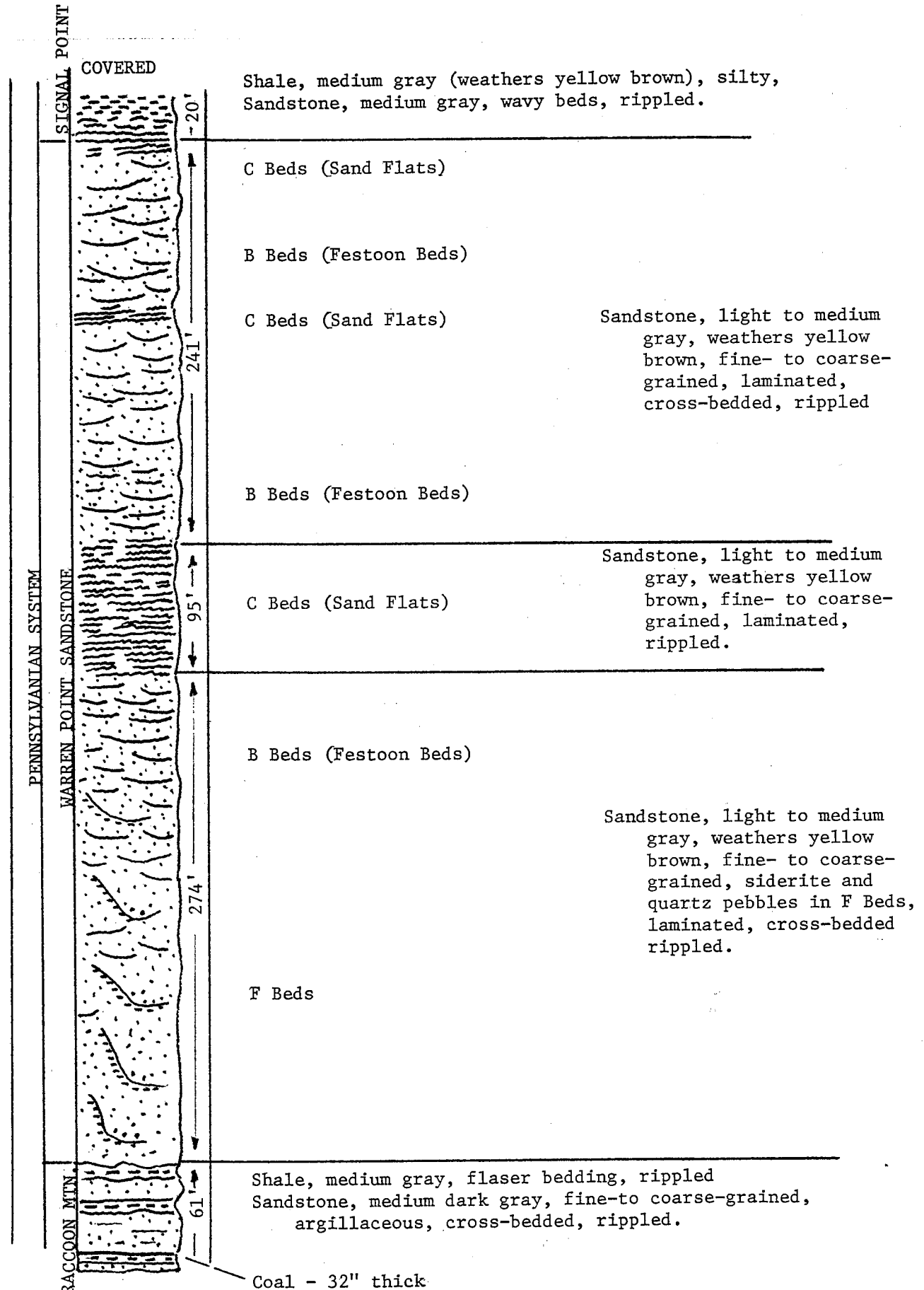


FIG. 3: Stratigraphic column of Pennsylvanian System along W Road, Signal Mountain, Tennessee.

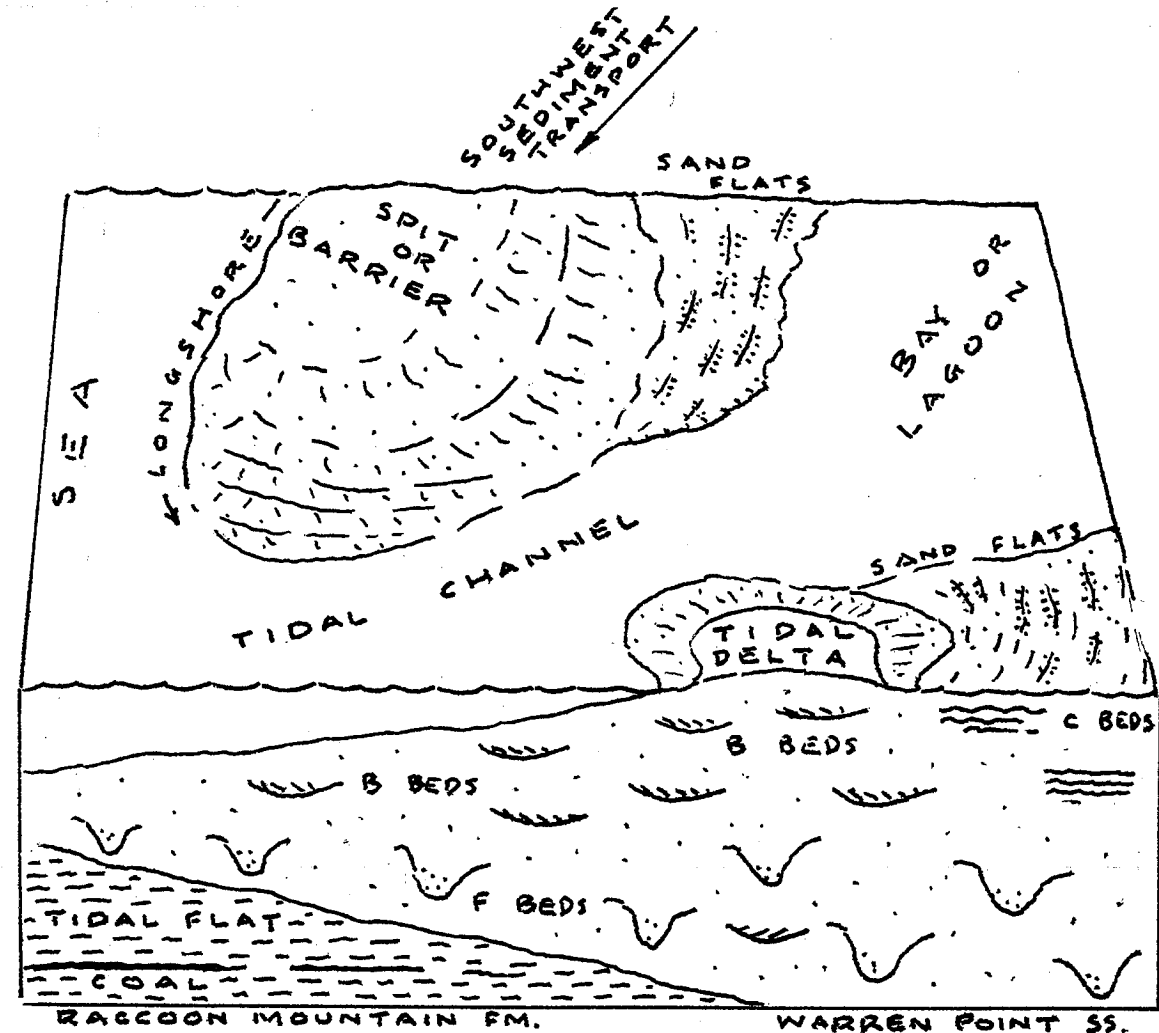


FIG. 4: Sedimentational model of Pennsylvanian Exposures along W Road, Signal Mountain, Tennessee.

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