depths exceeding 5 feet in very few places; the area is 8 square miles. It is divided into an inner and an outer lagoon. The outer lagoon opens to the Gulf Stream through a narrow, deep natural channel. The outer lagoon also opens onto the Great Bahama Bank proper across wide, shallow flats, exposed at low tide. Tidal range in the lagoon is 2–3 feet; large volumes of water enter and leave the lagoon with each tidal cycle. In the lagoon, bottom communities, sediments, and currents are closely interrelated. Distribution of the communities is controlled by current action, and by the degree of tidal exchange of water with the Gulf Stream; the nature of the sediment is determined by the organism community present.

Most of the tidal exchange into the lagoon takes place through the deep channel. Current velocities exceed 2 knots. Consequently the channel is floored by bare rock, sorted gravel, and coarse sand. The margin of the channel is marked by an abrupt rise and current velocities of about 1½ knots. The strong current over the channel margin promotes luxuriant growth of *Thalassia*, which acts as a sediment trap, and prevents erosion. The sediment is fine-grained and poorly sorted.

Away from the channel, the current velocity is less than 1 knot, *Thalassia* is sparse, and wave action affects the nature of the sediment. Many benthonic communities can be recognized.

The inner lagoon is an isolated hypersaline water mass. Current velocities are very low. Most of the bottom is covered by bare sand with a few species of algae, but the richest molluscan faunas occur here.

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A.A.P.G. PUBLIC INFORMATION COMMITTEE—WHAT IT CAN DO FOR GEOLOGY

The A.A.P.G. constitutes an enormous reservoir of knowledge, experience, material—and money—which can and should be used to aid in the dissemination of geological information to an interested public.

It is not now effective in that area, largely because the emphasis always has been on geologist talking to geologist—not on geologist talking to public. The budget, the interest, the organization, and the function of the A.A.P.G. emphasize this point.

Furthermore, in a world which is made by scientific knowledge and which, if it is to be destroyed, will be destroyed by misapplication of scientific knowledge, a scientifically alert populace is essential to human survival. Public information on scientific matters is, therefore, not an opportunity but an obligation—the greatest obligation.

What geologists have failed to acknowledge is that the future of the A.A.P.G.—of petroleum geology—of geology in general—rests largely with non-geologists. To the degree that geologists interest and educate the public—the ultimate decision-makers—the profession will be rewarded by public understanding and support.

Public information—public education—is an enormous task, but fortunately there is one route open to all the public—the public schools. Other routes lead to various groups of adults and children. These routes need only to be used.

The A.A.P.G. as an organization with a vast and competent membership, a wide geographic distribution, and the money to do whatever must be done has the obligation to take the lead in the area of public information in geology.

The opportunity is there—the capability is there—only the awareness is limited.

Geologists can remove that remaining limitation, for it is of their own making.

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EDUCATION FOR A SCIENTIFIC AGE

Science will play an increasingly significant role in the lives of educated people in the years ahead. For this reason, young people going through school now, and those who are yet to be educated, should be getting a basic understanding of the language of science as part of their general education. Most students now in schools, including colleges and universities, are not getting the kind of education in science which will prepare them for life in a scientific age. Science is being presented to them as a body of facts and techniques. Consequently students have little, if any, opportunity to develop an understanding of the basic principles and concepts common to science.

Facts and techniques have a short half-life—a way of becoming obsolete in a hurry. Individuals whose science training has been largely fact- and technology-oriented also become obsolete in a hurry. It is grossly unfair to the young people who are now being educated and those who will be educated in the future to burden them with obsolete training in science. New materials and new courses, which emphasize the "structure or broad unifying principles" of each science discipline, need to be developed and teachers trained to present science as inquiry. Sound training in science should begin in the early school years to provide children with a conceptual framework which they can use as a base for assimilating and understanding later experiences in science.

The new elementary and secondary-school science curriculum materials provide a base on which a sound curriculum can be built, but much remains to be done if tomorrow's citizens are to be scientifically literate.

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BASIC FRAMEWORK, DEFORMATION, AND PETROLEUM IN MIDDLE EAST

The most prolific oil-producing area of the Middle East lies on the southern flank or extension of the ancient Asiatic Tethyan geosyncline and was at least partly subjected to the same tectonic forces which produced the Alpine-Taurus-Himalayan Mountains.

The importance of these tectonics is second only to depositional conditions in the Arabian-Persian Gulf geosyncline during which occurred the proper distribution of salt and anhydrites in time and place. To emphasize the importance of the evaporites, most if not all of the large gentle structures of Arabia and the southern gulf are salt-generated and the remaining structures in Iran and Iraq were created or modified by plastic deformation of salt and anhydrite. The Hith Anhydrite caps Jurassic oil in Arabia; the Fars Anhydrite caps Cretaceous Miocene oil in Iran and Iraq.

Late Tertiary deformation and fracturing of the Cretaceous Bangestan and Miocene Asmari Limestones created the long lines of story-book folds of the Zagros Mountains and oil reservoirs in Iran and Iraq. Fractured Bangestan oil reservoirs leaked much of their contents upward into fractured Asmari reservoirs where oil finally was trapped by the plastic Fars Formation.

Zagros deformation not only determined the size and shape of reservoirs but also their permeability and porosity.

The economic importance of this area is obvious. The Middle East, especially the Arabian-Persian Gulf and its periphery, is presently producing more than one third of the world's oil. Recent discoveries and extensions of known reservoirs have increased production to the point that the area produces more than North America. More than half of the world's proved reserves are in this area.

Communist-block countries, in spite of tremendous potential, are contributing less than one-sixth of total world oil. Doubtless this is partly a result of the fact that these countries still have not attained the same wide use of petroleum products as the free world. Also, oil commerciality depends on the proper balance between a stable growing market and cheap transportation. The unique accessibility and availability of Middle East oil from this gulf guarantees its rising importance in world-energy needs.

A plethora of oil is here and available; transportation is cheap. Extensive oil discoveries in new, inaccessible, or distant inland areas, even in the Middle East, world conditions permitting, should in no way threaten this source for many years to come.

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HYDRODYNAMIC SIGNIFICANCE OF MOLLUSKS IN PLIOCENE TURBIDITES NEAR VENTURA, CALIFORNIA

The distribution and orientation of valves of a small species of pelecypod in Pliocene turbidite sandstone near Ventura help clarify the complicated hydrodynamic history of turbidite events. Because of their relatively constant configuration and size, these pelecypod valves are superior to platy or elongated minerals and rock fragments in this respect. Moreover, it can be shown that valve stability orientations differ according to basic mode of sediment accumulation and possibly flow regime. The preliminary conclusions presented below are based on both laboratory experiments and field observations.

The stable orientation of convexo-concave shells seen wihin the massive, graded basal part of a typical turbidite bed is concave up. Laboratory experiments suggest that the shells are "rotated" into this configuration by consolidation of the viscous turbidite "slurry" during the final few seconds of motion before this part of the bed "freezes." There is evidence that the opposite configuration will exist if internal shear was present in any significant amount, such as near the base of the flow.

Shells located in the upper, laminar parts of the turbidite sequence generally are convex upward; this is the well-known stable configuration for current flow.

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STATE OF THE SOCIETY

The Society of Economic Paleontologists and Mineralogists was organized by a small group of specialists in micropaleontology and sedimentary petrology, and was established as a division of The American Association of Petroleum Geologists in 1926. Since then it has attained a membership of more than 2,400, and a reputation as an important international society. The S.E.P.M. publishes two journals and a series of special publications, and performs other useful services to the profession. The membership is composed of a variety of specialists with diverse interests and professional connections, and this makes for a certain amount of unrest and dissatisfaction with the *status quo*. There is a widely held desire to change the name of the society to something that would express more accurately its aims and activities. Some members have suggested splitting into two societies, one for sedimentary petrology and one for paleontology; others have suggested that the Paleontological Society and the paleontologists of the S.E.P.M. join in a separate society. Many members and non-members of the S.E.P.M. have expressed disapproval of the status of the society as a subordinate division of the A.A.P.G. In particular, there is a strong feeling on the part of some that the requirement of membership in the A.A.P.G. as a qualification for full (active) membership in S.E.P.M. makes second-class citizens of the associate members of S.E.P.M., many of whom are outstanding members of the profession.

Recent councils of the S.E.P.M. have sampled the opinions of the membership, and have arrived at what is believed to be a consensus that can be used for making necessary adjustments in the affairs of the society.

The name-change movement distills down to the following. There is no agreement on a possible new name; a change in name would create serious confusion, because the society's publications are indexed in libraries and bibliographies; and it is believed that the society's aims and activities are widely known under its present name. No change is being made.

The fractionation sentiment is countered by a majority opinion that paleontology and the study of the physical environment should be kept together in the same society, to provide for continued cross-fertilization and the strengthening of the ecological approach to stratigraphy and paleogeography.

The independence movement is faced by the practical consideration that the society is still partly supported and aided by the A.A.P.G., both in the close association in the headquarters office and in the operation of the joint annual meetings. The financial status of the S.E.P.M. is good, but completely independent operation would be a risky endeavor and would limit the vigor of the society's work.

With reference to all of the foregoing questions, an appreciable number of members, including both academic and non-academic types, value the economic aspect of the profession and the S.E.P.M.'s association with petroleum geologists.

A new constitution has been written, the principal feature of which is the removal of the requirement of membership in the A.A.P.G. as a basis for full status in the S.E.P.M. A large majority of the old associate members can be advanced immediately to full membership and acquire the right to vote and hold office. A new class of associates is established, to include somewhat more junior members of the profession, who would not have voting or candidacy rights but who could advance into the member rank, on gaining further experience, without having to join another society. Other provisions of the new constitution in general merely state more accurately the society's present functions and business procedures.

I do not wish to imply that the Council thinks that all of the problems have been solved, or that all factions have been satisfied. I am sure that succeeding