definition of carbonate sediments to include those containing more than 50 per cent carbonate minerals, many new parameters can be studied and new and useful information can be incorporated in studies of carbonate rocks.

It is obvious that, by enlarging the definition, consideration of insoluble residues and stratigraphic associations is possible. Further, the geographic range of carbonate sediments is enlarged, permitting study of a wider variety of environmental conditions. Finally, a greater variation in thickness of Recent carbonate sediments is found, a fact which should allow a better understanding of sedimentation rates.

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AGE RELATIONS OF MID-ATLANTIC RIDGE SEDIMENTS

Age relations of Mid-Atlantic Ridge sediments were established by means of planktonic Foraminifera in several selected areas between 22° N. lat. and the equator. Sediment types containing planktonic Foraminifera include unconsolidated ooze, consolidated ooze ranging from loosely friable aggregates to hard limestone, breccia, and palagonite-rich rock.

In the 22° N. area, consolidated sediments ranging in age from late Miocene to probable middle Pliocene were dredged from the flank of the ridge. Associated with the consolidated sediments in the dREGRES were basalt overlies the late Miocene. Studies of Sr/Rb isotopes in the basalt are still in progress at M.I.T. Results thus far, however, indicate that these isotopes do not permit an age assignment. On the crest of the ridge there is no evidence of the presence of sediments older than Quaternary. Materials examined from the crest of the ridge include indurated detrital tuff and palagonitic rock.

Examination of sediments collected from the 11° N. area, Romanche trench and St. Paul's Rocks, are still in progress. In the Romanche trench, late Tertiary planktonic Foraminifera mixed with Quaternary assemblages were recovered from foraminiferal ooze in a core. In the St. Paul's Rocks area, the matrix of a conglomerate containing pebbles of the St. Paul's Rocks type yielded a Pleistocene foraminiferal assemblage. In the same area a vesicular basalt was filled with limestone. The limestone in the vesicles contained a mixed assemblage of late Tertiary and Pleistocene.

It is difficult to arrive at definite conclusions on the basis of the relatively little material thus far examined. Yet, it is interesting to note that the oldest assemblages recognized are late Miocene. Though not conclusive, the present data agree with other evidence suggesting a relatively young tectonic and volcanic history for at least parts of the Mid-Atlantic Ridge.

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GRAIN FABRICS IN TURBIDITE SANDSTONE BEDS AND THEIR RELATION TO SOLE-MARK TRENDS ON SAME BEDS

Grain fabrics of six beds were determined quantitatively for 62 turbidite sandstone beds that exhibited sole marks (19 beds with flute casts and 43 beds with groove casts). Statistically significant alignment of elongate grains within these beds tend to parallel the trends of the sole marks on the base of the beds.

Grain orientations were determined quantitatively for 62 turbidite sandstone beds that exhibited sole marks (19 beds with flute casts and 43 beds with groove casts). Statistically significant alignment of elongate grains within these beds tend to parallel the trends of the sole marks on the base of the beds.

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EARLY DIAGENETIC CHANGES IN FRESH-WATER CLAY DEPOSITS

Cored borings of Recent fresh-water swamp deposits that accumulated in the Atchafalaya River basin, Louisiana, revealed the existence of numerous early diageneric changes in clay deposits and the formation of various types of synogenic and epigenetic inclusions. The deposits, approximately 100 feet thick, range in age from contemporary to slightly greater than 10,000 years and were deposited in four major environments of deposition: poorly drained (stagnant) swamp, well-drained swamp, lacustrine, and lacustrine delta fill.

Many of these environmentally controlled facies are repeated several times in a single vertical sequence and offer the unusual possibility of studying diageneric changes at different stages of development within a particular environment. The most common diageneric change is the replacement of plant rootlets and other organic fragments by pyrite and calcium carbonate. Pyrite replacement is most common in the poorly drained swamp sediments, whereas carbonate replacement occurs most commonly in the well-drained swamp deposits. These changes took place rapidly, probably within a few years after deposition. Both pyrite and calcium carbonate tend first to be formed in the open spaces within the organic fragments, second to invade the pore spaces, and last to replace most of the original organic material. Vivianite (Fe₃P₂O₇ • 8H₂O) forms fairly rapidly and also replaces organic material. Nodules are abundant throughout the section, but are more common in lacustrine sediments. The size of the nodules differs, generally being smaller in the younger units, and increases in size in the older units. The shape changes, ranging from round, flattened, lentilicular masses (lacustrine) to round and irregular-