d24 Coast Ranges and Insular Mountains

< U.S. northwest and British Columbia, ongoing folding, faulting >

> The oil age will come to an end, but not for lack of oil, just like the Stone Age came to an end, but not for lack of stone.
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> — Sheik Ahmed Zaki Yamani
> a founding architect of the Organization of Petroleum Exporting Countries.[1]

> Wind and solar power have been dropping about 50 per cent in price per decade over the past 30 years. Even with smaller future price drops of 30 per cent per decade, they will become competitive around mid-century and could likely overtake most of our energy consumption before the end of the century.
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> —Bjorn Lomborg, 2002.[1]

In North America, the youngest folds are in Cenozoic rocks. In California, these folds near the coast are little eroded and show as ridges in both the onshore and the submarine offshore topography.[2] Oil wells can be sited using this topographic information (***Footnote d24.1***). The orogeny that is currently taking place is called the *Pasadenan* (Stille, 1936)[3] or the *Coast Range* orogeny.

Flysch is the name given to generally thick, monotonous, sequences of rhythmically alternating thin beds of shale and thin beds of graded-bedded graywackes. In flysch, macrofossils are notoriously rare, but meandering feeding trails of ichnofauna (trace fossils of animals) are common. High-resolution microfossil, microfacies, and palynofacies studies usually find that flysch has accumulated in moderately deep to deep marine waters. Flysch is a name originally applied to a formation of Tertiary rocks in the northern Alpine region of Europe. Identical appearing rocks (called *turbidites*) interbedded with pillow lavas, build the Coast Ranges of the northwest and the Insular Mountains of British Columbia. This region has been subject to compression and folding throughout the Cenozoic. Deepening alternated with underthrusting and uplift. The turbidite facies also include "wild flysch," which is a coarse mudflow conglomerate of chaotically slumped shallow-water deposits. The Coast Ranges expose above sealevel slices of Cenozoic and Mesozoic age rocks and slivers of serpentinized mantle rock (serpentinite is California's state rock but unhappily it bears tremolite that when released to the wind by weathering puts nearby residents at increased risk of mesothelioma).[4] The Mesozoic rocks (as at Patrick's Point State Park)[5] include crystalline blueschists,[6] and chevron folded deep-water marine turbidites. This formation is called the *Franciscan* and because it is complexly folded and fault sliced, it is referred to as a mélange. The Franciscan fm is a terrane that was added to the west coast during the Late Jurassic period.[7] ❑

Footnote d24.1 Crude oil prospecting began in earnest after Canadian geologist Abraham Gesner in 1849 showed how kerosene, which betters whale oil as an illuminant, can be distilled from it.[8] In California, the first oil well was drilled manually in Humboldt County in 1861 and the first commercial oil field was discovered 1875 at Pico Canyon, Los Angeles County. The "California oil boom" followed the discovery of this "black gold" in 1899 in a shallow hand-dug oil well on the west bank of the Kern River. Derricks (eponym for British inventor Thomas Derrick, a rapist coerced to be a hangman for a pardon and in 1609 executioner of his pardoner the Earl of Essex for treason, of a better gallows rig)[9] then sprouted in the San Joaquin Valley farmlands, and a string of spectacular gushers, as the Lakeview Gusher, is the history.[10] About 13% of the original oil in place has been recovered using primary production methods. Since 1961, injected-steam-soak stimulation (a method piloted by Shell at Yorba Linda field in Los Angeles) of otherwise unflowing (high viscosity) oil resulted in an 8-times increase in production.[11] Some 31,000 yet-producing wells produce about 1% of the total world production even though productive offshore drilling in California has been banned[12] ever since fouled beaches and wildlife resulted from crude spilled into the Santa Barbara channel by the blow-out of Dos Cuadros field, February, 1969.[13]