



THE MAINE GEOLOGIST

THE NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

OCTOBER
1987

VOL. 14 NO. 1

Society News:

Fall Meeting
Geological Society of Maine
"Computer Applications in Geology"
USM at Gorham
Friday, November 13 at 2PM
Evening Program at 7PM



President's Message: By Carol White

In recent discussions about the Fall meeting our new Vice President, Carolyn Lepage, suggested that the Geological Society of Maine sponsor a meeting on **Computer Applications in Geology**. Several members thought it was a great idea so we have settled on it as the topic of the next GSM meeting. The meeting is scheduled for Friday, November 13 at the University of Southern Maine in Gorham.

We hope to offer several informal workshops/demonstrations of different computer programs and graphics that are being used by both Maine colleges and private consultants. In addition, we are planning to have two presentations, one from a geologist from Woods Hole discussing computer applications in research at Woods Hole, and the other presentation by long time GSM member Jack Rand. Jack is keeping his topic a secret...but somehow I don't think that Jack will be talking about COMPUTERS. If you are interested in giving a presentation please contact Carolyn Lepage at the DEP (289-2651) or myself (846-5599).

GSM Secretary Peter Garrett has suggested that the Society sponsor a winter meeting on Hydrogeology in Maine. Please bring your ideas or suggestions of topics for this meeting, or alternative topics to the November meeting.

Please let us know what topics you would like to see GSM discuss at future meetings, and what other activities or publications the Society should pursue.

Rocks & Minerals Magazine will publish a special Maine issue; November-December, 1987. Contact Rocks & Minerals, 4000 Albemarle Street, N.W. Washington, D.C. 20016 for more information.

Annual Meeting of the Geological Society of Maine,
Cutler United Methodist Church Hall
1st August, 1987

Present: about 50 members, friends and family.
Dinner: a delicious bean supper provided by the Cutler Methodists

Steve Pollock, outgoing president, called for acceptance of the Secretary's report, which came unanimously.

The Treasurer's report, from founding member and who-knows-how-long-term Treasurer, Bob Gerber, took a bit longer to deliver. The essence of it is as follows: GSM has \$1,495.31 in hand at present, thanks to a current membership of 247. There is thus no need to increase the dues.

More good news is that GSM has its nonprofit status back, though only on a temporary basis. Whoever becomes Treasurer in 1991-2 should tie a knot in his/her handkerchief NOW to remind him/her to apply for permanent nonprofit status during that year. The associated bad news is that status was regained at the cost of \$835 for lawyers and accountant's fees. But thanks to an anonymous donation of \$400 from a little know company with the initials RGGI the day was saved.

Bob also suggested that it would be a good idea to publish Bulletin #4, if only because it would help to sell Bulletin #3 of which we have a superfluity of copies. Perhaps suggested someone, the \$1,495 in hand could help defray part or all of the publication costs for Bulletin #4.

Steve obtained unanimous support for the 1987-8 slate of officers. He then launched into eloquent thanks to the Cutler Methodists for the meal, and to Bob for his untiring work in keeping GSM afloat, and ensuring that it flourish. Bob replying, said that maybe a few gray strands in his beard were the result.

Walter Anderson seconded Steve's accolades for Bob. Moving to other business, he then called for more support from geologists for geologically-related bills in the Legislature.. He regretted the fact that a couple of the bills which were expected to pass, most notably the 1987/8 funding for the sand and gravel aquifer mapping project got no verbal support in committee from our community, and did not pass.

OCTOBER

Carol White, our new President, called for suggestions for a Fall Meeting topic and location, and closed the meeting just in time for viewing of a superb sunset rainbow over the Cutler's pretty harbor.

1987 GSM Annual Field Trip by Peter Garrett

Down East Maine
Led by Ollie Gates, Joe Kelley and several of his students.

If there is any part of Maine deserving of the adjective "ephemeral", it is the down-east coast of Washington County. Elsewhere, the granite coast suggests a rugged steadfastness against the onslaught of waves, while in parts of inland Maine old and almost forgotten peneplain surfaces stubbornly maintain themselves despite the ravages of glaciation.

But as Joe and his eager students, Bill Duffy, Rebecca Smith, and Andy Walsh showed us at Jasper Beach, Holmes Bay and the Lubec and Quoddy spits, this downeast coast is rapidly changing. The glacial bluffs erode, leaving a collection of cobbles and boulders strewn over the foreshore to be swept up into beach crescents by storm waves, or left like turtles on the tidal flats. The mud and much of the sand, meanwhile, finds its way to the open ocean presumably during storm events. (In ephemeral environments, almost everything happens during storms.)

But there is more to storm events than just sweeping and washing. The temporary storage of mud is just as interesting as it is before and after locations. For instance, the mud from bluffs of till or Presumpscot clay slumps into salt marshes, those most productive of marine ecosystems. In the course of time, it migrates from them across the clam flats, and finally sifts in suspension to below wave base in the Gulf of Maine. At every stage in the journey, imagine each particle of silt as a medium of exchange in the economy of life along the shore. Without the currency of silt passed from one life form to another through gobs and guts, where would be our State's fishery?

Just think about that for a minute. Mud is full of nutrients, so is colonized by marsh plants who use and stabilize it. When in the water, bacteria stick to its surfaces: every particle is a place for them to call home. Ostracods, nematodes and all those other little critters whose names are longer than their bodies, feed on the bacteria, and themselves provide food for larger fry. We eat those larger fry. Yummy mud!

The whopping tide range of this region is another fact to engender awe for the ephemeral. But even the tide range is ephemeral. Only a few thousand years ago, when the George's Banks were offshore sandy islands, the Gulf of Maine had little exchange with the

ocean, and little tidal range. In consequence, the waters were warmer in summer. Supporting evidence is that the Indians used to eat oysters all up and down the Maine coast: now oysters only survive in the Damariscotta River.

Mean sea level is ephemeral too, especially Downeast. The current rate of subsidence in the Passamaquoddy Bay Region of nearly a meter a century has drowned jetties and salt marsh hay dikes constructed by the great grandfathers of present-day inhabitants. But our ideas about why there should be such subsidence in this local area are just as ephemeral as coastal structures. We suppose it must have something to do with the Oak Bay Fault System, ("because it's there?"). But is, that fault system greased by the increased tidal range of this millennium, in the same way as mid-continental faults are greased by heavy rainfall?

And while still on the subject of bedrock geology, it should be pointed out that the environments represented by middle Paleozoic sediments of the region where also ephemeral. Ollie Gates, in his characteristically self-deprecating and cheerful manner didn't say as much, though he showed us as much. There were deep basin euxinic shales and siltstones, with turbidites and graptolites, intruded by gabbros and pillow basalts, shaken and deformed as soft sediments, (and later deformed by the fossils sheared out by slaty cleavage). The whole was laced with volcanic ash, bombarded by agglomeritic showers, and occasionally smothered by breccia. Then there was a quiet interlude with tidal flat deposition to close out the marine sedimentary record of the region.

The Red Beach Granite came next, down in the bowels of the earth. It must have lead to or been associated with uplift, for the next sedimentary event, the curtain call for this corner of Maine, was the deposition of the Perry red beds onto which some of the first creatures from the deep crawled out onto relatively dry land, and were occasionally buried in it.

It was a good gathering, with the usual ephemeral mix of new and familiar faces. Roll on the next.



MGS News:

Coastal Beach and Sand Dune Development By Stephen M. Dickson

How the beach and dune system will respond to one and three foot rises in the sea during the next century has involved many geologists in Maine recently as new rules governing coastal development have been drafted by the Maine Department of Environmental Protection. Proposed new "sand dune rules" restrict new development in the back dunes and allow relocation and reconstruction of existing structures in the

frontal dune. As in the previous set of rules, seawalls are prohibited.

At issue in the back dune is the extent to which natural dunes may be "developed" with lawns, drives, and buildings without interference with the natural supply and movement of sand in the dunes. The new approach is to leave 60% of a lot natural and to limit the building cover to 20%. The remaining 20% may be lawns, drives, walkways, etc. As in the previous dune rules, back dune homes must be elevated above the height of the 100-year coastal flood. In addition, proposals for large multi-unit structures must convince the Board of Environmental Protection (BEP) that the project will be safe from storm danger and shoreline erosion assuming a three foot sea level rise over the next century.

Many buildings exist in the frontal dune and represent non-conforming uses under the proposed new rules. How these homes are treated after storm damage continues to be debated. With the new rules, the BEP may allow damaged buildings to remain (newly flood-proofed) in areas that experience large waves in major coastal storms as long as their foundations are not washed by the spring high tides. With this plan, coastal development will retreat with the landward migration of the spring high tide line as sea level rises.

Geological and Geophysical investigations in the Bottle Lake Complex
By Robert G. Marvinney

As part of our continuing efforts to oppose the Department of Energy's nuclear waste siting program in Maine, the Maine Geological Survey is conducting an extensive research program in the Bottle Lake Complex, one of two candidate sites in the state. This multi-phase program consists of a photo-linear analysis, brittle fracture mapping, a gravity analysis of the region, and a high-resolution seismic profile across the complex. The photo-linear analysis, currently in progress and which includes the Sebago batholith area as well, is being conducted by Brad Caswell of Caswell, Eichler, and Hill, Inc. Brittle fracture mapping was completed by Prof. Rudolph Hon of Boston College and John Hopeck of Queens College, CUNY. Preliminary results indicate that the main candidate area of the Bottle Lake Complex is extensively fractured. Results of the gravity study, conducted by Prof. William Doll and Stephen Potts, both of Colby College, suggest that the main pluton thins rapidly to the north. The seismic survey is slated to begin around October 20, 1987. The data will be collected by Western Geophysical Company and will be processed and interpreted jointly by William Doll and Prof. John Costain, Virginia Polytechnic Institute. We expect the summary results of this program to provide sufficient geological grounds on which to rest our case against the Department of Energy.

MAINE GRANITE ON MONUMENT

A block of Deer Isle granite will be placed among native stones from other states at the Fountain of Freedom Monument being built by Independence Hall in Philadelphia, Gov. John R. McKernan announced Tuesday.

The monument commemorates the 200th anniversary of the Constitution, and will be bordered by the hall and the Liberty Bell.

The 2,600-pound block is a gift from the New England Stone Industries quarry on Crotch Island in Stonington.

Tony Ramos, president of the company, volunteered to have the stone cut, prepared and shipped.

Each state was asked to send a piece of native stone to be cemented into the wall.

Kennebec Journal, September 1987.

Jackson Volume Update:

The final format has been decided for the Maine Geological Survey's, C.T. Jackson volumes. A total of six volumes will be published in three broad subject categories: geologic structure and stratigraphy, igneous and metamorphic geology, and Quaternary geology. There will be two volumes in each subject category. The first volume will be on geologic structure and stratigraphy and will be published and available at the Portland GSA meeting in March, 1988. For more information contact Bob Tucker or Bob Marvinney.

The Second Edition of the **Groundwater Handbook for the State of Maine** should be available by November, 1987. Contact MGS for ordering information.

SIDE SCAN SONAR:

Joe Kelley, of the Maine Geological Survey, recently received a grant from the Center for Marine Studies at the University of Maine to purchase the Seafloor Mapping System Side Scan Sonar device produced by E.G. and G. In its first uses this past summer the device, which produces acoustical images of the seafloor analogous to air photos, was used in a variety of ways. In Muscongus Bay it was used to interpolate between bottom samples to make seafloor maps. In the Kennebec River, Joe and Steve Dickson (MGS) used sidescan imagery to demonstrate the upstream movement of large sandy bedforms following a dredging action. The equipment supported herring egg spawning ground research in Machias Bay as well as efforts to evaluate the impact of fishing gear in the bottom. Finally it was used to image mussel bars to determine the effects of seeking and harvesting and to assist in archeological investigation in Penobscot Bay. If you have any interest in the device contact Joe Kelley.

ARGO-MAINE:

The Maine Geological Survey (MGS) has become a member of the Association for Research on the Gulf of Maine (ARGO). Along with other ARGO members, the Maine Department of Marine Resources, the University of Maine, the Bigelow Laboratory for Ocean Sciences, and the Maine Maritime Academy, the MGS recently became a co-recipient of the 80 foot Research Vessel Cayuse from the National Science Foundation. ARGO is presently coordinating efforts to study many aspects of the Gulf of Maine, including the impact of a tidal dam across part of the Bay of Fundy.

NATO FIELD CONFERENCE Bay of Fundy Region By W. B. Thompson

During the week of July 20-26, over 80 Quaternary scientists from countries as widespread as Argentina, U.S.S.R. and China attended a NATO-sponsored field conference entitled "Quaternary Glaciations, Geomorphology, and Sea-Level Changes: Bay of Fundy Region". This field trip began at Dalhousie University in Halifax, Nova Scotia and visited many sites of geologic interest around the Bay. Trip leaders included Dave Scott, Ralph Stea, and other geologists from various institutions in Nova Scotia and New Brunswick, as well as the Maine Geological Survey and University of Maine.

Joe and Alice Kelley organized the Maine part of the conference, which examined a variety of coastal and glaciomarine deposits in Washington County. Assistance in describing these stops was provided by Dan Belknap, Hal Borns, Sarah Miller, Craig Shipp, and Woody Thompson. An outstanding lobster dinner and social evening at U. M. Machias left a favorable impression on visitors from other countries, a few of whom had never been to the U.S. and supposed that most of our country resembled New York City.

Memorable localities in coastal New Brunswick and Nova Scotia included sea cliffs that expose glaciomarine sediments and tills from several glaciations, and sand bars, salt marshes, and other features associated with the macrotidal environment of the Bay of Fundy. Stops to examine a wave-cut bedrock platform eroded during the Sangamon interglacial rounded out the trip, the main concern of which was the Quaternary history of sea-level change in this region.

The field trip guidebook (prepared in cooperation with IGCP Project 200) is still available, and contains well-illustrated descriptions of each stop. The cost is \$10.00 (Canadian funds),

payable to "Minister of Finance, Province of Nova Scotia", Nova Scotia Dept. of Mines and Energy, Library, 1701 Hollis St., Halifax, Nova Scotia B3J 2X1.

XII INQUA Congress By Tom Weddle and Woody Thompson

The XII International Congress of the International Union for Quaternary Research (INQUA) convened in Ottawa, Canada, July 31 - August 9, 1987, sponsored by the National Research Council of Canada, the Canadian Quaternary Association, L'Association quebecoise pour l'etude du Quaternaire, and the Geological Survey of Canada. INQUA is an interdisciplinary organization affiliated with the International Union of Geological Sciences, and has held conferences about every four years since 1928, except during World War II. The proximity of the 1987 Congress to the northeastern U.S., and in particular to Maine, was undoubtedly an event which will not happen again in the near future. Geologists from more than 30 countries attended the meetings, including representatives from Australia, China, Japan, USSR, and Argentina.

The objective of INQUA is to understand the processes by which the natural environment has changed during the Quaternary Period. The necessity of this objective is obvious when one considers that all human cultures evolved during the Quaternary Period, and that knowledge of the environmental changes which occurred during that time enhances our understanding of Earth's natural systems. In many instances, the study of these systems is necessarily an international investigation. As a state with an international border, Maine cannot ignore current geological work in neighboring Canadian provinces.

The Maine Geological Survey research exhibit at INQUA provided an opportunity for other countries and states to review some of our current activities involving studies of Quaternary deposits. These works include the significant sand and gravel aquifer mapping program, surficial geological mapping, Maine peat resources, and the coastal hazards mapping program of Maine's beaches. In addition, a technical poster session on glaciomarine deltas in Maine was presented by Woody Thompson (MGS), co-authored by Hal Borns (U Maine), Chris Krossen (Anchorage CC, Alaska), and Bjorn Andersen (U Oslo, Norway). Maine and the northeastern U.S. were represented at technical sessions by individuals from academia, other state surveys, and the U.S.G.S., but the Maine Geological Survey was the only representative from the U.S. to have a research exhibit on display during the entire conference.

The Congress also included several presentations by research agencies. A full day symposium on applied Quaternary studies provided an opportunity for consulting geologists to present results from their projects, two of which are very relevant to Maine. One of these, entitled "Using Quaternary stratigraphy to help select a hazardous waste disposal site", detailed preliminary siting procedures and geotechnical investigations in thick clay deposits of the Champlain Sea. The other was "Modelling of Quaternary parameters and the choice of nuclear waste disposal sites", in which the natural evolution of a site is modeled utilizing various geological processes, based on siting of nuclear waste repositories in France.

Finally, although the Congress included topics from a spectrum of disciplines, such as archaeology, soil science, limnology, oceanography, palynology, tectonics, and volcanology, the reasons for studying the Quaternary Period were best summed up by Dr. R. J. Fulton (GSC) in his opening remarks to the symposium on the Laurentide Ice Sheet, and these comments are applicable to Quaternary studies in Maine. All of Maine was covered by the Laurentide ice. The soil which provides food and nourishes our forests, our surficial aquifers, and much of our engineering and construction materials are products of the ice sheet. Understanding of glacial processes and determination of the flow patterns of the ice can help to locate sand and gravel deposits, and in tracing metal-bearing glacial sediments to their bedrock source. Moreover, knowledge of climatic changes and vertical movements of the Earth's crust resulting from fluctuations of the ice sheet provides a measure of variations in sea level, important to future planning of coastal and near-coastal developments.

For further information on the XII INQUA Congress, the following references are suggested:

Fulton, R.J., and Andrews, J.T., 1987, The Laurentide Ice Sheet: Geographie physique et Quaternaire, v.41, no.2, 318 p.

Episodes, International Geoscience Magazine, Special Issue on XII INQUA Congress, Quaternary sciences in review, March 1987, v.10, n.1

For abstracts of Congress write to H. Lacoste, INQUA '87, National Research Council of Canada, Ottawa, Canada, K1A 0R6.



High Yield Bedrock Wells:

Two bedrock wells were drilled in Fort Fairfield recently as part of the pilot MGS Bedrock Aquifer Project. The wells were installed to test the reliability of surface geophysical techniques to predict high yield zones. Yields of 100 gpm and 30 gpm were obtained, supporting the use of geophysics to predict high yield zones. For more information contact Geologist Craig Neil at MGS.

NEGSA '88

A list of symposia organized for the Portland NEGSA, scheduled for March of 1988, appeared in the July GSM Newsletter. The Short Course topic has been changed. John Tewhey will teach a course entitled "Hydrogeochemistry".



- Fall Meeting -

The GSM Fall Meeting, November 13th at USM at Gorham, will feature hands on computer demonstrations and poster sessions. Selected topics will be hydrogeologic and glacial modeling and drilling programs. The program will begin at 2PM, will be followed by supper at USM and an evening speaker.



MEMBERSHIP DUES STATEMENT

THE GEOLOGICAL SOCIETY OF MAINE, INC. is a non-profit Maine corporation established as an educational Society to advance the professional improvement of its members; to inform its members and others of current and planned geological programs in Maine; to encourage continuing social contact and dialogue among geologists working in Maine; and to further public awareness and understanding of the geology of the State of Maine, and of the modern geological processes which affect the Maine landscape and the human environment.

The Society holds three meetings each year, in the late fall, early spring and (with the Annual Meeting and sometimes field trips) in mid-summer. A newsletter, **THE MAINE GEOLOGIST**, is published for all members four times a year (more or less), approximately on a quarterly basis starting in September. The Society year runs from August 1st to July 31st. Annual dues and gift contributions to the Society are tax deductible. There are three classes of annual memberships:

- \$7 **REGULAR MEMBER** - Graduate geologists, or equivalent, with 1 year of practice in geology, or with an advanced academic degree in geology
- \$6 **ASSOCIATE MEMBER** - Any person or organization desirous of association with the Society
- \$4 **STUDENT MEMBER** - Persons currently enrolled as students in college who are interested in geology
- \$2 **APPLICATION FEE** - A one-time fee to all new members, payable when applying for membership

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87/88 SOCIETY YEAR STARTED - AUGUST 1st - PLEASE SEND IN YOUR DUES

THE GEOLOGICAL SOCIETY OF MAINE
 C/O Arthur M. Hussey, Dept. of Geology,
 Bowdoin College, Brunswick, Maine 04011

THE MAINE GEOLOGIST is published four times a year, more-or-less, in early Fall, late Fall, late Winter, and maybe June or July, for members of the Geological Society of Maine, a nonprofit educational Maine corporation interested in all aspects of the geology of the State of Maine.

Correspondence about membership in the Society should be mailed to Arther M. Hussey, Dept. of Geology, Bowdoin College, Brunswick, ME 04011. Items for inclusion in the newsletter may be directed to Robert A. Johnston, Maine Geological Survey, Department of Conservation, Station #22, Augusta, ME 04333

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