have greater diversity than in the thin-skinned regime because the plastic substratum allows easy vertical motion; nearly vertical faults are allowable. (5) The basement does fold, but with difficulty and in broad wavelength. (6) Because of the broad arching, a "neutral surface" exists well within basement over uplifts, allowing high-level features, such as Rattlesnake Mountain, to be bounded by high-angle normal faults. (7) This same neutral surface forces out-of-the-basin crowding, causing the steep flanks of most basin folds to face toward the adjacent uplift.

(8) The "Hafner approach" illustrates the diversity of curved faults that can be generated in a vertically sinusoidally loaded beam, and which can be generated equally well in an end-loaded sinusoidally buckled beam, as long as it sits on a passive plastic substratum. (9) The Sanford model is excellent for depicting the fault configuration generated in sediments above a high-angle fault. (10) Faults such as Dinosaur Monument can be seen to steepen downward, but my models suggest that they go listric at their lower transition with the plastic substratum. (11) The COCORP trace of the Wind River fault indicating a nearly planar 35° dipping fault most of the way through the crust is probably real; arguments that you cannot see a fault of "granite" against "granite" do not apply. (12) Gravity highs over uplifts, models, and later collapsed uplifts speak for a flexed and jostled slab configuration and against a buoyant root configuration.

(13) Thrusting from several different directions appears not to be a problem when viewed in the context of "jostled slabs." (14) Blocky corners do place limits on amount of thrust and strike-slip translation. (15) The argument for pure verticality to solve a presumed "space problem" in the Piney Creek structure loses validity as soon as the bounding tears are allowed to stray from a perfectly vertical dip. (16) The argument at Elk Mountain that the dip of the bounding structure must be at least as low-angle as the degree of overturning of sedimentary panels is wrong (proven by Five Springs).

(17) Sales' eastward crowding of the Colorado Plateau and development of a "Wyoming couple" north of it still seems cogent. (18) The Chapin and Cather, and Gries subdivision into movement phase also appears to be correct. (19) If horizontal compression is a reality, Stone must be correct in principle; there have to be logical connecting structures. (20) The crust can transmit stress over great distances because it is weak enough; southeast Asia tectonics require greater distances of stress transmittal than Laramide foreland tectonics.

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Horizontal Compression and a Mechanical Interpretation of Wyoming Foreland Deformation

If the basement fault-controlled style of deformation in the Wyoming foreland is dominated by elastic response of the upper lithosphere, and the deformation in the foreland is genetically linked to the horizontal compression characteristic of the thin-skinned thrust belt to the west, then concepts of continuum mechanics can be combined with results of experimental rock mechanics to suggest the following.

(1) Basement faults initiate at the basement surface, propagate downward at an approximate 35° dip, and die at a depth dependent upon the magnitude of elastic shortening. Displacement on these faults necessarily decreases with depth. The faults are not expected to be appreciably curved in cross section.

(2) Foreland structures develop early as fault-cored folds of small amplitude (< 1,500 m, 4,900 ft), with selected ones developing to large amplitudes (up to 13,000 m, 43,000 ft). Regions where the entire lithosphere has not "failed" (early stage) show only small-scale structures (e.g., Colorado Plateau), whereas regions where the lithosphere has experienced through-going failure will show small intra-basinal structures (early) isolated by more widely spaced large basin-margin structures (late). This bimodal size distribution of structures is present in the Wyoming foreland.

In this study, horizontal compression as a sole causal mechanism can be combined with accepted mechanical concepts to produce a plausible model which adequately explains the regional features of Wyoming foreland deformation.

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New Sources of Gold in the West

Records show discovery of, perhaps, 40,000 gold and silver deposits in western United States. Mine descriptions give dates of operation and allow correlations with history. These mine histories commonly indicate that the properties have further potential. Many of the prospects left 50, 75, and even 100 years ago are of interest today because of new geological concepts. Simple veins of yesterday may be the exposed parts of larger entities. The old ore controls, structures, or zones may be tied to larger lineaments, elements, or zones. In younger deposits, corollaries are often made with geothermal fields. Lineations and cross lineations require further consideration. Connections with plate tectonics come easily.

As an example of the increase in size of useful parameters, the line of segmentation portrayed in coast ranges of northern California and Oregon might be looked upon as lines marking transverse zones of extension. Better known zones of extension are parts of the very large fault network centering around the San Andreas and Garlock faults, and parts of the Imperial Valley region south of the Salton Sea, a well known geothermal area. Corollaries with such areas are sought, for example, along lines marked by the Antler and Sevier tectonic belts in Nevada.

In other western areas, pillow lavas occur in close proximity with gold occurrences which stimulates thinking along lines of spreading centers and submarine springs.

The old gold and silver deposits appear to fit readily into a framework, in which treatment of prospects as segments within a geothermal model is helpful. Conversely, with the growth of geothermal development, the view of activity will be incomplete without consideration of the potential by-products, precious metals.

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Synorogenic Sedimentation Associated with Development of Paris-Willard Thrust System, Wyoming-Idaho-Utah Thrust Belt

Depositional environments, facies distribution, and provenance analyses of Upper Jurassic through lowermost Upper Cretaceous strata in western Wyoming, eastern Idaho, and northeastern Utah suggest that episodic tectonic activity along the Paris-Willard thrust system strongly influenced deposition during early development of the Wyoming-Idaho-Utah thrust belt and associated foreland basin. Synorogenic conglomerates present at various stratigraphic levels in these strata reveal periods of rapid uplift. In general, the synorogenic units contain proximal cobble-boulder conglomerates (braided stream) which grade downslope into distal pebble conglomerates and coarse-grained sandstones (meandering stream). Periods of relative tectonic quiescence and/or less rapid uplift and erosion are represented by interbedded finer grained fluvial, lacustrine, and marine deposits.

During the Late Jurassic, erosion of incipient highlands prior to thrusting resulted in eastward progradation of beach/barrier sandstones represented by the Stump Formation. Initial intensive thrusting followed in the latest Jurassic and earliest Cretaceous, with the newly formed highlands shedding proximal braided stream cobble-boulder conglomerates and more distal meandering stream pebble conglomerates and sandstones of the Ephraim Formation into the subsiding foreland basin. Continued subsidence coupled with a decrease in clastic input due to subdued uplift, resulted in establishment of extensive lacustrine systems and deposition of the Peterson Limestone. Renewed movement on the Paris-Willard thrust system then gave rise to the proximal conglomerates and distal sandstones and mudstones of the Bechler Formation. The overlying lacustrine Draney Limestone and marginal lacustrine Smoot Formation represent another period of continued basin subsidence with little or no uplift.

The Wayan and laterally equivalent Bear River Formations represent, respectively, near-source fluvial and shallow beach-marine deposition following Smoot/Draney accumulation. Wayan strata were deposited on a meandering stream flood plain and are indicative of slow uplift and erosion in the source area. Bear River strata consist of a beach sandstone unit underlain and overlain by transgressive marine shales. Alternate deposition of transgressive and regressive facies resulted from either eustatic changes in sea level or differential uplift and erosion of the Paris-Willard highlands.