a data file. Angle averaging was chosen as the most practical and accurate method of computing the survey. Programs were written to plot tops for maps and to project the tops into a vertical plane for cross sections. The final result was a geologic interpretation that was consistent for 5 maps and 43 cross sections.

The computer also was used to plot the well courses. Many wells had to be redrilled for the secondary-recovery program. The courses have to be controlled closely to avoid collisions and to make effective completions. The data file is searched for wells that might interfere with the proposed course. These are plotted so the drilling engineer will be aware of potential problems.

The software development and computer costs were minor compared with charges for conventional engineering and geologic studies and for data preparation. The method is practical and easy to use, and has been applied to other fields in California.

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GEOTHERMAL EXPLORATION IN IMPERIAL VALLEY

A study of the geothermal resources of Imperial Valley of Southern California was initiated by a group of researchers at the University of California, Riverside. The aims of the study program are twofold: (1) to map the areas of abnormal heat flow which may become potential geothermal-energy exploration targets, and (2) to study the fundamental geologic and geophysical factors affecting the abnormal heat-flow regime in the valley.

In the first phase of the Imperial Valley project, shallow-hole temperature gradients of up to 0.78°C per meter were measured; the mean for all readings was 0.184°C per meter. These values are more than one order of magnitude greater than the average value for the entire earth, suggesting that vast amounts of geothermal energy are to be found in the valley at a relatively shallow depth. At least some of the geothermal highs correspond to the gravity highs in the valley, indicating that convective heat flow must have caused densification of the sediments.

Deep electrical-resistivity exploration was useful in confirming the shallow-hole geothermal measurements and in identifying areas of high heat flow. Electrical resistivity proved very useful also in mapping an uncharted system of faults (named "the West San Andreas" system) running through Imperial Valley.

From the preliminary findings it is concluded that the Imperial Valley can be classed as a significant source for geothermal energy in California.

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SEDIMENTOLOGY OF SOUTHEAST PACIFIC OCEAN DEEP-SEA CORES

Cores and bottom photographs from the continental margin and the Peru-Chile trench off Callao, Peru, show large amounts of organic material in the sediments, a direct reflection of the high productivity in the surface waters of the Peru (Humboldt) Current. Organic material ranges from 6.0 to 17.7% by weight and is roughly seven times the amount found in samples seaward of the trench. Values of C/N show a wide range but average 14.2 for sediments of the trench-continental margin and 13.3 for sediments seaward of the trench. Sediment at water depth of 1,000 m has greater $CaCO_3$ content and mean-size diameter, and better sorting than the sediments of the shelf and slope. These changes in chemical and textural parameters are the result of maximum abundance of Foraminifera at this depth. Bottom photographs show the presence of cobble and other coarse clastic material at considerable depths off Callao, and of slumped sediment, scour, "streams" of megarippled sediment, and patches of thin-crested oscillation (?) ripple-marks in the trench axis (5,200 m) off Valparaiso, Chile.

Sediments south of the Nasca ridge are generally brown calcareous clay, buff clay with fecal pellets, manganese micronodules, and interlayered pyroclastics. Dredge hauls and bottom photographs indicate several regions of abundant manganese nodules.

The distribution of $CaCO_3$ is a function of productivity, water masses and currents, bathymetry, and distance from land. Variations of carbonate with time indicate a trend similar to Arrhenius' model of lower $CaCO_3$ production for Holocene and interglacial sediments in the equatorial Pacific. On the assumption that two cores, approximately 500 km apart, have a complete record of Quaternary sediments, a sedimentation rate for the total Pleistocene is calculated at 1.3–1.4 mm/1,000 years. Along the Nasca ridge, as a result of higher carbonate production, Holocene sediments have accumulated at the rate of 1.4–2.7 mm/1,000 years.

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SEMBLANCE AND OTHER COHERENCY MEASURES FOR MULTICHANNEL DATA

The concept of "semblance" is a new likeness or coherency measure, and is related to energy-normalized cross correlation. All coherency measures must be considered from three basic viewpoints—the domain in which they are applied, the philosophy of their design, and their manner of use.

The most familiar of the likeness or coherency measures is cross correlation. Differences in design philosophy mainly involve changes in normalization. The "semblance" concept, thus, contains elements of both. In addition, semblance shares certain features of the summation, or "stack," method—a recently much-used coherence measure.

Several measures, including semblance, have been used in a seismic problem area—the determination of stacking velocities from multiple ground-coverage seismic data. A noise-free synthetic example was developed to compare discrimination thresholds of the various methods. Among the various coherence methods, the semblance calculation, if properly interpreted, has the greatest sensitivity.

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DETAILED GEOPHYSICAL STUDY OF NORTHWEST NORTON BASIN, BERING SEA SHELF, ALASKA

(No abstract submitted)

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MULTICHANNEL MAPPING TECHNIQUES

(No abstract submitted)