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# AGE OF AMSDEN FORMATION, CHERRY CREEK, WIND RIVER MOUNTAINS, WYOMING

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*Contribution of the Geological Survey of Wyoming*

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# AGE OF AMSDEN FORMATION, CHERRY CREEK, WIND RIVER MOUNTAINS, WYOMING[1]

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*Abstract.*—Six new collections of fossils from the lower part of the Amsden formation at Cherry Creek, Wind River Mountains, Wyoming, place the Mississippian-Pennsylvanian boundary more than 48 feet and less than 63 feet above the Madison limestone. The lower faunas are Chesteran in age, and the upper faunas are tentatively dated as Atokan. The name "Sacajawea formation" is rejected for the Mississippian beds at Cherry Creek.

The presence of two sandstones in the Amsden, both of which have been called "Darwin sandstone," is inferred, and it is pointed out that the Amsden at Cherry Creek contains beds that are specifically excluded farther north in the Wind River Mountains. Until the faunas of the type Amsden are made known it will be impossible to decide which use of the name "Amsden" is correct in the Wind River Mountains.

*Introduction.*—There is currently considerable interest in the age of the Amsden formation, stimulated in part by the summary of the problem by Burk (1954). The recent discovery by Bell of several faunules in the lower 70 feet of the Amsden on the north bank of Cherry Creek in SE. ¼, NW. ¼, Sec. 19, T. 31 N., R. 99 W., Fremont County, Wyoming, on the southern flank of the Wind River Mountains, is of sufficient interest to warrant publication in advance of a projected general summary of the faunas of the Amsden and its equivalents in Wyoming.

*Problem.*—The circumstance that led to a reëxamination of the Cherry Creek section was that E. B. Branson and Greger (1918), Morey (1935), and C. C. Branson (1937) collected at Cherry Creek and reported a Mississippian fauna, and Biggs (1951) made a collection of 483 specimens that are Pennsylvanian (Burk, 1954, p. 7).

Biggs' failure to discover any Mississippian forms led Burk (1954, p. 3) to conclude that earlier collections had not been made from the Amsden formation. In order to establish whether two faunas actually do occur in the same formation, Bell visited Cherry Creek several times in 1954 and succeeded in making six collections in the lower part of the Amsden, as shown in Figure 1.

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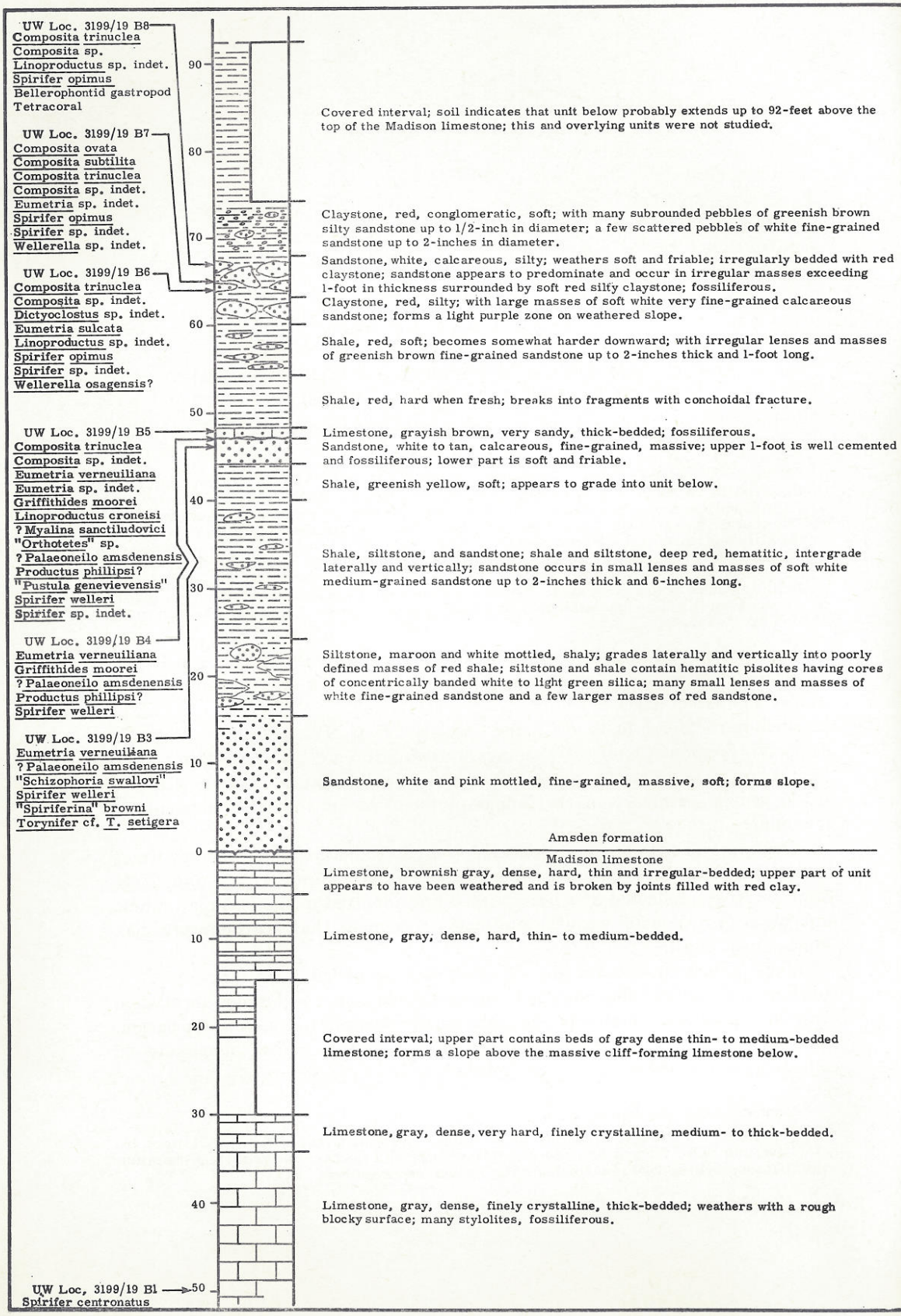


FIG. 1.—Columnar section of lower part of Amsden formation at Cherry Creek, Fremont County, Wyoming.

Bell's collections, all from rocks *in situ*, clearly establish that both Mississippian and Pennsylvanian faunas are present. The Mississippian fossils range to a stratigraphic height of at least 48 feet above the base of the Amsden, and the Pennsylvanian fauna occurs above a point 63 feet above the base. As the lists in Figure 1 show, the lower fauna is that described by Branson and Greger (1918) and Branson (1937). No micropaleontological examination has yet been made for the ostracodes found by Morey (1935), but they should be present. The upper fauna is that described by Burk (1954).

*Age of faunas.*—The Mississippian fauna of the Amsden has been dated as Ste. Genevieve since its description (Branson and Greger, 1918, p. 312; Morey, 1935, p. 474; Branson, 1937, p. 651), but the work of Cooper (1941, p. 12) has shown that most of the ostracodes of the Amsden Mississippian are found in the Clore formation (upper Chesteran) of Illinois. Of the thirteen species described from Cherry Creek by Morey, eleven have been found elsewhere; of these, only *Healdia ornata* has been found below the Menard formation (middle Elvira) of Illinois, and that species is also present in the Menard and in the Reynolds limestone of West Virginia, which Cooper (1941, pp. 12–13) correlated with the Menard. In all, three Cherry Creek species have been identified in the Menard, five in the Clore and one in the Kinkaid of Illinois. In addition, seven Cherry Creek species are present in the Otter formation of Montana, which Scott (1935) provisionally regarded as Chesteran; Cooper's work confirmed Scott's correlation.

Sloss (1946, p. 7) assigned the fauna of the Wyoming "Sacajawea" to the lower Chesteran and noted that it appeared to be older than the fauna in the lower Amsden of Montana.

The brachiopods are less definitive for dating than the ostracodes, but it may be noted that several of the identifications of Ste. Genevieve species in the Amsden seem to be open to question. This problem lies beyond the scope of this article.

The Pennsylvanian fauna of the lower Amsden is clearly distinct from the Elvira fauna, although there are some close resemblances, if not specific identities between them. The most obvious changes are from *Spirifer welleri* to *S. opimus* and from *Eumetria verneuiliana* to *E. sulcata*. Also, the principal *Compositae*, although identified as *Composita trinuclea* in both faunas, are distinguishable. Negatively, the trilobite *Griffithides moorei* is abundant in the Mississippian fauna though no Pennsylvanian trilobites are known at Cherry Creek.

Even though the Pennsylvanian fauna is distinctive, it is not now possible to date it precisely. It presents only superficial resemblances to the Morrow fauna (Mather, 1915), yet work elsewhere in Wyoming suggests that the fauna appears low in the Pennsylvanian. The suggestion is made here that the fauna is Atokan, but this dating is highly tentative and is subject to revision.

*Conclusion.*—In this note the following conclusions are drawn only about the Cherry Creek section and their wider application is left to a later, more comprehensive summary.

1. Branson and Greger (1918), Morey (1935), and Branson (1937) were correct in stating that a Mississippian fauna exists in the Amsden at Cherry Creek.

2. Burk (1954) was also correct in identifying a Pennsylvanian fauna there.

3. Hence, Branson and Greger, who identified the formation as Mississippian, and Burk, who called it all Pennsylvanian, were in error.

4. The use of the name "Sacajawea formation" at Cherry Creek is not justified, for the Mississippian beds do not here constitute a mappable unit under present mapping standards: in this the writers disagree with Branson (1937, pp. 651–52). However, possibly such terms as "Sacajawea fauna" or "Sacajawea beds," used in a colloquial sense, may be applicable at Cherry Creek.

5. Since the basal sandstone of the Amsden at Cherry Creek lies below the

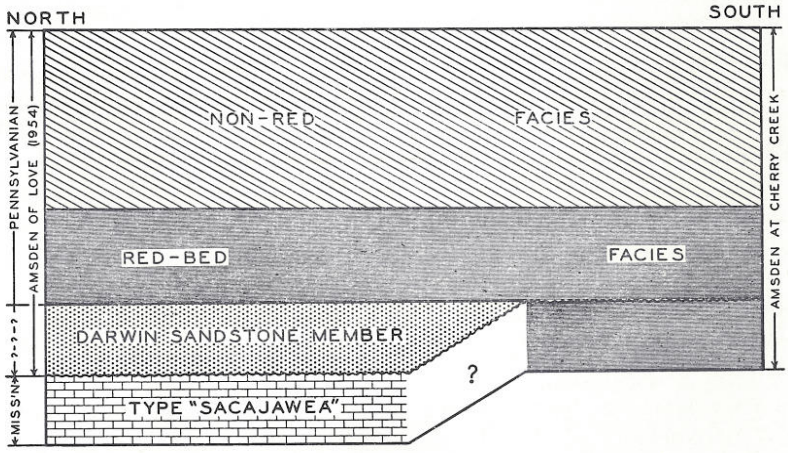


FIG. 2.—Diagram of stratigraphic nomenclature of Amsden formation in Wind River Mountains. Not drawn to scale.

Mississippian fauna it is not the same lithic unit as that identified as Darwin sandstone by Biggs, Blackstone, Love, and Thomas (quoted by Burk, 1954, p. 4) and Love (1954) elsewhere in the Wind River Mountains. Thus, there are two sandstones, both lying at the base of a redbed sequence, that have been confused as one. The systemic boundary may lie below the upper sandstone, but it can not lie below the lower one. Love's correlations (1954) strongly suggest that the upper sandstone is the correlative of the type Darwin.

*What is "Amsden" in Wind River Mountains?*—The Cherry Creek discoveries present a problem in stratigraphic nomenclature that is at the moment insoluble. Since the writers do not recognize that the Mississippian part of the redbed sequence at Cherry Creek can be mapped separately from the Pennsylvanian part, they consider the entire succession between the top of the Madison and the base of the Tensleep as one formation, which they call "Amsden" (Fig. 2). But elsewhere in the Wind River Mountains, Love (1954) and others have restricted

the Amsden to the beds above and including the upper sandstone noted earlier, thus, excluding the known Mississippian from the Amsden. Thus, the Cherry Creek section includes Mississippian beds that are excluded from the Amsden on the north. This dual usage of the name "Amsden" is confusing and undesirable, but solution of the problem lies in the type area of the formation, on Amsden Creek, in the Bighorn Mountains. If the typical Amsden contains both the Mississippian and Pennsylvanian faunas, the Cherry Creek section is also typical Amsden, and Love's restricted Amsden should be renamed. Conversely, if the type Amsden lacks the "Sacajawea fauna," the restricted Amsden is proper, and the Cherry Creek section should be renamed. In view of the present lack of definitive information on the type Amsden, it would be unjustifiable to try to choose either of these alternatives now.

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