tending to concentrate brines in deeper parts of many older sedimentary basins may operate at depths of only a few hundred feet in young sediments. The downward increases in salinity can not be accounted for easily by such mechanisms as molecular filtration. However, a combination of pressure-induced diffusion and migration induced by the geothermal gradient (Soret effect) tends to pump salts downward and appears to be a promising explanation for the increase in salt content with depth.

Total water content in the cores is uneven, partly because of irregular carbonate cementation. The cementation may be related partly to changes in ionic composition noted in the interstitial waters.

Fresh waters have been detected in marine strata under the Atlantic Ocean as far as 60 miles from shore. The water-bearing zones are believed to be extensions of land aquifers and may discharge in the slope regions.

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COMPUTERS SIMPLIFY LOG APPLICATIONS

Modern exploration methods generate large quantities of information about each well drilled. Much of the data obtained are pertinent for subsurface studies. However, in order for the petroleum geologist to take full advantage of the information, he must correlate and consolidate the various data from seismic studies, drilling, sampling coring, wireline logging, *etc.* It is here that electronic computation offers the greatest potential for geologic studies.

Various forms of computers are now used for automatic well-site processing of data from electric well logs. Simple forms of computers apply automatic corrections for borehole and environmental effects. Others convert the basic measurements to a more convenient form. For example, density values and neutron log counting rates each may be converted, during the logging operations, to equivalent limestone-porosity values. Such field-recorded logs of porosity simplify well-site interpretations of lithology and formation-fluid content.

More sophisticated recorder-computers are used at the well-site to record logs on tape and to merge and compute data from separately recorded surveys. The logs thus produced enable a rapid and thorough reconnaissance of all formations logged.

The tapes of digital log values offer several important advantages over the customary optical records. For example, information on magnetic tapes may be transmitted rapidly via telephone and microwave circuits. In addition, the taped logs provide a rapid input for office-based, high-speed, electronic computers.

The speed and flexibility of general purpose computers permit even more complex correlations and applications of well data. Such computers offer a wide variety of combinations of information and, at the same time, enable presentation of results in forms best suited for application. In addition, information from sources other than electric logs may be incorporated.

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LUNAR STRATIGRAPHY AND SEDIMENTATION—POST-RANGER VIEW

The completion of the preliminary geologic mapping of the equatorial belt of the Moon allows a first look at the history of a large piece of the lunar crust. Twenty-eight quadrangles at a scale of 1:1 million, amounting to 3 million square miles, have been mapped, and a compilation at a scale of 1:5 million has been made. Field studies of terrestrial impact and volcanic craters are underway, and laboratory studies of crater formation by hypervelocity impact and impact metamorphism of the rocks are continuing.

The Moon is studied by examination of telescopic and spacecraft photography, by visual telescopic observations, by photometry, by polarization, and by infrared, radar, and microwave radiation.

The geologic development of a large linear basin, first worked out in the Imbrium region on the basis of smaller-crater morphology and deposits, has been amplified and extended. A similar sequence of events is indicated by the deposits around other lunar basins. A preliminary attempt can be made to interrelate the basinal histories. Several areas are blanketed by complex volcanic deposits of several types and several ages. The interlayered volcanic and ejecta deposits are offset by at least four episodes of faulting. The processes affecting the original constructional topography have been worked out in lowland areas and are being applied to the more complex uplands. Sedimentation, erosion, isostatic adjustment, and tectonic deformation gradually obliterate lunar craters. Sediments are formed by impact and volcanic processes, and both may cover large areas.

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FACTORS INFLUENCING EARLY STAGES OF COMPACTION OF CLAYS AND SANDS—REVIEW

Variations in the water content and fabric of clay, and the porosity of sand during compaction under pressures of 0–100 kg./cm.^{2} reflect the influence of sediment texture and composition, and are not related uniquely to increases in overburden load.

The porosity and water content of sand, silt, and clay under these pressures are inversely related to particle size. This relation commonly is strong enough to obscure the expected decrease in porosity with increasing depth of burial.

Variations in the water content of saturated clay reflect the physico-chemical influences on the sorption of water on the surfaces of clay minerals. Water content and surface area per unit mass in the common clay minerals increase in the order kaolinite-illite-montmorillonite. In montmorillonite, at pressures less than 50 kg./cm.^{2}, the water content changes with the exchangeable cation—Na-montmorillonite holds more water than montmorillonite whose exchange positions are filled with Ca, Mg, K, or Al. Increasing concentrations of interstitial electrolyte tend to increase the water content of most clay at a given pressure less than 50 kg./cm.^{2}, presumably by increasing the tendency of the clay particles to form open-work flocculated aggregates that resist compaction. The main exception to this is in very fine-grained clay saturated with Na electrolytes in concentrations less than 0.3 molar.

Most of the development of preferred orientation in clay compacted under pressures of 0-100 kg./cm.^{2} takes place very early—at pressures near 1 kg./cm.^{2} The most critical factor for this development may be the amount of water held by the clay. If enough water is present, the particles may slip past one another into preferred positions; if not, preferred orientation may be either poorly developed