The Upper Cretaceous (Campanian) ammonite and inoceramid bivalve succession at Sand Creek, Colusa County, California, and its implications for establishment of an Upper Cretaceous Great Valley Sequence ammonite zonation

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with 2 figures and 2 tables

Abstract. Megafossil collections from strata of Campanian age on Sand Creek, Colusa County, California show the presence of three stratigraphically differentiable ammonite and inoceramid faunules. In ascending order, these three faunules are correlative with the *Inoceramus schmidtii* Zone, *Baculites chicoensis* Zone, and *Hoplitoplacenticeras vancouverense* Zone of the Nanaimo Group (Ward, 1978a). The Sand Creek locality is the only known area in California where these three megafossil assemblages can be recognized in the same section. The succession of species on Sand Creek indicates that previous reports on the relative stratigraphic distribution of Campanian index ammonites and inoceramids in California are incorrect.

Introduction

The development of a high resolution megafossil zonation for the Upper Cretaceous portion of the Great Valley Sequence in California has been impeded by the high proportion of unfossiliferous facies among surface exposures, structural complication of sections, and the highly discontinuous nature of those sections sufficiently fossiliferous to be useful in establishing a zonation. Matsumoto (1960) and Popenoe et al. (1960) both published lists of short ranging species in their inferred stratigraphic succession within the Great Valley Sequence. In neither case, however, were formal zones defined.

We have studied a sedimentary succession on the west side of the Sacramento Valley, at Sand Creek, Colusa County (Fig. 1). This locality has long been known as one of the few places in the western valley where ammonites and inoceramid bivalves are common in the upper part of the Cretaceous section. Both Matsumoto (1960) and Popenoe et al. (1960) have correlated the Sand Creek and other nearby sections in the Rumsey Hills with the middle part of the Campanian stage, because of the presence of two key species:

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