

2. STRATIGRAPHY

Several factors require that a detailed analysis of the stratigraphy, including a review of previous investigations, be presented before consideration is given to the systematic paleontology. First and most important of these is the necessity of providing a framework in which to record the precise stratigraphic occurrence of all fossil collections. Second, because of the many conflicting interpretations and diverse definitions by past workers (Fig. 3), there is considerable confusion as to exactly what has been, or may be, intended by past and current use of the terms "Cloverly, Morrison, Greybull, Pryor, rusty beds", etc. Consequently it is essential that stratigraphic terminology as used in this report be clearly defined and compared as precisely as possible with the usage of previous workers. To accomplish this, it was necessary to visit the sites of all previously published measured sections. Charts 1 to 7 compare these earlier interpretations of specific sections with the terminology of this report.

The sole purpose of the lengthy stratigraphic discussion which follows is to eliminate diverse or inconsistent applications of terminology as a source of confusion, so that the collections reported here can be placed in any or all stratigraphic contexts (Darton's, Lee's, Fisher's, Hewett's or Moberly's, etc.). It is not important to me at this point which usage the reader prefers. What is important is that stratigraphic data relating to our collections be accurately and unmistakably translatable into terms that have been used by others. Darton's Cloverly Formation exists as a formal term, at least, and has been applied by numerous geologists to rock strata within the western interior. It has not yet been demonstrated, however, whether or not his *specific lithic units* can be recognized with certainty outside the immediate vicinity of his type area. Most geologists after Hewett and Ziegler believed that they could distinguish between Darton's Cloverly and the Morrison Formation; a few, however, have declined to select a boundary. Whether or not this nonmarine sequence should be subdivided into two formations is not of primary concern in this report (although it is my own opinion that such twofold division is both useful and warranted on stratigraphic grounds). The primary concern is whether Darton's Cloverly Formation can be recognized with certainty throughout the Bighorn Basin and adjacent regions. My conclusion is that it can.

In the discussions that follow it will be evident that identification and correlation of specific lithic units within the Morrison-Cloverly sequence are often extremely difficult. Persistent key horizons are rare or difficult to recognize in widely separated exposures. Few lithic units seem traceable over great distances with any degree of confidence. Correlations between spot localities are questionable, to say the least, due to pronounced lateral and vertical facies changes, wedging and erosional gaps in the section. The only practical method upon which to establish correlations is by walking out exposures, but, in spite of an abundance of exposures in the study area, outcrops are discontinuous and in some places separated by several miles or more. Fortunately (or unfortunately), the only means of discovering fossil vertebrate remains is by walking out exposures, and in the course of our search the entire outcrop belt of the Morrison-Cloverly sequence encircling the Bighorn Basin (Fig. 2, follows Chart VII) was traversed. The generalized stratigraphic section that follows is based on observations and data collected on this traverse. Documentation is presented at the back of this report in