THE MAINE GEOLOGIST

THE NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

DECEMBER 1976

VOL. 3 NO. 2

WINTER MEETING SCHEDULED

TIME: 3:00 PM, FRIDAY AFTERNOON, MARCH 4, 1977
PLACE: GEOLOGY DEPT.,COLBY COLLEGE, WATERVILLE,ME.
PROGRAM: SPLIT SESSION

THOMAS E. EASTLER, U.MAINE-FARMINGTON, on MINERAL RESOURCES RELATED TO ENERGY (Afternoon Session)
and
STANLEY E. WALKER, JORDAN GORRILL ASSOCIATES, on ENGINEERING GEOLOGY IN MAINE (Evening Session)

NOTE: Donaldson Koons advises that the College dining hall, although hassled by current renovations, may be able to provide a room for us for supper (+ 5:30-6:00 PM) if advised in advance as to anticipated group size. Accordingly, if you plan to attend the evening meal between the GSM sessions, would you PLEASE mail the enclosed card to Bill Rideout WITHOUT DELAY.

FALL MEETING

You may feel that the date assigned to this Newsletter is stretching the truth just a little, maybe, since it is now February 1977, and better than 2 months have passed since our Fall meeting. That event occurred at Colby through the afternoon and evening of December 3rd, with a mobile attendance ranging from time to time between 30 and 40 members and guests. In spite of the fact that our timing was not the best for Don Koons, since he had to depart in mid-meeting for Augusta, we all had a good time, and we do extend herewith our thanks to Don and Colby for providing us with finest quarters for tossing our thoughts around.

Publications Committee

Your Treasurer reported at the Fall meeting that we had somewhere around $690 in the pot (up to $723.09 at 02/01/77), and wondered if the membership might wish to construct ways to put that money to good use. Three ideas were advanced (if you don't count one which called for paying out to the members a dividend in the form of cash or maybe as one big roaring party):

1. Don Koons suggested that we might consider publishing valuable information which is now only to be found in obscure (to geologists) journals, such as Bill Forbes' pioneering work on Devonian plants;
2. Don Newberg suggested that the Society might usefully re-publish all the old NEIGC guidebooks for field trips in Maine, with addenda to revise the old trips and describe new ones based on the wealth of new material recently collected;
3. Art Hussey felt that we might develop a sort of Bulletin series, "Shorter Contributions to Maine Geology", in which new work and progress reports of significance to Maine geologists could appear and receive fairly wide distribution.

Since these were all good ideas, and further since any one of them alone could easily shoot the Society's kitty right through all nine lives in a single blast, it was voted to form a Committee on Publications, comprised of, you guessed it, Messrs. Koons, Newberg and Hussey. These gentlemen are in the process, we trust, of working out a proposed publishing policy, and will report back in due time.

Where's the Mother Lode?

A lot of mining companies, oil companies, joint ventures and private individuals have spent something in the millions of dollars over the past couple of decades trying to find ore deposits in the State of Maine, apparently without a whole lot of success. At the Fall meeting, Bob Doyle outlined the history of metals exploration in Maine since the mid-50's, and described his own thoughts as to the fundamental geologic controls which may have localized known metallic mineralization here.

The historical sequence began around 1954, when the discovery of massive sulfides, predominately zinc-bearing, in Ordovician rhyolitic rocks of the Bathurst area, New Brunswick, sent people scurrying out along the regional strike into Maine Bear Creek Mining (Kennecott) settled in at Parmachene; New Jersey Zinc covered wide areas in Washington and Hancock Counties; Texas Gulf Sulphur drilled zinc and copper deposits at Blue Hill, and looked at other known deposit areas in Hancock County and elsewhere; American Metals Climax did reconnaissance examinations in numerous places. These projects had folded their tents and left by the late 1950's. Late in 1957, a joint venture under Roland F. Beers settled in on the Ni-Cu show at Union, and started an investigation which continues to this very day under Knox Mining Company.

There followed a few years, into the early 1960's, of great and entertaining hustle as many Canadian exploration companies and prospecting groups descended in flocks, largely onto the old 19th century mining districts around Cape Rosier, Blue Hill, Sullivan and Gouldsboro, and the early 20th century camps at Cherryfield and way down east. These outfits sprayed geophysics, mainly EM, all over the place; poked diamond bits, mainly Ex, into everything that buzzed; and made those Wednesday evening smorgasbords at the old Hancock House in Ellsworth events you couldn't hardly ever forget. And they also made us two mines before they left: Cu at Harborside, now mined out; and Zn-Cu at Blue Hill, now running 1000 tons per day.

During the 1960's, the Big companies took over, including Texaco, Conoco, Humble and Noranda. They concentrated their efforts in the northern wildlands townships, on Parmachene, the Moose River thrust, Catheart Mountain, Rockabema. Noranda made a major effort also on gabbro in eastern Maine, late in the decade. These major explorations dwindled by 1969 without making a mine. In the last few years, Bob noted, some large companies have kept their "thoughts" on Maine, but mostly only that: sitting back to contemplate the geologic and tectonic history of our region. Maybe it's time to get the Canadian prospectors back. Nobody's beat their record yet.

on ore localization, Bob listed several observations which he feels are of significance:

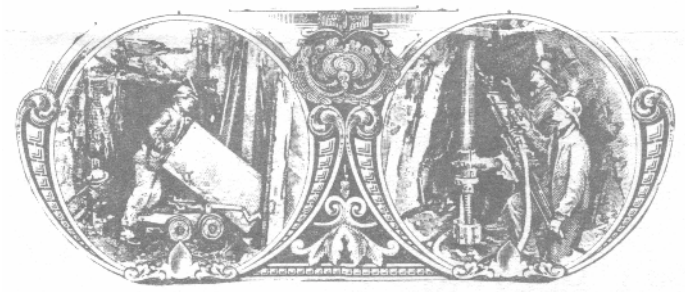
1. With the exception of deposits at Gorham, New Hampshire and South Strafford, Vermont, base metal sulfides in the region are largely confined to Ordovician rocks ranging in age from Late Cambrian to Taconic;
2. With few exceptions, these deposits are in volcanic and volcanoclastic rocks, with a noted preference for leucocratic (highly siliceous) volcanics;
3. There seems to be a close spatial relationship to "overthrust linears" where Devonian elastic rocks are in fault contact with pre-Devonian volcanoclastic rocks;
4. The mineralized regions are spatially associated with the southeast coastal and northwest volcanic terranes, where Bob sees volcanic island arc sequences at continental contact zones, with an underthrust zone of plate contact plunging to the mantle. Emanations rising from the subducted plate would result in a metals zonation at the present erosion level of the overlying crust. Bob visualizes this erosion level as tilted somewhat relative to the level which obtained at the time of the subduction episode.

In northwestern Maine, where Bob feels the structure is not so complex as in the coastal zone, he sees the sulfides as localized in Ordovician rocks at an overthrust contact zone on which Devonian rocks slid over the older rocks. He feels that in the coastal volcanic belt, where the metals zonation patterns do not seem to make proper sense, the regional structure has been made very complex by deformations derived from more than one compressional episode. He interprets sulfide emplacement in the coastal zone to have been controlled by strong fractures of random orientations.

Between the northwestern and southeastern volcanic belts is an 80-mile-wide stretch of Maine in which the terrane is characterized by ankeritic siltstone, fine sandstone, turbidites and some conglomerates. There is a paucity of leucocratic volcanoclastic rocks, and there are very few base metal sulfide showings.

on ore deposits in mafic rocks, Bob noted that there are 3 major gabbro bodies in Maine, and all contain pentlandite/chaicopyrite mineralization. Apparently the best grade of this mineralization is comparable for all 3 bodies, making 0.9% combined Ni-Cu. With respect to tectonic controls, some of the mineralized bodies have a north northeasterly trend, but every north-south-trending gabbro is said to be devoid of mineralization.

on uranium, it seems you can save your money to pay the oilman; don't run out to shoot it on a late model geiger counter. Aside from a few isolated crystals in pegmatites in oxford County and the Topsham district, Bob sees "no potential at all" for commercial concentrations of uranium in Maine. Although large low-grade disseminations of radioactive minerals may be found in certain bodies of "Conway" granite of Jurassic age in New Hampshire, for some reason much studied but not yet explained Maine does not have comparable bodies of hot "Conway".



INFORMATION NEEDED

Talking about pegmatites, Vandall King is writing his thesis at SUNY-Albany on the distribution of elements within the zones of the Main pegmatite at Newry, and he needs help in locating drill core and old reports. He has material which indicates that there have been several core-drill investigations at Newry, and he has found capped hole collars just below the Twin Tunnels and Bell dumps. He also needs unpublished technical papers for the area, in particular, copies of reports known to have been written by Dr. Ching Chang Woo (late '50's?) and by Mr. John Burnham.

If any of you knows of the location of drill core taken at Newry, or has any technical or other information which can be shared, please contact: Vandall T. King, Department of Geological Sciences, SUNY-ALBANY, 4240 Ridge Lea, Amherst, N.Y. 14226.

Maine Survey Notes

At the Fall meeting, Barry Timson, Brad Caswell and Walter Anderson kept us up to date with short **notes on their various projects.**

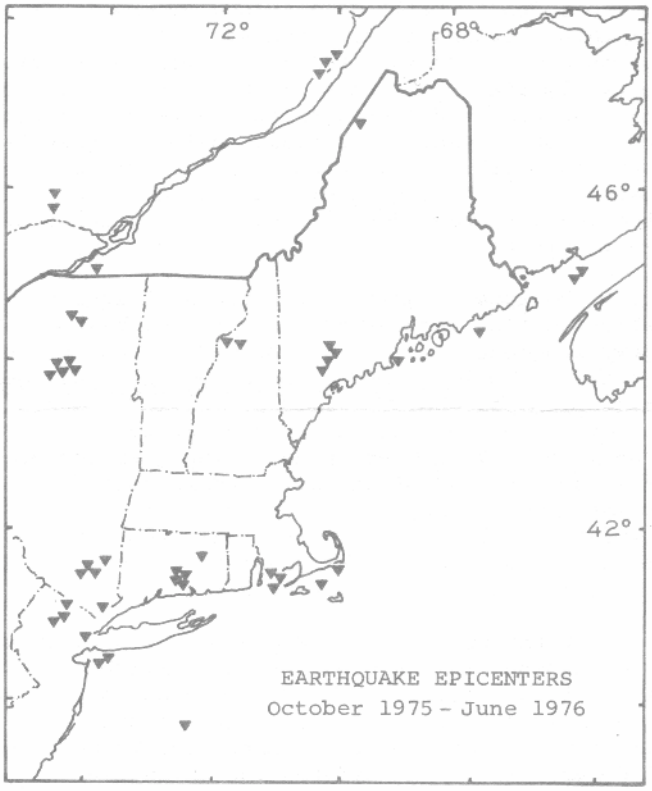
Barry offered some conclusions from his continuing work on barrier beaches and beach dune restoration. He reported that post-glacial sea level rise in Maine started to slow down about 3000 years ago. Barrier beaches have subsequently migrated little, and have existed as vegetated barriers for about 3000 years. With the present sea level rise, which has been going on for several decades, the barrier beaches are now being narrowed by frontal erosion. If sea level continues to rise, the beach environment, including beaches which have been planted with houses, will enter a "washover sequence". If the beach has been "protected" with seawalls, the effect of sea level rise will be to lower the beach in front of the seawalls. Scouring of the seawall foundation materials can ultimately lead to the collapse and destruction of the wall.

Brad Caswell gave us a little more to **ponder from his work with inland** bedrock water wells which contain high salt contents (50008000 ppm NaCl). Some studies on ionic balance in these waters are interpreted to mean that they cannot merely be diluted sea water, but have to have been derived from evaporites. All of the anomalous wells apparently are located in Siluro-Devonian rocks. (But your Editor would like to ask again whether anyone REALLY knows much about the distribution of post-orogenic continental deposits of Upper Devonian to Pennsylvanian age in central Maine to the north of the Norumbega fault system?)

Brad also described a "high-yield" bedrock area on the coast by Harpswell Sound, where 2 wells yield 60-75 GPM from a pool below sea level. one well is 99' deep, the other 124', with collar elevations probably at 20' or less above the adjacent bay. Water levels in the wells respond very rapidly to precipitation, but do not rise and fall with the nearby ocean tides. Although the wells are 350' apart, pumping of one immediately draws the other down, indicating an essentially unimpeded hydraulic connection between the wells. The wells were drilled to supply a coastal housing development, not yet constructed. The potential here for contamination of the subsurface reservoir by road salt, human wastes and/or ocean water is interesting to contemplate, should the area become closely settled and the wells pumped at high volume.

Walter Anderson gave us his usual packet of goodies, including a series of geologic index maps now available, plus maps printed on mylar bases describing surficial and coastal marine geology subjects. You'd better check personally with Walter on these, since a lot of good information seems to pour off his presses regularly, and it was a whole two months ago that he told us about his latest batch. He also noted that the Maine Survey, through the auspices of the State Planning office, has mylar separates of USGS topo quadrangles for Maine. For a few bucks you can get mylars made of the mylars, if you want just topography, just culture, just streams, etc., for your areas of interest. That looks like a really good deal.

on earthquakes, the Maine network of seismometers is continuing to build rapidly. A new station is in at Turner, and 4 additional units, operating on solar panels, are now transmitting data to Allagash. The Survey has also printed an earthquake questionnaire on 4"x 8" cards. In the event of an earthquake people might feel, these cards will be distributed locally by civil defense organizations, to acquire "felt reports" for the event throughout the State. From these reports, isoseismal plots can be made to assist in establishing the apparent epicenter of the event.



Chiburis, E.F. and R.O. Ahner (1976) Seismicity of the Northeastern United States. Bull. 3, Northeastern U. S. Seismic Network; Weston Observatory, Weston, Massachusetts 02193.

THEY WERE SMALL

Weston observatory sends us their data from the Northeastern Seismic Network on a quarterly basis, and we'll keep up-dating this map as new information comes in. All of the events reported above for Maine were very small, and don't feel badly if you missed them.

Maybe for the next issue of the Newsletter, when we should have a full year's reporting for the Network, we'll put together a discussion of the contemporary seismicity in the region, and make a few speculations as to geologic structures which seem to localize the activity.

GLACIAL FEATURES-SEARS ISLAND

Bob Gerber and J. R. Rand used up a good portion of the evening session of the Fall meeting showing slides and describing the Pleistocene stratigraphy and late-glacial deformations of the bedrock and tills as exposed in two trenches which Central Maine Power Company excavated in 1975 on Sears Island at the north end of Penobscot Bay. The trenches were dug in connection with site studies for a proposed nuclear power plant.

The most complete, continuous stratigraphic section exposed in trenching measured about 37' in total thickness, and included units interpreted to range from Laurentide to Early- or preWisconsinan in age. The section, from ground surface downward, was comprised of: 1. sorted outwash sands and gravels directly derived from a loose, unsorted ablation till; 2. fine-grained olive lodgment till; 3. a thin glaciomarine bed of thinly laminated silt and sand; 4. a fine-grained gray lodgment till; 5. a partially sorted gravelly fine sand and silt outwash; 6. a 2' bed of iron-cemented "ferruginite", a hard, compact pebbly sandstone; 7. partially oxidized gravelsand-silt till, containing phyllite bedrock masses; 8. pebble till emplaced in crevices in the bedrock, unconformably overlain by the gravelsand-silt till.

The upper sequence from the soil zone in ablation till and outwash down to the base of the gray lodgment till is interpreted as Laurentide in age. The lower sequence, below the gray lodgment till, is characterized by varying degrees of oxidation, and is interpreted as earliest Wisconsinan to Illinoian in age. The gray lodgment till at the base of the presumed Laurentide contains angular fragments of "ferruginite", indicating that the "ferruginite" unit was cemented to its present rock-like consistency prior to being overridden by the Laurentide ice.

At the bottom of a trough in the bedrock surface exposed in the trenches, the till/bedrock contact is deformed. The deformation in one trench is a 6" intrusion of soft, plastic extremely weathered phyllite into gray Laurentide lodgment till. The deformation in the second trench, 200' to the northeast of the first, is laterally discontinuous: a 1" reverse fault rupture on the limb of an arched bedrock surface occurs on one wall of the trench at the till/ bedrock contact; the till/bedrock contact is not faulted on the west wall of the trench, 25' distant. The zone of extreme bedrock weathering
and local till/bedrock deformations trends N34E, coinciding with the strike of an underlying fault zone in the bedrock.

Bob Gerber was Director of Environmental Studies for CMP and J. R. Rand was consulting geologist for site and regional geology for the proposed nuclear plant at the time of the trench excavations on Sears Island. They have interpreted the deformations of the till/bedrock contact to have been caused by either stress directed against the weak, weathered bedrock fault zone through base shear and stress distribution from the weight of a glacial lobe advance immediately to the northwest of the fault zone; or to the lateral relief of stress which had been imparted to the bedrock under loading of the last continental ice sheet. Since there is a quite precise spatial match of the location and trend of the deformed till/bedrock contact with the location and trend of the overlying transition along which the final ablation till graded to outwash at the front of a glacial lobe, the former interpretation involving differential bedrock loading and base shear is preferred.

Social Notes

Jim Richard collected his M.S. from Ohio State last June, and is now working on the "Erie-Niagara Counties (N.Y.) 208 Areawide Water Quality Management Program" out of Niagara Falls. Jim and his wife will be returning to Maine to settle for good this coming June, and would sure like to hear from anyone who knows of a job for a geologist-hydrologist. With 149" of snow at Buffalo, and still building fast as of Feb. lst, it looks like what they may need most out there is a 208 Areawide Snow Management Program.

All of our members aren't busy cutting back the heat to 650 (600 at night). Allen Myers (U. N.Carolina) has put his work on Maine cobble beaches on the back burner and is soaking up some carbonate geology in the Bahamas. And we've heard from Luke Fournier that as of November 28th it had finally cooled down to 70°F at his shop in Pakistan. We find around Cundy's Harbor that we can easily meet Jimmy Carter's 600-at-night edict. It's simply a matter of keeping a VLCC tanker tied up to the Fisherman's Cooperative dock, with all compartments pumping wide open.

THE MAINE GEOLOGIST is published maybe four times a year, in September, early Winter, late Winter and June or July, for Members of the Geological Society of Maine, a non-profit, non-incorporated educational society interested in Maine geology. Correspondence about the Newsletter, or about Membership in the Society may be sent to John R. Rand, Cundy's Harbor, RD2-210A, Brunswick 04011.

MAINE MINING - 1976

The following Annual Preliminary report is reprinted from the U. S. Bureau of Mines "Mineral Industry Surveys". The material is prepared in the State Liason office (Augusta) by Herbert R. Babitzke, under a cooperative agreement between the U. S. Bureau of Mines and the Maine Survey.

THE MINERAL INDUSTRY OF MAINE IN 1976

The value of mineral production in Maine was $36.4 million in 1976, a decrease of 1% from that of 1975, according to the Bureau of Mines, U. S. Department of the Interior. Major commodities produced in the State by value were sand and gravel, stone, cement, zinc and copper.

Lime Products Corp. of Union, exanded its quarrying operation and after complete development, the new area will encompass approximately eight acres. The company sells both commercial and agricultural lime products and the new quarry will provide a grade of lime needed for the commercial market.

During the year, oxford Feldspar Corp. continued their operation at West Paris. The company shipped 670 tons of ground feldspar for use in the ceramics industry.

Exploration activity was stepped up during the year with several mining companies opening offices in Maine. Kerr-McGee Corp. appraised the uranium potential along the Maine-New Hampshire border. Aquitaine Co. of Canada discovered base metals near Oxbow in Aroostook County and planned to engage in further drilling and evaluation. Phelps-Dodge Corp. explored the coastal belt. The belt extends from East Penobscot Bay to Canada and contains numerous deposits of copper, lead, zinc and silver. Standard Metals, Inc. continued their search for base metals. Most of the scouting was centered in an area south of Umbagog Lake.

The Pittston Company's proposal to build an oil refinery at Eastport continued to make headlines during the year. The major hurdle continues to be Canada's opposition to allowing oil tankers to pass through Canadian waters en route to Eastport.

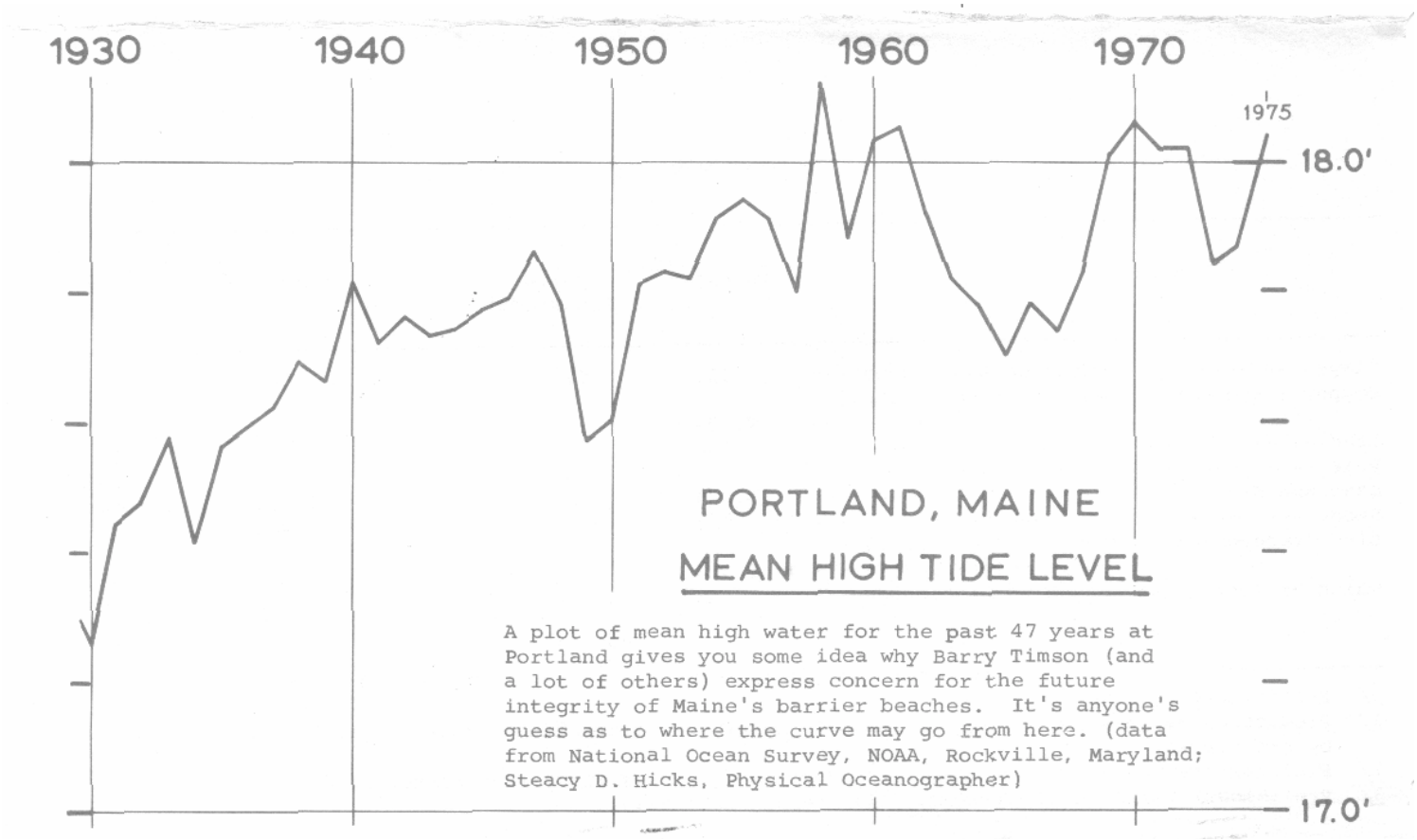
Maine's Land Use Regulation Commission (LURC) unanimously adopted a plan to regulate the use of the State's 10 million acres of unorganized wildlands. The Governor approved the plan which regulates land use over half the land mass.

Although Maine is not a major mining state, the processing industry is of considerable importance. Estimated value of manufactured metal and nonmetallic products was $800 million in 1976. Value of electrical energy produced during the year was $250 million. More than 501% of the electricity was derived from nuclear power and 20% from fossil fuels.

TABLE 1. -- MINERAL PRODUCTION IN MAINE 1/

Mineral	1975 Quantity	1975 Value (Thousands)	1976 p/ Quantity	1976 p/ Value (Thousands)
Clays----------thousand short tons----	125	$202	147	$233
Copper (recoverable content of ores, etc.) short tons----------	2,024	2,599	1,890	2,646
Lead----------do----------	364	157	235	109
Peat----------thousand short tons----	4	207	5	269
Sand and Gravel----------do----------	9,875	11,403	9,184	3/ 11,664
Stone----------do----------	2/ 1,253	2/ 3,741	1,281	4,152
Zinc (recoverable content of ores, etc.) short tons----------	8,318	6,488	7,170	5,306
Value of items that cannot be disclosed-----	XX	11,944	XX	12,039
TOTAL	XX	$36,741	XX	$36,418

p/ Preliminary. XX Not applicable.
1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
2/ Excludes certain dimension stone; included in "Value of items that cannot be disclosed".
3/ Preliminary value based on using 1975 average unit value.


1930
1940
1950
1960
1970
1975
18.0'
17.0'
PORTLAND, MAINE
MEAN HIGH TIDE LEVEL
A plot of mean high water for the past 47 years at Portland gives you some idea why Barry Timson (and a lot of others) express concern for the future integrity of Maine's barrier beaches. It's anyone's guess as to where the curve may go from here. (data from National Ocean Survey, NOAA, Rockville, Maryland; Steacy D. Hicks, Physical Oceanographer)