BURBANK HILLS, UTAH, U.S.A., PROVIDE A PARADIGM FOR MIDDLE AND LATE DEVONIAN EVENT STRATIGRAPHY.

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Introduction: Our study of the Burbank Hills Upper Devonian sequence began in 1968 and a co-worker presented a preliminary measured section[1]. We showed the relation of this sequence to a depositionally distinct, coeval sequence in the nearby Confusion Range and to the developing Pilot basin in the hinterland of the Antler orogeny through a successively improved, conodont-dated, time-rock block diagram[2,3,4]. Herein, we present an updated measured section (Figs. 1, 2) dated by the standard conodont zonation. Most known global[5] and Nevada[6] events, beginning with the late Givetian Middle *varcus* Zone Taghanic onlap, are well displayed by the Burbank Hills depositional sequence. Paleotectonic settings changed upward during the Frasnian and early Famennian from carbonate platform to stromatoporoid reef to basinal slope to backbulge basin. After a continent-wide 4–5 m.y. erosional episode, here involving the middle Famennian Late *marginifera* to Late *postera* Zones, a thin, complex unit, dated as Early *expansa* to *praesulcata* Zones, was deposited. This unit evidences transgressive onlap (dysaerobic black chert) followed by stillstand (oncolite-brachiopod bank) and regression (aerated bypass siltstone).

Major eustatic rises: Cardinal numbers (shown in the columnar sections) refer to numbered Nevada events[6]; Roman numerals refer to numbered Transgressive-Regressive cycles[7]. The Taghanic onlap (1, IIa) is documented by an open-marine crinoidal wackestone, containing brachiopods and rugose corals, overlying a 200-m-thick sequence of peritidal micrite and evaporite-solution breccias. At the base of the Guilmette Formation, the *disparilis* Zone rise (3, IIb) is displayed by a yellow siltstone that commonly contains *Spirorbis* worm tubes and columnar stromatolites. The punctata Zone rise (5, IIc) within a shallow carbonate-platform sequence is evidenced only by thicker limestone beds containing a more diverse fauna than the underlying beds. The *semichatovae* rise (8, IId) is displayed by a 23-m-thick sequence (probably the thickest known in North America) of nodular slope limestones containing the ammonoid *Manticoceras*. *Palmatolepis semichatovae* does not range above this interval. Within the lower Pilot Shale, the Early *marginifera* Zone rise (14), which coincides with expansion of the basin, is evidenced by coarser clastics and more limestone interbeds. The Early *expansa* Zone rise (18, IIf) rivals the Taghanic onlap as the major Devonian transgression in North America. This rise is part of an Upper Devonian black shale depositional complex that onlapped the margins of the North American craton[8]. In Utah and Nevada, this rise is evidenced in the Leatham Member of the Pilot Shale by a basal lag sandstone, containing abundant conodonts and ichthy- oliths and an overlying sequence of black chert and chertified shale, siltstone, and sandstone. It is displayed, as described, in the southern Burbank Hills, whereas in the Confusion Range, the black chert contains large micrite concretions. In the northern Burbank Hills, however, the beds that evidence this rise are truncated by a slightly younger unconformity below the basal Late *expansa* Zone quartzitic lag sandstone.

Alamo Breccia Impact Event (6): A couplet of anomalous, chaotically bedded channel deposits, containing hematite-studded and shocked-quartz sand grains, is interpreted to be derived from the Alamo Impact fallout, ensuing megatsunami runoff, and possible post-event torrential rain.

[1] Biller E. J. (1976) USGS OF Rpt. 76-343. [2] Sandberg C. A. and Poole F. G. (1977) U. Calif. Riverside Contrib. 4, 144–182. [3] Sandberg C. A. et al. (1989) Canadian Soc. Petrol. Geol., Mem. 14-1, 183–220. [4] Sandberg C. A. et al. (2003) Cour. Forsch.-Inst. Senckenberg 242, 187–207. [5] Sandberg C. A. et al. (2002) Spec. Pap. 356, 473–487. [6] Sandberg C. A. et al. (1997) BYU Geol. Studies 42-1, 129–160. [7] Johnson J. G. et al. (1985) GSA Bull. 96, 567–687. [8] Gutschick R. C. and Moreman W. L. (1967) Intl. Symp. Dev. System v. 2, 1009–1023.

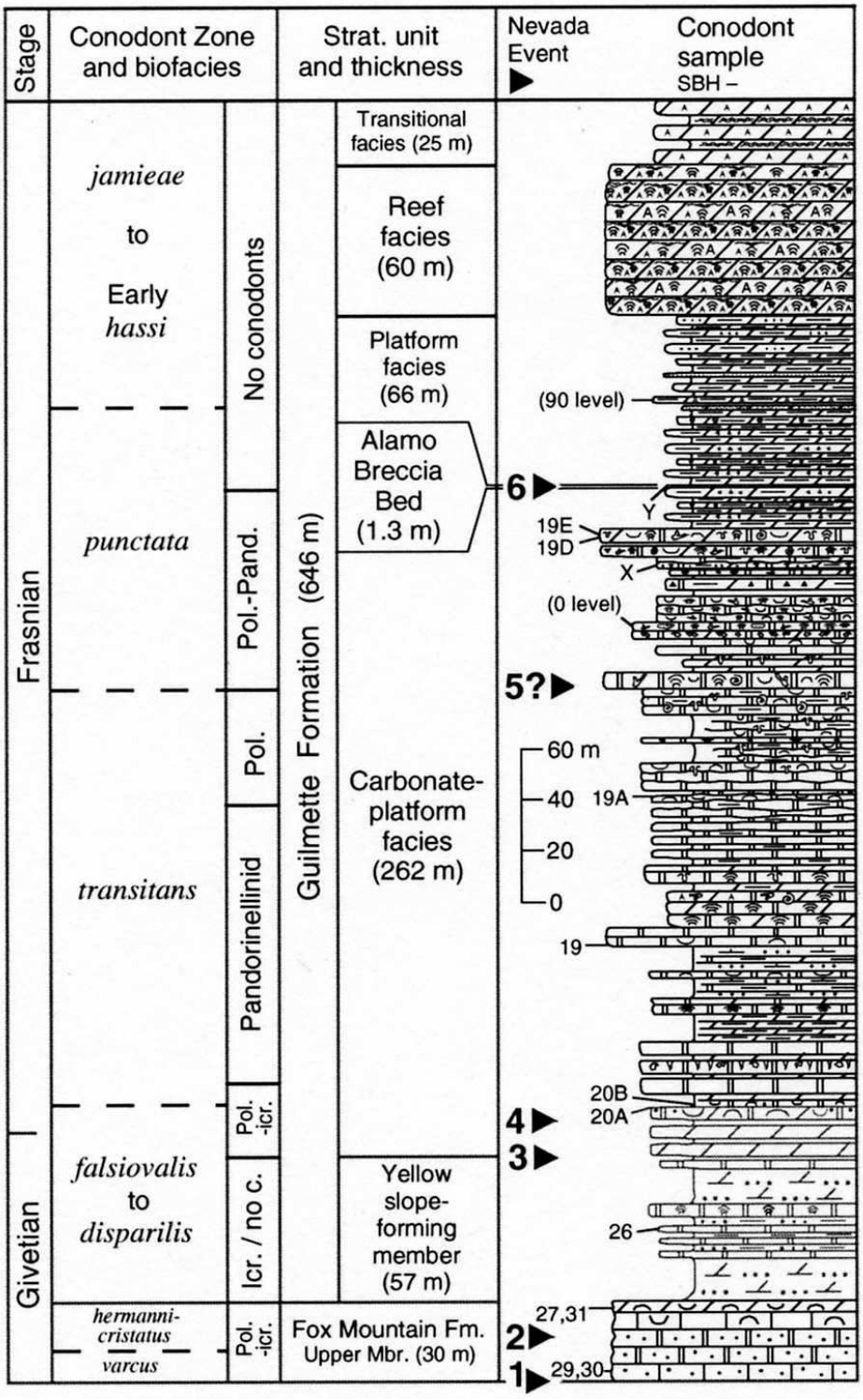
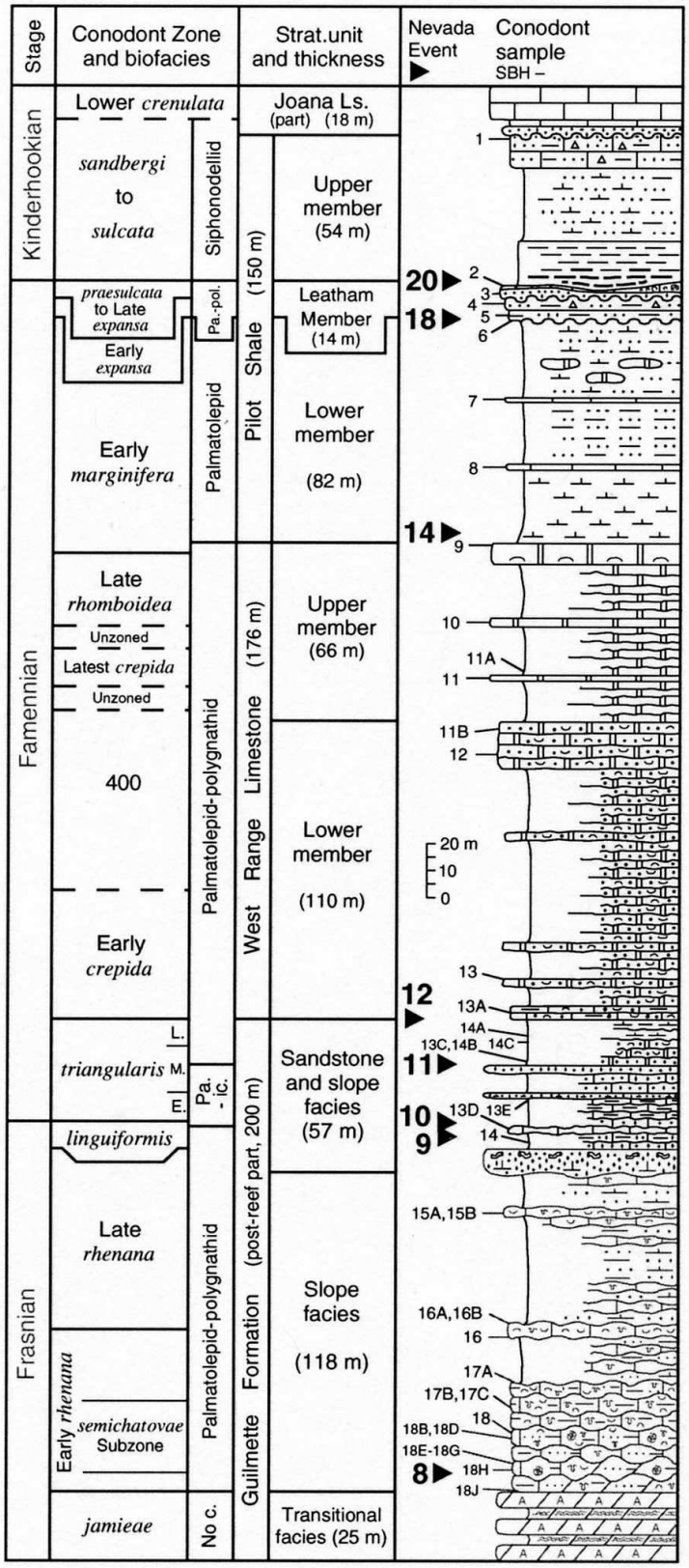


Figure 1 — Lower part of composite section measured at three locations near Big Jensen Pass, Burbank Hills, Utah. Note difference in scale and repetition of Transitional Facies unit. Numbered Nevada events[6] are indicated by solid triangles. Conodont biofacies: Pa., palmatolepid; Pand., pandorinellinid; Pol., polygnathid; Icr. or Ic., icriodid; no c., no conodonts.



Figures 2 — Upper part of composite section measured at three locations near Big Jensen Pass, Burbank Hills, Utah. Note difference in scale and repetition of Transitional Facies. Numbered Nevada events[6] are indicated by solid triangles. Conodont biofacies: Pa., palmatolepid; Pand., pandorinellinid; Pol., polygnathid; Icr. or Ic., icriodid; no c., no conodonts.