

Fig. 2. Stratigraphic column for White-Inyo Mountains, California, showing positions of *Pteridinium* (?), *Rusophycus-Cruziana*, and *Wyattia* and their relation to other Lower Cambrian forms. Modified from Nelson (8).

middle Cambrian forms (10, plates 39 and 40), and this organism is known from published illustrations and extensive collections studied to have been more prone to a sedentary life in the Cambrian and to moving about in younger rocks. *Rusophycus-Cruziana* also has distinctive forms that vary with age, as did their makers. As to affinities, trilobites have been reported (11) in place in such markings, although illustrations of the association are unknown, and *Rusophycus-Cruziana* is widely considered to be a trilobite sitz-mark and crawl-track association. The paired scratches that make it up clearly indicate that the maker had chelate appendages, was certainly an arthropod, and may well have been a trilobite. The most closely reasoned case for this interpretation is that given by Walcott (10, especially the figures and explanations for plates 37 to 40), who attributes such markings to trilobites without reservation. Be that as it may, a survey of publications and collections at hand shows strong similarity between *Rusophycus-Cruziana* in the Deep Spring Formation (Fig. 1, E-G) and known Cambrian forms (for example, Fig. 1D). On these grounds we take the level of the Deep Spring collections of these forms (locality 7, Fig. 3B; localities 1, 3, Fig. 3A) to be within the Cambrian in the strict sense, just as much as if shell-bearing trilobites had been found at the same place. This opinion has also been expressed by Brian Daily (12) of South Australia, a student of the Ediacaran fossils and sequence (13), following his study of the same and other specimens from Nelson's collections.

Next we may turn to the occurrence reported in the Reed Dolomite (14) of the calyptomatid "mollusc" (15) *Wyattia*, which compares with representatives of the family Globorilidae. Examination of the type locality indicates that the *Wyattia*-bearing beds are within the basal Deep Spring Formation rather than uppermost Reed Dolomite as reported (14). This locality (5, Fig. 3B) is about 600 feet stratigraphically below the possible *Pteridinium* from the Deep Spring beds, and, as globorilids have previously been reported only from rocks of Middle Cambrian age, may be taken as at least strongly suggestive of a Cambrian age. *Wyattia*-like forms occur also in the upper part of the Reed Dolomite (locality 4, Fig. 3A), supporting conclusion 1 below.

What conclusions can we draw from all this? We suggest the following:

1) In the southwestern Great Basin, the Phanerozoic-Cryptozoic boundary is at least as low as the upper beds of the Reed Formation and is here provisionally placed at the boundary between the Reed and Wyman formations. There is, to be sure, as yet no positive evidence for the Precambrian age of the Wyman formation, but it has always been considered Precambrian and occurs unconformably below the Reed. Better evidence pro or con

should be sought, but until it is found we provisionally accept the conventional age designation.

2) The bottom of the Cambrian in the usual sense, based on *Rusophycus-Cruziana*, is in our judgment at least as low as upper Deep Spring and probably below Deep Spring.

3) Evidence from this region suggests, although it does not prove, near coincidence between Phanerozoic-Cryptozoic, Paleozoic-Precambrian, and Cambrian-Precambrian boundaries.

4) The very early metazoan fauna

represented by elements of the Ediacaran of South Australia, the Nama beds of South West Africa, and occurrences in England and the U.S.S.R. may also be present in the middle Deep Spring beds of the southwestern Great Basin. If so, these strata are referable not only to the Phanerozoic, but, logically, also to the Paleozoic and probably to the Cambrian.

5) The only reasonable alternative is to recognize at the base of the Phanerozoic Eon (and Paleozoic Era) an Ediacaran Period as proposed by the Termiers (16). In favor of this is the possibility that there was an interval of "pre-skeletal" evolution during which most but not all metazoans were planktonic and shell-less. In the eastern California sequence, however, this would represent, according to provisional placement of the Phanerozoic-Cryptozoic boundary, only a relatively thin and historically uneventful sequence of beds—perhaps 1800 feet to *Wyattia* or 3000 feet to the lowest yet known *Rusophycus-Cruziana*.

PRESTON E. CLOUD, JR.
C. A. NELSON

Department of Geology, University
of California, Los Angeles 90024

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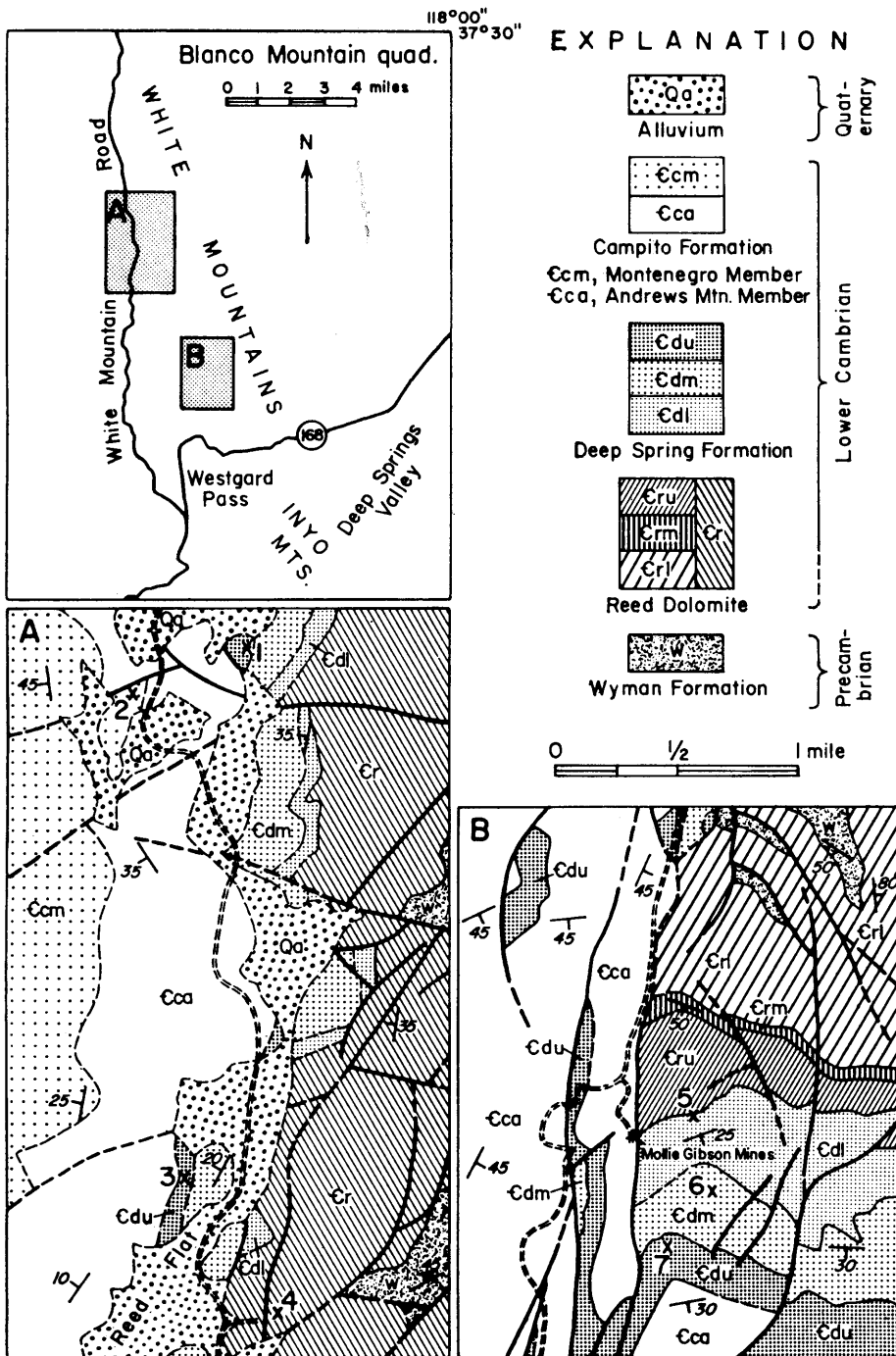


Fig. 3. Index map and geologic maps showing geologic occurrence of localities (x, 1-7) in White-Inyo Mountains. Geologic maps from Nelson (9).

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