



WALTER A. ENGLISH (left) receiving Honorary Life Membership from ARTHUR S. HUEY.

phology, Sediments, and Geological History of the Basins of the Santa Maria Area, California." The A.A.P.G. Section presented Honorary Life Memberships to Walter A. English and John R. Pemberton, both now consulting geologists.

Abstracts of the papers on the programs of the combined three groups are arranged in alphabetical order by authors.

EDWIN C. ALLISON, San Diego State College: Bivalves of Lower Cretaceous Alisitos Formation, Baja California, Mexico

More than one hundred bivalve species are recognized in the thick, predominantly pyroclastic, northwestern Baja California section which includes rocks and fossil localities cited in the original description of the Alisitos formation. A majority of the species is new.

Bivalves and associated fossils suggest an Aptian age for most and possibly for all of the section investigated. The environments of deposition were generally sublittoral, including widely distributed reefs of corals and pachyodont pelecypods. Highest parts of the Alisitos formation in the type area were deposited in fresh water.

ORVILLE L. BANDY, University of Southern California: Cenozoic Planktonic Foraminiferal Zonation

Modern planktonic foraminiferal ecology serves to define limitations of Cenozoic zonation. Modern tropical species are abundant and diverse, temperate zone species are sparse and diverse, and cool temperate and polar areas have an extreme abundance of very few species. Keeled globorotaloids are restricted to water temperatures higher than about 17° C., non-keeled globorotaloids to waters warmer than about 9° C., and there are no globorotaloids in polar regions. Thus, a keeled planktonic line is one criterion for the recognition of boundaries of tropical and warm temperate areas in the Cretaceous and Cenozoic. Large heavy tests of planktonic species are indicative of bathyal environments.

Planktonic zonation for the Cenozoic is considered

to have general worldwide uniformity and thus provides a means of recognizing the standard European stages in open marine deeper-water facies of tropical areas of the world. General planktonic parameters include: (1) the development of keeled globorotaloids in the Paleocene and their decline and disappearance in the Middle Eocene; (2) a second development of keeled globorotaloids in the Burdigalian and their continued dominance into the Recent; and (3) the recognition of important times of appearance of specific groups—the *Globigerinoides triloba* datum at the base of the Aquitanian, the *Orbulina* datum at the base of the Burdigalian, the *Globorotalia menardii* datum near the top of the Burdigalian, and the *Sphaeroidinella dehiscens* datum at the base of the Pliocene.

DICK CASEY, Allan Hancock Foundation, University of Southern California: Studies on Ecology of Planktonic Foraminifera and Radiolaria off Southern California Coast

An ecologic study is being conducted on the living planktonic foraminifera and radiolaria off the southern California coast. Collections are being made with Clarke-Bumpus opening and closing, Nansen closing and vertical plankton nets. Initial findings indicate both general and zonal distributions. *Globigerina bulloides* d'Orbigny and *Globigerina quinqueloba* Natland show a general distribution throughout the water column (tows are taken from the surface to a depth of 1,000 meters), whereas *Globigerina pachyderma* (Ehrenberg) and *Globorotalia scitula* (Brady) occur only deeper than 100 and 500 meters, respectively. Morphologic similarities between foraminifera and radiolaria, as illustrated by deep living *Globorotalia scitula* (Brady) and *Phacodiscus* cf. *clypeus* Haekel, are related to their bathymetric distribution. Studies on seasonal variation are as yet incomplete.

ORLO E. CHILDS, U. S. Geological Survey: Career Opportunities in Geology

For the years 1960-61 and 1961-62 a special Committee for Industrial-Academic Relations was appointed. The objective of this committee was to gather facts that would allow a recounting of the history of employment practices and academic training of geologists over the previous ten years; then, to attempt a forecast of this supply and demand relationship over the coming years to 1965. Two detailed questionnaires were sent out in successive years, and final results arrived in March, 1962.

Industry trends continue to emphasize a Master's degree as the basic academic training for professional employment. Thus, five years are needed for the training of a geologist. The five-year training period introduces a critical time lag that distorts the relations of demand and supply if industry is only willing to think of its employment needs on a year-to-year basis.

Geological education fulfills a dual role. We must serve the science needs of the student majoring in other subjects. At the same time, we must provide a sound basic knowledge of general geology and allied sciences for the student majoring in geology. General geological training, with emphasis on field and laboratory courses, is still the most important background for which industry looks in the selection of professional geologists.

Employment demand for geologists will exceed the supply of graduates from universities over the next three years. Already major oil companies are exceeding their normal search for geologists with five or six years of experience. It can be expected that competent, experienced geologists, who have swelled the ranks of