capable of extracting substantially all of the gases from a mud sample, regardless of the drilling mud properties, it is now possible to obtain reproducible, quantitative mud analyses. Such analyses are essential if the full value of mud logging is to be realized.

ROBERT L. MANLY, Standard Oil Company of California

Graphical Analog Dip Computer

An especially calibrated stereographic net is described and displayed which is the foundation for the computer assembly. A transparent overlay disc printed with suitable reference marks and a central fastener pin complete the computer. Input and temporary data storage are accomplished by using a sharpened grease pencil to plot data on the transparent disc.

Two apparent dips relative to the bore axis-normal produce a pole plot of the uncorrected dip. Tool orientation, inclination and drift corrections are made by following a simple three-step technique on the overlay. Readout of true dip and direction of dip corrected for magnetic declination is automatic. The operation from raw data to finished results requires less than one minute.

Dips up to 89°, with or without hole drift angles up to 89°, can be accurately handled. Overturned bedding relative to the bore is readily indicated.

ROBERT A. HARMAN, University of Southern California, Los Angeles

Foraminiferal Variation in Sediment Layers of Santa Barbara Basin, California

Quantitative variations in foraminiferal assemblages characterize the three different sediment types found in cores from the Santa Barbara basin. Gray turbidity sediments contain low foraminiferal numbers and usually a high percentage of benthonic Foraminifera. Laminated sediments are typified by very few specimens of *Bolivina argentea* and by variable foraminiferal numbers. Homogeneous sediment layers also have highly variable foraminiferal numbers, but contain a diverse fauna and a large number of *Bolivina argentea*.

No arenaceous and very few porcellaneous foraminifera are present in the basin. The number of benthonic specimens present appears to be directly proportional to the number of planktonic specimens present.

The frequency at which Foraminifera are added to the sediment was determined by using rates of sediment deposition. Solution effects on Foraminifera were especially noted in the upper 100 cm. of the cores studied.

JOHANNA RESIG, Allan Hancock Foundation, University of Southern California

Ontogenetic Variation in Eponides Repandus (Fichtel and Moll)

HELEN TAPPAN, University of California at Los Angeles and U. S. Geological Survey

Foraminifera from Pleistocene Gubik Formation of Northern Alaska

About 70 species of Foraminifera have been obtained from wells and seismic shotholes of Naval Petroleum Reserve 4. The majority of the species are now living off the coast of Alaska, and in the Arctic seas. Approximately one third of the species are Miliolidae, the remainder mostly Polymorphinidae, Nonionidae, and Elphidiidae, with a smaller number of Nodosariidae, Cassidulinidae, and a few rotaliform genera.

The complete absence of planktonic species, in contrast to Recent Pleistocene faunas of southern Alaska, is probably due to the local shallow water conditions during the Pleistocene.

M. A. FURRER, California Research Corporation

California Cretaceous "Siphogenerinoides"

Recorded occurrences of California Cretaceous *Siphogenerinoides* are restudied on the basis of topotype collections and comparisons are made with those from the Gulf Coast Texas Cretaceous sediments. Based on comparisons with the type species of *Siphogenerinoides*, *S. plummeri* (Cushman), it is suggested that California Cretaceous "*Siphogenerinoides*" be allocated to other categories.

DONALD HOWARD DAILEY, Richfield Oil Corporation

Stratigraphic Paleontology of Jalama Formation, Western Santa Ynez Mountains, Santa Barbara County, California

The Jalama formation of Late Cretaceous age is exposed along both sides of the Pacifico fault in Jalama and Santa Anita canyons in the Western Santa Ynez Mountains. It consists of 2275± feet of alternating sandstones and silty shales that have been divided into seven members. The base is nowhere exposed but the geologically older Espada formation in Salsipuedes Canyon is Late Jurassic in age, which suggests an unconformity at the Espada-Jalama contact. The relationship between the Jalama and overlying Anita formations is uncertain at the type locality but an unconformity exists beyond this area.

Approximately 133 species of Foraminifera, of which the majority are calcareous perforate forms, have been identified from nineteen localities. Three separate foraminifer faunules of characteristic composition can be distinguished. Forty-four localities have yielded 58 molluscan species that have been treated systematically; 12 pelecypod species and 5 gastropod species are new. The megafauna can not be broken down into stratigraphic faunules but may be subdivided into 2 ecologic groups.

Both the foraminifer and molluscan assemblages indicate a late Campanian age for the Jalama formation. The Foraminifera correlate with Goudkoff's Tracian and upper Weldonian stages and with the lower Navarro of the Gulf Coast.

The megafauna is most closely related to the molluscan assemblage of the upper Chico formation, but is slightly younger, and is very close in age to the Cretaceous sediments in Bee Canyon, Orange County, California, in the Sucia Islands, Washington, and in the lower horizon in the Simi Hills, Ventura County, California.

DON L. PROTZMAN, East Los Angeles College

Facies Relationships of Sespe and Alegria Formations, Santa Barbara County, California

The stratigraphic relation between the Sespe and Alegria formations consist of a gradual facies change from the terrestrial environment of the Sespe to the marine environment of the Alegria. Detailed columnar sections show the gross lithologic members within the two formations. Individual members lose their identity laterally over the relatively short distance of approximately a mile or less, with changes in lithology, texture and color, or a combination of these, and exhibit much thinning, wedging and grading. The major lithologic units recognized within the two formations consist largely of cobble and pebble conglomerate, fine-, medium- and coarse-grained sandstone, siltstone, and mudstone.

The red pigment (Fe_2O_3) which colors several members within the Sespe and Alegria formations is dispersed throughout the clay complex of the finer-grained sediments. The rapid burial of these sediments before alteration has thus preserved much of the original red coloration. The presence of organic matter at the site of deposition caused reduction and the initially red sediments transformed into drab-colored deposits.

TJEERD HENDRIK VAN ANDEL, Scripps Institution of Oceanography

Sedimentary Facies in Modern Basins

WALTER W. WORNARDT, JR., University of California, Berkeley

Stratigraphic Distribution of Diatom Floras in Sisquoc Formation of Purisima Hills, California

ALFRED R. LOEBLICH, JR., California Research Corporation
HELEN TAPPAN, University of California, Los Angeles

Suprageneric Classification of Rhizopodea

A proposed suprageneric classification of the class Rhizopodea is given, with particular revision to the order Foraminiferida.

The subclass Lobosia contains the orders Amoebida, Arcellinida, and Mycetozoida. The subclass Filosia includes the orders Aconchulinida and Gromida, and the subclass Granuloreticulosia includes the orders Athalamida, Monothalamida, Foraminiferida, Xenophyophorida, and Proteomyxida.

The order Foraminiferida includes 7 superfamilies based on wall composition and structure, and method of test growth: Lagynacea (gelatinous to chitinous tests), Astrorhizacea (non-sepate, agglutinated test), Lituolacea (septate and agglutinated), Parathuramminacea (non-septate, with wall of calcareous granules in calcareous cement), Endothyracea (septate, with granular or fibrous calcareous wall, generally with two distinct layers), Fusulinacea (basically three distinct wall layers), Miliolacea (porcellaneous). The so-called calcareous perforate foraminifera represent ten superfamilies, six of which have radially built walls: the Nodosariacea (with basically radiate aperture), Buliminacea (high spired test and commonly with internal toothplate), Asterigerinacea (enrolled, no-canaliculate, walls and septa single layered), Rotaliacea (canaliculate, enrolled), Globigerinacea (planktonic), Orbitoidacea (with double walls and primarily formed double septa). The last four superfamilies include the Cassidulinacea (walls of perforate granular calcite), Carterinacea (walls of calcareous secreted spicules), Robertinacea (wall of aragonite and chambers internally subdivided) and Spirillinacea (wall optically acts as a single crystal of calcite).

A complete synonymy of all suprageneric categories has been compiled, in order to determine the correct family group names to be utilized, on a priority basis.

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EUGENE C. BOVEE, Department of Biology, University of Florida
EUGENE B. SMALL, Department of Zoology, University of California, Los Angeles

Mechanisms of Movement: Basis for New Major Dichotomy of Sarcodina

Members of the Sarcodina seem to possess either of two basic mechanisms for protoplasmic movement: (1) a contraction-hydraulic system, in which flow of protoplasmic sol is caused by contraction of a tube of gel, and (2) an active shearing or active sliding mechanism in which two surfaces, usually both of gel but possibly one of gel and one of sol, move in relation to each other. The first system occurs typically in *Amoeba* (Mast, 1926) and *Physarum* (Jahn, Rinaldi, and Brown, 1960; Jahn, 1960), and the second in *Allogromia* (Jahn and Rinaldi, 1959). Examination of older literature and of living specimens reveals that the contraction-hydraulic system is found in the Amoebida, Mycetozoida, Acrasinorida, and some the the Testacida (e.g., *Arcella*), and that the active sliding system is found in the Foraminiferida, Radiolarida, Acantharida, Helozoida, Helioflagellorida, most Protemyxida, and some Testacida (e.g., *Euglypha*). No organism has been found which possesses both mechanisms.

If these two mechanisms are distinct, possession of either one or the other must be of great phylogenetic importance to the organisms, and therefore should be of taxonomic importance. If so, we should divide the Sarcodina into two major groups on the basis of possession of one or the other.

The morphological basis established by the French school (Grasse, 1948) for the rearrangement of the orders of Rhizopoda on the basis of the morphology of pseudopods is further emphasized by the existence of two basic mechanisms for pseudopod formation. However, use of these mechanisms as a basis of the major dichotomy combines the Actinopoda with the Filosa and the Granuloreticulosa into one of the two major groups.

DALE WIGGINS, Standard Oil Company of California

Mississippian Microspore Assemblage from White Pine County, Nevada

Core samples from the subsurface Chainman formation in the Standard-Continental Hayden Creek Unit No. 1, Sec. 17, T. 15 N., R. 59 E., White Pine County, Nevada, were examined for palynological data.

The abundant Mississippian microspore assemblage obtained from this interval included the important spore genera. *Rotaspora, Grandispora, Densosporites, Callisporites, Tripartites, Schulzospora, Auroraspora, Convolutispora, Knoxisporites*, and *Reinschospora*.

In comparison with the Pennsylvanian, Mississippian strata have remained virtually unexplored for palynological criteria. However, in recent years investigations have been considerably expanded with the increased interest in palynology as a tool for correlation.

Mississippian microspore literature is rare world-wide and generally confined to sediments of Chesterian age. In the United States published data are practically nonexistent, being limited to three papers, two of which have not been satisfactorily correlated with type Mississippian sections.

A comparison made of the assemblage obtained from the Chainman formation with other published and unpublished data indicates that it is probably lower Chesterian in age.

SHERWIN CARLQUIST, Claremont Graduate School, Claremont, California

Pollen Morphology of Rapateaceae

Rapateaceae is a family of monocots restricted to