points on the fault surfaces, defining additional faults, and exchanging points between fault surfaces, *etc.*, until a final interpretation is reached.

The computer performs the tedious tasks of information retrieval, numerical computation, and display generation, whereas the geologist uses his specific knowledge of the problem at hand to evaluate results and propose alternatives until a satisfactory interpretation is reached. The interpretations made in this interactive environment can be geologically and economically superior to those reached by entirely manual or entirely analytic methods.

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CALIFORNIA DIGITAL MAPPING

The Utility Data Corporation, in a joint venture with several petroleum companies, is conducting a precision-mapping program across 50,000 sq mi of the State of California. Accurately located within the project area will be approximately 50,000 section corners and 26,000 historic wells.

The project area has been surveyed by use of high-altitude, high-resolution aerial photography. Within each of the 2,500 photographs, there are photo-identifiable USCGS and USGS monuments that were flagged prior to flight. These are referred to as basic control, and permit, through analytic photogrammetric procedures, positioning of other photo-identifiable points of interest appearing on the photograph to within ± 5 ft of accuracy. These coordinates properly describe, both in latitude-longitude and in the state plane-coordinate system, the location of the point on the geoid.

The program provides a coordinated set of base maps throughout the project area. It provides an accurate area base map with various levels of accuracy in coordinating section and rancho corners; *i.e.*, photo-identifiable (53%), projected/protracted (17%), and calculated (30%). When the positions of the section and rancho corners are refined, significant errors in well locations become apparent.

The end products of the project are a digital file and a graphic file. The digital file contains coordinates of section and rancho corners, historic wells, and other points of interest. The graphic file produces a 15-minute quadrangle, automatically plotted at a scale of 1 in. = 2,000 ft. The equipment currently used for plotting is a Gerber Plotter with optical head to achieve the optimum in edge sharpness.

The California computerized-mapping program is the first of its type and scope to be conducted for the petroleum industry. Implementation of the program acknowledges the impact of the computer upon exploration; further, it reflects the needs of the industry for accurate land-net data, although precision well-location data do not share an equal priority.

The basic program provides an accurate area base map which, if considered as an initial building block, can be used by other elements of a company with minimum costs for supplemental aerial photography in small selected areas. For example, once geodetic control has been established, an overflight at lower altitude provides the Pipeline Department with right-of-way profiles and detail maps, the Production Department with precision plant-inventory records, and the Tax Department with accurate taxing-boundary information. This information is in digital form on tape or cards, formated for introduction into the computer.

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SEDIMENT DISPERSION IN NORTHERN CHANNEL ISLAND PASSAGES, CALIFORNIA

The presence of strong bottom currents in the northern Channel Island passages makes these areas ideal for the study of sediment dispersion and energy regimes by analysis of the textural properties of the sediments.

A grid-sampling system was used to take 25, 36, and 37 grab samples from San Miguel Passage, Santa Cruz Channel, and Anacapa Passage, respectively. The sand fraction of each sample was analyzed texturally by an automatic settling tube. The data then were synthesized by an IBM 360 computer, which constructed 5th-degree trend surface maps for the mean, sorting, skewness, and kurtosis values for each of the passages.

Of the primary agents available for transport of traction load, it is suggested that wind-driven currents are more important in accounting for the sediment distribution than either tidal currents or wave action. Although the last two are active continually, it is believed that their effect is superimposed on the net movement caused by wind-driven currents, and hence they are subordinate processes.

San Miguel Passage is characterized by southeastward sediment dispersion. The energy level is highest in the center of the passage and there is a gradual decrease in energy toward the sides. A lobe of coarse sediment in the northern section of Santa Cruz Channel shows the southeastward dispersion; however, fine sediment from the east moves into the southern part of the area, where it is intercepted by currents at the head of Santa Cruz Canyon. Because there is dispersion both east and west, Santa Cruz Channel may represent a shear zone between two prominent currents. Anacapa Passage shows dominant westerly dispersion with a superimposed north-south tidal-current effect.

All the passages are believed to be at or near equilibrium with respect to sediments and mechanical energy.

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LIMITATIONS OF REFLECTION-SEISMIC METHOD: LESSONS FROM COMPUTER SIMULATIONS

Multiple ground-coverage seismic techniques are based on a few key assumptions. Among the more important are the assumptions that subsurface reflectors locally are continuous and linear, and that the primary reflections between particular source-receiver pairs travel along unique paths. However, overenthusiasm concerning recent advances in the use of "velocity spectra" models has led to some violations of these important assumptions. The most common types of violations involve use of these models in (1) determining primary velocity, (2) computing interval velocities and dips, and (3) migrating depth sections. Although all three processes are industry-wide objectives which commonly are obtainable by other methods, their attainment through the use of the "velocity spectra" models is beyond the limits of current theory. Therefore, those who use "velocity spectra" methods to predict subsurface conditions can be misled by the errors which result.

The theory and limitations of the seismic methods currently employed can be clarified by examining lin-