THE MAINE GEOLOGIST

THE NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

OCTOBER 1986

Vol. 13 No. 1

Society News:

Fall Meeting

Date: Friday; November 7, 1986
Where: University of Maine at Orono
Boardman Hall, Room 336

Student Papers: 2 PM Technical Sessions
Evening Program: 7 PM Ed Decker 'Deep Drill Hole'

President's Message

As I begin my second term as the Society's President I would like to express my sincere appreciation and thanks to Chris Olson for doing a fine job as Newsletter Editor last year.

I would like to thank Hal Borns, Dick Gilman and Tom Lowell for leading this year's field trips. The trips were well attended. We had approximately 40 for Dick's bedrock trip on Saturday and 38 for Hal and Tom's surficial trip on Sunday. While the weather was less than sunny on both days, spirits and enthusiasm was high. Dick led us through several shatter zone exposures, the Cadillac and Somesville granites, as well as the Cranberry Island and Bar Harbor Series. There were several good discussions on the granites and the enclaves within them. The cordierite seen in the Bar Harbor Series was a real treat. Tom and Hal took us to real neat diamicton and lag beach deposits, as well as to the ever impressive raised shoreline features. Many thanks to the three of you for the fine field trips. The Guidebooks for these trips are available from Bob Gerber in Freeport while the supply lasts. Cost is $2.00 to cover printing.

The Society discussed the possibility of publishing a commemorative bulletin to mark 150 years of Maine geology at the spring meeting. In July, the Maine Geological Survey, headed by Walt Anderson, sent out letters soliciting papers for a volume or volumes to be published in 1987 by the Maine Geological Survey. This portends to be a significant publication marking the sesquicentennial of C. T. Jackson's "Geology of the Wildlands of Maine", and the 150th anniversary of government-sponsored geological investigations. Those of you desiring further information, or manuscript requirements should contact the survey. The survey, especially Walt, is to be complemented for expediting the commemoration of geology in Maine.

Steve Pollock

SECRETARY'S REPORT

The summer meeting was held in Southwest Harbor/Seawall on August 2, 1986. Steve Pollock opened the meeting at 7 p.m. The Secretary's report was accepted as written in the previous newsletter.

Bob Gerber reported that GSM lost $300.00 over the year, primarily due to hiring an accountant for the IRS problem. We are still negotiating our nonprofit status. The Society had $1300 in the bank as of the summer meeting. Finally, Bob noted that the "thrill is gone", and he is ready to retire from the Treasury one of these days.

In new business, Carolyn Lepage informed us that LURC has formed a Lakes Advisory Committee, and is looking for information on outstanding natural features (including geological features) for lakes in the unorganized territories. Anyone with knowledge of such features should contact Carolyn.

The election of new officers was held, and in a cliffhanger (by acclimation) the following slate was adopted:

Steve Pollock	President
Carol White	Vice President
Bob Gerber	Treasurer
Bob Johnston	Editor
John Williams	Secretary
Andy Tolman	Director

A motion by Chris Olson to declare Art Hussey as the official postperson failed when there was no second. Art will continue his role as the unofficial postal chairman.

The meeting was adjourned at 7:13.

Submitted by John Williams, Secretary

TREASURER'S REPORT

GEOLOGICAL SOCIETY OF MAINE, INC.
INCOME STATEMENT
FOR THE TWELVE MONTHS ENDING JULY 31, 1986

INCOME

GROSS SALES	
Dues & Appl. Fees	$ 643.85
Bulletin Sales	465.85
Program Fee Income	7.90
Now Account Int. Inc.	88.64
	$1,206.24
SALES RETURNS & ALLOWANCES	
Cash Refunds	-15.85
GROSS PROFIT	$1,190.39

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EXPENSES

OFFICE EXPENSES	
Postage & Mail Fees	$50.00
Total Office Expenses	$50.00
PRINTING EXPENSES	
Newsletter Prt. Exp.	642.45
Misc. Print & Copy	19.80
Total Printing Expenses	$662.25
OTHER EXPENSES	
Meeting Fee Expense	$164.55
Outside Consult. Exp.	375.00
Reim. Member Exp.*	209.95
Misc. Expenses	22.45
Total Other Expenses	$771.95
TOTAL EXPENSES	$1,484.20
NET LOSS	($ 293.81)

*Primarily covers reimbursement for out-of-pocket payment of postage charges for mailing newsletters.

Cash in Bank - July 31, 1986 $1,645.74

Total Members as of 9/5/86 = 252

Bob Gerber

To the Editor:

The recent plea for contributions to the Maine Geologist has struck a responsive chord from this displaced member. I would like to make a request and a suggestion.

First, I am compiling a list of published interstadial radiocarbon dates for northern New England and adjacent Canadian areas. To be sure, it is a very short list, but I am concerned that there may be unpublished dates of which I am unaware. I would like to know if any of our members have obtained dates that remain unpublished, and would be willing to share that information.

Second, is it possible to produce a membership directory? A ready reference list would be helpful for all geoscientists working in Maine but particularly so for those of us that rarely get the chance to attend the annual or semiannual meetings yet would like to stay in touch. A directory need not be published every year; alternate years would probably be enough.

Sincerely,

R. Scott Anderson
Departmment of Geosciences
Universittiyy of Arizona
Tucson, AZ 85721

SECURE LANDFILLS ONLY, PLEASE

by Robert G. Gerber, PE & CG
Freeport, Maine 04032

Several years ago my firm completed the hydrogeological work for what was proposed to be an ordinary sanitary landfill in a remote area of Hancock County. As we have always done with landfill impact analysis, we used a computerized ground water simulation model to evaluate the extent and magnitude of ground water impact. We found, as always, that the Safe Drinking Water Standards would be violated in ground water for a considerable distance down-gradient from the landfill. Because the site is in a remote area, we applied for a variance from the DEP rule that "a landfill shall not contaminate ground water beyond the outermost boundary of the area where solid waste is to be disposed". a variance procedure is specifically spelled out in the DEP Regulations under CMR 401(4)(A)(17)(b), which permits the BEP to set "alternative boundary" at some distance beyond the limits of the proposed fill.

After considerable research on the part of the DEP and probably the Attorney General's office, the DEP concluded that no "alternative boundaries" could be allowed by the DEP (Regulations notwithstanding) because all ground water in Maine is currently classified as suitable to be developed as a drinking water supply. The DEP claims that until the legislature defines areas in the State where the ground water would have a lower classification, no degradation of ground water below Drinking Water Standards can be permitted beyond the solid waste limits.

Having worked on many landfills in Maine, we have known for a long time that landfills without liners and leachate collection systems will eventually contaminate the ground water beyond Safe Drinking Water Standards even though they are located on soils considered "suitable" by DEP. Many ordinary landfills have been approved, however, since the applicants did not do a quantitative impact analysis, but rather simply claimed that the landfill would meet all DEP regulations with respect to site geology. Until the legislature adopts an appropriate ground water classification scheme, it is clearly time to declare that all new landfills in Maine must be "secure" landfills with leachate collection. Furthermore, any existing landfill that contaminates ground water beyond Safe Drinking Water limits beyond the waste boundary, even if within the property limits, should be forced to take corrective action. Too many landfills are closed with soil caps meeting DEP regulations, but that are not effective enough in stopping leachate generation. Again, just meeting the Regulations in terms of cover soil characteristics is not adequate for most situations.

DEP ADMINISTRATION OF 205(J) GRANTS

by Robert G. Gerber, PE & CG
Freeport, Maine 04032

The federal governments gives money to the State of Maine for use in promoting wise land use planning to protect and enhance water resources, including ground water. This fund is administered by Water Bureau of the DEP. In fiscal year 1985-86, the DEP made something on the order of $100,000 available to towns and regional planning commissions for projects of various types and sizes which got money though competitive proposals. In fiscal year 1986-87, it appears that much less money will be available to towns and regional planning commissions because State government is using most of the money to fund their own in-house programs relating to 205(J) objectives. However, towns which are lucky enough to get 205(J) money should be aware of potential pitfalls in contracting with DEP.

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Our firm contracted with the Gray Water District to do a study to refine the definition of the recharge area for the District water source and to evaluate potential contamination sources within the recharge area and recommend appropriate land use control measures to protect future water quality. We made an initial proposal to the Water District 2 years ago to do this work for about $90,000 since much deep drilling, surveying, and modeling appeared to be needed to do the study with the accuracy requested by the District. The District applied for 205(J) funds in the amount of $9000 without really altering our suggested scope of work. The DEP gave a $7500 grant to the District, again without substantially altering the scope of work.

After a long period of fumbled competitive bidding and negotiations with DEP, the Water District finally approached us and asked us to do the work. We said we would, though $7500 was too little to accomplish all of the objectives of the study, but we would do the best we could with the available budget. After spending about $15,000 in time and expenses (i.e., losing $7500 on the job), we completed the project to the best of our ability using better than the ordinary standard of practice that a consultant would use in such an endeavor. We qualified our work appropriately, since future drilling and surveying was clearly needed to refine our interpretation of the aquifer recharge boundary.

DEP refused to make final payment on the contact because they claimed that since we qualified our work, we could not have met the contract objectives which they apparently interpreted to require a precise determination of the aquifer recharge boundaries. Anyone familiar with the amount of work required to do this type of study would know that this would be impossible with a $7500 budget and we have pleaded that we have done well beyond the required standard of practice in prosecuting the work. As of the date of this writing, we are still negotiating for payment. However, the lessons are clear: 1) don't try to do a $90,000 study for $7500; b) negotiate contract language carefully so that realistic contract objectives are set.

From the Editor:

The 78th Annual Meeting of the New England Intercollegiate Geological Conference was held on October 17-19 at Bates College. Field trips were centered in southwestern Maine and the weather was very cooperative for a Maine fall weekend. Don Newberg did an excellent job editing the guidebook and orchestrating the entire affair. He and others at Bates should be commended. Next year's conference will be held in central Vermont at Norwich University. Contact Dave Westerman or Fred Larson at Norwich for more information.

This issue is my first attempt at editing the GSM newsletter. Send your comments to me in care of the Survey. I would like to thank Chris and the contributors for their assistance. I would urge the readers to contribute letters, articles, and geology news to me for inclusion in future issues.

Bob Johnston

Survey News:

Maine Geological Survey Involvement in Digital Geographic Information System (GIS) Grows

(Augusta) Maine Geological Survey involvement in the development and use of a digital Geographic Information System (GIS) for the management and display of geologic, hydrologic, and geophysical information continues to increase. Several major projects for Federal agencies (including the USGS) are making extensive use of present GIS capabilities within the Department of Conservation at Augusta, and the Survey is spearheading a major effort to upgrade the facilities' hardware and software.

A Geographic Information System consists of the computer hardware, computer software, and personnel necessary to maintain and display geographic information (such as contacts or outcrop locations on a geologic map) and the data associated with the map features (such as lithology, structural information, chemical analyses, etc.). At the present time the software being used by the Survey is limited in the amount of data it can deal with, but the proposed upgrade would bring a full scale GIS to the Department of Conservation.

Currently, the Survey is using the GIS facility in a NOAA-funded project to develop hazard maps for sensitive Maine beaches. Information on the geologic environment, flood-prone areas, topography, and location of roads and houses is entered into the computer from a variety of scale maps and aerial photographs. The computer is then used to overlay the information at the same scale, and the resulting map is used to derive zones of high-, moderate-, and low-potential for beach erosion. The maps will ultimately be used by local communities and the Board of Environmental Protection in ruling on applications for building on and near Maine's beaches.

A second Federal-funded project involves using the GIS facility to calculate the National Water Well Association DRASTIC index of susceptibility of groundwater to contamination. Calculation of the index requires topographic, geologic, and hydrologic information in order to calculate a numerical index of susceptibility. This information must be taken from a number of sources, usually at different map scales and levels of accuracy, and combined on a series of maps at the same scale before the calculations can be done. The GIS software will perform the scale conversion, and will generate the computer files to be used for calculation of the DRASTIC index. The system will also allow the users to calculate several sets of indexes, depending on the weights or values assigned to various factors.

The Maine Geological Survey is also planning to use a GIS in many of its basic mapping programs. Planning for use of a GIS in detailed surficial geologic mapping underway in Southern Maine is most advanced, but plans also call for use of a GIS in the bedrock and hydrologic programs.

Marc Loiselle

MGS

— Marine —

The Marine Geology Division of the Maine Geological Survey had an extremely busy summer of field, lab, and office work. Newcomer, Steve Dickson, used large scale aerial photographs of the Maine coast to map geologic environments on our beaches and to relate the environments to development activities permitted by the Sand Dune Law.

Meanwhile Joe Kelley continued bluff erosion and mudflat accretion rate measurements in Casco, Damariscotta, and Machias Bays along with Dan Belknap and graduate students from Orono. This work, funded by Sea Grant also involved vibracoring in the same bays. A model for bluff erosion and mudflat/saltmarsh growth has been developed from this work, along with a sediment budget for part of Casco Bay.

Under funding from the Minerals Management Service, Joe continued sea floor mapping along Maine's inner continental shelf. Bottom sampling, side scan sonar, and seismic reflection profiling have now been completed from New Hampshire to Penobscot Bay. If funding continues, the next two years will be dedicated to a study of Penobscot, Blue Hill and Frenchman Bays.

The high point of the summer for Joe and Orono colleagues was a series of submersible dives in Casco and Saco Bays on the delta Sands. Numerous dives were made on targets previously identified on side scan sonar imagery. It was especially exciting to find large fields of megaripples extending out the drowned shelf river valleys off Old Orchard Beach. Next summer dives will be around the Johnson Sea Link to deploy sediment traps in the same areas.

Finally, a Humphrey Spiral has been obtained from U.S.G.S. and assembled at Orono with Joe Chernowsky. This devise takes several hundred pounds of offshore bottom sands and separates out 99.9% of the heavy minerals in a few hours. These minerals may then be separated by magnetic devices into subsamples for quantitative mineralogical examination. This tool is being used exclusively offshore now, but has great potential for prospecting on land.

Joe Kelley

— Hydrogeology —

Andy Tolman has left the Maine Geological Survey to work for a private consulting firm. In the interim of his absence and until his successor is found Tom Weddle will attempt to cope with continuing projects and day to day affairs of the Hydrogeology Division of the MGS, with the able assistance of other staff members Craig Neil and Pat Seaward. One of Andy's legacies is the Sand and Gravel Aquifer Mapping Project, which is continuing into its sixth year in 1986, focusing on the Bangor area.

The Hydrogeology Division completed field work this summer in northern Aroostook County. Sand and Gravel Aquifer mapping, detailed surficial geological mapping, and a pilot program to study fractured bedrock aquifers were part of the efforts undertaken by the group. Lodging was provided by the University of Maine at the Presque Isle and Ft. Kent Campuses, and many logistical problems were undone with the help of Bill Forbes and several UMPI students. Part of the bedrock program was co-directed by Bill along with the Survey in an effort to determine the agricultural irrigation potential of fractured bedrock aquifers. Dr. Reinhard Frohlich and graduate student Dave Owen (URI) conducted various geophysical surveys over areas where fractures were suspected, or where faults had been mapped. These data will provide a basis for locating sites for test borings to identify high-yield zones in bedrock.

The Sand and Gravel Aquifer Mapping continued as a cooperative effort by MGS and the USGS. Jim Adamik (USGS) organized the 12-channel seismic program, and provided experience in both that area and the test-borings and well installation later in the field season. Jim is transferring to Connecticut and will be sorely missed in Maine. Surficial mapping, well inventory, water quality data, and single-channel seismic data round out the information generated by the summer program. Along with the staff of the MGS Hydrogeology Division, summer field crews consisted of DEP members Dan Locke and Will Aldrich, UMPI students Vivian Hussey (now at Boston College) and Troy Smith, and some old faces (Enid Jones, MGS) and some new faces (Karen Knuuti, Harvard University, MGS, and Ann Thayer, Colby College, MGS). One of the immediate observations made during the surficial mapping is that there is ample coverage now provided by provisional 7 1/2'-topo sheets to allow detailed surficial mapping to progress in northeastern Aroostook County. There are several problems regarding the history of deglaciation in the area which could be partly resolved by detailed mapping (refer to MGS Bull. 37).

Tom Weddle

— Physical Geology —

The Maine Geological Survey continued its program of basic quadrangle mapping during the 1986 field season. Bedrock mapping was carried out by Gary Boone in several 15-minute quads in north-central Maine; Dick Gilman in the Newfield quad; Lindley Hanson in the Jo-Mary Mtn. and Norcros quads; and Art Hussey in the Boothbay area. Additional bedrock mapping was accomplished as part of a jointly funded USGS-MGS cooperative program (COGEOMAP), with Rick Abbott working in the Red Beach, Robbinston, and Devils Head 7.5-minute quads, and Mal Hill and Al Ludman in the adjoining Calais 15-minute quadrangle.

This year marked the beginning of a new phase of surficial mapping, as MGS contractors started compiling detailed 7.5-minute surficial quads with accompanying materials maps and texts. These detailed reports will gradually replace the reconnaissance level maps of earlier years, with highest priority given to the rapidly developing coastal zone of southwestern Maine. During 1986, the COGEOMAP program sponsored work by Pat O'Toole and Mike Clinch in the York Harbor, York Beach, and Kittery quads, and by Jeff Smith in the Maine portions of the Dover East and Portsmouth quads. Other persons involved in surficial mapping projects this year were Steve Kite and Tom Weddle in Aroostook County (part of the gravel aquifer study), and Woody Thompson, who is completing the Fryeburg quadrangle. Hal Borns investigated a series of exposures in the Pineo Ridge moraine system, and the team of Thompson/Crossen/Borns/Andersen completed a

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study of the origin, stratigraphy, and tectonic significance of 100 glaciomarine deltas for the forthcoming bulletin on the Crustal Warping Study.

The MGS entered the second year of its study of landslides in glaciomarine clay deposits. The landslide project is funded by the USGS Office of Earthquakes, Volcanoes, and Engineering. Contractors for this year's work is Cumberland County include Irwin Novak (landslide mapping), Tom Sandford and Steve Devin (engineering analysis), and Larry Mayer (clay geochemistry). MGS coordinators for this project are Carolyn Lepage and Woody Thompson.

Woody Thompson

Note the date on the mailing address and send in your dues if you have not done so already.

Notices:

FIRST CALL FOR PAPERS
1987 ATLANTIC GEOSCIENCE SOCIETY SYMPOSIUM
MINERALIZATION IN THE ATLANTIC REGION

This year's Atlantic Geoscience Society Symposium is to be held in Fredericton, New Brunswick and will begin on Saturday, January 24. The symposium title is "Mineralization in the Atlantic Region". Talks are welcome in one of the following three sections: (a) Sedimentary mineral deposits (e.g. placer); (b) igneous mineral deposits (e.g. cumulate) or; (c) Metamorphic mineral depositts (e.g. skarns, shear zones). There is to be a workshop entitled "Metamorphism of Ultramafic-Mafic Complexes", to be held on Friday, January 23. For further information, contact John Spray, Department of Geology U.N.B., P.O. Box 4400, Fredericton, New Brunswick E3B 5A3, telephone (506) 453-4804.

NCIC

AFFILIATE CARTOGRAPHIC INFORMATION CENTERS ARE ESTABLISHED BY MAINE

Maine has become the 44th state to establish cartographic information centers linked to the National Cartographic Information Center of the U.S. Geological Survey.

Two state NCIC-affiliate offices have been established in Maine: in the College of Forest Resources of the University of Maine in Orono and in the Maine Geological Survey of the state Department of Conservation in Augusta. Part of the regular duties of both centers is to provide information about map and aerial photographic coverage of Maine to governmental agencies and the public.

NCIC serves as an information clearinghouse for organizations and persons who acquire or produce cartographic data and those who need the data. NCIC's computerized files contain information on maps and other cartographic products held by federal, state and local governments as well as many private firms and organizations.

As NCIC affiliates, the Maine offices are able to fill requests for cartographic and geographic information and serve the public in Maine and surrounding states. They have quick access to information on the availability and source of many types of maps, charts, digital cartographic data, aerial photographs, satellite and radar images, photographs from manned spacecraft and a variety of other types of cartographic data. The centers can, for example, provide access to the more than 1,600 maps of Maine and more than 74,000 maps of the United States that have been produced by the U.S. Geological Survey.

Under the agreement between the U.S. Geological Survey and the Maine NCIC-affiliate offices, NCIC supplies catalogs, indexes, microfilm and microfiche of cartographic reference aids, and the Maine centers make this information available to the public. Also, Maine's cartographic records will be incorporated into NCIC information systems to make them available in the state and nationwide.

The University of Maine facility is in 208 Nutting Hall, College of Forest Resources, Orono, Maine 04469, telephone (207) 581-2854. The Maine Geological Survey facility is at State House Station #22, Augusta, Maine 04333, telephone (207) 289-2801. The offices are open from 8 a.m. to 4:30 p.m. Monday through Friday.

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

ANNUAL RENEWAL or APPLICATION FOR MEMBERSHIP - THE GEOLOGICAL SOCIETY OF MAINE

NAME _____
(Please print or type)

ADDRESS _____
(permanent Mailing Address)

_____

_____
Zip code

Please make checks payable to:
THE GEOLOGICAL SOCIETY OF MAINE, INC.

Regular Member $7 per year $_____

Associate Member $6 per year $_____

Student Member $4 per year $_____

Application Fee $2 One-time $_____

TOTAL ENCLOSED : $_____

MAIL TO: ROBERT G. GERBER, TREASURER
P. O. Box 270
South Freeport, Maine 04078

86/87 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 non-profit 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 Robert G. Gerber, P.O. Box 270, South Freeport, 04078. 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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