Guinda Formations include species of *Globotruncana*, *Hastigerinoides*, *Schackoina*, *Hedbergella*, and *Heterohelix*, and are assigned an "early" Senonian age.

The Forbes Formation is characterized by *Globotruncana arca*, and species of *Pseudotextularia* and *Globigerinelloides*. These fossils occur in other described Campanian microfaunas from the Stanford University campus, the Marlife Formation of Fresno County, and the Kelly Ranch of Carlsbad.

The pelagic Foraminifera from this area are correlative with microfaunas from the Austin and Taylor Groups of the Gulf Coast, and from the Turonian to Campanian stages of Europe.

ECHOLS, RONALD J., University of Southern California

FORAMINIFERAL TRENDS IN SOUTH SANDWICH TRENCH

Foraminifera were studied in 18 small gravity cores and 6 trawl samples from the area of the South Sandwich trench. The samples ranged in depth from 558 to 7,700 meters. Nine core samples were collected in a traverse across the central trench area from 57½° to 59° S. Lat.

Foraminiferal trends are discussed in terms of groups of species with similar depth distributions. Calcareous Foraminifera (*Cassidella* sp. group) may be as abundant as 40 per cent of the foraminiferal fauna between 558 and 805 m., but gradually decrease with depth to insignificant numbers below 1,058 m. As calcareous Foraminifera decrease with depth, *Haplophragmoides membranaceum* group increases and becomes characteristic of the zone between 1,244 and 1,841 meters. *Textularia antarctica* group remains remarkably constant throughout these depths but also declines below 1,841 meters. Samples from the lower bathyal zone (2,976–4,800 m.) contain large numbers of species including *Cyclammina pusilla*, *Cribrostomoides subglobosus*, and *Martinottiella communis*. A diverse *Trochammina* fauna (*Trochammina* sp. A group) is especially characteristic.

The upper abyssal fauna (1,076–1661 m.) is a reduced lower bathyal fauna dominated by *Trochammina antarctica*, a species common at all depths. A core and a trawl from 7,700 meters both were barren of Foraminifera.

FERRIS, CRAIG, E. V. McCollum and Co.

GRAVITY AND COMPACTION ANTICLINES IN HIGHLY EXPLORED AREAS

Grass-roots structures, beneath the glacial drift in Michigan, Ohio, and Alberta, Canada, are discussed with the aid of gamma ray-neutron and electric logs. These compaction anticlines are detectable by gravity and are shown to be related to deeper Devonian, Silurian, Ordovician, and Cambrian structures.

GEARHART, BARTON, JR., Vulcan Oil Recovery Co.

REVIEW OF THERMAL RECOVERY METHODS APPLIED TO CALIFORNIA RESERVOIRS

The number of thermal recovery projects in California has had a spectacular increase during the last year. Current emphasis is on the "steam soak" work, but this does not seem to be the ultimate answer for the majority of California reservoirs.

Steam and *in situ* combustion appear to hold the greatest promise for thermal recovery in low-gravity California oil sandstones. With steam, there is the "soak" and the flood, whereas with *in situ* combustion, there are forward and reverse burning techniques.

To date most steam work has utilized the "soak" technique and all commercial *in situ* combustion work has utilized the forward burn.

For the most part, a single thermal recovery technique has been used on a sandstone or reservoir. It now appears that more sophisticated approaches should be used, with the object of combining the best of several techniques. This will allow benefiting from the unique advantages of each technique.

Good detailed geology is very important to the future success of thermal projects. Too often in the past this has been overlooked. The future success of California thermal projects will necessitate the close cooperation between the geologist, the engineer, and the field operating personnel.

This paper will review the advantages and limitations of steam and *in situ* combustion processes.

GREEN, FRED, Miller and York Drilling Co.

COST CUTTING IN EXPLORATORY DRILLING

Geologists responsible for costs on exploratory wells may effect savings through non-technical, commonsense attention to bid requests, rig and personnel selection, and integration of the geological well program with that suggested by drilling engineers and practically trained contractor supervisors.

HACKEL, OTTO, Otto Hackel and Associates

FIELD TRIP ORIENTATION, SOUTHEASTERN SAN JOAQUIN VALLEY, KERN RIVER TO GRAPEVINE CANYON

A field trip was conducted on April 3, 1965, along the southeastern margin of the San Joaquin Valley between Kern River and Grapevine Canyon. An effort was made by members of the field trip committee to explain the surface and subsurface geology seen along the route. Speakers at pertinent stops discussed stratigraphy, structure, paleontology, and oil fields. Four demonstrations of geophysical instruments also were made.

A guidebook is available which contains a geologic log of the field trip route. Papers on local, regional surface, and subsurface geology, as well as paleontology, amplify the log. A regional surface map and a subsurface contour map on the Santa Margarita Formation are included as fold-ins.

HEINTZ, LOUIS O., and JAMES W. VERNON, L. O. Heintz and Associates

GEOLOGY OF SOUTH-CENTRAL TEJON OIL FIELD

The South-Central Tejon oil field is at the southern edge of the San Joaquin Valley, approximately 1 mi. southeast of the Central Tejon oil field. It was discovered by the Drilling and Production Company in June, 1963. The oil-bearing section is the upper Miocene Reserve zone, which is 90 to 170 feet thick in the field and is composed of several sandstones separated by shale layers. Currently, 5 wells produce from depths of 2,200 feet or less. Initial production of these wells ranged from 25 to 135 BOPD; at present they average 30 BOPD.

The field lies within the Tejon embayment, an ill-defined trough of Tertiary and Quaternary sediments. Trapping results from stratigraphic pinchout across a gentle arch within an essentially homoclinal structure. Minor faults are suspected to be present and may contribute to structural closure.