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The Engineering Geologist

THE GEOLOGICAL SOCIETY OF AMERICA

NEWSLETTER OF THE ENGINEERING GEOLOGY DIVISION OF THE GEOLOGICAL SOCIETY OF AMERICA

Volume 16, Number 1 February 1981

CHAIRMAN'S MESSAGE – BEYOND ATLANTA

Each year, at the time of the Society's annual meeting, the Management Board of the Division convenes for a marthon nocturnal session devoted to a review of Divisional activities during the past year and to the formulation of future plans. The Board meeting held in Atlanta was no exception to previous practice, and a lengthy agenda, which fairly reflected Allen W. Hatheway's dynamic chairmanship during the past year, demanded the attention of your Board members until the small hours of the following morning. It is appropriate, therefore, to highlight some of the achievements that have been attained during the past year and to convey to you some of the future directions for the Division that have been established, not only by Management Board action but also by dedicated action on the part of members of the Division.

Newsletter

I am sure that it is evident to all members of the Division that during 1980 the Division's newsletter, *The Engineering Geologist,* through both content and frequency of publication, provided excellent testimonial to the health of the Division and to the diversity of interest of Division membership. To all of those who made contributions, your executive is indeed grateful; and, in particular, we are all grateful to the newsletter editor, Bob Fickies, who has kindly volunteered to continue in this capacity.

The newsletter provides an excellent means for members of the Division to share their professional experience with others, to express their views on directions taken by the Division (or lack of them!), and thereby to participate in a worthwhile function of the Division. Specifically, contributions to the *Engineering Geology Data Sheets* are being sought by the data sheet committee chairman, Professor Bernard W. Pipkin, Department of Geological Sciences, University of Southern California, Los Angeles, CA 90007 and for *Cases-in-Point* coordinated by Professor Christopher C. Mathewson, Department of Geology, Texas A&M University, College Station, TX 77843. Readers are referred to Vol. 15, nos. 3 and 4 of *The Engineering Geologist* for background information on both the data sheets and cases-in-point.

It is the intention of the Division to publish the newsletter regularly on a quarterly basis (January, April, July, October) with the size of each issue being governed only by the quality of material on hand and the financial resources available to the Division.

U.S. National Committee on Engineering Geology (USNCEG)

Previous newsletters (Vol. 15, nos. 3, 4) have reported both the progress and results achieved by the dedicated efforts of David J. Varnes in establishing USNCEG as the U.S. National Group for affiliation with the International Association of Engineering Geology. With the formation of this group and its enthusiastic acceptance by the executive committee of IAEG during its July 1980 meeting at IGC in Paris, the United States now joins with over 40 countries whose national groups on engineering geology are affiliated with IAEG.

Although formal affiliation of the USNCEG with IAEG has been established, the organizing subcommittee, chaired by David J. Varnes, has further tasks in establishing the necessary procedures to amalgamate the present individual U.S. members of IAEG, now numbering about 115, plus new members into an operational national group. During 1981, U.S. members of IAEG will continue in the individual membership category with the administration of their membership being provided directly through the office of the Secretary-General, IAEG. It is expected that by 1982 the organizing committee of USNCEG will have the administrative procedures in place to provide for an operating National Group within the United States.

Membership in IAEG offers, at modest cost, a subscription to the IAEG *Bulletin*, which provides an excellent window on the international world of engineering geology. Those wishing to join USNCEG may use the application form included in this issue of the newsletter (p. 14) and may contact any of the Engineering Geology Division officers or other members of IAEG listed herein to act as sponsors.

GSA Centennial

The Division's Committee for the Planning of the Decade of North American Geology, ably chaired by James W. Skehan, S.J., has formulated plans, approved by the Management Board, for two special volumes on engineering geology as part of the Society's contribution to D-NAG. One of these volumes, to be edited by James W. Skehan, S.J., and Richard H. Jahns, will be devoted to a definitive history of engineering geology. As a contribution to this volume and as part of the Division's program for the 1981 annual meeting of the Society in Cincinnati, the symposium theme, "Role of Government Agencies in the Development of Engineering Geology," has been chosen. It is expected that the contributions to the volume will provide both a useful and an informative account of the early beginnings and development which underlie the widespread and vigorous activity that engineering geology has now become.

A second volume, with Allen W. Hatheway and John S. Scott as co-editors, will be devoted to topical subject matter that will serve to illustrate how the development of engineering geology has been influenced by practice. Specific details of these volumes will appear in forthcoming issues of the newsletter, and Division members can expect to be approached by the editors for manuscript contributions to these volumes.

Environmental Geology

The results of the Straw Ballot, reported on in the July 1980 (Vol. 15, no. 3) issue of the newsletter, were further analyzed by Frank W. Wilson and discussed by the Management Board. While approximately one-fifth of those responding to the Straw Ballot were in favor of a change in name for the Division, the Management Board was unanimous in maintaining the present name for the Division. The Board was equally unanimous in its agreement with providing increased communication with and committee activity for those of the Society's membership having an interest in environmental geology. Implicit in this agreement is the continuing support of the Board for the purpose of the Division to improve and promote the science of geology as applied to engineering works and to the geological interpretation of natural conditions to which engineering structures and plans must be adapted.

Both the Divisional symposium on geology in environmental planning and the joint technical session on engineering and environmental geology held in Atlanta are manifestations of Divisional support for environmental geology. Similarly a joint technical session on engineering and environmental geology is planned for the 1981 annual meeting of the Society. Thus, Management Board support for activities in environmental geology is in place; the onus is now upon Divisional membership to capitalize upon the opportunities.

Regional Sections

The Management Board has noted the general absence of engineering geological content in the annual meeting programs of regional sections. These regional meetings, which are intended to distribute and enhance the activities of the Society, provide an ideal opportunity for members of the Division to contribute to attainment of Divisional aims.

Chairman-Elect, Howard A. Coombs, has been charged with the responsibility for contacting regional chairmen to assist in promoting engineering geological activities at the regional level. Again, such action can only convey to members of the Division the desire and support of the Management Board for broadening the scope of activities of the Division. The success of these endeavors rests with the Divisional membership.

With the 1980 Management Board meeting a matter of record that appears elsewhere in this issue, the Division is now beyond Atlanta and en route to progress. In my view, such progress can be best achieved by communication among the membership and with our colleagues in other divisions of the Society and by active participation of the Division's membership in Divisional activities at both regional and wider levels.

Let 1981 be the year of your contribution!

John S. Scott
Geological Survey of Canada

Engineering Geology Division Awards

At its annual meeting in 1979 the Management Board of the Engineering Geology Division approved the creation of a "Certificate of Appreciation" to be awarded by the Division to members for distinguished service. Through the efforts of Division Chairman for 1980, Allen W. Hatheway, and through the courtesy of his firm, Haley and Aldrich, Inc., of Cambridge, Mass., a handsome certificate, complemented with four of David Royster's outstanding landslide drawings, was prepared.

The first seven certificates bearing appropriate citations were awarded by 1981 Chairman, John S. Scott, to the following recipients at the Division's annual luncheon and business meeting held in Atlanta, November 1980:

Donald R. Coates—in editing the Engineering Geology Review Volume III, *Landslides;* and in bringing greater awareness to the profession of such hazards and their treatments, 1977.

Richard W. Galster—as Chairman in 1975, and as the architect of the revitalization of the Division.

George A. Kiersch—in editing Review Volume II, and four Case History volumes from 1963 to 1969, as Chairman in 1961, and in providing thoughtful guidance to the Division in the years thereafter.

William J. Mallio—in editorship of *The Engineering Geologist*, 1976 to 1979.

W. Harold Stuart—as Chairman in 1969, but especially in recognition of his representation of our conscience of tradition, and his key role in creation of the E.B. Burwell, Jr., Memorial Award.

David J. Varnes—in editing and guiding Division publications, as Chairman in 1977, and providing leadership in creating the U.S. National Committee for the International Association of Engineering Geology, achieved in 1980.

On the same occasion, Allen W. Hatheway, as past-Chairman of the Division, was presented with the Berkey gavel—both a handsome and functional memento crafted from a core of Boston pudding stone with a beautifully finished wooden handle and mounting board. It is fitting that the presentation, which re-establishes a tradition within the Division, was made to a person who had served the Division with enthusiasm and unstinting effort not only during his term as Chairman but also during his previous terms of office on the Division executive committee, and who was always mindful of the many contributions made by others to achieve the aims of the Division.

The hazards and rewards of urban field geology

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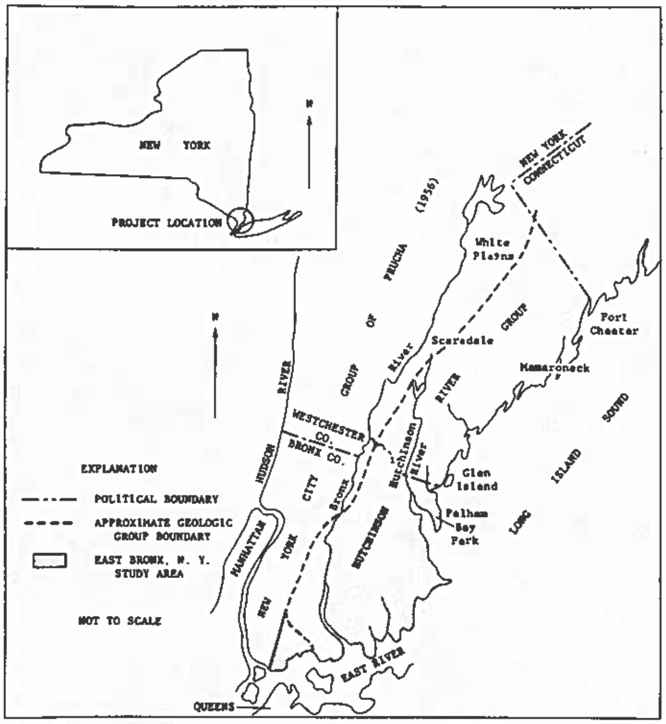

Figure 1. Geologic sketch map showing location of the east Bronx and adjacent areas discussed in this paper.

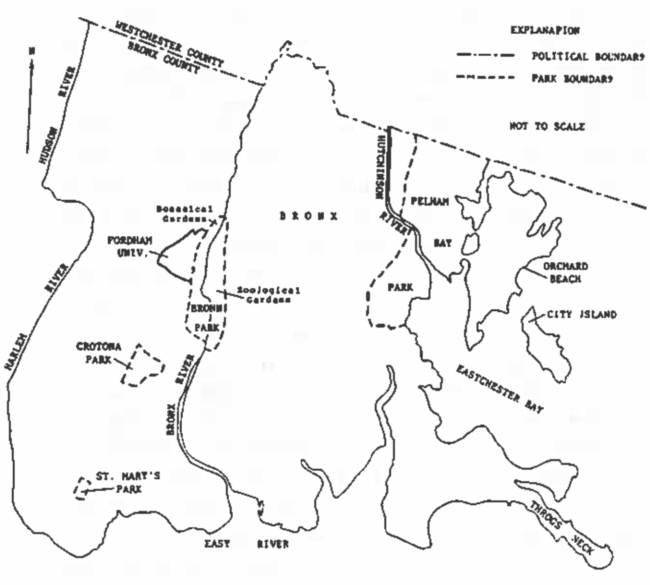

Figure 2. Locations of parks in the East Bronx, New York.

Most geologists think of areas like the Northern Rockies of Wyoming and Montana or the Sierra Nevada of central California when "field work" is mentioned. Some geologists feel more comfortable in the Appalachians, where hamlets of 50 to 500 people may be found here and there within a region encompassed by a 7½-minute quadrangle. Except for a few engineering geologists working on areally extensive projects such as subway systems or water-supply aqueducts, few field geologists think of San Francisco, Chicago, New York, or Boston as field areas. My field area is New York City, which occupies most of some and parts of the rest of 17 U.S. Geological Survey 7½-minute quadrangles.

Last summer, a part of the area, east Bronx (Fig. 1), had to be mapped to determine the lithologic relationships of several metamorphic units. Geologic mapping of this area was originally done between 1883 and 1900 by Merrill and others, and their maps were published in 1902 (Merrill and others, 1902). The area shown on Fig. 1 as Hutchinson River Group was mapped by Merrill as Manhattan Schist. Recent work by Pelligrini (1977) in the Mamaroneck quadrangle, and my work in the Bronx (unpublished data, 1980) has shown these rocks to be of Hartland Formation lithology, typical of western Connecticut.

The first question that arises when New York City is mentioned is, "Where do you expect to find rock there?" About 90 to 100 percent of the New York City area is shown on quadrangle maps as pink, indicating heavily built-up areas. However, several parks are in the east Bronx, including two very large ones—Pelham Bay and Bronx Park (Fig. 2)—that would be reminiscent of lightly populated areas in other parts of the country (Fig. 3). Mapping in these parks is no different from doing geology in some of the rural counties up the Hudson Valley, although I did have a frightening experience in Pelham Bay Park while studying an outcrop on the northbound exit ramp of Interchange 5 of the Hutchinson River Parkway. I heard the squeal of tires coming around the ramp. When I looked up, the driver and I just about had eye-to-eye contact. He then made a sharp right turn off the ramp and into the woods behind an outcrop across the roadway from me. The car door slammed, then quiet. A few seconds later, a pall of smoke rose up from the general area. Climbing to the top of my outcrop, I saw bright orange flames coming from the now-abandoned vehicle. The car, which I assumed to have been stolen, had been torched. It occurred to me to discreetly vacate the area. Needless to say, observations on that outcrop were not completed until several weeks later.

Working southward from Pelham Bay Park in the Bronx involved picking a neighborhood each day—such as Kingsbridge, Sound View, Baychester, or Throgs Neck—then driving for a short reconnaissance until a likely looking outcrop area was located. Then I'd park

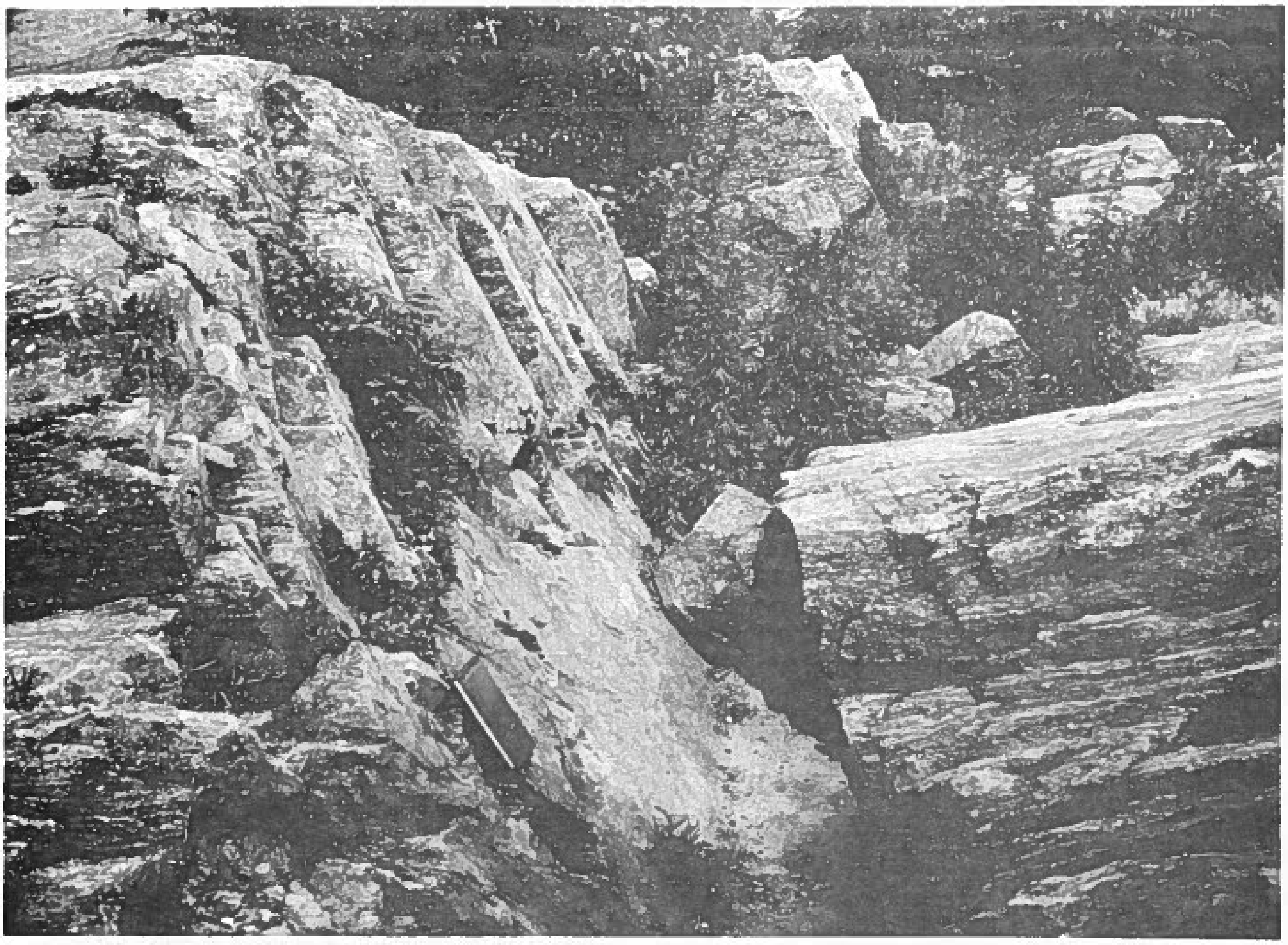

Figure 3. Typical outcrop area in Pelham Bay Park.

the car and spend the rest of the day walking systematically along miles of streets, looking into yards or vacant lots for outcrops and taking notes and measurements. In many neighborhoods, buildings, asphalt, and concrete effectively covered the bedrock, but topography indicated that rock was not far below the surface. If I followed a ridge and encountered a vacant lot, school, or landscaped hospital complex, an outcrop would invariably be located.

Once, when Bronx Park (Fig. 2), which includes Bronx Botanical Gardens and Bronx Zoological Gardens, was on the field schedule, I parked at the north end near Bedford Park Blvd. on Southern Blvd. between Bronx Botanical Gardens and Fordham University (Fig. 2). Many cars parked by commuters on this street surrounded mine, because the Conrail railroad station is near by. The park is large, so the Botanical Gardens was all I covered that day. When I returned in the evening, most cars were gone except mine; the area looked desolate. I got in, turned the key—nothing! My battery was gone! I walked to the nearest gas station across the railroad bridge, but they would not accept my credit card. I had to walk about a mile south to a Sears store, by which time it was nearly 5:30 p.m., and I was nervous and worrying that the rest of my car was being dismantled. I finally located a salesperson, but he tried to convince me that one battery was better than another. After much discussion, I was sent to the credit office to get approval of my out-of-state Sears card. The credit person announced that I was the "fourth one today." Mine was the fourth out-of-town car in the area to have been hit for its battery. I finally returned to the salesperson who wanted to know where my "exchange battery" was. I loudly exclaimed that it was stolen and that I needed the battery before the rest of my car disappeared! I waited in another line in the automotive section to get the battery. I took a bus back uptown. It was now 6:00 p.m., and all sorts of things were going through my mind. As I walked back across the bridge carrying the new battery, I looked through the trees and saw part of a blue car with the hood up and two persons standing in front of it. My adrenalin started pumping, and I ran the last 100 yards with the battery to discover that the blue car was not mine. Needless to say, I had to stop for a moment to recompose myself. I put the new battery in and left.

Farther south in western and south-central Bronx, one encounters many blocks of abandoned, burnt out, and vandalized buildings—no people, no traffic (Fig. 4). Rubble and garbage everywhere. A very depressing sight, but the devastation makes geology easier to do. Where buildings have been torn down and lots leveled, one

Figure 4. Typical street scene in part of the south-central Bronx mapping area.

notices blocks of rock of different lithologies among the bricks. One neighborhood might contain limestone; another, thinly laminated gneiss and amphibolite. These blocks came from foundation walls of the demolished buildings. In foundation walls of nearby standing buildings, similar rocks can be found. These foundation blocks would not have been visible 15 years ago when brick facing covered the buildings from the sidewalks up. These old buildings were constructed by blasting the basement out of bedrock, then using the excavated rock in constructing foundation walls. In essence, I was mapping on "urban float." In a topographic ridge running between parallel avenues down the middle of many city blocks for a kilometre or more, as previously mentioned, bedrock would be hidden in backyards or beneath buildings. When the devasted areas were reached, by checking the foundation "float" I was led to these backyards, and there I'd find the ridge of exposed limestone or gneiss.

In many places where no buildings in the block had been demolished, I had to go through buildings to gain access to the backyards. At one point I was completely deterred, because the building excavation was more than 4.5 metres deep below grade to the basement floor level, and both the stairs to the former delivery entrance at the back of the building and the stairs inside the inner court yard, which were accessible only by going through the building, had been ripped out. It was too far to jump and there appeared to be no way to get out; strikes and dips had to be taken by sighting from a distance.

All the abandoned buildings had their plumbing ripped out, with water running into the basements. Garbage and trash filled the basements, windowless stores, and first-floor hallways. While I was working in a lot on an abandoned street, a nerve-wracking sound came from an abandoned store across the street. I turned to see a man leaving through the former store window with a large empty garbage can. The sound was made when the man dumped his rubbish in the store.

Some buildings had been so badly burned that they were visibly leaning over, being prevented from collapsing only by the adjacent buildings. So many buildings and street signs are gone that I needed to use a Hagstrom's street map of the Bronx to locate myself.

I never had any problem getting a drink of cool Catskill Mountain water while working those hot streets. Practically every hydrant was open, in populated as well as in abandoned areas. In abandoned areas, people would come to wash their cars and leave the hydrants on. At other sites, kids would turn on hydrants to cool off and not shut them off. At one point, water pressure became so low due to the open hydrants around the city that a task force was sent by the city to turn hydrants off one night. The next day, I observed them being turned on again.

I saw drug addicts and poor people with shopping carts full of metal from vandalized buildings—and their ubiquitous crow bars. In devastated areas like this, where there may be a few holdout families in half-vandalized buildings among burned-out and demolished buildings, 10-year-olds have sullen, hopeless looks on their faces.

On one such street, Cauldwell Avenue, the morning news mentioned that a young woman in her early thirties had been found slumped over the steering wheel of a car with a bullet in her; at the time I was on my way back to that street to finish the work of the previous day.

In south-central Bronx, I found a few oases of new and rehabilitated buildings such as those south of St. Mary's Park. The people there had looks of pride and hope in their faces. A similar project north of Crotona Park, the rehabilitation of a burned-out building, was under way.

One of my final traverses was along the Amtrak rail cut from the Oak Point freight yards on the East River north to the Bronx River where an outcrop is almost continuous for the whole distance of 1.2 km. In the four-track cut north of the yards, the rock walls are steep and high. About two blocks north into the cut, I heard dogs barking at the top of the slope. Junk yards are at this location, and I realized that the guard dogs had spotted me. I felt that as long as I was on the railroad right-of-way, I was "on my territory" and the dogs were on theirs. Suddenly, I found the dogs had come down the slope behind me and were on a low wall above the tracks. I kept walking. The barking got louder; the dogs had jumped to the tracks, cutting off my exit to the yards; it's a long way north to the Bronx River. My defense was a geologist's pick and a Swiss Army knife. I figured that if they attacked together, the knife or the pick might make quick work of the big German shepherd. Maybe my hiking boots might disable the other one? They must have known what a knife was, because they held their ground, and I walked away toward the Bronx River—nervously taking notes and strikes and dips as I went, until I was out of their sight. In situations of this kind, whether the aggressor is animal or human, you walk, don't run.

I learned that as long as you keep your wits about you and remember that you are there to do geology, you'll find that more geology is exposed in devastated parts of cities than in populated areas once you are able to "read the signs." I also found this field session to be a mind-boggling study in sociological contrasts.

References Cited

Merrill, F.J.H., Darton, N.H., Hollick, Arthur, Salisbury, R.D., Dodge, R. E., Willis, Bailey, and Pressey, H. A., 1902, Description of the New York City district: U.S. Geological Survey Geologic Atlas, Folio 83, scale 1:62,500.

Pelligrini, T. L., 1977, Geologic map of the Mamaroneck quadrangle, New York-Connecticut: New York State Museum and Science Service, Geological Survey Map and Chart Series 29.

Prucha, J. J., 1956, Stratigraphic relationships of the metamorphic rocks in southeastern New York: American Journal of Science, v. 254, no. 11, p. 72-284.

International Association of Engineering Geology

The following articles, extracted from the statutes of the International Association of Engineering Geology, are provided for the information of members of GSA/EGD who are interested in joining IAEG and thereby participating in the formation of a U.S. national group on engineering geology:

Article I: NAME AND SEAT

The name of the organization is: International Association of Engineering Geology (IAEG). Its seat is the place of domicile of the Secretary General. It is affiliated to the Internation Union of Geological Sciences (IUGS).

Article II: SCOPE AND AIMS

The scope of Engineering Geology is defined as the science which determines the physico-chemical and mechanical properties of the Earth's crust, both in rock samples and in situ bedrock, as exactly as possible; which makes these geological findings available for the utilization of the earth with special regard to the needs of all branches of engineering, for the safety and for the greatest benefit of mankind.

Thus, the scope of Engineering Geology also covers the applications of Earth Sciences to engineering, planning, construction, prospecting, testing and processing of related materials.

The aims of the International Association of Engineering Geology are to promote and encourage the advancement of engineering geological research and technology, to improve teaching and training in Engineering Geology, and to collect, evaluate, and disseminate results and failures in engineering geological activities from all over the world, expeditiously and for the benefit of all.

The IAEG may never become a commerical enterprise.

Article III: MEMBERSHIP

A. There are three types of membership of IAEG:

1. National Groups:
   associations, corporations or societies which represent the interests of Engineering Geology in their country.
2. Individual Members:
   natural persons interested in Engineering Geology and ready to promote the intentions of IAEG.
3. Associate Members:
   institutions, organizations and contractors interested in scientific research, education, or the application of Engineering Geology and supporting the activities of the IAEG.

B. Admission and Resignation:

Every National Group which represents the interests of Engineering Geology and which is willing to support the aims of the IAEG may submit a written application for admission to the IAEG to the Secretary General. The application will be voted upon at the next meeting of Council, and approval of the application will be decided by a majority of two-thirds of the votes cast. Each National Group is responsible for the entry requirements to the group of any member wishing to become a member of the IAEG.

Applications of Individual and Associate Members should be made in writing to the Secretary General. An application will be accepted when sponsored by at least two members of the IAEG. New members will be proposed for acceptance at the General Assembly.

Notice of Resignation may be given in writing by July 1st in any year, to take effect from the next year.

Case-in-Point

Dredged channel infilling by erosion from dredged-material islands

Christopher C. Mathewson
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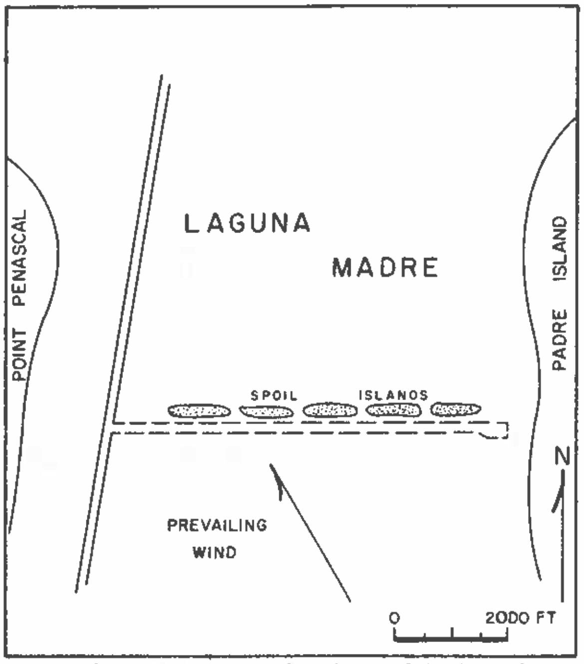

Figure 1. Seven Islands. Simplified sketch of the design for the dredging permit submitted to the U.S. Army Corps of Engineers.

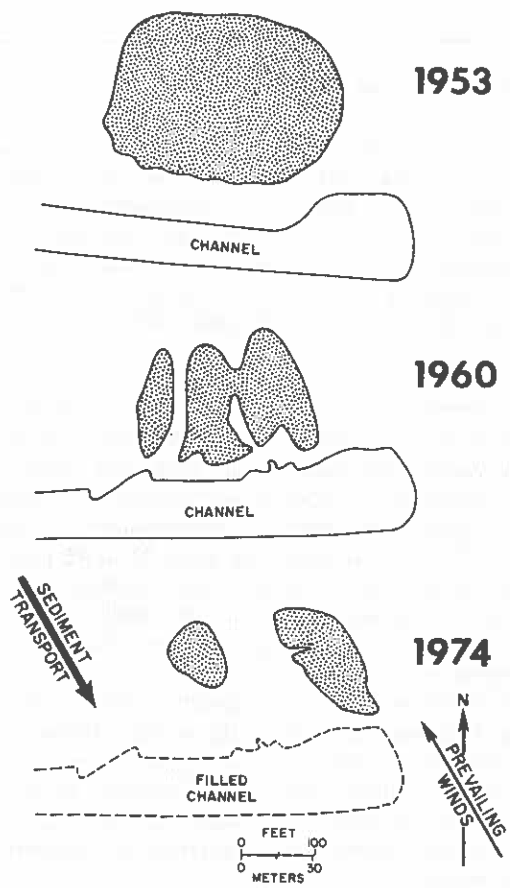

Figure 2. Study island at the Seven Islands location. Note the changes in island geometry since its placement in 1953. Note that the island is eroding into the dredged channel.

I. The Problem

Numerous small dredged channels in shallow bays and lagoons along the Texas Gulf Coast have been silting up with sediment eroded from the nearby islands formed of dredge spoil. The dredging procedures called for construction of islands alongside the channels on the downwind side (Fig. 1). Active hydrodynamic processes, however, have rapidly eroded the islands and transported the sediment "upwind" and into the channels (Fig. 2).

The Questions

1. What are the factors that cause or prevent erosion in shallow bays and lagoons?
2. What factors affect the transport of sediment?
3. What are the active processes that could erode and transport sediment into the prevailing wind direction?
4. What geologic processes should be considered in the construction siting of open water dredged material islands?

Geologic Setting

Laguna Madre is a long, narrow lagoon on the coastal plain and is part of a broad homocline downflexed on the edge of the Gulf of Mexico geosynclinal basin. Numerous bays are developed on the coastal plain including drowned river valleys, deltaic interdistributary bays and lagoons. The bays are separated from the Gulf of Mexico by a long chain of barrier islands broken by narrow inlets.

Laguna Madre is the result of a barrier island build-up occurring with the post-glacial rise in sea level. To the west and north of the study area is Baffin Bay, a drowned stream valley formed before the build-up of the barrier island (Price, 1947), and to the south is a broad aeolian plain. The surface deposits along this region are late Quaternary clayey sands spread fairly uniformly throughout the area. Outcrops of Beaumont clay can be found in Baffin Bay with late Pleistocene coquina outcropping on the shoreline at the mouth of Baffin Bay (Rusnak, 1960).

To the east of Laguna Madre is Padre Island. Padre Island probably originated as a line of islands formed over high points on the Pleistocene surface because these points withstood wave attack and thereby served as accumulation centers for sand. The true offshore bar did not develop until the islands were tied together by littoral drift. As sea level rose, the islands shifted inland and built into the continuous feature which exists today (Fisk, 1949). Once sea level stabilized, Padre Island entered its regressive state (Fisk, 1959). Padre Island can be described as a complex of geomorphic zones paralleling the coast; the beach, foredunes, active dune fields, marsh, deflation flats, and the wind tidal flats.

As described by Rusnak (1967), Murdock Basin in Upper Laguna Madre (Fig. 3) is an "inverse-filled basin whose source of sediment supply is from the sea by eroding locally available deposits and carrying them into the basin. . . ." An inverse-filled basin is one of several types of estuarine sedimentation. Rusnak also defines temperate

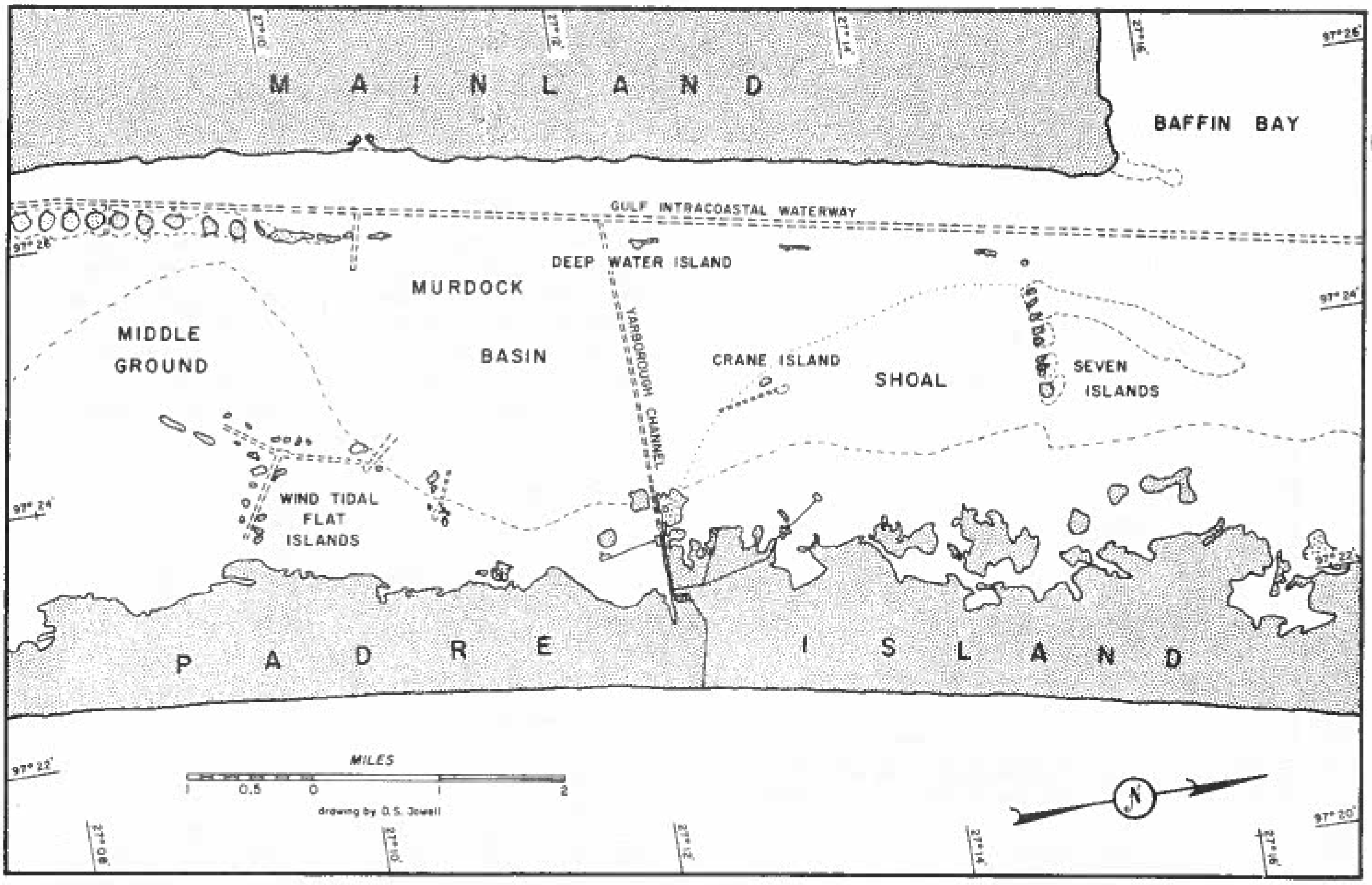

Figure 3. Map of study area showing dredged-material islands and channel locations.

estuaries with moderate run-off as positive-filled basins which are filled by lateral distribution of suspended river and biological materials. He defines non-filling estuaries as neutral-filled basins in which the basin sediment is redistributed without a change in volume. An example of a neutral-filled basin might be the smooth oval lakes and inlets on the east side of the Mississippi Delta where local erosion occurs due to tidal currents (Shepard, 1960).

The concept of an inverse-filled basin is emphasized by the work of Mathewson and others (1975). A hurricane breach of the foredune wall moves beach and dune sand toward the lagoon. Aeolian processes create a dune field which migrates across the island continuously being replenished by the aeolian transported beach sands. A historical sequence of aerial photographs shows that some dune fields move more than 30 m per year toward the lagoon (Piper, 1974). The wind tidal flats are the result of the sand migration, and this large expanse of flats has divided Laguna Madre into the upper and lower sections.

Bathymetry

Upper Laguna Madre has a centrally sloping floor on the east side with a few elongated basins on the west side. The west side of Murdock Basin is from 1.8 to 2.4 m deep, shallowing eastward to the flats. Water depths average 4.5 m in the Gulf Intracoastal Waterway. The west and northwest edges of the basin are rimmed by shallow platforms of carbonate cemented coquina reefs covered by extensive layers of sepulid worm tubes and barnacles (Rusnak, 1960). Parts of these platforms have been destroyed by the dredging of the Gulf Intracoastal Waterway. Subaerial islands resulting from dredging in this area have a composition of a highly erosion resistant mixture of reef boulders and coarse shell. Other sediments consist of Holocene sands and muds which are slowly covering Pleistocene sediments at an estimated rate of 120 mm per 100 years (Rusnak, 1960).

Climate

The climatic conditions of Upper Laguna Madre are classified as semi-arid (Thornwaite, 1948) with evaporation exceeding precipitation and run-off (Pritchard, 1951). The fifty-year record of the mean annual rainfall is 533 mm per year. As a result, this estuary is hypersaline. The Upper Laguna Madre salinities may vary from 22 to 45 parts per thousand chlorinity. Extremes have been recorded within the lagoon up to 113.9 parts per thousand salinity (Hedgpeth, 1953). Variations of salinity due to cloud bursts and excessive runoff last only a short time.

Wind in South Texas is subequally divided in velocity, direction, and duration between the strong offshore, longshore, "northers" of winter and the equally strong and prevailing onshore southeasterly winds of summer. Roses plots of wind frequencies recorded at Corpus Christi (Fig. 4) illustrate the higher frequency of occurrence of "northers" in the winter months.

Wind intensities varied from the gentle southeasterly breezes of 9.6–16.1 km/hr to "northers" gusting over 80.5 km/hr. Southeasterly winds maintain a constant velocity in fair weather picking up in the afternoon with the development of thermal convections over the land. "Northers" almost always associated with storms produce winds of usually higher intensity, though frequency of occurrence is a great deal less annually as seen in the wind roses.

Fetch

Fetch lengths of the wind for the island locations change as the basin configuration changes. Changes in the basin referred to are basin infilling and segmentation. Infilling creates shoals limiting the water depth and wave action. As shoaling increases, parts of the lagoon become segmented, which shortens the fetch for potential wave propagation. The basin shape changes as it is segmented, in order to maintain an equilibrium with the current forces. Basin infilling and segmentation lowers the current forces allowing for more material to settle out (Price, 1947). With the formation of lines of dredged-material islands, the basin is segmented and fetch lengths are further reduced, decreasing wave size and propagation.

Tides

Water-level changes in Laguna Madre are not tidal effects but wind effects. Lunar tidal differences in the area on the outer coast of Padre Island may vary from −0.9 m at lowest water to +0.3 m at high water. In Corpus Christi Bay, the water exchange from bay to Gulf is restricted to Aransas Pass and the Corpus Christi fish pass, keeping tidal fluctuations restricted to 0.15 to 0.45 m. Laguna Madre is further separated from Gulf tidal circulation by the solid-fill John F. Kennedy Causeway, from Flour Bluff to Padre Island. The causeway effectively reduces tidal flow into Laguna Madre to the point that it is insignificant as a factor affecting water circulation and water-level change in the lagoon. No effect is felt in the study area some 48 km south of the causeway. To the south of the study area, the next Gulf inlet is Mansfield Pass some 56 km away. Tidal influence has been seen up to the land cut separating Lower and Upper Laguna Madre, at which point tidal influence ceases (Rusnak, 1960).

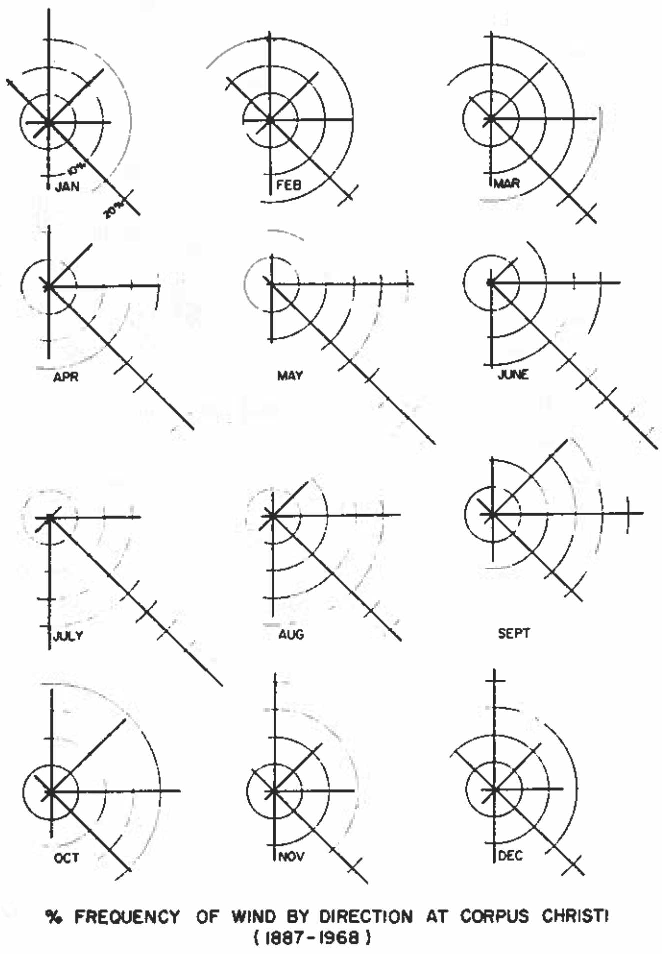

Figure 4. Frequency of wind by direction at Corpus Christi. Note that the southeast wind has a higher frequency during the year (U.S.N.W.S.C., 1970).

Circulation

The circulation of water in Upper Laguna Madre is controlled by wind. Wind tides can vary depths in Upper Laguna Madre from 0.3 to 1.2 m (Rusnak, 1960) depending upon wind directions. The restrictions created by the dredged material disposal islands in the lagoon and the narrow passages to the Gulf Waters creates a lag time for water-level equilibration from tidal surges in the Gulf. Prevailing winds from the southeast create a northern circulation in Laguna Madre, which continues as the wind maintains the steady south-to-north direction. Water will move into southern Laguna Madre through Mansfield cut and slowly move north through the land cut into Upper Laguna Madre. Similarly, north winds will blow water to the south through the land cut into southern Laguna Madre.

The water removed from Murdock Basin by the south winds moves north, raising the water levels in the north lagoon near the causeway. As noted by Brandes and others (1970), equilibration of the water level at the causeway due to wind set up takes some 8 hours. With a change of wind direction to the north, the water is blown back to the south into the basins raising the water level and inundating the wind tidal flats.

Extreme weather conditions will create excessive water flow. With high-intensity storms high winds create wind tidal surges into Murdock Basin increasing the water level which allows for larger waves and increases the wave erosion of the dredged-material islands.

Hurricanes may also blow enough water into the basin to raise the water level above the dredged-material islands. Island erosion is low at this time. As noted by Miller (1975), the energy release of waves is manifested for the most part in the bore of the wave which shapes the foreshore. With the extreme high water covering the islands, neither breakers nor bore have a chance to form, thereby reducing erosion.

Seven Islands

Seven Islands are located in the northern section of Murdock Basin and are on a shoal surrounded by water that does not exceed one m in depth, except during extreme conditions. These islands are composed of sand, shell, and mud and are subaerial with a covering of dense scrub vegetation. Surrounding the islands is a fine sand covered by an algal mat holding silts and clays (Figs. 5 and 6). Winds vary the water depth from 0.3 to 1.2 m, covering or exposing large parts of the island shore lines.

A comparision of the island volume changes in the Seven Islands area showed that for the 1953 island (Fig. 2), the volume was 27,037 m³. The volume of this island corre-

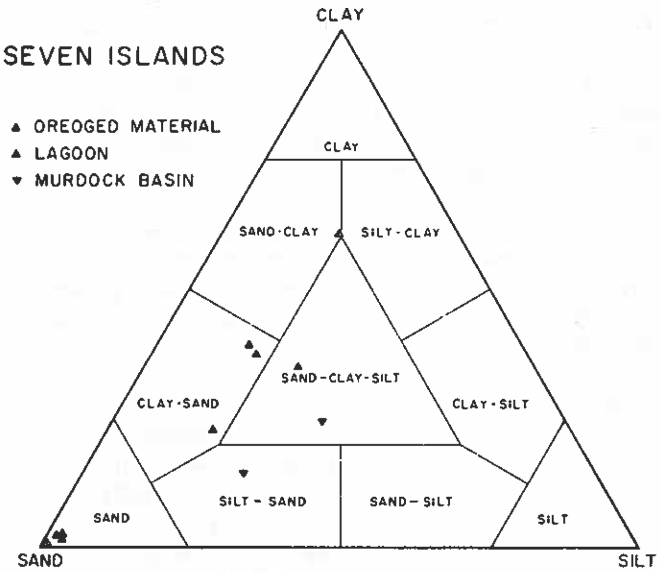

Figure 5. A triangle diagram of sand-silt-clay contents of samples in the Seven Islands area. Dredged material represents samples taken on the island. Lagoon represents samples taken outside of the dispersion area. Murdock Basin representa samples from the center of the basin away from major disposal areas.

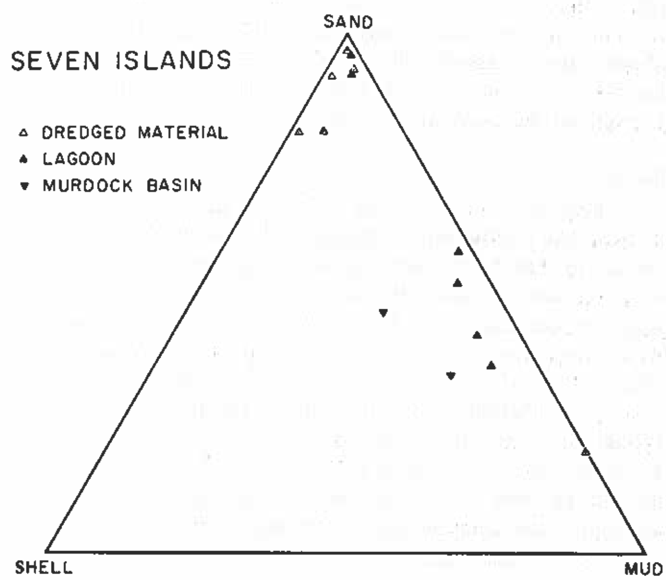

Figure 6. A triangle diagram of sand-shell-mud contents of samples in the Seven Islands area. Dredged materiel represents samples taken on the island. Lagoon represents samples taken outside of the dispersion area. Murdock Basin represents samples from the center of the basin away from major disposal areas.

lates with the amount of material removed from an adjacent section of the channel dredged to 1.8 m.

The 1974 volume was 25,337 m^3 (Fig. 2), which is 94 percent of the 1953 volume. The sediments have dispersed over a wider area and have filled the adjacent channel.

Island volume calculations show that there has not been an appreciable loss of volume, but rather an increase in the dispersion area of the sediments. This increase of the dispersion area and the direction of dispersion acts as a threat to the adjacent channel demanding mainenance to keep the channel open.

Examining the surface area of the Seven Islands complex in 1953, the island complex had an original dispersion area measured at 33,265 m^2. In 1960, the area had increased 160 percent, and in 1974 the dispersion area had increased 225 percent from the original configuration.

The subaerial area decreased from 28,895 m^2 in 1953 to 38 percent in 1960 and to 33 percent in 1974. There was a 62-percent change from 1953 to 1960 and only a 5-percent change from 1960 to 1974.

Sediment movement has been to both the north and south. The present morphology of the island, as observed in the field, shows that the majority of the sediment has moved to the south into the channel and been removed from the system. The material in the channel is predominantly sand with silt and clay partially covered by an algal mat.

II. A Solution

Significant factors to consider

Factors that are considered to affect erosion of dredged-material islands and transport of sediment from these islands are given in Table 1.

Criteria for siting dredged-material islands

The investigation of dredged-material islands along the Texas coast reveals that the net direction of sediment redistribution is predictable. Dredged-material islands located in the southern portion of the Texas bays undergo a net transport to the south. This occurs for two reasons. Wind tide, generated by the north storm wind, increases the water depth in the southern portion of the bays. The combination of the increased water depth with the greater fetch length to the north results in the generation of the highest waves toward the south. Waves generated by the prevailing southeast wind are insignificant in the southern portion of the bays because of the short fetch length and the decrease in water depth that results from the northward flowing wind tide. Dredged material islands located in the north or northwest portions of the Texas bays conversely undergo a net transport to the northwest. The reasons for this direction of transport are the same except that the southeast prevailing wind has the greatest fetch length and causes a northward flowing wind tide that increases the water depth in the north

TABLE 1. FACTORS AFFECTING ISLAND SITING

Wind	Climate
Waves	Basin physiography
Tides	Island design
a. Astronomic	Man
b. Wind	a. Ship wake
Currents	b. Subsidence
a. Wind	Biology
b. Fluvial	a. Fauna
c. Tidal	b. Flora
Dredged material	
a. Sand	
b. Clay	
(1) Cohesive	
(2) Clay balls	
c. Silt	

ends of the bays. Exceptions to the above general observations occur at islands on a river delta and along a dredged inlet.

One island is situated on the northwest side of a river channel and undergoes a net direction of transport to the southeast. This occurs because the only significant fetch is to the northwest. Fetch from the southeast is blocked by shallow natural levees that flank each side of the channel. If dredged sediment were placed on the southeast side of the channel, the net transport would be to the northwest because of the limitation placed on the northwest fetch by the natural levees and the reduction in water levels that accompany the north wind. Tidal currents are important in determining the net direction of sediment transport at the islands along the tidal inlet in northern, lower Laguna Madre. At this location, the ebb current, intensified by wind tide, results in the transport of the eroded sediment into the channel, regardless of location.

A generalized model for the selection of the most efficient site for unconfined dredged material islands can be made for any bay. The method for the generation of this model involves the following steps:

1. Literature research. Perform a literature review to obtain information on processes unique to the bay.
2. Wind data. Obtain wind frequency, velocity, and direction information and isolate the prevailing wind component and the intermittent storm wind component.
3. Physiographic data. Obtain information on the depth and configuration of the bay.
4. Tide data. Obtain information on wind and astronomic tides and tidal currents.
5. Formulate model. Based on the following process-response relationships, formulate a net transport model for sediment eroded by waves and currents from potential dredged-material disposal sites in the bay.
   a. Wind
      (1) Frequency. Determines the duration of wind wave attack.
      (2) Velocity. Determines, in conjunction with other factors, the potential wave height; the higher the velocity, the greater the wave height.
      (3) Direction. Determines the direction of wave attack, wind tide, and general water-circulation patterns.
   b. Physiography
      (1) Depth. The greater the depth, the greater the potential wave height.
      (2) Configuration. Controls the fetch length of a particular wind component. The longer the fetch length, the greater the potential wave height. An elongated bay oriented with its axis parallel to a wind component will have a greater fetch length than if oriented perpendicular to it.
   c. Tides
      (1) Wind tide. Responsible for varying water depths and thus wave heights in different portions of a bay.
      (2) Astronomic tides. Responsible also for water level variatioans, but more importantly, it creates potentially erosive currents in the vicinity of tidal inlets.

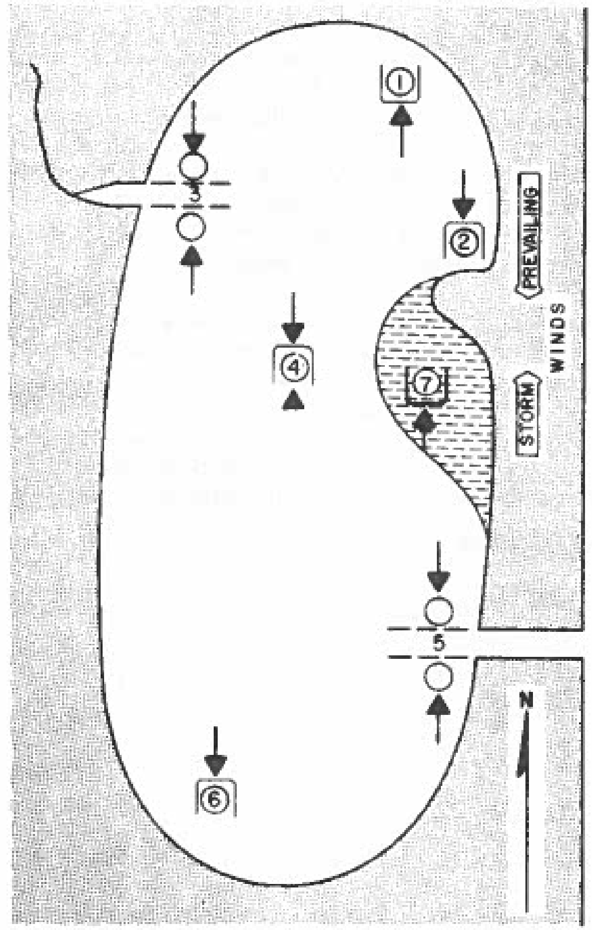

Figure 7. Generalized sketch of a hypothetical bay in which the prevailing wind component is from the north and the storm wind component is from the south. Arrows indicate the expected net direction of sediment transport. Locations 1, 2, 4, and 6 show channel orientations that will be relatively free of sediment infilling.

As an example, Figure 7 shows a generalized model of a hypothetical bay for which the directional wind components include a north-prevailing wind and a south intermittant storm wind. Six potential disposal locations are portrayed with proper channel orientations. The response of the dredged material to the active processes is as follows:

Site 1: Sediment from this disposal site will undergo a net transport to the north because of the much greater fetch length to the south and the increased water depth that results from wind tides.

Site 2: Net direction of sediment transport will be to the south due to north wind waves. Because of the very limited fetch from the south, no erosion can take place from this direction.

Site 3: Located adjacent to a river channel, the sediment from these dredged-material islands will undergo a net transport into the channel due to the protection afforded to each side by the shallow natural levees flanking the channel.

Site 4. This disposal site, located in the deeper central portion of the bay, where depth variations due to wind tide are minimal, will undergo a net sediment transport to the south. Because of the depth, some transport to the north can be expected.

Site 5. The net direction of sediment eroded from dredged material disposed of on either side of the inlet will be into the channel. This occurs for two reasons. In most estuaries, there is an appreciable influx of fresh water that creates a density contrast between the estuarine water and the incoming marine water. As a result, the dense saline marine water brought in by the flood tide will flow along the bottom within the channel, and the less dense estuarine water carried by the ebb tide will flow along the top of the water column toward the channel directly affecting the dredged material along the flanks. Where wind tide is involved, the additional hydraulic head will cause intensified ebb currents.

Site 6: Dredged material disposed of at the far south end of the bay will undergo a net transport to the south. The short fetch to the south and the low water level that results from the northward flowing wind tide make the storm winds ineffective in creating significant wave activity. Wave activity produced by the long fetch prevailing north wind results in the southward direction of sediment transport.

References Cited

Brandes, R. S., White, W. A., Hill, F. R., Masch, F. D., 1970, Analysis of hurricane tides at Padre Island, Texas: Proceedings of the 12th Coastal Engineering Conference, American Society of Civil Engineers.

Fisk, H. N., 1949, Geological investigation of the Laguna Madre flats; unpublished report, Humble Oil & Refining Company, Houston, Texas.

———1959, Padre Island and the Laguna Madre flats, coastal South Texas: Second Coastal Geography Conference, Coastal Studies Institute, Louisiana State University, April.

Hedgpeth, J. W., 1973, An introduction to the zoogeography of the Northwestern Gulf of Mexico with reference to the invertebrate fauna: Contributions to Marine Science, University of Texas Publication, v. 3, no. 1, p. 111–224.

Mathewson, C. C., Clary, J. H., Stinson II, James E., 1975, Dynamic physical processes on a South Texas barrier island—Impact on maintenance: OCEAN IEEE 1975 Conference on Engineering in the Ocean Environment and 11th Annual Meeting of the Marine Technology Society, San Diego, California, September IEEE Publication, 75 CHO 995-1 OEC.

Miller, R. L., 1975, The mechanics of surf and sediment interaction [abs.]: American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists Annual Meeting, Dallas, Texas.

Piper, D. P., 1975, A geo-economic evaluation of barrier island developments [M.S. thesis]: Texas A&M University.

Price, W. A., 1947, Equilibrium of form and forces in tidal basins of the coast of Texas and Louisiana: American Association of Petroleum Geologists, v. 31, no. 9, Tulsa, Oklahoma.

Pritchard, D. W., 1952, Estuarine hydrography, *in* Landsberg, H. E., ed., Advances in Geophysics: v. 1, p. 243–280.

Rusnak, G. A., 1960, Sediments of Laguna Madre, Texas, *in* F. P. Shepard, F. B. Phleger, and T. H. van Andel, eds., Recent sediments, Northwest Gulf of Mexico: American Association of Petroleum Geologists, Tulsa, Oklahoma.

———1967, Rates of accumulation in modern estuaries, *in* Lauff, G. H., ed., Estuaries Publication 83: American Association for the Advancement of Science, Washington, D.C.

Shepard, F. P., 1960, Gulf Coast barriers, *in* Shepard, F. P., ed., Recent Sediments, Northwest Gulf of Mexico: American Association of Petroleum Geologists, Tulsa, Oklahoma.

Thornthwaite, C. W., 1948, An approach toward a rational classification of climate: Geography Review, v. 38, p. 127–316.

Publications of interest

A Guide to Establishing Quality Control Policies and Procedures in Geotechnical Engineering Practice has been published by the Association of Soil and Foundation Engineers (ASFE). The guide was developed as an adjunct to the association's peer review program. The program is aimed at improving the professional practices of consulting geotechnical engineering firms through both remote and on-site review by peers to evaluate certain factors that affect a firm's professional performance. A firm can use the guidelines provided in the new booklet to establish and present its policies and procedures for achieving quality in its practice.

The publication identifies and gives guidance on specific elements of a firm's practice, including organizational structure, public relations, supervision, client relationships, office environment, technical staff, professional development, employee relations, and loss prevention, among others. Each section includes discussion of suggested policies a firm can employ to meet its individual needs.

ASFE's new publication was developed by a task committee of the association's Council of Fellows consisting of Harl P. Aldrich (Haley & Aldrich, Inc.), Bramlette McClelland (McClelland Engineers, Inc.), William L. Shannon (William L. Shannon, Consulting Engineer), and Eugene B. Waggoner (Eugene B. Waggoner Consulting Engineering Geologist).

Copies of *A Guide to Establishing Quality Control Policies and Procedures in Geotechnical Engineering Practice* are available at a cost of $7.50 from ASFE, 8811 Colesville Road, Suite 225, Silver Spring, MD 20910. Payment must accompany each order.

Clay Fills. Proceedings of a conference sponsored by the British Geotechnical Society in November 1978. Published by the Institution of Civil Engineers (Great Britain), the volume contains 27 papers concerning applications of compacted clay. Cost is $47.50 for the hard-cover book. ISBN 0-7277-0069-3. Available from ASCE, 345 East 47th Street, New York, NY 10017.

EGD forms new committee on engineering geology nomenclature and mapping symbols

At the suggestion of Jeffrey R. Keaton, Dames & Moore (Salt Lake City) in August 1980, the Management Board has created a Committee on Engineering Geology Nomenclature and Mapping Symbols. The purpose of the committee is to promote standardization. The means of accomplishing the purpose are not fixed; hopefully, a variety of means, all of which encourage discussion, will be utilized. Workshops and symposia at annual and section meetings are appropriate. Newsletter articles, a case history volume, and contributions to Barney Pipkins's new Engineering Geology Data Sheet series are all possible products of the committee.

The chairmanship position was "rewarded" to Jeff on the basis of his suggestion. Jeff is also working on the Association of Engineering Geologists Ad Hoc Committee on Engineering Geology Mapping Symbols, which is being chaired this year by Dennis L. Hannon of Leighton and Associates, Inc. (San Diego). Jeff's involvement in both committees will contribute to a joint effort in achieving common goals.

Jeff has managed to line up David J. Varnes, U.S. Geological Survey (Denver), and Richard W. Galster, U.S. Army Engineer District (Seattle), to contribute to the committee.

Suggestions for topics of discussion should be directed to Jeff, c/o Dames & Moore, 250 East Broadway, Suite 200, Salt Lake City, Utah 84111; phone (801) 521-9255.

Environmental meaning of safe yield

Nikola P. Prokopovich
United States Water and Power Resources Service, Mid-Pacific Region
2800 Cottage Way, Sacramento, CA 95825

Present growth of population and predictions of its future increase are making the prudent development of our natural resources an important task. One of the most important natural resources is water, which may become the limiting factor in future development. The importance of careful planning and water management cannot be overemphasized. Management of ground-water basins leading to an overdraft, for example, can cause their depletion, pollution, and land subsidence. The establishment of a safe yield of an aquifer system is, therefore, an extremely important task.

The term, "safe yield," first introduced probably by Meinzer (1923, p. 55), is widely used in hydrogeologic reports, publications, and textbooks. According to a generally accepted definition, it indicates "the rates at which water can be withdrawn from an aquifer without depleting the supply to such an extent that withdrawal at this rate is harmful to the aquifer itself, or to the quality of the water or is no longer economically feasible" (Howell, 1966, p. 252). More or less similar definitions are given in popular textbooks (Todd, 1959; De Weist, 1965).

Frequently, safe yield considerations are more or less restricted to the immediate area of development. In present times of growing ecological-environmental concerns, such restrictions are probably too narrow. It should be remembered that natural processes are usually in a state of dynamic equilibrium. Ground water is not accumulated indefinitely in an aquifer but, in general, is subjected to some natural underground outflow. Development of the aquifer means modification of conditions in outflow-discharge areas.

Some hypothetical examples of several "unsafe" results of a development based on the safe yield within the developing area are shown on Figure 1. The development area has two aquifers—the upper one, unconfined (F), and the lower one, confined (A). A new ground-water development in the district "D" includes pumping from the unconfined aquifer (pu) and the artesian flow from the confined aquifer (pa). The development is based on a safe yield of both aquifers and causes no decline of either the free-water table or the piezometric head.

Reduction of the original natural outflow from the unconfined zone results, however, in the degradation and drying of a swampy area (s) and reduced outflow from the confined horizon into a saltwater basin (B), resulting in a saltwater intrusion (In) into the originally freshwater aquifer (A), salt poisoning of vegetation in area "T," and ecological changes in area "C" which originally was inhabited by brackish organisms due to the dilution of salty water by fresh underwater outflow (O). Hence, the yield which was "safe" for a developing area was not so safe for other distant areas.

The "safe yield," from an environmental standpoint, is a "myth"—any man-caused water extraction changes natural hydrologic conditions and is more or less ecologically "unsafe." Such human interventions, however, are unavoidable if our civilization is to be preserved. The term "safe yield" is so widely used that it has become sacrosanct. However, attempts should be encouraged in environmental impact statements to analyze as much as possible the impact of the "safe yield" outside the area of development particularly within areas of natural discharges. The ideas expressed in this paper are those of the authors and may not represent the official views of Water and Power Resources Service.

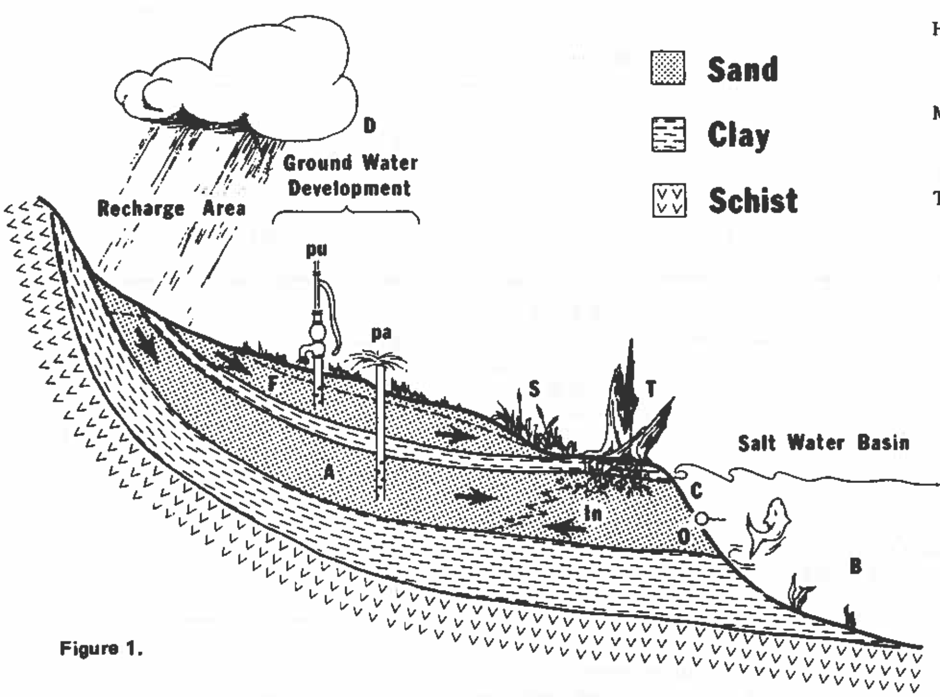

Figure 1.

References

De Weist, Roger J. M., 1965, Geohydrology: New York, London, Sydney, John Wiley & Sons, p. 366.

Howell, J. V., 1966 (Coordinating Chairman), Glossary of Geology and Related Sciences, 2nd Edition: Washington, D.C., American Geological Institute, p. 325-372.

Meinzer, Oscar E., 1923, Outline of Ground-Water Hydrology with Definitions, USGS Water Supply Paper 494: Washington, D.C., U.S. Government Printing Office, p. 71.

Todd, David Keith, 1959, Ground-Water Hydrology: London, Chapman and Hall, Ltd.: New York, John Wiley & Sons, p. 336. (You may have more up-to-date edition.)

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Engineering Geologic Data Sheets

Bernard W. Pipkin (1979)
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Committee will develop pocket Looseleaf, notebook-format, tables, charts and other reference data for practice; to be printed in the *Engineering Geologist*; contributions welcome.

Penrose Conference

Robert H. Fakundiny (1979)
State Geologist of New York
New York State Geol. Survey
Albany, NY 12230
(518) 474-5816

Investigating feasibility of conduct of Penrose Conference dealing with geologic factors in surficial and shallow-ground disposal of hazardous and special wastes. Committee Member: Allen W. Hatheway.

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GSA Centennial Participation by EGD

James W. Skehan, SJ (1979) Weston Observatory Boston College Weston, MA 02193 (617) 899-0950	Organizer of the 1981 EGD Symposium at Cincinnati, Ohio; Role of Government Agencies in the Development of Engineering Geology; abstracts solicited by Committee Chairman.

Construction Materials

Erhard M. Winkler (1978) Department of Geology University of Notre Dame Notre Dame, IN 46556 (219) 283-7135	Compilation of materials standards.

Liquified Natural Gas Ports

James E. Slosson (1979) Slosson & Associates 15373 Valley Vista Boulevard Sherman Oaks, CA 91403 (213) 783-8404	Organizers of a possible Case History volume dealing with geologic factors in siting, design, and regulation.

Cases-in-Point

*Christopher C. Mathewson (1979) Department of Geology Texas A&M University College Station, TX 77843 (713) 845-2451	Compilors of a series of short (3-4 page) synopses dealing with important factors in engineering geology; goal will be a Case History volume; format to follow in the *Engineering Geologist;* contributions solicited by Committee Chm.

Case History Volumes

Harry F. Ferguson (1979) U.S. Army Corps of Engineers Federal Bldg., 1000 Liberty Ave. Pittsburg, PA 15222 (412) 644-6947	Seeks new and desirable topics; recommends editors; open to direct contact by interested members.

Geology beneath Cities

*Robert F. Legget (1977) 531 Echo Drive Ottawa, Ontario K1S 1N7 (613) 235-6946	Convened the 1978 EGD Symposium; now preparing a 12-paper volume dealing with selected major cities of North America, tentatively slated as Volume V of Reviews in Engineering Geology; Dr. Robert F. Legget, Editor.

USNC on Engineering Geology

*David J. Varnes (1980); Chairman Engineering Geology Branch U.S. Geological Survey MS 903, KCG Denver Federal Center Denver, CO 80225 (303) 234-3346	Undertaking the establishment of a U.S. Natl. Committee on Engineering Geology to represent the United States with the International Association of Engineering Geologists.

*Member, International Association of Engineering Geology

Let's go to the movies

Recently, the *ASCE News* published a list of engineering firms that had technical/promotional-type films available that might be of interest to ASCE members. Although your editor has not reviewed any of these films, he presents some of the titles here in hope they will be of interest to engineering geologists as well.

L. Michael Baker Jr., Inc. Films on the Alyeska Pipeline Company, Trans Alaska Pipeline Project and on the New River Gorge Bridge (West Virginia) were mentioned. More may be available. Write to Anthony C. Ciufo, Director of Corporate Communications, Michael Baker Jr., 4301 Dutch Ridge Rd., Beaver, PA 15009.

Raymond International Builders, Inc. This firm has a substantial film listing, covering subjects from construction of the Pontchartrain Bridge to Deep Bay Test Borings to Sunken Tube Tunnel Construction. Write to Film Library, Raymond International Inc., 2801 S. Post Oak Road, P.O. Box 22718, Houston, Texas 77027.

Iowa State University. A film on "Stabilization–Holding the Roads," produced by a grant from the Koehring Co. and 19 stabilization agent producers is available. Write to Film Library, ISU Media Resources Center, Pearson Hall, Ames, Iowa 50011.

Foundation Engineering Co., has a film on vibroflotation. Address inquiries to Foundation Engineering Co., 600 Grant St., Pittsburgh, PA 15219.

Menard, Inc., has a film on dynamic consolidation of soils. Write to Menard, Inc., 339 Haymaker Road, Suite 200, Monroeville, PA 15146.

The Asphalt Institute, 2400 E. Devon Ave., Des Plaines, IL 60018, has a number of films on road construction.

The University of Strathclyde. "The Sediment Problem" and "Computer Simulation in Hydrology" are two films offered by the University. Inquiries go to Dr. George Fleming, University of Strathclyde, Dept. of Civil Engineering, John Anderson Building, 107 Rottenrow, Glasgow 4 ONG UK.

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