semblymen and senators, and even engineers, can be of some assistance. The profession has dallied for years on the primrose path of apathy, except for periodic outraged reaction to intrusion on its preserve by others. As a "program" this mixture of apathy and outrage is reminiscent of the life of a porcupine. Fortunately there are other paths to take. The profession has the capacity for making a rational choice from the overlapping yet conflicting programs offered by registration (equals licensing), certification, and incorporation (equals chartering). If you do not know the precise differences among these terms, this is as good a time as any to find out. If you do know, and have an interest in the profession at which you work, this talk offers a 20-minute interval in which to think about it.

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CHRONOLOGY OF DEFORMATION OF PALEOZOIC AND TERTIARY SUCCESSION NEAR RAILROAD VALLEY, NEVADA

Principal structures occurring in the Paleozoic sedimentary section of the Horse Range are thrust faults (some placing older over younger rocks, but most placing younger over older), north-south-trending, asymmetrical, eastward-overturned folds, and high-angle faults. Pre-Oligocene deformation of these Paleozoic rocks is indicated by Oligocene volcanic rocks lying with angular unconformity on overturned Ordovician strata.

In the dissected pediments west of the Horse Range, a 10,000-foot-thick sedimentary and volcanic succession of Oligocene, Miocene, and Pliocene rocks crops out (Moores, 1965). The Miocene-Pliocene part of the section lies disconformably on Oligocene volcanic rocks and consists of an assemblage of terrestrial strata, including indurated ash beds, lacustrine limestone, and immature detrital deposits which contain angular Paleozoic carbonate and Oligocene volcanic clasts derived from adjacent ranges.

The general parallelism of the Paleozoic and Tertiary successions given as evidence for contemporaneous deformation (Moores, 1965) is expressed only in that they are in contact with one another for a distance of approximately 12 miles. There the parallelism ends. Folds and thrust faults in the Paleozoic rocks trend north-south, whereas folds within the Tertiary succession trend east-west and plunge steeply toward the west. These relations, together with the angular unconformity between the Oligocene volcanic rocks and Paleozoic rocks, temporally separate tectonic deformation of the Paleozoic and Tertiary successions.

Principal deformation of the Paleozoic succession at least preceded the Oligocene volcanic rocks, and may be as old as Pennsylvanian (Ptacek, 1963). Deformation of the Tertiary succession occurred, at least in part, after the Pliocene rocks were deposited, and probably during the Oligocene and Miocene, as is suggested by several unconformities reported in the Tertiary succession (Moores, 1965).

Some occurrences of Paleozoic rocks are in positions that suggest emplacement by gravity sliding during or after deposition of Tertiary rocks. These occurrences can be explained easily as gravity-slide blocks emplaced from adjacent ranges (*e.g.*, Horse and Grant) as the ranges were uplifted along high-angle faults, but in no way imply that the principal deformation of the Paleozoic strata was contemporaneous with deformation of the Tertiary succession.

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CLOSING THE ONSHORE-OFFSHORE GAP

(No abstract submitted.)

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STRATIGRAPHIC FACIES PREDICTION AND RECOGNITION IN YOUNG OFFSHORE BASINS FROM STUDIES OF FOSSIL ENVIRONMENTS

Basic principles of stratigraphy provided by Cambrian paleontology have analogies with Pacific Coast Oligocene, Pliocene, and other rocks. Re-examination of concepts from the time of Hutton (1795) and restudy of the complete fossil record are proposed to interpret the geologic history of new areas of petroleum exploration.

The doctrine of uniformitarianism in sedimentary processes, and uniformitarian biologic laws, provide the key to solution of stratigraphic problems if they are combined with the principle of uniqueness of environments (Nairn, 1965).

Stromatolite reef occurrences from the Precambrian of Glacier National Park (Rezak, 1957) to the Recent of Shark Bay, Australia (Logan, 1961), with oölite, glauconite, and shoal sediment features, illustrate the first principle (unchanging physical geologic processes).

Palmer's biomere concept (1965) for benthonic trilobites and his Upper Cambrian agnostid studies, and the Middle Cambrian agnostid studies of Robison (1964), provide analogy with benthonic and nektoplanktonic fossils of any age under the second principle (uniformitarian biologic laws).

The stratigraphic limitation of the fossil biomere in Cambrian, Oligocene, or Pliocene by historical events, by the migration from eurybathyal to stenobathyal habitats, and by the effect of cyclical climatic events on evolution or extinction shows the third principle (uniqueness of environments).

Analogous examples of the fundamental principles are provided by Foraminifera in benthonic uvigerinid biomeres in the Oligocene of the Pacific Coast. Analogy with cyclothems is found in correlations between cyclical climatic stages of the Pliocene planktonic *Globigerina pachyderma* (Bolli, 1950) in the Los Angeles and Ventura basins, California (Bandy, 1961), and synchronous climatic history in Japan (Kobayashi and Shikama, 1961).

Correlation of cyclical historical events rather than reliance only on syntax of animal or plant fossils is important for regional correlations and sedimentary-facies studies.

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CONTINENTAL MARGIN OF NORTHERN AND CENTRAL CALIFORNIA

The geology of the continental margin offshore from northern and central California, though actively studied in recent years, still is very incompletely known. Much of the available data consists of measurements made at the ocean surface from which deductions have been made regarding the rocks and structures on the sea floor. The nature of the young sediments on the surface of the sea floor is moderately well known from dredge sampling, though not nearly