where the lowest trilobite body fossils occur, in the middle of the Andrews Mountain Member of the Campito Formation. However, if one includes all shelled metazoans in the Lower Cambrian, the base of the Cambrian would here be lowered to within the uppermost part of the Reed Dolomite, where the small, conical, shelled Wyattia occurs. Another possibility is placing the basal Cambrian boundary at the first unconformity below the lowest trilobite (here the base of the Reed Dolomite; the underlying Wyman Formation is considered Precambrian).

The interval between the lowest trilobite and the unconformity separating the Wyman Formation and Reed Dolomite has been referred to as "Cambrian or Precambrian?." Similarly labelled intervals occur in other Precambrian-Cambrian transitional sections around the world, where small shelled fossils, abundant trace fossils, or soft-bodied metazoans occur below the lowest trilobite, brachiopod, or archaeocyathid body fossils.

With the use of trace fossils to delineate or define the base of the Cambrian, the troublesome "Cambrian or Precambrian?" interval can be eliminated in most sections.

Stratigraphic sections that span the Precambrian-Cambrian boundary have been described, with emphasis on the contained trace fossils, from the following areas: southern Cordillera of Canada, east Greenland, Finnmark, southern Sweden, South West Africa, and southern and central Australia. Almost all bear similarities to the White-Inyo Mountains section in the relationship of the trace fossils to the body fossils. The general pattern that emerges is that in rocks of definite Early Cambrian age (above the lowest trilobite body fossils), trace fossils are abundant, diverse, and structurally complex. Below the lowest trilobites, in the "Cambrian or Precambrian?" intervals, trilobite trace fossils such as Rusophycus and Cruziana occur, along with other trace fossils. Below the lowest trilobite trace fossils, trace fossils are rarer and structurally simpler, primarily horizontal unbranched trails and burrows, or simple vertical burrows. The soft-bodied metazoans (Ediacara and similar faunas), where present, occur below the lowest trilobite trace fossils. Finally, in rocks of definite Precambrian age, trace fossils are very rare or questionable.

If the beginning of the Cambrian is to be based on the first appearance of trilobites, then the base of the Cambrian could be lowered to the lowest trilobite trace fossils, because trilobite trace fossils are an indication of the existence of trilobites or the trilobite grade of organization. The fact that trilobite body fossils are not found in the units containing the lowest trilobite trace fossils probably indicates that the earliest trilobites had unmineralized exoskeletons unsuitable for preservation.

I favor placing the base of the Cambrian just below the lowest trilobite trace fossils. In the White-Inyo Mountains section, this is at the base of the upper member of the Deep Spring Formation.

The use of trilobite trace fossils to delineate the base of the Cambrian enables the use of other trace fossils to be used as indices of the Lower Cambrian. Many trace fossils occur in the Lower Cambrian and below the lowest trilobite body fossils, but do not occur below the lowest trilobite trace fossils. Thus the presence of one or more of these trace fossils in rocks of Precambrian-Cambrian transitional sequences or in rocks of doubtful Lower Paleozoic or Precambrian age, would indicate a Cambrian age. These trace fossils can be used where trilobite traces are absent, or as a check on the use of trilobite traces to delineate the base of the Cambrian.

The non-trilobite trace fossils which can be used as indices of the Early Cambrian include the following ichnogenera: Diplocraterion, Monocraterion, Laevicyclus, Bergaueria, Phycodes, Arthrophycus, Zoophycos, Teichichnus, Rhizocorallium, Chondrites, Syringomorpha, Cochlichnus, Belorhaphe, Plagiogmus, and Psammichnites.

Ichnogenera which cannot be used in this manner, because they are known or reported to occur in rocks below the lowest trilobite trace fossils, include Skolithos, Planolites, Scolicia, Curvolithus, and simple, unbranched, horizontal trails or burrows.

In summary, the use of trilobite trace fossils as indices of Cambrian age and as an aid in delineating the base of the Cambrian is advisable for the following reasons.

1. The base of the Cambrian is still founded on the presence (though indirect) of trilobites.
2. The first appearance of trilobite trace fossils roughly coincides with the first appearance of other trace fossils (U-shaped burrows, anemone burrows, branched burrows, various feeding burrows). This relatively sudden appearance and abundance of trace fossils (made by arthropods, worms, coelenterates) probably represents the first explosive radiation and evolution among the metazoans, and thus affords a convenient and meaningful position for the base of the Cambrian.
3. Trace fossils are abundant and widespread in rocks of earliest Cambrian age.

The contents of this section are more fully discussed in Alpert (in press).

REFERENCES

Alpert, S. P., 1973, Bergaueria Prantl (Cambrian and Ordovician), a probable actinian trace fossil: Jour. Paleontology, v. 47, p. 919-924.

———, 1975, Planolites and Skolithos from the Upper Precambrian-Lower Cambrian, White-Inyo Mountains, California: Jour. Paleontology, v. 49, p. 508-521.

———, 1976, Trilobite and star-like trace fossils from the White-Inyo Mountains, California: Jour. Paleontology, v. 50, p. 226-239.

———, (in press), Trace fossils and the basal Cambrian boundary, in Crimes, T. P., ed., Trace Fossils, v. 2, Geological Jour., special issue.

———, and Moore, J. N., 1975, Lower Cambrian trace fossil evidence for predation on trilobites: Lethaia, v. 8, p. 223-230.

Cloud, P. E., and Nelson, C. A., 1966, Phanerozoic-Cryptozoic and related transitions: new evidence: Science, v. 154, p. 766-770.

Durham, J. W., 1974, On the Precambrian-Early Cambrian trace fossil Plagiogmus: Geol. Soc. America Abstr. with Programs, v. 6, no. 3, p. 170.

Langille, G. B., 1973, "Uppermost Precambrian-Lowermost Cambrian" ichnocoenoses, Inyo County, California: Geol. Soc. America Abstr. with Programs, v. 5, no. 2, p. 186.

Nations, Dale, and Beus, Stanley, 1974, Pellet-lined burrows in Poleta Formation (Lower Cambrian) of White-Inyo Mountains, California: Geol. Soc. America Abstr. with Programs, v. 6, no. 3, p. 225.

Wiggett, G. J., 1973, Occurrence and implications of trace fossils in the Lower Cambrian of the White-Inyo Mountains, California: Geol. Soc. America Abstr. with Programs, v. 5, no. 1, p. 122.