the unemployed during the past five years, will again find their professional services needed in the near future.

JOSEPH C. CLARK, Stanford University: Monterey Rocks in the Santa Cruz Mountains, California

Recent field work in the Santa Cruz Mountains of California demonstrates that siliceous mudstone beds of Miocene age, previously mapped as "Monterey shale," are the products of two separate marine cycles of sedimentation. The older cycle was a middle Miocene (late Relizian—early Luisian) event; the younger was initiated in late Miocene (late Delmontian) time and lasted into Pliocene time.

Each cycle consists of a basal, transgressive sandstone unit followed by a thicker mudstone sequence. The more widespread, middle Miocene mudstone sequence is siltier and contains abundant calcareous Foraminifera, whereas the thicker, late Miocene mudstone sequence is more siliceous, locally diatomaceous, and contains abundant volcanic debris. Field relationships together with paleontologic data suggest that the basal sandstone unit of each sequence was deposited in a near-shore, shallow-water environment, while the overlying mudstone unit was deposited in an outer neritic to upper bathyal environment. The Purisima formation of Pliocene age represents a later, near-shore and partially regressive phase of the second cycle.

A landmass that separated the early Miocene ("Vaqueros") sea from the Pacific basin to the southwest disappeared prior to middle Miocene time, and the later Miocene basins were probably directly connected to the Pacific basin.

GREGORY A. DAVIS, University of Southern California: 1962 International Field Institute in the Swiss Alps

Classic areas of Alpine geology were studied during the summer of 1962 by twenty-five American college teachers of geology participating in the second International Field Institute. Participants in this foreign study program, sponsored by the American Geological Institute and funded by a National Science Foundation grant, represented colleges and universities throughout the country and nearly every geological discipline. Under the guidance of leading Swiss geologists special attention was paid in the field to regional stratigraphic and structural relationships and to their importance in the solution of Alpine tectonics and paleogeography. Nappe development and geosynclinal theory were topics discussed in detail in light of recent Alpine studies requiring modification of classical views. More significant to Institute participants than the acquisition of specialized knowledge in their own fields of interest was a profound impression of the magnitude and complexity of geological processes. The effect of this continuing AGI program on American geological thinking in general and on the petroleum industry in particular lies in the broadening of experience and perspectives of participating geology teachers. Their introduction to classic areas overseas and to modern trends in foreign geological study will undoubtedly contribute to the geological awareness and scientific effectiveness of their students.

M. B. DOBRIN AND W. G. RIMMER, United Geophysical Company: Regionals and Residuals in Seismic Prospecting for Stratigraphic Features

Many geological features associated with oil accumulation show up on seismic maps as interruptions of regional trends rather than as true structural closures. Among such features are reefs, which are often best detected by draping of overlying formations; erosional escarpments which truncate porous limestone beds on their updip sides; and buried ridges which cause productive stratigraphic build-ups in overlying beds. In the presence of regional tilting, seismic indications from such features can be so obscured that special data processing techniques are required to make them readily recognizable on seismic maps.

The problem here is very similar to that of separating gravity and magnetic effects of features having economic interest from regional background. The techniques developed for accomplishing this type of separation, such as residual and second derivative determinations and orthogonal polynomials, can be applied advantageously to seismic data where regional structure obscures significant anomalies. Both contour-smoothing or grid methods can be used depending on the nature of the problem and the preference of the interpreter. As with gravity or magnetics, the grid methods are particularly adaptable for high-speed electronic computation.

Some examples are shown where regional effects are removed from seismic maps over known reefs and productive erosional escarpments by derivative and residual techniques using electronic computation.

A somewhat different approach is necessary when it is desired to remove the effect of velocity variation from time maps by treating the velocity function as a regional effect. Here the regional is multiplicative rather than additive and cross-product terms must be taken into account. By relating the time maps and velocity maps using this approach, the principal hazards of using time maps for interpretation can be avoided.

PETER EMBREE, JOHN P. BURG, MILO M. BACKUS, Geophysical Service, Incorporated: Wide-Band Velocity Filtering—The Pie Slice Process

The development of a new technique makes it possible to process a seismic record section in such a way that all seismic events with dips in a given range are preserved with no alteration over a wide frequency band, while all seismic events with dips outside the specified range are uniformly and severely attenuated. To state it another way, it is possible to combine the elements of a line array in a manner resulting in a directed beam in which the beam width is independent of frequency, and which has uniformly low side lobes, also essentially independent of frequency.

By applying this process to a noisy record section, a record section may be obtained which has all events within a specified dip range perfectly preserved, and very high velocity noise such as the P_L mode has been essentially eliminated, a result which is impossible by simple wave-number filtering or conventional array usage. In structurally complex areas, where several steeply dipping events interfere, the technique may be applied to separate the events with different dips. In areas where a normal-moveout contrast exists between primaries and multiples, the technique may be used for wide-band multiple-attenuation.

By application of a "rotating pie-slice" to microspread noise data, seismic noise may be separated on the basis of propagation velocity, and a clearer picture of the seismic noise problem obtained. The "rotating pie-slice" also provides a means of uncovering diffractions and other steeply curved events from a record section.

The technique is described in terms of its application to synthetic examples. Various examples of its application to actual seismic data illustrate its practical effectiveness.