THE MAINE GEOLOGIST

THE NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

DECEMBER 1978

VOL. 5 NO. 2

FALL MEETING '78

The Fall Meeting of the Society, hosted by Prof. Donaldson Koons, convened along toward 3:20 PM on Friday, November 10th in the gleaming new quarters of the Geology Department in the Seeley G. Mudd Building, Colby College. Following an introductory tour of the facilities, Don opened the meeting, with some 3 dozen in attendance, by describing his new establishment and further offering to part with certain antique impedimenta no longer needed. Among the items available to interested collectors was a 1933 Geologic Map of the U.S. which described a somewhat greater portion of Maine than it is currently in fashion to do as being of Precambrian age.

D. S. Westerman then took over the meeting to work through a few "business" matters:

1. BULLETIN COMMITTEE: Art Hussey reported that 8 technical papers for the inaugural issue of the GSM BULLETIN have been reviewed and are now back with the authors for re-working and final camera-ready manuscript preparation. The deadline for these final manuscripts to be returned to the Committee is the end of November, for going to the printer on December 1st. The target for publication release is January 1979. We will advise the Members by direct mail (and the World by GEOTIMES ad) of the BULLETIN's availability, cost and ordering procedure, later in the year when we are given the information.

2. MAINE SURVEY: Walter Anderson expanded on the numerous items concerning the extensive geologic activities in Maine which were outlined on Page 7 of the September 1978 Newsletter. In addition, he noted that he had investigated the facilities of the Bangor Civic Center and found it to be technically suitable for handling the meeting of the Northeastern Section of the Geological society of America, now scheduled for Spring 1981. To sponsor that meeting will demand an Herculean effort which even Walter can't quite handle alone; a lot of help will be needed from the Maine geologic community to make the meeting run smoothly, efficiently and with most of the slides in proper order and upside right (down?) in the carousels.

3. NOMINATING COMMITTEE: J. R. Rand proposed that the Membership consider the matter of selecting a Nominating Committee at the Winter-Spring GSM meeting (March 16th at Bates College), so that an officers-Director-Newsletter Editor slate can be formally prepared for publication in the June Newsletter. He also expressed his continued interest in turning over, come summer, the powers and pleasures of the Treasurer and Editor positions to others. He can guarantee that there are moments of true joy and satisfaction in each of these jobs, and feels that it's time to give others a chance to ride the high wave.

4. COLLECTING GROUPS: Dave Westerman reported that he had received a non-member inquiry as to whether there existed in Maine a group that got itself together from time to time to go out on fossil collecting expeditions. The consensus of those in attendance seemed to be that no such formal, informal group was known, and that fossil collecting by members of the GSM was generally undertaken on a one-on-one basis.

Dave also noted an apparent need for a Maine Center for Meteorite Information. He has had 3 "meteorite" reports in the past several months (one of which, further reported on elsewhere in this issue, actually turned out to be true) and cannot find any agency to which to refer the reporters. Dave was thereupon, by acclamation, appointed as the Society's Curator of Meteorites. If you think you have one, you might contact Prof. D. S. Westerman, Center for Meteorite Information, Department of Earth Sciences, University of Southern Maine, Portland, Maine 04103.

Robert G. Doyle

At the Fall Meeting on November 10th, Bob Doyle announced that he will retire as State Geologist of Maine toward the middle of January 1979, to enter private geologic consulting. His decision, which Bob said was made about 2 years ago, will permit him to undertake some projects of special interest in economic geology. Walter Anderson, now Assistant State Geologist, will become Acting State Geologist until Bob's successor has been appointed by the Commissioner of the Department of Conservation. In making his announcement, Bob specifically extended his appreciation and thanks to all who have supported him and the Maine Geological Survey during his 20-year term of office.

In sequel to Bob's announcement, Donaldson Koons recounted the history of the Maine Survey from the late 1940's when Prof. Joseph M. Trefethen ran it part-time on a shoestring budget at the Geology Department, University of Maine in Orono. In the late 1950's, J. R. Rand took on a 3-year contract to launch a small but fulltime Survey in the Department of Economic Development at Augusta. The growth of the Survey to its present dimensions and competence came in the 1960's and '70's under Bob Doyle's guidance.

(Please turn to Page 2)

BOB DOYLE (Cont.)

During this period, the Survey was bounced around from the Department of Economic Development (where it didn't belong) to the Department of Forestry (where it also didn't belong) and finally came to rest in the Department of Conservation, where it did belong and where it was nourished from time to time by funds from outside agencies. Its role in "public" geology expanded, with the initiation of the coastal zone studies, hydrogeologic research, marine geology programs and surficial geologic mapping by some of the best geologists in the U.S.

These special programs, along with the basic bedrock mapping which got under way in the 1950's, were continually plagued by funding discontinuities beyond the Survey's control. Money problems notwithstanding, a lot of very good work has been done over the past 20 years, including that leading to the Preliminary Geologic Map of Maine (1967; A.M. Hussey II, Chief Compiler), to the currently in-construction 1:250,000 surficial geologic map series, and to the numerous reports, Bulletins and open-file material on bedrock, surficial, hydro- and marine geology. The geologic community well appreciates the excellent work that has been done by many professional geologists during Bob's administration. The value of this work to the people of Maine is substantial and will be long-lasting.

USGS Stress Studies

We have received from Fitzhugh Lee a long abstract, "Rockbursts in the Mount Waldo Granite, Maine", by F. T. Lee, D. R. Miller and T. C. Nichols, Jr., USGS, Box 25046, Mail Stop 903 KCG, Denver 80225. The paper gives details of rock stress measurements made at several sites in the Mount Waldo area, and with other notable material offers the thought "that present-day stresses are largely paleotectonic and were annealed in the rock during its cooling and deformation". For more details on this work, you might contact Fitz directly. (JRR)

Errata

It seems that we're slipping pretty badly down here at Cundy's Harbor, and if this keeps up you should consider either imposing a little peer review on your Newsletter Editor or, maybe, replacing him altogether with a new, more careful perfectionist. Two items in the September MAINE GEOLOGIST (Vol. 5, No. 1) need modification or expansion:

1. Page 3, THE NORTHERN BOUNDARY FAULT: the (omitted) reference for St. Julien and Hubert (1975) is, St. Julien, P. and C. Hubert (1975), Evolution of the Taconic Orogen in the Quebec Appalachians: American Journal of Science, Vol. 275-A, p. 337-362.

2. Page 4, GRAVEL AQUIFER MAPS: the proper reference for the gravel aquifer study from which the sample map illustration was taken is: Caswell, W. Bradford, Ludwig, Schuyler, and Thompson, Woodrow B. (1978), Gravel Aquifers of Eastern Waldo County: Maine Geological Survey, Augusta, Maine, 16 p. and map.

For further explanation on the gravel aquifer publication, Woody Thompson mapped the aquifers; Schuyler Ludwig gathered the well data; Woody and Schuyler compiled the map; and Brad Caswell (Project Supervisor) and Woody authored the report.

NOTICE OF SPRING MEETING

DATE - FRIDAY, MARCH 16, 1979

PLACE - Department of Geology
Bates College, Lewiston

SCHEDULE - 1:00 - 5:30: Student Papers and the customary business meeting.

5:30 - 7:00: Evening Meal

7:00 Onward: Special Presentation
(To be Announced)

Prof. John W. Cressy, as host for the Spring Meeting at Bates, has come up with an interesting variation for the afternoon session, in which students from Maine colleges are invited to submit abstracts and present-papers describing their projects. The program (to commence at 1:00 PM rather than 3:00) is visualized to follow the G.S.A. format, with 15-minute talks and 5-minute discussion periods. The abstracts, to be published by the Newsletter as an insert in the March issue, have a submittal deadline of February 23rd, 1979, so that they may go in and return from the printer in time for the Spring meeting.

For the evening session, it is proposed to invite the new State Geologist to outline his program, if Bob Doyle's successor has been named by that time. If not, then possibly we will try to have the then Commissioner of the Department of Conservation (in which the Maine Survey resides) offer his thoughts or desires for future Survey administration and programs.

RADIOACTIVE GROUNDWATER

Radon-222 (Rn^{222}) is a radioactive gas derived from the decay of radium-226, in its turn having derived through a decay series originating with uranium-238, a naturally-occurring radioelement in the bedrock of Maine. Radon is a noble gas not adsorbed or complexed by other substances. If it moves into groundwater, it remains there until the water is exposed to the atmosphere, to which the radon then rapidly escapes. The half-life of radon-222 is about 91.7 hours; the half-life of its uranium-238 parent is 4500 million years. In 1974, the U.S. Environmental Protection Agency (EPA) established the recommended upper limit of radon-222 in potable water at 500 pico-Curies per liter (pCi/1). Most water supplies in the U.S. contain less than 100 pCi/1. In Maine, most public water supplies also contain less radon-222 than the recommended EPA limit. Private water supplies, however, from both dug and drilled wells range to far in excess of the recommended limit, from 500 to more than 120,000 pCi/1 of radon-222.

(Please go to Page 3)

At the evening session of the Fall GSM meeting at Colby, before 50-55 members and guests, Prof. Stephen A. Norton discussed his research (in association with W.F. Brutsaert, C.T. Hess & R.E. Casparius at the University of Maine-Orono) on the occurrence and geologic controls of radon in Maine groundwaters. The goals of the research are 3-fold: to characterize the uranium content of the various Maine bedrock lithologies; to determine the cause of radon variability within and between rock and overburden types; and to define whether there is a relationship between radon in groundwater and incidence of certain human cancers in Maine. It has earlier been shown that uranium miners have a relatively high mortality rate from cancer, and further that an increased chance of contracting certain cancers appears to obtain for those who smoke and also regularly inhale air-borne radon.

The ultimate source for radon-222 is uranium-238 in the bedrock. Of the various bedrock types, granites naturally contain substantially more uranium than low-silica igneous rocks; "dirty" marine sediments, shales and phosphorites have notably high uranium contents. Using the Preliminary Geologic Map of Maine (1967) as a guide to the regional distribution of various bedrock formations, Steve and his associates have measured radon-222 contents of groundwater sampled from drilled and dug wells in or on most of the various major bedrock types in Maine. Water from dug wells tends to have a lower radon-222 content than drilled wells in the same terrane, probably because of the relative ease of radon escape to the atmosphere from dug wells.

In drilled bedrock wells, metasedimentary rocks tend to yield less radon-222 in groundwater than granitic rocks, and the major variations in radon content have been found to occur between different rock units. Although there is not an abrupt change in groundwater radon content within any metasedimentary formation as that unit trends into successively higher metamorphic zones, groundwater in the high-grade metamorphic rocks of SW Maine tends generally to have a higher radon content than in lower-grade rocks to the NE, due to the widespread occurrence of uraniumenriched pegmatites in the high-grade zone.

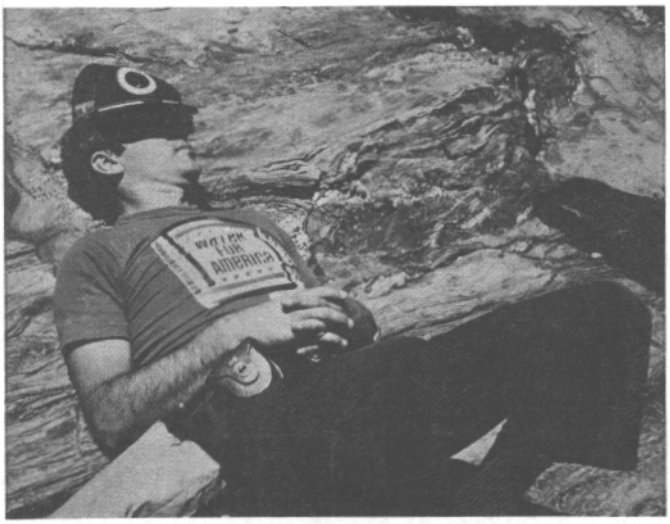
Based on a preliminary look in Waldo County, it appears that there is no appreciable difference between radon content in groundwater in highyield bedrock wells and in waters from low-yield wells. Examination of radon content as a function of depth of drilled wells has also failed to detect any obvious direct relationship. It appears also that variations in groundwater radon content from place to place in Maine are not a function of the water's residence time in the rock.

On the potential hazard to human health from radon-222, Steve expressed the view that ambient levels of radon in household air may be of greater significance than the radon within the water. By a series of experiments, he and his associates have determined that the radon content of air in a contemporary house shows a direct linear relationship to the radon content of the well water which enters the house. Although the air content is commonly about 10,00oX lower than the water content in radon, the residence time of radon in household air is relatively long. Householders are especially exposed to newly-escaping radon while washing dishes, washing clothes, taking showers or baths, etc., in confined areas of exposed or agitated well water. In this respect, Steve suggested that for all its other shortcomings, an old, leaky house with wood stoves and fireplaces might support a substantially lower air-borne radon content than its new, air-tight, energy-efficient neighbor.

The true significance to human health of the anomalously high groundwater radon content in Maine remains to be defined, although it is known that a general relationship does exist to connect radon ingestion with certain types of cancer. Funds are being made available to continue Steve's research on the Orono program, and the EPA has started a study to evaluate radon ingested from water. A greater effort does seem justified, in that the question may not be restricted to Maine: the Appalachian bedrock terrane from which our radon issues continues to the northeast into New Brunswick and other maritime provinces, and to the southwest through New Hampshire and southern New England and along the Piedmont into Alabama.

To end on a hopeful note, radon-222 is both a very mobile and short-lived radioelement, and a relatively simple agitation and de-gassing pro cess can readily release it from your water into the atmosphere, where it can succumb. Since it is illegal at the moment in the U.S. intention ally to discharge any radioactivity to the air, we can only suggest that the installation of both kitchen and bathroom exhaust fans are standard architectural procedures these days, specifically to remove household moisture before it condenses on vapor barriers, saturates the insulation, peels the paint and rots the timbers. (JRR)

FIELDTRIP '78



WATER FOR AMERICA Photo by D. Koons

"..on-site inspection by a ground-water geologist, however, may be of help.." (W. Bradford Caswell, Page 89, Groundwater Handbook for the State of Maine, 1978, State Planning Office, Augusta 04330)

THE PEOPLE'S CORNER

This is a public corner in the Newsletter to be devoted to observations, questions, answers and ideas. I would like members to contribute words, maps, sketches, important locations, cartoons or anything involving their current work, thoughts or hopes. An effort will be made to answer all questions, and there is no standard format to hold to. I'd like also to thank the large number of you who attended the Fall business meeting at Colby College; I would have felt pretty silly up there if none of you had shown up. Don Koons felt a little badly that the coffee and cookies ran out, and that there was standing room only for the evening presentation by Steve Norton, but I was sort of pleased. I hope we pull a repeat on the Bates people in March, only I suspect they'll fox us and reserve the gym. Hope to see you all there.

One of the results of the Fall Meeting was that I became the CMI (Center for Meteorite Information). JRR tells me that very few people can call themselves that. My first report in that capacity follows below, and an unsolicited second report will be found on the back page of this issue.

D. S. Westerman, Pres., GSM
University of Southern Maine

WALNUT HILL METEORITE

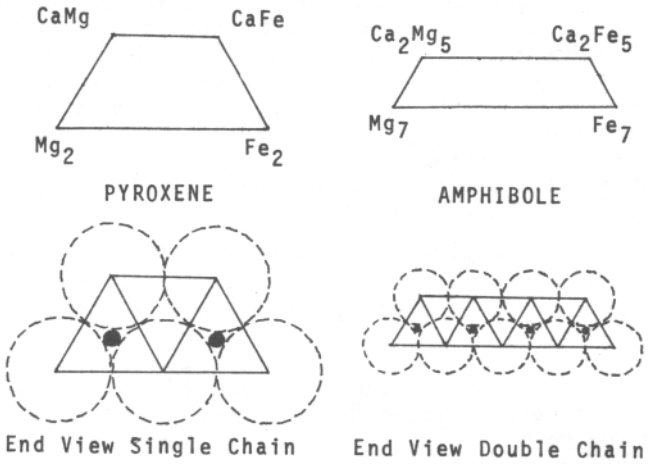
In September 1978, the son of Mr. Donald Smith went out to put some tar on the roof of an old chicken brooding house in the Walnut Hill area of North Yarmouth, Maine. While working on the roof, he noticed a hole approximately 2" in diameter near the edge of the roof. He investigated the hole and found a black stone lying inside on a beam about 8" below the roof, and when he picked the stone up there was a piece of tarpaper under it from the roof. He also noticed that the stone had no dust on it although the inside of the building was very dusty; and that it had a very smooth faceted surface and was roughly rectangular, 1" x 2" x 2.5". The members of the family suspected it to be a meteorite, and within a few days it found its way to my office at U.S.M.

The most prominent characteristics of the stone are its high density (3.35 gm/cc), smooth faceted surface, and a black crust (in part, shiny) approximately 0.3 mm thick. The weight of the stone is 218 gms. The stone is magnetic and will easily hold small magnets on its lower surface. Approximately 10-15% of the external surface is rusty, seen as spots up to 1 mm in diameter, and a polished corner reveals two metallic phases. The strongly dominant phase is silvery in color, and is thought to be an Fe-Ni alloy, whereas the very minor metallic phase is weakly yellow and is probably an Fe sulfide. The remainder of the stone consists of light gray crystals between 0.5 and 1.0 mm in diameter which are most probably silicate minerals.

My conclusions are that the stone is a meteorite belonging to the stony group, and that the fall occurred within four months prior to the discovery. The lack of dust and the fact that Mr. Smith had been on the roof several times last spring are the bases for fixing the time of the fall. Pictures of the stone and of the hole in the roof can be seen in the October 20, 1978 issue of the (Maine) Portland Evening Express.

PYROXENES AND AMPHIBOLES

Is there any reason why the shape of the pyroxene quadrilateral (compositions) corresponds exactly with the cross-sectional shape of the centers of the oxygens in a single SiO_4 chain, and the amphibole quadrilateral very nearly corresponds with the cross-sectional shape of the centers of of the oxygens in a double Si04 chain? (The correspondence for amphiboles would be exact if the Ca/(Ca+Mg) percentage for tremolite were 25% instead of 28.57%.) D.S.W.



LATE-GLACIAL SPRUCE LOGS DISCOVERED IN PORTLAND, MAINE

By Woodrow B. Thompson
c/o Maine Geological Survey
Department of Conservation
Augusta, Maine 04333

In the summer of 1976, the author found a piece of fossil wood in the Presumpscot Formation at Portland, Maine. The wood was discovered in a gravel pit near the Fore River while mapping the surficial geology of the Portland West quadrangle for the Maine Geological Survey. Subsequent excavation at the site revealed additional logs, along with branches, conifer needles, and cones. A few other fossils were also found, including the impressions of leaves from shrubs and several species of marine mollusk shells. This is the first described occurrence of fossil wood in the Presumpscot Formation (Thompson and Hyland, 1978). The locality is especially significant because of the diversity and excellent state of preservation of the tree remains, as well as their bearing on the late-glacial history of coastal Maine. Thus, a detailed study of the fossils is now in progress.

The stratigraphy of the locality is fairly simple. Glacial kame gravel of Late Wisconsinan age is overlain by 3-5m of silty clay. The latter unit is part of the Presumpscot Formation, which was deposited during the late-glacial marine submergence of coastal Maine. The contact between the gravel and the clay is sharp and dips to the northwest. All of the plant remains have been found in the lower part of the clay, either resting on the contact with the gravel or located a few centimeters above it. A thin layer of very fine sand locally occurs between the gravel and clay. This sand layer is colored dark brown by

included organic material, and it is overlain by a mat of conifer needles (at the base of the clay). A modern soil has developed in sandy sediments of uncertain origin that cap the glacial-marine clay. The elevation of the ground surface at the top of the pit face is about 12m.

The logs are the most prominent fossils at the Portland locality. Three sections of tree trunks have been found, along with numerous smaller pieces of trunks, branches, twigs and roots. The largest sections are approximately lm long and up to 20cm in diameter. Fay Hyland (Botany Department, University of Maine-Orono) has examined wood from these logs and identified them as spruce. Thin sections reveal that the cell structure is exceptionally well preserved and comparable to that of modern spruce trees. A ring count on one log indicated that it was at least 180 years old at the time of death. The growth rings are narrow, possibly because of an adverse late-glacial climate.

Many of the twigs and small branches in the clay have retained their needles. In fact, the needles on one twig were still green when they were unearthed. Cones were not found on the branches, but they do occur abundantly in the needle mat at the base of the clay. The cones evidently separated from the branches during the short time between their sinking and burial. Prof. Hyland identified the cones as white spruce (Picea glauca), and it is likely that the associated wood and needles are of the same species.

Two kinds of leaf impressions were found in the same part of the clay as the logs. The impressions are clear and were made by leaves from shrubs named Chamaedaphne calyculata ("leather leaf") and Ilex verticellata (common winterberry). The shell impressions of two marine mollusk species were also discovered in the pit face: Hiatella arctica and Macoma balthica. The actual shells of these and other species were collected recently from a pipeline excavation next to the pit. The latter shells have been identified but not studied in detail.

Robert Stuckenrath (Radiocarbon Laboratory, Smithsonian Institution) has obtained a total of eight carbon-14 dates from three of the spruce logs. Only one of these dates (12,510 ±100 yr BP) is within the 13,000-12,000 yr BP age range of the Presumpscot Formation as determined from shell dates (Stuiver and Borns, 1975). The others range from 10,875 ±80 to 11,830 ±115 yr BP. While there is no reason to suspect a laboratory error, duplicate samples are being dated at other laboratories in an attempt to resolve this discrepancy. If the ages that seem too young are actually correct, then they indicate that the marine submergence lasted longer in the Portland area than hitherto suspected. The carbon-14 age of the shells from the wood locality may help in solving the problem if enough of them can be collected to constitute a datable sample.

Determining the source of the tree remains is also a problem. The number of trees that they were derived from is not known. The logs certainly are not _in situ, but they are belived to have floated no more than a few kilometers from their source. This conclusion is based mainly on the concentration of tree remains in a single small area and the occurrence of well-preserved delicate twigs (with attached needles) that are clustered around the logs.

Further information concerning this fossil locality, including detailed descriptions and photomicrographs of the samples, will be published in a forthcoming article by Hyland, Thompson and Stuckenrath.

Stuiver, Minze and Borns, H.W. Jr., 1975, Late Quaternary marine invasion in Maine: its chronology and associated crustal movement: Geol. Soc. America Bull., v. 86, p. 99-104.

Thompson, W. B. and Hyland, Fay, 1978, Late Wisconsinan tree remains in the Presumpscot Formation, Portland, Maine (abs.): Geol. Soc. America Abstracts with Programs, v. 10, no. 2, p. 88-89.

Maine Geologist Certification

By Robert G. Gerber, Chairman
Maine State Board of Certification
for Geologists and Soil Scientists

Sec. I, R.S.T. 32, c.73 requires that a person performing "..geological work or service for the public ...wherein the performance is related to the public welfare or the safeguarding of life, health, property and the environment" be certified by the Maine State Board of Certification for Geologists and Soil Scientists. While the Board certifies soils scientists as well as geologists, this article is limited to geologist certification, and will describe the history, purpose, operation and problems of the Board of Certification.

The original law was derived from L.D. 2000 of the 1973 Maine legislature. Under the leadership of the Maine Soil & Water Conservation Commission, soil scientists in Maine drafted a bill to certify themselves. Geologists, in an effort to protect their own field of interest from encroachment by soil scientists, drafted a separate certification bill to cover geologists. The legislature, in its wisdom, combined the two bills and created one Board having 2 sets of certification criteria. Although much of the original impetus for professional certification was to proclaim who would be qualified to do subsurface sewage disposal investigations in Maine, the authority for licensing people to do this particular type of work has since been transferred to the Maine Department of Human Services.

The Certification Board is composed of 7 members: State Geologist (ex officio); State Soil Scientist (ex officio); an academic soil scientist; an academic geologist; a consulting geologist; a consulting soil scientist; and a public member- all appointed by the Governor. The purposes of the Board are to certify qualified applicants; to prosecute uncertified people who violate the Certification statute; and to prosecute people certified by the Board who are alleged to be guilty of "fraud or deceit in obtaining a certificate", or of "gross negligence, incompetence or misconduct" in professional practice, or of "any felony or any crime adversely affecting the eth ical standards of the profession" regulated by the statute, or of "the commission of any unlaw-

Maine Geologist Certification (Cont.from Page 5)

ful act" as set forth in the statute. The Maine Attorney General's office prosecutes cases for the Board in the State Administrative Court. Since the Board was formed in 1973, one Certified Soil Scientist received a 6-month suspension of his license from Administrative Court, and the Board is still considering a complaint against a Certified Geologist.

Regular Board meetings, open to the public, are convened at 10 AM in the 3rd Floor Hearing Room of the Ray Building at AMHI in Augusta, on the 1st Thursday of January, April, July & October (it will be on the 2nd Thursday of January 1979). Special meetings are held if required.

To gain certification as a geologist, an applicant must meet certain academic and/or experience requirements, and if so qualified, must take an examination administered by the Board. Qualified applicants scoring 70% or more on the examination will then be certified upon payment of fees. The wording of the statute in describing qualification criteria is not so clear as one would like, but the requirement is to have some combination of academic credentials in geology and some work experience in responsible charge of geologic work. It is possible to become qualified without academic credits if one has been a professional geologist for 7 years. A student leaving school with a B.S. in geology must have 5 years' work experience in "responsible charge of geological work" unless he goes to graduate school, in which case each year of graduate school counts as h-year of experience, up to a maximum of 2 years' work experience credit.

The examination is given in one day, divided into two 4-hour sittings. The exam was originally compiled primarily by academic geologists working in Maine. It was recently revised, however, to make it more pertinent to the work of consulting geologists. Two parts of the exam are mandatory: a section on general geologic principles; and a section on Maine geology. The remainder of the exam consists of the selection of several sections from a list of specialty topics such as structural geology, environmental geology, economic geology, etc. The grading of the exams is done by geology professors at the University of Maine at Orono, and is somewhat subjective since all questions are essay type. The Board is working on improving the exam, to establish more objective grading criteria and to provide more choice of specialty exams.

Several problems presently confront the Board. The Board has not yet adopted approved rules for hearings--as required by the Administrative Procedure Act of Maine, which became effective on October 17, 1977. Between the requirements of the law and the operating requirements of the Board, there are at least 5 different rules that must be written, approved by the Attorney General and the Secretary of State, and adopted after a formal, advertized public hearing to be held by the Board. The Board hopes to get these rules adopted early in 1979. The second problem is an inability to balance the Board's budget. The State's general "overhead" charge to the Board (over which the Board has no control), coupled with the part-time secretarial cost, exceed the annual income from renewals of certificates and new application fees. The deficit is presently absorbed from a fund reserve that accumulated in the initial years of the Board. This reserve, however, will be consumed in several more years. Extraordinary expenses such as prosecutions of complaints against people certified by the Board could easily bankrupt the Board. As a first step to ease the financial problem, a bill will be submitted to the 1979 legislature to raise the annual certification renewal fees from $15 to $20.

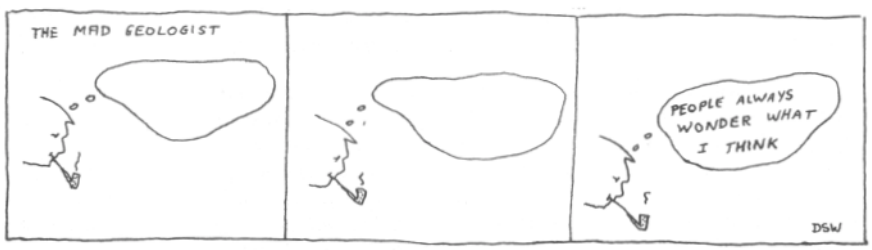
Another bill that will be submitted to the 1979 legislature would remove the exemption of State employees from the requirements of the Certification Act. This would require, for example, that the head of the Division of Solid Waste Management of the Department of Environmental Protection become certified as a geologist if his Division were submitting geological evidence and opinions into the public record.

Of course, there is a question of whether or not certification of geologists and soil scientists is needed at all. It is interesting to note that the writer lobbied long and hard against the original certification bill. The arguments against certification include, among others: it increases bureaucracy and cost to the Maine people; it is exclusionary to some people who may otherwise be qualified; geology is a science and as such should not be regulated; and it is difficult to acquire the necessary geological work experience in Maine to become certified since there are so few job openings in geological work. On the other hand, land-use decision makers are relying more and more on the knowledge and advice of geologists, and certification does require geologists to accept full responsibility for their work. The debate over professional certification and what it should accomplish should continue.

The opinions expressed in this article are those of the writer, and not necessarily those of the Board of Certification.

CALL FOR CONTRIBUTIONS: MAINE GEOLOGY, VOL. II

The first volume of Maine Geology, the new Bulletin of the Geological Society of Maine, is in its final stages of preparation, and will soon be available. You will be notified when, where and how to acquire your copy. We are presently receiving papers for Volume II, and if enough are in by Spring we hope to see it in print by July. If not, we'll shoot for late Fall publication. Instructions to authors are available from A. M. Hussey II at Bowdoin, and D. S. Westerman at The University of Southern Maine. We look forward to your response (and papers).



DOES GROUND FREEZING AFFECT WELL RECHARGE?

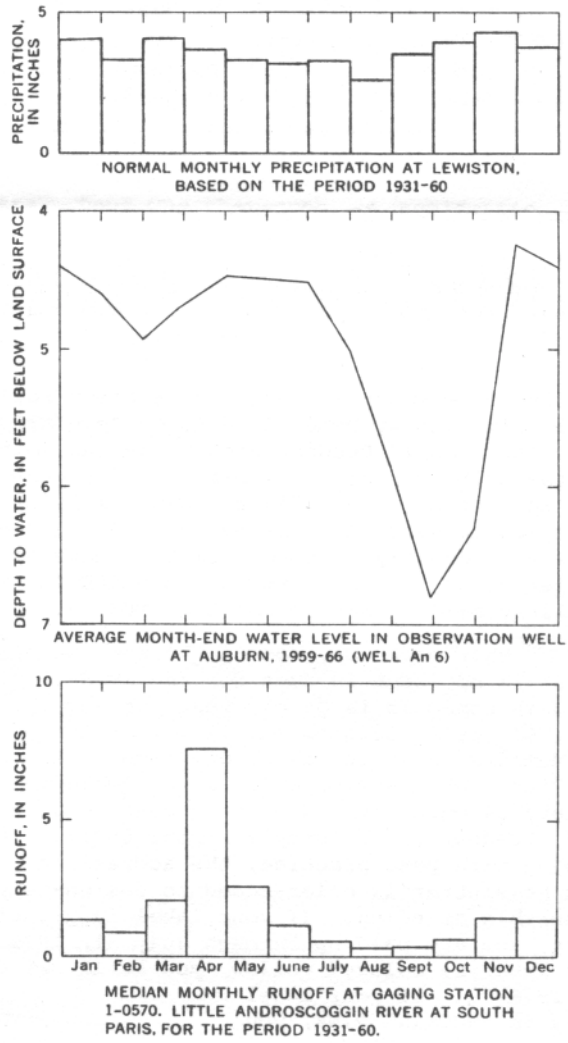
By Robert G. Gerber
Cons. Geologist & Civil Engineer
South Harpswell, Maine 04079

The summer and fall of 1978 have been particularly dry ones for Maine. The lack of precipitation has caused many wells in central Maine to go dry, and there has been a growing fear that these wells will remain dry throughout the winter unless appreciable rainfall occurs before the ground freezes. Although the problem is somewhat dependent upon the specific surface soil texture and land cover type of individual watersheds, the lack of well recharge during the winter months is not usually due to "ground freezing".

Probably the only long-term accurate monitoring program of water well levels in Maine is that conducted by the Water Resources Division of the U.S. Geological Survey. Eleven Hydrologic Investigations Atlases have been produced to date by the Maine office of the U.S.G.S. Water Resources Division, authored by Glenn Prescott, Jr. Each of these reports contains graphs of average monthly precipitation, average monthly water level in a monitoring well, and average runoff from a nearby gaged watershed. A sample set of graphs from Prescott (1968) is reprinted below to illustrate the annual pattern in water level fluctuation in an observation well. Note that although precipitation is (usually) relatively constant from month to month, the well water level shows two seasonal downward trends. The large dip bottoms out in September and is a result of slightly below-average rainfall during the summer months plus water table losses due to evaporation and plant transpiration. (The graphs do not cover consistent time periods, and since the observation well was only monitored from 1959 to 1966, the September water level "average" is really slightly below the long-term average due to the drought of the summer of 1965). Notice that the other dip in average well water level occurs in February. This winter dip begins in December-about the time of change in state of precipitation from rain to snow.

A set of unpublished data on piezometer readings in observation wells on a large wooded island in Maine was compared with daily temperature and precipitation measurements made at a meteorological tower located on the island. The nine monitored wells were in glacial lodgment till, and weekly readings were taken for a period of two years. These data show that winter fluctuations in well water level correlated with form of precipitation more than with temperature, although temperature was important during the "January thaw". In other words, recharge stopped when precipitation turned from rain to snow in December, and not necessarily when frost formed in the ground, which is usually somewhat earlier. During a period in mid-January when a thaw occurred (average daily temperature was above freezing) recharge occurred to the wells although frost was still in the ground. Throughout February, however, the average daily temperature was below freezing and well levels dipped again until the end of the month, when the spring thaw began and precipitation changed back to rain. Frost did not leave the ground, however, until April. Except for the "January thaw" effect (which does not occur every year, and is not felt so dramatically inland as on the coast), the trend of the island well data is similar to the U.S.G.S. data shown here.

The writer's conclusion is that freezing of the ground (i.e., frost) does not usually prevent recharge to wells from December to February. More likely, loss of recharge is due to a change in form of precipitation to snow which is unable to recharge the wells until a prolonged warming trend allows snow to melt (or precipitation to occur as rain). It is evident that recharge will occur through frost if the recharge is in liquid form, at least on forested watersheds. Exceptions may occur on open fields and developed areas, particularly if the topsoil has a high silt content. Frost always penetrates deeper into fields than woods, and frost density is proportional to silt content. Thus, dug wells in glacial till and glaciomarine silty soils, particularly if the watershed is in open field, will experience some loss of recharge from frost development. Since the recharge to most drilled wells in bedrock is often derived from upland forested areas having shallow soil cover, these wells should not have much loss of recharge due solely to ground freezing.



Prescott, G.C.,Jr. (1968) Ground-water favorability areas and surficial geology of the lower Androscoggin River basin, Maine: U.S. Geological Survey Hydrologic Investigations Atlas HA-285.

The Geological Society of Maine c/o
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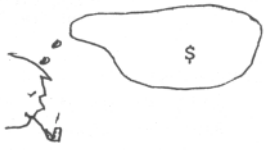
Correspondence about this Newsletter, or about membership in the Society may be addressed t0 John R. Rand, Cundy's Harbor, RD2-Box 210A, Brunswick 04011.

MID-SUMMER MEETING 1979 TO BE AT DICKEY-LINCOLN

DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES DUES

As of December 1, 1978, the Society rolls showed 111 paid-up Members, with 77 Regular, 21 Associate, and 13 Student Members having joined for the 1978-79 year. On that same day, the GSM bank account stood at $747.85, with bills of unknown (but presumably impressive) amounts headed our way in January to cover printing both of this Newsletter and of the forthcoming BULLETIN, its ancillary mailing notice and GEOTIMES ad.

At that same day, some 110 former Members had still not sent in dues for the 1978-79 year. The dues schedule is $5 per year for Regular Members, $4 for Associates and $2 for Students. For new Members there is also a one-time $2 Application fee. Dues are payable to the Geological Society of Maine, and should be sent to John R. Rand, Treasurer, at Cundy's Harbor 04011. In keeping with past practice, the address label on this Newsletter is color-coded to designate your membership standing. If your label is pristine white, you are paid up through July 31, 1979. If your label is colored yellow, you still owe dues for 1978-79. If your label glows in SHOCKING PINK, you still owe for 1978-79 plus past years ($) , and you may expect to receive no further GSM mailings until your past dues are paid up.



Another "FIRST" for Maine

On October 25, 1978, Prof. David Westerman of the University of Southern Maine took a sometimes functioning metal detector and 24 lowly undergraduates to the outskirts of Saco, and spent several hours participating in what is believed to be this State's first meteorite search. Based upon eyewitness information concerning a meteorite fall, and an "ejecta" submitted to the University by the witness, the search was begun and coordinated by Dr. Westerman.

Though all data have not yet been correlated, the preliminary results are in. Based upon field examination and backup geochemical analysis, the "ejecta", of which more fragments were found, has been tentatively identified as congealed latex paint, moderate brown (5 yr 3/4 in GSA rock-color chart), manufacturer unknown. Upon piecing together the "ejecta" fragments, the shape of. a bucket was formed. It was the conclusion of the majority of this group, based upon the fragmentation and pattern of the "ejecta", that "the meteoric impact must have occurred within the bucket of latex paint, manufacturer still unknown".

Also found in the search was a private dump, a lost undergrad, and the beginnings of a fine football game. Continuation of the search, as is the case with the majority of meteorite deposits in Maine, is at present economically unfeasible.

L.M. Glaser, Pres., Geol. Club
University of Southern Maine