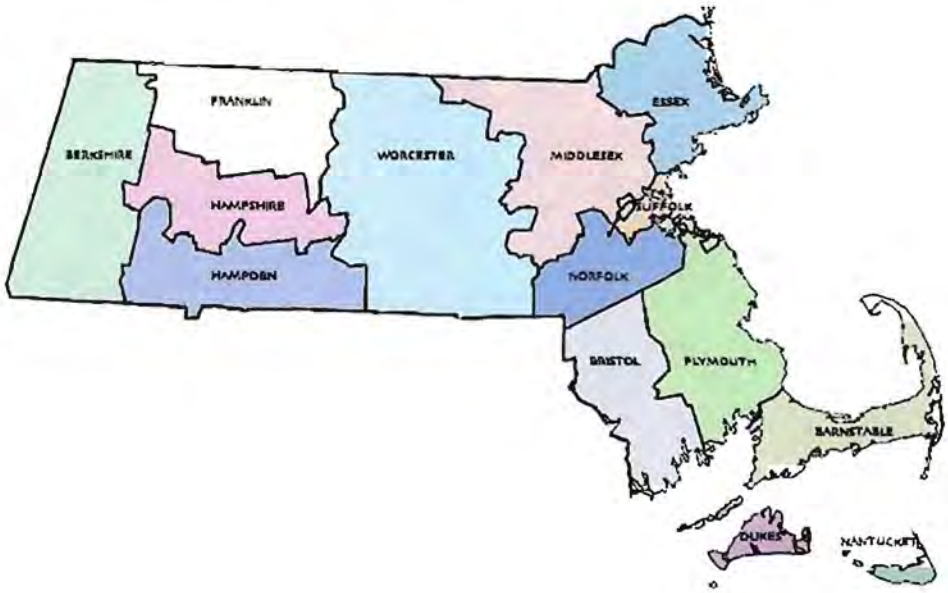
MASSACHUSETTS MINERAL AND FOSSIL LOCALITIES



Compiled by Peter P. Gleba

Dedication

It has been some thirty years since I compiled this publication in 1978. The geology and localities have not changed but technology has progressed.

Certainly many mineral and fossil localities have been discovered since this publication was written. One which comes to mind is a wonderful fossil insect imprint recently discovered in North Attleboro.

How I wish I had GPS and a digital camera when I was writing this publication and before, during and after when I visited many of the localities. My fond hope is that someone of the new generation will take up the challenge of revising and further completing my work.

I am grateful to the members of the Boston Mineral Club who both inspired and motivated me to revisit this work and make it available in today's computer technology to the widest possible audience. I dedicate this work to them.

I wish the same joy I have found in the life-long pursuit of minerals and fossils to all those who read and use this publication.

Peter P. Gleba
December 2008
Quincy, Massachusetts
Member Boston Mineral Club

Courtesy Google maps

UNDER THE SURFACE, ROUTE 128 IS GOLDEN *Jerry Ackerman, Globe Staff*. **Boston Globe** Boston, Mass. Apr 7, 1987. pg. 45

Abstract (Summary)

BRAINTREE - By most accounts, land near the intersection of Route 128 and Route 3, where traffic from the west and south of Boston meets and passes at the rate of 168,000 cars a day, is some of the most valuable real estate in Massachusetts.

Calculating it another way, [Peter Gleba] said that had the Central Artery plan not gone through, "the state might have enough assets under Route 128 to do the work itself."

The rocks where Gleba took his sample are known as Mattapan volcanics because they were first seen by geologists in Mattapan Square. They crop out of the ground from Roxbury south to Brockton and from Braintree west to Needham and Wellesley.

BRAINTREE - By most accounts, land near the intersection of Route 128 and Route 3, where traffic from the west and south of Boston meets and passes at the rate of 168,000 cars a day, is some of the most valuable real estate in Massachusetts.

It has access, it has convenience, it has exposure. Hilltop sites last year sold at around $600,000 an acre for office-park development, according to professional appraisers. Even the cheapest land, on back roads, costs $200,000 an acre.

But the value of this land now turns out to be more than skin deep.
Down under, in rock just west of that intersection, there's gold. Real gold. The stuff of the Old West, here in the Old East, and worth $400-plus per ounce, if you could get at it.

Peter Gleba, a geologist, seems to be the first to have seen it, even though these six-lane roads have been traveled since the 1950s and the land repeatedly blasted and bulldozed to make way for shopping plazas and office buildings.
He saw it one morning three winters ago when he glanced out the window of his car as he passed west of the Massachusetts state lottery offices and saw a spreading rust stain on the rock face jutting out beneath the Blue Hills Tennis Club.

To a geologist, Gleba explained in an interview, rust on rock means iron inside. Iron usually means other metals are there, too. And in the sort of rock that lies here, that includes gold.

Pulling off the road, the 44-year-old Dorchester native parked his car, whacked

off a piece of stone with a hammer and later sent that rock to California to be tested.

The answer was that, if this sample was representative, each ton of rock at that location contains about 0.2 ounce of gold per ton. At today's spot-market price for gold, that works out to about $7.50 worth of the precious metal in each ton of ore. Calculating it another way, Gleba said that had the Central Artery plan not gone through, "the state might have enough assets under Route 128 to do the work itself."

Before people start taking out their picks, real estate experts caution that it would take quite a bonanza to make it worth expecting landowners to leave without a fuss.

"I'd say that the real gold is on top of the land, not underneath," said Gordon Derman, chairman of the Braintree board of assessors.
And, although Gleba and other geologists say it might be possible to dig mines beneath the Forbes Industrial Park and the South Shore Plaza, lots of legal questions would arise.

Mining law is vague in Massachusetts, state lawyers say. "Our statutes only give us authority over minerals in coastal waters," said Carl Dierker, a lawyer with the state Department of Environmental Quality Engineering.
In fact, mining hasn't been a big issue in Massachusetts since the 1920s, when a group of entrepreneurs made a futile effort to reopen the former Chipman silver mine in Newbury.

A brief exploratory foray into the Berkshires in 1981 and 1982 by several Western mining companies led to a survey of the former Davis copper mine in Rowe, but that effort was abandoned, according to state geologist Joseph Sinnott.

Nevertheless, Gleba's was a tantalizing find, one of several mineral discoveries in New England since the 1970s, including gold in a state forest in central Connecticut last spring.

Moreover, similar gold deposits -- or even richer ones -- may be waiting to be found in other back yards from Boston south.

The rocks where Gleba took his sample are known as Mattapan volcanics because they were first seen by geologists in Mattapan Square. They crop out of the ground from Roxbury south to Brockton and from Braintree west to Needham and Wellesley.

"Gold concentrations in rocks like these are very unpredictable," says Rudolph Hon, associate professor of geophysics at Boston College. In a similar formation

in North Carolina, enough was found recently to warrant opening a mine. Hon's advice: "It is worth pursuing."

Gleba, who is also exploring in the area of the old Newbury mine and hopes sometime in his life to prospect in Australia, thinks the state should do just that. He said he thinks the median strip of Route 128 is especially promising because it appears to lie over ancient, deep cracks, known as faults, which may indicate a gold concentration.

"I see it as money in the bank for the state," he said.

The Department of Public Works doesn't warm readily to the idea of blasting and tunneling over one of Massachusetts' busiest highways. "I don't think commuters would like being diverted into one-lane traffic while this is going on," said Scott Pickard, spokesman for the highway agency.

Gleba concedes that the concentration of gold that he found might not be worth the trouble, but says a richer ore would.

Indeed, except for filing a claim in the Norfolk Registry of Deeds, he kept his find secret for three years until a lawyer told him the cost of testing that claim could be enormous.

Now that the news is out he forsees strong public interest -- including rubberneckers slowing traffic a bit as they pass. "I just hope," he said, "that this doesn't cause any accidents."

ERRATUM

page 4...line 14...(143 should be (141...line 29...70°00'42" should be 70°00'46"...line 47...70°00'42" should be 70°00'46"
page 7...line 27...).2 mile should be 0.2 mile
page 16...line 26...p.1 mile should be 0.1 mile...line 46...Know should be Knob
page 18...line 16...73°28'20" should be 73°28'23"
page 26...line 31...should read 30",70°44'34"
page 29...line 21...42°36'18" should be 42°36'48"
page 34...line 18...p.2 mile should be 0.2 mile
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page 46...line 15...should read Crag Mtn.)158)--
page 48...line 40...Dpot should be Depot
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page 51...line 14...should be 72°58'55"--adit
page 52...line 6...[illegible] second locality should be (42°15'53",72°59'08")
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page 59...[illegible] line 11...42°18'01" should be 42°18'02"... HATFIELD...locality for Native Copper should be for Whately, Franklin County only
page 63...line 31...[illegible]71°15'0" should be 71°15'02"... line 34...71°15'0" should be 71°15'02"
page 68...line 50...)3" should be 03"
page 82...line 25...should be 21'07",71°07'48"
page 86...line 9...should be (42°26'27",71°35'40")211)
page 88...line 25...should be (87(near Ghost Hill
page 94...line 40..vvol.'V should be vol.IV
page 104...line 6...should be ----------,1958, Cheshire
page 105...line 18...p.382 should be p.385
page 114...line 55...p.19-20 should be p.9-10

ADDITIONS

page 16....line 38...after covered over?...Rutile and brown tourmaline,
page 39...line 7...Ostracodal Shale--see Rowley.
page 55...line 21...after thompsonite...Quarries currently operating for crushed stone.
page 58...line 25...between wroewolfite, sulfenite, add wulfenite (tabular and prismatic)
page 69...line 25...Amphibolite--see Bolton, Worcester County Mineral Localities.
page 85...line 39after cerium ochre...Currently a charge of 25¢ is made at the unpainted brown house for collecting.

R59

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Cambridge, Massachusetts 02139

INTRODUCTION

The purpose of this book is to bring together in a single publication information pertaining to those localities reported in the literature. This book was written for both the amateur rockhound and the professional geologist.

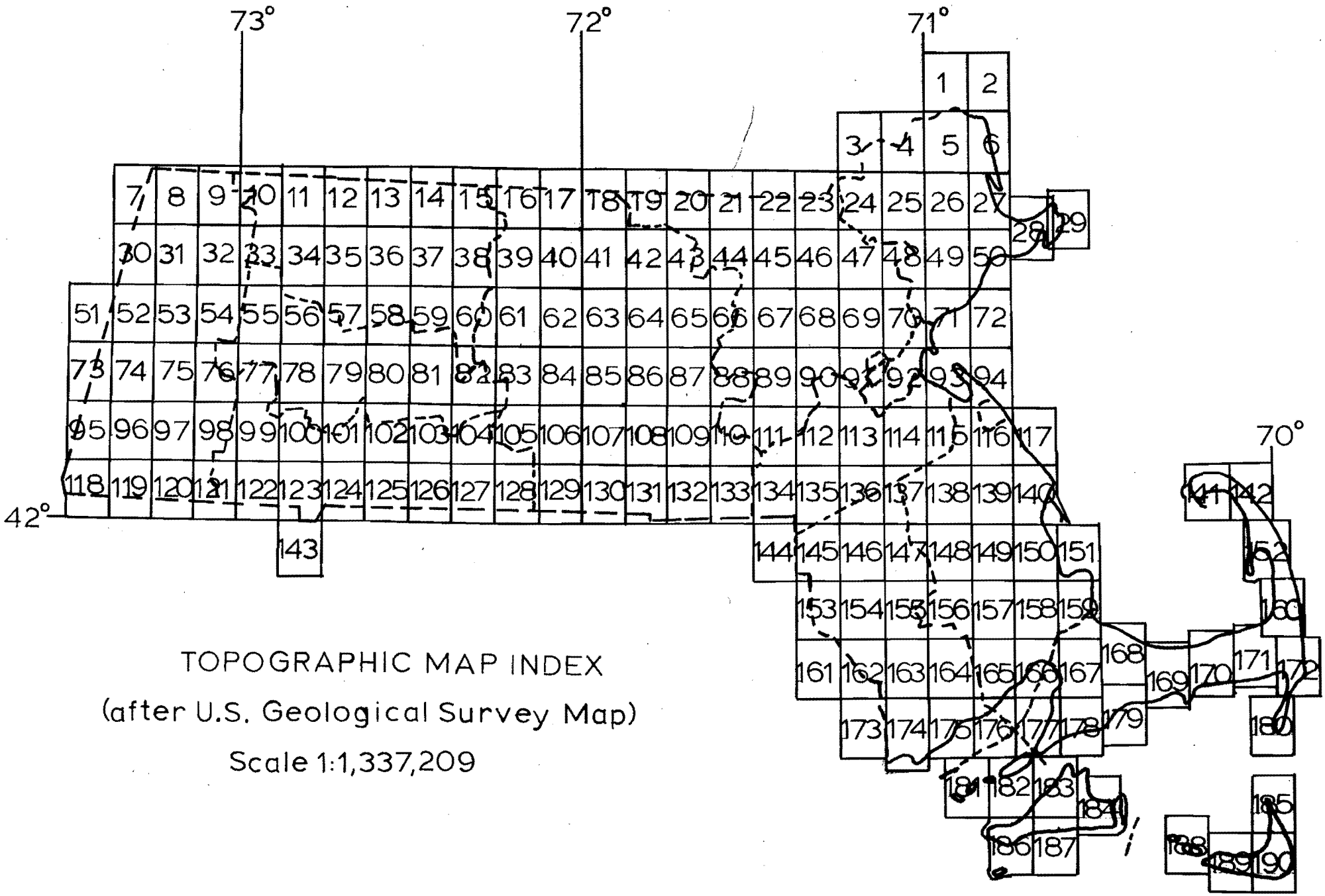
The geographic arrangement of the localities is according to the alphabetic order of the counties in Massachusetts. Each county is subdivided into Mineral and Fossil Sections which are arranged alphabetically according to townships. Following the mineral or fossil name is a three item sequence of numbers which refer to the topographic map, latitude and longitude of the locality, and number of the reference from which the information is drawn. An example would be (26(42°43'33",70° 53'53")406,map) referring to the Georgetown 7½ minute topographic quadrangle at the noted latitude and longitude with the locality described by John H. Sears (reference 406 with a map). The topographic map numbers are keyed to the Topographic Index Map in the front of this book.

The latitude and longitude locations were determined by using a transparent overlay gridded at 10 squares to the inch. It is estimated that the accuracy of this method is to within 50 feet. Where the geographic location of a locality is uncertain, this is noted by stating "area of ..." The Index Map in this book is after that distributed free by the U.S. Geological Survey. That map and the topographic maps which are sold by the Survey may be obtained from the Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, Virginia 22202. The topographic maps are sold by private agencies and are at libraries. The names of these agencies and libraries can be obtained from the Index Map (Index to Topographic Maps of Massachusetts, Rhode Island, and Connecticut).

The descriptive information regarding the localities has been kept to a minimum as the interested reader can refer to the original source material for further information. It should be emphasized that the descriptive material that is in this book has been taken from the source material and is not the author's own work. Also where location information refer to property owner's names, the reference date should be noted as the property owners are of that date.

Users of this book should be aware that at least 80 percent, if not more, of these localities are on private property. Permission should always be obtained to go onto private property and that extreme care should be taken when using private lands in order to collect specimens. The statement of a locality in this book in no way implies free access. Where localities are built over or are no longer accessible, this information has been stated to the best of the writer's knowledge. However, given the magnitude of this book, there was no way that one person could examine the present condition of all the localities.

I would like to acknowledge the help given to me in the preparation of this book by the Boston Mineral Club, especially that of Mr. Hal Krueger, past president of the club, and the library staff at the Harvard University Geological Library.



TOPOGRAPHIC MAP INDEX

(after U.S. Geological Survey Map)

Scale 1:1,337,209

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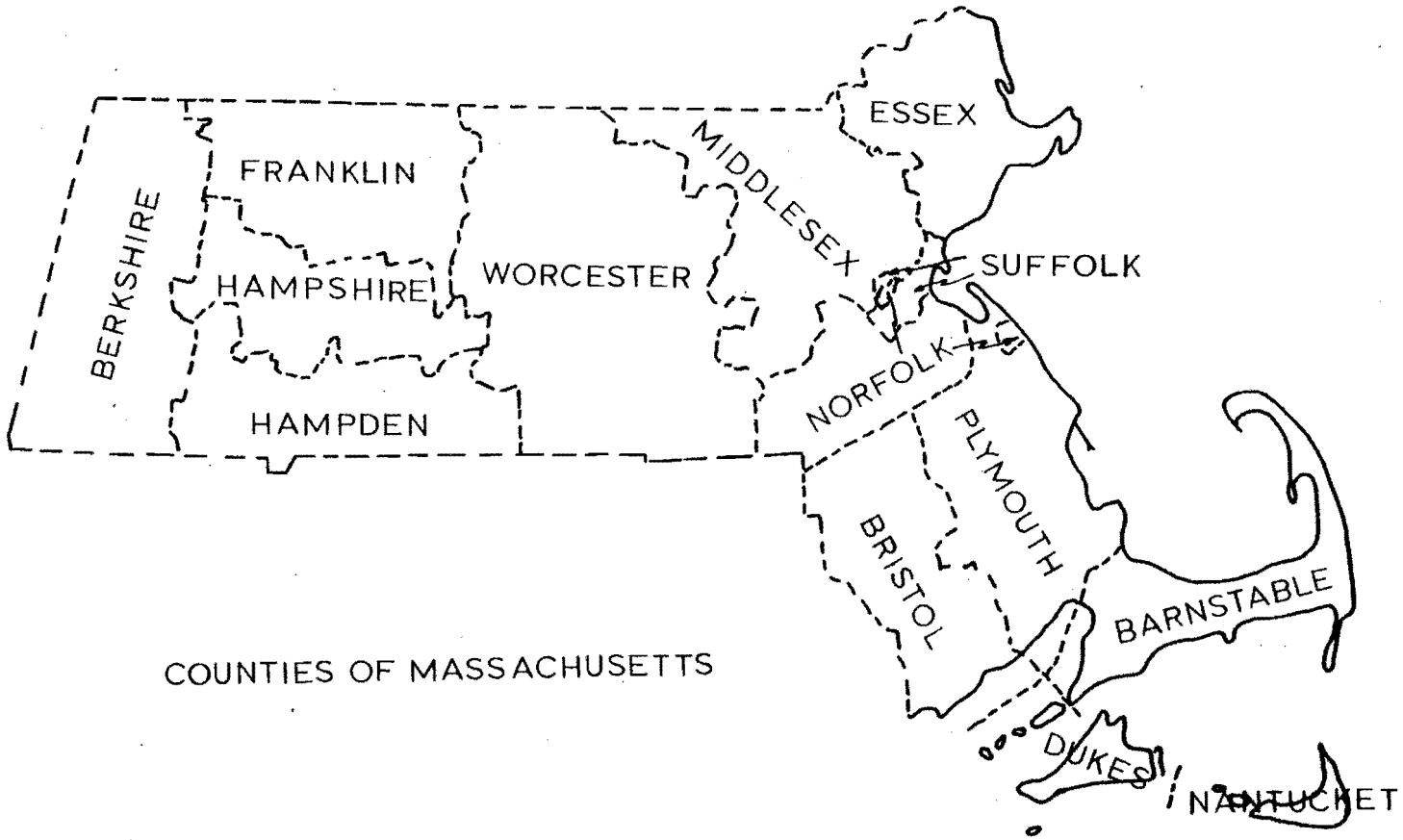

COUNTIES OF MASSACHUSETTS

BARNSTABLE COUNTY MINERAL LOCALITIES

BARNSTABLE COUNTY (GENERAL): Clay--Burgess Point--eastern side of Buzzards Bay (head of the bay)(Plymouth County?) (reference 186)

BARNSTABLE: Brick Clay Pit (169(41°42'03",70°21'17")186,421,p.484, personal communication--Mr. Robert Oldale(1976))--Bricks stamped "West Barnstable" are collector items. Dark Mineral Accumulation (169(41°44'02",70°17'36")456)(179(41°36'26",70°25'49")(41°36'48", 70°22'35")456)--near Osterville.

BOURNE: Clay (159(locality uncertain)186)--at or near water level in the valley of the Monument River (now Cape Cod Canal). Clay Pit (167(area of 41°41'41",70°33'56")298,p.1136-1137). Ventifacts (159 (41°48'29",70°32'08"--Sagamore Heights(Highlands))298,p.1164)(166 (41°41'11",70°38'47"--Wings Neck)298,p.1164). Ventifact (Einkanter) (159(locality uncertain--Bourndale)298,p.1166)--boulder known as "Sacrifice Rock". Upper surface polished by wind. Measures 30 by 20 feet. Epidote and Jasper Pebbles (159(on sea beaches)189). Dark Mineral Accumulation(166(41°39'37",70°37'43")(41°39'50",70°38'05")456) (159(41°48'27",70°32'09")456)--moderate to heavy amounts for approximately 2 miles southeast along the sea beach from last noted point.

BOURNDALE: Ventifact (Einkanter)--see Bourne.

BREWSTER: Clay (171(locality uncertain)186)--In the vicinity of West Brewster, and to the northeast and southwest, indications of clay are seen in roadside exposures. One mile northeast of Brewster a little sandy clay shows in the beach; also along shore near East Brewster.

CHATHAM: Clay (172(area of 41°44'11",69°59'16")186)--Outcrops in a broad, low arch or anticline beneath a thick series of sands and gravels. The clay continues for 100 or 200 feet, then sinks below the beach. (172(41°44'11",69°58'52")186)--similar anticline of dark clay. This is somewhat higher and broader than the preceding, and more clay is exposed. (172(area of 41°43'09",69°58'49")186)--Outcrops of clay on Nickersons Neck, on the south shore of Pleasant Bay, beginning about a 1/3 mile from the mouth of Muddy Creek and extending to the bend of the neck, 3/4 mile northeast. The clays outcrop along the beach in a series of gentle folds. On the south side of Nickersons Neck clay is exposed in the high bluff on the north shore of Crows Pond and in a pit just southeast of the highway (Fox Hill Road) leading to Nickersons Neck, and near the head of Riders Cove, there is a pit 75 feet in diameter and 15 feet deep (1906)...Another clay pit is located just west of the State road (Route 28), as it descends from Nickersons Neck to Riders Cove. (172(locality uncertain)186)--At North Chatham a small pit north of the road (Stony Hill Road?) shows 5 feet of brownish clays, with occasional pebbles. The same clay rises and shows in the road nearby 25 feet higher. Brown Clay (silty?) (172(41° 40'49",69°58'18")186)--near Oyster Pond. Blue Clay (172(41°40'26", 69°57'25")186)--near Mill Pond. Boulder Clay--see Wellfleet and Eastham (Fossil Section). Quarries (172(41°41'26",69°58'33")(41°41'37", 69°59'01")(41°41'46",69°57'50")topographic map)--type of occurrence unknown. Dark Mineral Accumulation(172(41°40'26",69°55'57")(41°40'09", 69°56'04")(41°39'54",69°56'16")(41°42'08",69°57'20")(41°41'51",69°57' 35")(41°41'23",69°57'31")456)--mainly garnet. Nauset Beach. (171(41°40'

04",70°01'58")(41°40'12",70°01'12")456). Ruby (Red Corundum) (172 (Nauset Beach)265)--several grains found in samples of heavy sand. Boulder Clay (172(see Wellfleet)447).

DENNIS: Clay (170(locality uncertain)186)--In the vicinity of North Dennis, yellow clay with some erratic pebbles below a few feet of gravel or till. The clay is thin and underlain by a sand layer, below which another layer of blue clay is encountered. (170(41°45'02",70° 11'19")186)--At Corporation Landing, on Nobscusset Point, a greenish-gray clay, with pebbles and interstratified sand, is seen in thin layers. A little farther west a greenish-gray sandy clay with ferruginous laminae comes up above the beach, several feet being exposed for some distance along the beach to the west. At the edge of the marsh, just back of the old wharf (1906), a pit shows 5 feet of gray and greenish clay, with pebbles. (170(locality uncertain)186)--1/2 mile southeast of South Dennis, in the bottom of a large sand and gravel pit, as exposed a series of alternating sand and clay layers, becoming bluish at a depth of a few feet. The blue clay is without pebbles. Lignite,Peat (170(area of 41°44'48",70°12'17")396--see Fossil Section. Dark Mineral Accumulation (170(41°45'21",70°09'33")(41°44'59",70°11'43") (41°44'27",70°13'15")(41°39'02",70°08'58")(41°39'08",70°08'04")456)

EASTHAM: Clay (160(see description)186)--Knob about 10 feet high-sand and clay- a little south of Nauset Beacons (Nauset Beach Lighthouse?) (41°51'38",69°57'09"). Just beyond, several feet of folded gray to light chocolate clay outcrop for 100 feet or so along the beach. Boulder Clay---see Eastham, Fossil Section and Wellfleet, Mineral Section. Dark Mineral Accumulation (152,160(41°52'30",69°57'09")~~456)~~,160(41° 50'37",69°56'45")(41°50'38",69°56'46")(41°49'05",69°56'25")456)

FALMOUTH: "Clay" (178(area of 41°35'30",70°37'15")298,p.1137)--An irregular area of flat land, about 120 feet above sea level, covering 40 or 50 acres. The broad shallow pits in the western part of the flat area were dug to secure "clay" for the construction of tennis courts and for the manufacture of bricks. The "clay" is in reality a finely laminated silt with alternating layers of reddish-brown and brownish-gray sediment that in some places recur so regularly as to resemble varves. Clay (172(Woods Hole)186)--Clay is encountered in some of the wells and sometimes found under the beach a few feet from the surface. Ventifacts (178(area of 41°32'44",70°55'39"--Falmouth Heights)298,p.1164) --In well-bedded gravels 2 to 8 feet below the surface; also on beach. (172(Woods Hole)298,p.1164)--In layer of well-bedded gravel 2 to 8 feet below surface. (172(41°31'01",70°39'32"--Nobska Point)298,p.1164) --On beach. (172(41°33'53",70°39'15"--Gunning Point)298,p.1164)--In layer of well-bedded gravel. Dark Mineral Accumulation (177(41°36'17", 70° 38'59")(41°36'19",70°38'49")(41°31'55",70°40'14"--Woods Hole)~~456)~~ (178(41°32'32",70°37'02")(41°32'43",70°34'45")41°32'54",70°34'12")456)

HARWICH: Clay Pit (171(locality uncertain)186)--in valley about 3/4 mile west of South Harwich. Dark Mineral Accumulation (171(41°39'28", 70°06'42")(41°39'48",70°05'01")456)

HYANNIS: Clay (169(41°38'35",70°16'29"--Harbor Bluff)186)

HYANNIS PORT: Dark Mineral Accumulation (169(41°37'52",70°19'16") (41°37'34",70°18'54")456)

MASHPEE: Ventifacts (179(41°33'32",70°28'36"--Succonnesset Point) (41°37'49",70°29'42")132,298,p.1164) Dark Mineral Accumulation (179(41°33'53",70°28'10")456)

MONOMOY ISLAND: Peat (172(41°38'31",69°58'02")456. Dark Mineral Accumulation (180(41°36'38",69°58'44")(41°34'44",69°59'13")(41°32'54", 70°01'03")(41°33'13",70°00'41")456)--mainly garnet.

ORLEANS: Clay (160(see description)186)--(0.1 mile northwest of Nauset Heights, shores of Nauset Harbor)(area of 41°47'54",69°52'25"--indications of clay in the hills northwest of Town Cove)(area of 41°48'49", 69°58'49"). Dark Mineral Accumulation (160(41°48'23",69°56'32") (41°47'46",69°56'08")(41°46'29",69°56'02")(41°46'17",69°56'00")456) Boulder Clay--see Wellfleet, Fossil Section.

OSTERVILLE: See Barnstable, Mineral Section.

PROVINCETOWN: Dark Mineral Accumulation (~~143~~ 146(42°02'42",70°11'24") (42°03'35",70°10'13")456)

SANDWICH: Clay (168(see description)186)--Pit was located near the end of Town Neck but is now grassed over and no clay is to be seen (area of 41°45'57",70°28'49"). Blue Clay worked at East Sandwich. Jasper and Epidote Pebbles (159,168(on sea beaches)189). Triassic Sandstone and Conglomerate Erratics (159,168(locality uncertain)298,p.1146)--in the gravel pit just west of Highway 130. Dark Mineral Accumulation (168 (41°46'29",70°29'44")456)--small amounts.

TRURO: Clay (142(42°02'23",70°01'09"--Highland Lighthouse)186)--First appears at the top of the bluff about 1/2 mile north of the Highland Lighthouse. Continues for 1/2 mile north. At this point about 20 feet of clay are exposed, the top being 40 feet above the beach (1906). The clay also comes close to the surface on the flats near the highway (Route 6) west of the lighthouse (area of 42°02'04",70°04'25"). (142,152(41°59'15",70°00'46"--Pamet River (Coast Guard) Live Saving Station)186)--One and half miles northwest of the Pamet River life-saving station (1906). At this point a gray to yellowish-brown laminated sandy clay or clayey sand, associated with numerous springs, shows above the beach...One mile farther south a few feet of very fine, compact, and somewhat contorted sandy clay of a greenish color, interlaminated with sand were seen. The clayey sand or sandy clay continues to show along the beach southward for about one-eight mile, when it again disappears beneath the beach, only to reappear for a short distance, about half a mile farther on, or three-fourths of a mile from the life saving station...In front of the life-saving station a greenish and olive clay, full of iron laminae and concretions, outcrops in the beach between the high and low tide marks...The gray to orange (yellowish-brown) sandy clay, however, was seen in the bluff about a mile northwest of North Truro, but the bed was only about 2 feet thick. Some sandy clays or clayey sands were also seen in the bluffs 2 miles south of North Truro. Clay and Clayey Sand (142(Sea Cliffs at Highland Light) 421)p.985). Clay and Sand Pit (152(area of 41°59'40",70°00'31")412,p.541) --alternating clays and sands. Clay (152(41°59'15",70°00'46"--Pamet River (Coast Guard) Life Saving Station)186)--Southward along the coast from the station clays are first exposed in the (beach) bluff about 1/4 mile south distant, where a few feet of clay project through the talus at a single point. The clay shows again about 1/2 mile south of the

station, but it is not until a point 1½ miles south is reached that the clay is seen in any considerable amounts. Here, however, nearly 20 feet of clay are exposed along the bluff for some distance. Dark blue-gray clay with thin layers of yellowish sand...A few hundred feet farther on the clay dips nearly or quite to beach level, but soon rises again and is seen through the talus at scattered points for about one-fourth mile, beyond which it is again well exposed as a horizontal bed 20 feet thich at the bottom of the bluff at numerous points for another half mile, south of which it is covered by talus. It appears to sink below the level of the sea to a point northeast of Long Pond (Long Pond in Wellfleet--(152(area of 41°56'39",70°00'26") but is strongly developed again one-half mile farther south, where it occurs as a strongly folded bed overlain by from 10 to 30 feet of sand and gravels. Ventifacts (142 (see description)132)--Head of one of the ravines or gulfs in the cliff face, just north of the Signal Station (42°02'26",70°03'35"--Highland Light), also railroad cut (railroad now abandoned, area of Route 6) at North Truro station (42°02'08",70°04'49")--few ventifacts at base of cut, common at the top. Dark Mineral Accumulation (141(42°04'23",70°08'16")(42°03'54",70°06'41")(42°00'28",70°01'33")(41°59'40",70°00'59")~~456)~~ 152(41°59'40",70°00'59")(41°58'57",70°00'30")(41°58'21",70°00'05")456)

WELLFLEET: Clay--see Truro (Long Pond). (152(see description)186)--On the east side of Great Beach Hill (41°54'17",70°04'15") and on the mainland north of Great Island (area of 41°55'08",70°04'08") the talus is somewhat darkened, possibly indicating clay beneath the surface. On Indian Neck (area of 41°54'38",70°01'24"), south of Wellfleet, and in the bluff on the small point (3 possible points--Field Point, Pleasant Point, and Old Wharf Point--see topographic map 152) between the neck and the railroad (old railroad grade shown on the topographic map), exposures of clay or clayey sand are found. This is a small bed of clay exposed in a broad arch in a bluff. In the southeastern portion of the bluffs at Indian Neck from 4 to 5 feet of interstratified sand and clay are exposed along the beach for several hundred feet...In the northern bluff at Indian Neck from 6 to 10 feet of blue clay, overlain by fine brown and gray sands, outcrop in an undulating layer for several hundred feet...The same or another layer...comes near the surface in the fields back of the hill (0.7 mile northeast of Indian Neck)...In the interior of this part of the cape near the level of the swamp, 1 mile north of Wellfleet, clay was seen in a pit...Another pit which has yielded considerable quantities of clay is located on the north side of the same swamp a little over ¼ of a mile to the west. Again, on the south side of the swamp, about ½ mile northwest of Wellfleet, there is a pit 20 feet in depth (1906) in which 8 feet of brownish clay, becoming greenish toward the bottom, interlaminated with sand, carrying occasional granite pebbles, are exposed under 2 or 3 feet of till and gravel. Blue clay is said to have been taken out below the portion of the pit now exposed...Just south of the road leading from Wellfleet Center westward across the railroad (abandoned) there is another pit of similar clay. Clay occurring in alternate streaks of blue, yellow, and brown, with some sand, is also said to outcrop in the woods ½ mile southeast of North Wellfleet. Pilgrim Spring, emerging from the base of the bluff, just east of Indian Neck, may flow from the top of a similar clay layer. (152(locality uncertain)412,p.541)--pit 200 or 300 feet north of South Wellfleet (abandoned railroad) station. (152(area of 41°54'46", 69°59'16")186)--Hard, blue putty clay without pebbles found below tide levl and was excavated to a depth of 4 feet...near the south side of

the mouth of Blackfish Creek. Boulder Clay (152(see description)392)--Traced from Indian Neck (area of 41°54'38",70°01'24"), South Wellfleet, to Eastham (Nauset (Coast Guard) Life Saving Station), through Orleans, Pleasant Bay, to Chatham. See Eastham, Fossil Section.

WOODS HOLE: See Falmouth.

YARMOUTH: Ventifacts (170(locality uncertain)132)--Common down to 2-3 feet below surface of "sea cliff", South Yarmouth. Dark Mineral Accumulation (169(41°36'39",70°16'05")170(41°38'52",70°11'58")456)

BARNSTABLE COUNTY FOSSIL LOCALITIES

BREWSTER: Microfossils (171(area of 41°45'45",70°06'33")393)--1.2 miles north of West Brewster in beach bank.

CENTERVILLE: Drowned White Cedar Forest (169(locality uncertain)391, p.10-13,298,p.1163)--near the eastern edge of Centerville, 4 feet below low tide level.

CHATHAM: Microfossils (172(41°40'45",69°57'51"--southeast shore of Oyster Pond)(41°43'11",69°58'53"--beach at Nickerson Neck)393)

DENNIS: Fossil Wood, Peat, Lignite (170(area of 41°44'48",70°12'17") 393,392)--Nobscusett Beach--reference 393--in the intertill bed along the bluff about half a mile west of Camp Dennis (location unknown)--pieces of white cedar. Many fragments of lignite and peat are in this intertill bed in widely separate localities along the beach. Fragments of coniferous wood were also discovered in the sands just above the lowest clay. At the southwestern end of the beach just before the clay tills disappear into cross-bedded sand and gravel (area of 41°44'11", 70°13'42"--Chapin Memorial Beach), several small fragments of poorly preserved comiferous wood with peaty material were found scattered through the gravel. Reference 392 states "...layer of poorly preserved water-worn wood fragments in a bed two feet thick between clay and the middle boulder clay. Associated with southern white cedar is a dark sand containing pollen of 18 warm climate trees. The floras at Nauset (Eastham) and Nobscusset correlate perfectly."

EASTHAM: Microfossils (160(41°50'37",69°56'45"--beach exposure, Nauset Beach (Coast Guard) Life Saving Station--October, 1943)393) Microfossils in Boulder Clay (160(Nauset Station)392)--sponge spicules, 16 species of warm-water diatoms, a radiolarian, and pollen grains of 20 species of temperate and warm-climate trees. Also see Wellfleet, Mineral Section.

FALMOUTH: Microfossils (178(area of 41°35'30",70°37'15")298)--"clay" pit--see Mineral Section.

GEORGES BANKS: Miocene Fossiliferous Concretions (--(area of 41°39'26", 67°28'07")(area of 41°57'08",66°16'52")442)--molds and casts of molluscan fossils. Mastadon Elephant Teeth (--(area of 41°42',66°10')477) Mammoth Elephant Teeth (--(area of 42°05',67°16')(41°51'30",67°30') (41°07',67°35')477)

HARWICH: Drowned White Cedar Forest (171(area of 41°40'00",70°03' 48")298,p.1163)--below low-tide level at Wychmere Harbor, Harwich Port.

NANTUCKET SHOALS: Freshwater Peat (--(area of (40°59',69°01')(41°09', 68°43')(41°06',69°42')(41°02',69°30')171)

ORLEANS: Bison Teeth (160(area of 41°47'50",69°58'38")3)--fragments of maxilla with 2 milk teeth. Specimen found embedded in till about halfway on a section of glacial moraine about 7 or 8 feet high situated on Town Cove. Microfossils (160(area of 41°47'19",69°59'37"--just south of railroad tracks)(41°48'01",69°56'30"--beach exposure, Nauset Heights)393)--The largest number of diatoms in regard to species as well as individuals was recorded from till at Nauset Heights. Microfossils in Boulder Clay--see Eastham.

TRURO: Eocene Marine Fossils (142,152(42°02'23",70°01'09"--Highland Light)107,492)--Fossiliferous boulders consisting of white calcareous sandstone containing shell fragments principally molluscan but also containing gastropods, echinoderms, coelenterates. Found in bank along beach at points ½, 4 and 5 miles south of the Highland Light. Cambrian Trilobites in Red Shale (Erratic Boulder) (142(near Highland Light)243, p.385)--Fossils probably similar to in situ occurence at Braintree--Weymouth, Norfolk County area. Microfossils (152(41°59'15",70°00'46"--Pamet River (Coast Guard) Life Saving Station)393)(141(area of 42°04' 38",70°04'03"--).2 mile north of Highland Light)393)--Exceptionally large numbers of diatoms found in the tills at Pamet and in the laminated clays and silts at Highland Light. (Second locality is stated to be uncertain in the reference.) In general the number of diatoms in the clay tills and associated deposits decreases toward the south and west.

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WELLFLEET: Microfossils (152(41°54'47",70°01'38")393)--Beach exposure, Indian Neck. Microfossils in Boulder Clay--see Eastham.

BERKSHIRE COUNTY MINERAL LOCALITIES

ADAMS: Marble Quarries (31(42°36'32",73°08'09")(42°38'29",73°07'16")(42°39'03",73°07'11")221,114,220,65,topograhic map)(9(Zylonite--725 feet north of the west end of Newark Street)114,p.4)--covered over? Quartzite (32(see description)319)--East side of Hales Hill (area of 42°36'17",73°06'25"). Quartzite extends for at least 1.3 miles north from this point (into quadrangle 9) and 1.2 miles south into Cheshire where it is cut off by a fault. At Hales Hill the quartzite has a width of 0.3 mile in an east-west direction (area of 42°35'48",73°05'32"--Burlingame Hill)--quartzite has an east-west width of 0.17 mile and extends south into Cheshire. Graphite (32(42°36'19",73°04'12")319)--"Lead Mine", short tunnel driven north, now collapsed. The graphite occurs as disseminated flakes as much as 5 millimeters in diameter in calc-silicate gneisses.

ALFORD: Galena and Pyrite (95,73(locality uncertain)231,232,p.127-128)--One mile north of the center of Alford. Vein of quartz, several feet wide, traversing limestone and containing galena and pyrite. Iron Ore (Limonite) Pits (95(area of 42°14'39",73°26'18")(area of 42°15'30",73°25'51"--Tremper Mine)121,89,p.54). Marble Quarry (73(42°16'00",73°24'27"--Churchill's limestone quarry)(42°16'14",73°24'27")128,p.50,125,372). Marble Quarries (73(42°15'07",73°25'16")95(42°14'49",73°25'05")(42°14'28",73°25'02")(42°14'28",73°25'02")(42°13'27",73°25'19")375) Magnetite--see Great Barrington (Tom Ball Mountain) (95(42°14'09",73°26'34")--magnetite phyllite.

ASHLEY FALLS--See Sheffield

BECKET: Potholes (76(42°17'58",73°00'17")318)--From an elevation of about 1000 feet to the ridge at 1250 feet on the brook draining north. The largest pothole is about 12 meters across. Marble with Silicates (76(42°16'18",73°02'28")318,65)--Prospect pit--Medium- to coarsed-grained calcite marble (Coles Brook limestone) with accessory plagioclase, quartz, diopside, tremolite, and chondrodite, and secondary or retrograde chlorite, serpentine, and talc. Weathered surfaces are generally buff but locally reddish-brown bands are formed from the weathering of ankeritic calcite and pyrrhotite. Altered Limestone (Marble) (76(localities uncertain--consult reference 318)65,318,357,161)--Many small areas of altered limestone (Coles Brook Limestone) with tremolite-actinolite, graphite, titanite, coccolite(hedenbergite), epidote, chondrodite and other minerals of the limestone contact association. Other minerals reported (reference 65)--adularia, amphibole, hypersthene, pericline, wernerite, and wollastonite. Prospect Pit in Banded Gneiss (76(42°17'08",73°02'34")65)--Quartz-plagioclase-microcline-biotite gneiss. Accessory minerals: clinozoisite, garnet, zircon, tourmaline, magnetite, muscovite, hornblende. Actinolite Gneiss and Chondrodite Limestone (76(locality uncertain)161)--Westward from Middlefield Station Bancroft, toward Becket Center, a ragged, castle-like ledge of calcareous actinolite, much contorted, forms the bare crest of the hill south of the road (area of 42°19'11",73°03'22"), and just east of this ledge is a bed, 75 feet thick, of a coarse, well-bedded chondrdoditic limestone standing vertically. It is full of nodules, often 15 inches across, consisting of salite (var. hedenbergite), tremolite, titanite, and chondrodite. Other nodules are wholly of pale-green bladed tremolite. Chondrodite-Phlogopite Marble and Actinolite-Pyroxene Rock (76(see description)161,p.43)--

A mile east of Center Pond (Center Pond--area of 42°17'51",73°03'52") --a bed of chondrodite-Phlogopite marble, 82 feet wide, has been opened. At its eastern contact is a selvage, 4 feet wide, of pale-green to olive-green actinolite-pyroxene rock, which consists for the most part of a loose network of coarse actinolite blades, with some large masses of pale-green pyroxene and pyrite. It contains amethyst, much titanite in the usual flat crystals, and orthoclase in small well-formed crystals with simple forms, rounded edges, and blue opalescence. Chalcopyrite (76(locality uncertain)161,p.107)--One inch wide vein worked. Associated with pyrite, pyrrhotite, and calcite in hornblendic gneiss. East of Center Pond, on farm of M.J. Alderman. Barite, Galena, Chalcopyrite (76(locality uncertain)161, p.106)--Boulders, in bladed masses, from the Hinsdale limestone. East of Shaw Pond (Shaw Pond--area of 42°15'08",73°07'25"). Chondrodite (76(locality uncertain)161,p.108)--in a limestone band 5 rods wide. East of R.A. Alderman and son's house in Becket Center. Serpentine (76(West Branch Westfield River)164,p.150,195)--serpentine marble found in a bed in gneiss on the river in Becket. Magnetite (75(see Lee)374,p.A20) Jasper (75(locality uncertain)161,p.120)--in Becket where a great mass was blasted in the roadside and near the West Becket post office. (see Monterey for description of Jasper). Hudson and Chester Granite Quarry (98(42°14'25",73°01'22")65,117)--Blue-gray biotite granite. Minerals reported (macroscopic?): allanite, apatite, calcite, epidote, fluorite, ilmenite, muscovite, pyrite, sphene, zircon. Also microscopic titanite in relatively large amounts. Granite Quarries (76(42°15'58",73°00'43")(42°16'11",73°01'11")(42°14'22",73°03'25") 65,265,topographic map) Magnetite, Almandine Garnet (75(see Lee)161, p.48,374). Steatite (76(area of 42°15'08",73°00'15")231,map)

BERKSHIRE--See Lanesborough.

CHESHIRE: Quartzite (32(42°35'29",73°05'34")(42°35'36",73°06'06") (42°32'42",73°07'22")(42°32'55",73°07'03")(42°33'19",73°06'37")319) Glass Sand and Refractory Quartzite Quarries (32(42°33'44",73°05'42") 319)(31(42°33'41",73°09'03")(42°33'34",73°08'57")(42°33'17",73°08'38") (42°32'56",73°09'24")(42°32'47",73°10'06"--shows as a gravel pit on the topographic map)(42°33'17",73°08'38")84,221,314,233) Limestone Quarries --(31(42°33'01",73°11'52")(42°33'13",73°11'46")221,233,114,365) Limestone Pits (31(42°33'19",73°11'44")(42°33'23",73°11'23")topographic map,114). Schistose Marble and Graphite Facies (31(42°36'10",73°12'00" --Jones Nose)221)--see also New Ashford. Iron Ore (Limonite) Pits with Pyrolusite (31(see description)221,89,365,map)--Jagger Mine--0.5 mile west of Cheshire village--at the east foot of a prominent ridge. It is 1500 to 1800 feet southwest of the Kitchen Brook crossing on West Mountain Road. Bennet prospect--1.5 miles east of Cheshire village on the E.L. Martin dairy farm (1945). Bliss Mine--a mile north of the village of Cheshire near Outlook Avenue on the farm of Mrs. Anna Warslowski (1945). Serpentinized Dunite (31(42°31'28",73°10'09")221,157, 297,279)--olivine (95% fosterite, 5% fayalite), magnetite, piccolite, niccolite, xylotile (ferriferous chrysotile)--as cross-fiber asbestos.

CLARKSBURG: Quartzite (8(area of 42°43'32",73°08'15"--Clarksburg (Bald) Mountain)220)--possible source of refractory material. Magnetite (8,9(locality uncertain)364,p.11)--magnetite-muscovite-quartz schist. Across State line on mountain road 1½ miles southwest of Stamford, Vermont.

CLAYTON--See New Marlborough.

COLTSVILLE--See Pittsfield.

DALTON: Agate, Chert, Yellow Jasper, Chalcedony (53(locality uncertain) 195)--Agate associated with chert and quartz. Ilmenite (53(42°27'43", 73°09'42"--Day Mountain)161,p.111)--in a lense of coarse granular orthoclase in a muscovite gneiss full of needles of black tourmaline. Ilmenite occurs in broad curved lamellae half an inch thick. Calcite, Pyrrhotite, Biotite, Allanite, Feldspar (53(42°27'54",73°10'34")161, p.39-40)--From this point, going southwest to Barton Brook (approximately 0.4 mile), allanite abundant in gneiss, also in brook bed. Up the brook bed, in a granular quartz rock, feldspar and calcite in balls 3 to 4 inches in diameter. These balls are sometimes blended into masses of very coarse marble as large as a man's head. There is much pyrrhotite developed, especially along the borders between calcite and quartzite, and biotite occurs in the calcite. Anthophyllite, Asbestos, Talc (31(northwest part of Dalton township (near North Mountain?)221)--small amounts mined from 1901 to 1906. The asbestos formed in pockets in the talc and the two were mined together. Individual pockets ranged from a few pounds to several tons. Possibly deposits were in the Hindsdale gneiss and may have been associated with amphibolite. Tremolite, Clinochlore (53(42°27'21",73°08'06")161, p.22-23)--These minerals occur in coarse blades and plates respectively. Also lenses of hornblende-pyroxene-epidote-calcite rock. Jasper (53,54 (42°28'09",73°07'13"--west slope of Barrett Hill)161,p.121)--in yellow, red, and white colors. Steatite, Serpentine, Tremolite-Actinolite, Chlorite (54(42°29'18",73°06'37"--Wahconah Falls)161,p.29-30,p.100)--see Hinsdale, Windsor.

EGREMONT: Marble Quarry (95(42°09'54",73°25'21"--Joyce Quarry)(42°09' 45",73°24'37"--also in Great Barrington)114,131). Iron Ore (Limonite) Pits--across State line in Hillsdale, New York. (95(area of 42°11'39", 73°29'09")(area of 42°12'11",73°29'09"--locality in or near marsh)121).

FLORIDA: Ultramafic Bodies (10(42°39'33",72°59'34"--prospect)(42°39'11", 72°59'47")(42°39'48",72°59'34")82,85,166). Talc Pit (10(42°39'34", 72°59'52")161)--same area as noted for second ultramafic body. Also see Rowe, Franklin County Mineral Section. Chalcedony, Prase? (10(East of Hoosac Mountain summit)195)--Chalcedony--associated with serpentine, pyrite, magnetite, hyalite, chalcedony, talc, asbestos, and other minerals. Prase (doubtful identification)--beautiful color with pyrite inclusions.

GREAT BARRINTON: Marble Quarries (with Tremolite and Phlogopite) (95(42°09'40",73°24'28"--also in Egremont)131)(96(42°11'48",73°21' 23")(42°11'41",73°21'24")(42°11'33",73°21'26"--apparently covered over)(42°13'27",73°22'25")114). Garnet, Magnetite (96(see description) 126,p.263)--In some places in Beartown Mountain there are layers; and at one ascent of the mountain made from the west side, about midway between the north and south extremities (area of 42°13'57",73°17'34"), James D. Dana found, near the top, a dark-gray, fine-grained layer, exceedingly tough, consisting largely of quartz and massive garnet. In a spur just east of the south end (area of 42°13'33",73°17'17"), he observed in the gray gneiss a seam 3/4 inch wide of magnetite.

Magnetite (96(locality uncertain)161,p.113)--vein 4 inches wide in quartz, enlarges to 18 inches a few feet down, rock on Bear Mountain, near the road to Beartown. Erratics (96(locality uncertain)126,p.262-263)--Deramy's Bluff has been stated to be the front of the plateau on which the south end of Bear (Beartown?) stands. Going eastward a mile and a half, and then rising by a rough and steep road to the top of this plateau--there found a limestone erratic--consisting mainly of rhodophyllite? (rose-colored pyrosclerite) and yellow chondrodite and another erratic of quartz, chlorite, and large imperfect crystals of rose-colored sphene. Source of erratics not located. Tremolite, Augite in Limestone (96(area of 42°11'46",73°18'45"--Muddy Brook) (area of 42°11'13",73°18'42")383,p.51,137,p.46). Quartzite Talus (74,96(area of 42°15'00",73°21'25"--west slope of Monument Mountain) 373). Smoky Quartz Crystals (96(42°14'23",73°20'09"(?)195)--hexahedral prisms; largest found nearly one foot long. Gneiss Quarry (96(locality uncertain)121,p.396)--ridge east of Great Barrington (Three Mile Hill?). North end of ridge. Quartzite Quarry (96(area of 42°11'06",73°17'31")121,p.400)--Devaney's Hearthstone Quarry. Washington Blue Quartz Gneiss (From (74(42°15'03",73°18'07") to (96 (42°15'00",73°18'07") to (42°14'14",73°18'18")(42°14'17",73°18'15") (42°13'28",73°17'56")(42°12'57",73°17'43")(42°12'37",73°17'11") to Monterey (42°12'22",73°16'54")(42°12'06",73°16'13")375,p.25-29,161, p.34,map)--A south to southeast trending formation, 4¼ miles long, ½ mile maximum width. Black Tourmaline Rosettes (96(42°11'12",73°17' 46"--near Bisbee Peak)(74(42°15'20",73°21'13"--Flagg Rock)375,p.47) --in Cheshire Quartzite, Intermediate Feldspathic Member. Magnetite (73(42°16'09",73°24'03"--top of Tom Ball Mountain)375)--magnetite-bearing chlorite-quartz schist--also Alford. Tremolite--Unit I of the Stockbridge limestone west of Great Barrington and on Fossbur Hill (95(42°09'41",73°22'47")375).

HINSDALE: Talc in Marble (54(42°24'50",73°06'49")85,p.6)--Outcrops in bed of East Branch of the Housatonic River under bridge. Salite-Actinolite-Graphite-Calcite Marble (54(locality uncertain) 161,p.22-23)--Appears north of the road (Creamery Road?) running southeast from the center of Hinsdale, near the creamery. A shaft was sunk 16 feet deep on this rock in 1885, in search of graphite, and later, in 1895, more digging was done at this same spot in search of iron. Impure Marble, Serpentine (53(localities uncertain)161,p.27-29,p.32)--As exposed in the railroad 50 rods north of the Hinsdale station, the limestone is a very coarse, wholy crystalline rock--a white coccolite limestone containing graphite, chondrodite, phlogopite, and coccolite in grains, pyrite, magnetite, and hornblende in large masses, some of which are a foot across. Only 25 feet is exposed, and it is covered by the coarse Hinsdale biotite-gneiss. Fourty rods north (of the Hinsdale railroad station), in the canal beside the stone mill --green massive rock/ pyroxene, actinolite, and much pyrite. In the second cut south of the Hinsdale station are great boulders of serpentine which came from some portion of the bed. (topographic map 54?) Impure Marble, Tremolite, Chondrodite, Clinochlore (54(see description) 161,p.27-29)--A mile south where the highway crosses the railroad near a bridge (42°25'29",73°06'51"), the (impure marble) bed reappears and continues for a long distance southward by the roadside, more than 100 feet in thickness being exposed. It is a very coarse crystalline limestone, the grains often 50 to 100 millimeters across and multiple twinned, with crystals of bronzy and pink phlogopite 20 to 30 millimeters across, and black to pale-green hornblende, clove-brown pyroxene, green coccolite, graphite and pyrite. It is in places changed

into great masses of matted pale-green tremolite, and this can be followed a long way southward as a very impure tremolite. It appears as a phlogopite limestone farther south, at the E. Cheesman place, a half-mile west of the next railroad crossing (area of 42°23'46", 73°09'53"). Salite, Actinolite, Graphite (54(see description)161,p.36, 235)--Small bands of impure limestone, now mostly changed to a pale-green salite-actinolite rock, appear in gneiss and the graphite is often so concentrated in them that they have been mined. Appears in Russo Brook (600 feet northwest of 42°25'29",73°06'51"-noted previously). Line of salite-actinolite boulders on crest of hill for a mile southwest of this point. Chondrodite, Clinochlore, Talc, Serpentine (54(42°23'46",73°06'42"(?))161,p.108)--locality uncertain, may be 0.5 mile further east on Ballard's Crossing Road. Here great layers 3 feet thick are made up almost exclusively of red chondrodite and bright green clinochlore, the latter in plates up to an inch across, and the change into serpentine and talc has taken place on a large scale. Further north, at River Bend Farm, below the mill pond on the Housatonic branch (only pond matching description is in the center of Hinsdale (53(42°26'22",73°07'37"), the limestone is exposed at the sawmill with a thickness of 600 feet and the base is not seen. At the top the bed is changed into a compact, firm, granular, apple-green talc for a thickness of 50 feet, and dark-gray slaty serpentine appears here also in boulders. Steatite, Serpentine, Tremolite-Actinolite (54(42°29'13",73°06'55"--Wahconah Falls)161,p.29-30,85)--A little farther down the brook, and easily reached by a footpath from the Windsor or Wakonah Falls, is an extensive bed of steatite. Here the limestone bed has changed through actinolite into steatite. Upon following the limestone south 30° west a ½ mile, to the point where it runs into Dalton and crosses the east-and-west road south of P. Mitchel's (Adams Road?), it is seen that the boundary line soon begins to be marked by a great number of serpentine boulders. Thirty rods north of the residence of D.J. Pratt, a great bed of serpentine 3½ rods wide has been quarried and is exposed. It is very dolomitic and slaty; much of it is still matted tremolite and actinolite. Also see Windsor, Dalton (Mineral Section). Asbestos (Tremolite) Mine (53(general area of 42°26'48",73°08'57")Pearre, 1956--see General Reference). Peat (53,54(locality uncertain)314)--mined during 1951, 1952. Sulfur (53,54(locality uncertain)233,p.48)--Spring which emits hydrogen sulfide. The decomposition of this gas produces a deposit on the ground around the spring. Jasper (54(locality uncertain)161,p.121)--On Peru road north of Ashmere Lake (George Schnopps Road?). Chalcedony (53, 54(locality doubtful)195).

LANESBOROUGH: Colby (Sherman) Iron Ore (Limonite) Mine (30(42°31'17", 73°15'59")89,365,p.182,map,121) Glass Sand Quarry (31(42°30'45", 73°11'06"--near Berkshire)84) Balance Rock State Park (30(42°30'38", 73°16'22")topographic map)

LEE: Magnetite, Almandine Garnet (75(see description)161,p.48,374)--In the bluffs which border the East Lee Valley (Massachusetts Turnpike) on the north and its continuation across Becket. Along the south side of the valley and on both sides of the next valley to the south, by which runs the road to Goose Pond (Forest Street), the rock is still more strongly magnetic, so that it is often prospected for iron, especially on the high hill a mile southeast of East Lee (42°17'04",

73°12'26"). Large iron garnets (almandine) can be found along the north side of the East Lee Valley into Becket. Along both sides--an upper bed is leek green and pyroxenic. Emerson stated that the magnetite is associatd with a hornblende-magnetite-biotite gneiss but recent mapping has shown that the magnetite occurs as layers and veinlets in alaskite. The mineralized zone is approximately 100 to 150 feet thick, but the actual beds of pure magnetite represent only a small fraction (10-15%) of the total thickness and appears to be developed as podiform deposits lensing along the strike. This mineralization is indicated by a curvilinear magnetic anomaly on the aeromagnetic map of the quadrangle (U.S.G.S. GP-448) extending northwestward from the southeast corner to the west-central part of the map (through Becket, Tyringham, and Lee). Tourmaline-Bearing Quartzite (75(42°18'29",73°14'18")(42°18'52",73°14'38")161,p.85-86,plate7). Phlogopite, Altered Pyrite, Muscovite in Limestone (75(42°18'52", 73°14'49")161,p.87)--Pyrite in pentagonal dodecahedrons. Chondrodite (75(see description)161,p.108)--On the high hill between the two valleys coming in from the east (42°17'39",73°13'01"), in masses as large as one's fist; also on the opposite side of the valley to the northwest, and in the bottom of the valley a mile east of East Lee. Wernerite (75(locality uncertain)161,p.120)--Upper Goose Pond (area of 42°17'12",73°10'39")--near Elwells Rocks. Marl (74,75(localities uncertain)232,p.53-54)--northeast part of Lee at mills of Sedgewick and Co. Ten feet thick, few acres. Also bed covering several acres in the northwest of Lee, near a pond, on land of Messrs Lemmel and Cornelius Bassett--one foot below surface, thickness varies from 4 to 12 feet. Place names as of 1838. Tremolite in Marble (Quarry) (74,75(locality unknown)161,p.84)--Old Gross Quarry. Dolomite Marble Quarries (with variable amounts of calcite, phlogopite, tremolite, pyrite; lesser amounts of graphite, chlorite) (74,75(see description)16,131,371)--Northeast Quarry (75(42°19'08",73°14'34")--now covered over; Lee Marble Works (75(42°18'01",73°14'51"); Lee Lime Corporation Quarries (75(42°17'39",73°14'57")(42°17'40",73°15'13")(42°17'32",73°14'51"); Marble Street Quarry (75(42°17'56",73°15'02")--apparently covered over. Standard Lime Corporation Quarry (74(42°17'35",73°15'35")--just southeast of the quarry is an exposure of gray marble containing much pyrite. Joseph Valenti Quarry (74(42°16'57",73°15'50")--aparently covered over. Chondrodite (75(see previous--area of 42°16'40",73°16'41")121,p.271)--On the high hill in South Lee between the entrances to the two valleys, the Tyringham (Hop Brook Valley) and South Lee (Housatonic River Valley), there is a large area of hornblendic rocks of Archean age, where the associated limestone contain chondrodite in masses as large as the fist ...The same rocks occur on the opposite side of the South Lee Valley to the northeastward. Jasper Erratics (75(42°18'31",73°14'13")161,p.210, plate 7)--at Fernside or Ferncliff. See Monterey (Mineral Section) for description.

LENOX: Iron Ore (Limonite) Pits (74(see description)89)--Belden Mine --two small open pits--one water-filled (42°21'42",73°18'21")(42°21' 46",73°18'20"). According to reports there were two (additional) iron mines in the village of Lenox, one, an underground mine, was located in the center of the village, where the Clifford Coal Company building and the Wheeler Market building are situated at present; the other, an open pit mine, was filled and is now the Lenox playground (1945). Chlorite Schist Boulder Train (74(42°21'38",73°18'58")49)--termination

of boulder train on the west slope of Prospect (Baldhead) Hill--see Richmond (Berkshire County Mineral Section). Marl (74,75,52,53 (locality uncertain)232,p.53)--four miles from courthouse in Lenox; also little east of village.

MILL RIVER:--see Sheffield, (Berkshire County).

MONTEREY: Jasper Erratics (97(area of 42°10'18",73°11'55")161,p.120) --various shades of yellow, often colored black by maganese, running into fine blue shades, and coated by fine drusy quartz. Marshall Bidweel's land, near Lake Garfield. Salite in Dolomite (97,96(locality uncertain)241,p.793-794). Quartzite Quarry (97(area of 42°12'00",73° 12'24")121). Washington Blue Quartz Gneiss--see Great Barrington, Berkshire County Mineral Section.

MOUNT WASHINGTON: Calcite in Limestone (118(42°06'32",73°29'36"--Wright Brook)(area of 42°05'42",73°27'59"--City Brook)240,p.727)--limestone also contains silvery mica, graphite and pyrite. Garnet (118(see description)240)--(42°03'06",73°26'51"--south side Sages Ravine); across State line in Salisbury, Connecticut:(42°00'43", 73°27'56"--Bald Peak)(42°00'07",73°28'12")(42°00'23",73°27'59"); across State line in Northeast, New York--(42°00'02",73°29'58") (42°04'19",73°26'29"--east shore of Plantain Pond)(42°03'42",73°26' 09"--Bear Rock Falls). Also see Sheffield, Berkshire County Mineral Localities. Garnet, Staurolite--Across State line in Salisbury, Connecticut (42°00'26",73°26'48"--Lions Head)240)--Garnets (rhombic dodecahedrons) over a centimeter in diameter, and staurolites (usually inclined-cross twins) a centimeter or more in length.

NEW ASHFORD: Galena (31(area of 42°36'59",73°11'23")137,p.57)--Bed of the ore is said to be on the east side of Saddle (Saddle Ball) Mountain. Schistose Marble and Graphite Facies (31(42°36'38",73°11'58") (42°37'21",73°13'14")221)----At the first locality the marble bed strikes north-south. At the second locality, the marble bed strikes northeast-southwest. Also see Cheshire, Berkshire County Mineral Localities.

NEW MARLBOROUGH: Magnetite, Pyrrhotite, Pentlandite, Other Minerals (120,119(see description)161,p.63-64,314)--Cleveland area--This is a triangular area one mile long from east to west, a half mile wide from north to south, half on the Sheffield (Ashley Falls(119) quadrangle and half on the Sandisfield (South Sandisfield(120) quadrangle. At its northern apex is the Cleveland iron mine (magnetite) about 100 rods northeast of the house of J. Cleveland. The Becket gneiss, somewhat granitoid, rests nearly horizontally upon the Hinsdale limestone, which is 4 or 5 feet thick, and below this, in the hillside, is a great thickness of the coarse, light-colored Hinsdale gneiss, in which is an irregular vein of magnetite, branching in places to a foot in width. The limestone is a white, firm, coarse-grained rock, in most of its thickness showing only a few pale-green mica scales. Some layers are filled with green mica, buff phlogopite, deep-red chondrodite, and colorless tremolite in fine needles. Commencing about 10 feet below the limestone, the gneiss is extensively trenched to open the iron ore ...outcrops of the biotite gneiss are abundant on the south side of the road past the southern end of the Cleveland road to the vicinity of the Wadsworth mine 100 rods north and ten degrees east of the house of Mrs. J.P. Wadsworth. Here are two openings, 10 feet deep, upon a

rusting bed of calcareous actinolite schist. In the center of the area is the Cleveland mine proper--shaft about 20 feet deep. The rock is a deep-green massive pyroxene-hornblende, carrying much pyrhottite and a little chalcopyrite, considerable coarse granular calcite and graphite. The mine was first opened as a gold mine. Later assays have shown no precious metals but various quantities of nickel from 3 to 26%. This information was given me (B.K. Emerson) by Mr. Cleveland. The bed was being worked in 1891 by a New York firm as a nickel mine. Mention is made (ref. 161,p.61,p.80) of the Hotchkiss mine which furnished pentlandite (?) crystals often an inch long. It has been stated (ref.314,p.xlx-4) that the Cleveland nickel mine occurs in pyroxenite, which is intrusive into the Washington gneiss. Pearre (~~1956~~--see General Reference) shows the Cleveland mine in this area (120(42°04'17", 73°14'40"--Cleveland Mountain) and the Hotchkiss mine to the northeast in the general area of (42°05'00",73°12'30"). Limonite (Ochre) (96,97, 119,120(locality unknown)232,p.126,p.128)--Farm of Josiah Sheldon (1838) --west part of New Marlborough. Quartz Crystals in Limestone (96,97, 119,120(locality unknown)195). Iolite (Cordierite) (120(area of 42°06' 03",73°14'02"--Southfield)194)--blobs of dark blue opaque material in green orthoclase lenses in schist. Kaolin (119(42°03'12",73°16'51"-- Clayton)124,123,382,p.150,314,vol.3,p.xxxf-11,161,p.80)--Formed from weathered pegmatite. Marble Quarries (119(42°04'17",73°16'34"--Benton Hill)114). Also see Sheffield, Berkshire County Mineral Localities. Diopside Crystals in Limestone (96(42°10'54",73°16'05")375)--road cut on Route 23. Salite in Dolomite (119(area of 42°06'49",73°16'06"-- Mill River)241,p.793)--see Sheffield.

NORTH ADAMS: Jasper Pebbles (8,9(locality unknown)195). Marble Quarries (9(42°41'52",73°07'01"--Witts Ledge)(42°42'29",73°05'33"--near Natural Bridge)220,114,285,map,97,p.21-22,map)--large crystals of calcite and occasional pyrite crystals. Quartzite Quarry (8(area of 42°42'05", 73°08'29")285). Iron Ore (Limonite) Pit (9(42°40'40",73°05'01")365,p.83) --Quartzite with limonite. Iron Ore (Limonite) Prospect (8(area of 42° 40'56",73°09'22")365,map)--May be covered by Mt. Williams Reservoir.

OTIS: Pyrite, Wernerite, Graphite, Garnet, Hornblende, Pyroxene, Actinolite, Chalcedony, Jasper, Magnetite (98(see description)161,~~p.127~~, p.57-58,~~p.120~~,p.74-127)--The coarse limestone at Otis Center contains wernerite in groups of stout, white interlaced crystals and purple glassy masses. It occurs in the brook bed near the mill and just west of the village street (near village center?--42°11'35",73°05'32")... (p.57) The eastern boundary (of the Washington Gneiss) seems to coincide with the Farmington River, and the first outcrops to the east, in the high banks, are of the Cambrian white gneiss, until, in the bluffs across the brook south of the blind road at P. Davison's (area of Dimmock Brook--42°11'26",73°05'05"), there is, at the old mine said to have been worked to a depth of 10 to 15 feet, an apparent outcrop of pyritous wernerite rock of pre-Cambrian age. It seems to lie a little west of the bluffs of white gneiss. The boundary then runs southwest into Sandisfield, and at the south foot of the hill, 40 rods west of H.S. Hawley's the last house before turning off to Cold Spring (area of Miner Road-Miner Brook(42°09'20",73°04'35") is another old mine. A deep trench runs into the hill where the white gneiss on the east and the rusty, graphitic pyritous gneiss full of garnets and black hornblende (this is the ore) on the west are closely approximated. (p.58)

Boulders along Farmington River valley containing wernerite (white stout crystals and lavender masses), pale-green pyroxene, emerald-green actinolite, pyrite, and graphite. Also along the Farmington River in Otis Center, boulders of chalcedony (some are white to pale sky-blue color, drusy and boytroidal in cavities). The enclose angular fragments of deep-yellow jasper. (Also see Monterey, Berkshire County Mineral Localities for description). (p.120) Both chalcedony and jasper enclose fragments of wernerite. (p.74) Considerable excavation for iron has been made west of T. Fay's.two miles east of Otis Center, more than 50 years ago. The gray gneiss is here a little more impregnated with magnetite than usual and carries hornblende. Limestone Quarry (98(area of The Pinnacle--42°11'32",73°06'02")65). Newell Granite Quarry (265(42°14'02",73°04'16")115,p.281,65)--Biotite-muscovite granite with pyrite, ilmenite, fluorite, calcite, epidote, apatite, muscovite, zircon, sphene. Granite Quarries (98(42°14'11",73°04'05")(42°13'55", 73°01'22")(42°13'45",73°03'28")topographic map). Magnetite, Hematite, Quartz (98(area of 42°11'12",73°03'39")225).

PERU: Sphene (54(area of 42°26'11",73°03'14"--Peru Hill)65). Agate, Jasper (54(locality uncertain)195)--Yellow moss agate with minor reddish variation and occasionally purplish in masses up to 55 pounds or more in weight, associated with brown and variegated jasper. "Gold" (Pyrite) (54(locality uncertain)164,p.88)--On the farm of Wesley Pierce. Account of occurrence unlikely; B.K. Emerson thought it to be pyrite. Garnet? (54(42°23'48",73°02'21"--Garnet Hill)topographic map).

PITTSFIELD: Shaker Iron Ore (Limonite) Mine (52(42°25'55",73°19'19") (also 1/4 mile south of this point, across Route 20)89)--First mining done north of Route 20 where ther is a vertical shaft 75 feet deep (now filled in?), and that from there the mining progressed southward. Two shafts were sunk south of the highway. One, now filled and obliterated, is located between two houses about 500 feet west of the railroad bridge; the other is about 300 feet farther south, a short distance east of the pond (formed by caving of underground workings). Green Quartz with Rutile, Jasper (53(locality uncertain)195)--Green quartz with rutile from southeast part of town. Jasper is gray or bluish and occasionally red in color. Limestone--Quartzite Quarry (52 (area of 42°25'45",73°16'00"--foot of South Mountain)121,p.405) Coltsville Marble Quarry (53(42°28'01",73°12'31"--Coltsville)161,p.84). --covered over? Marble Quarry (52(42°28'16",73°18'11")114). Elastic Marble from Quarry (52,53(locality uncertain)161,p.107). Marl (53(locality uncertain)232,p.53)--east part of village--border and bottom of a pond. Also, another bed mile southeast of village.

RICHMOND: Chlorite Schist Boulder Trains (51,74(see description)49,map, 121,p.395,map)--Boulder train originates from a hill called "The Knob" (51(42°25'53",73°25'00"--Fry's Hill), across the State line--partly in New Lebanon and partly in Canaan, New York. Reference 121 incorrectly identifies Douglas Knob (1.2 miles north of Fry's Hill) as boulder source. The boulder train extends east and turns southeast in Richmond and continues into and ends in northeast Stockbridge (74(42°21'03", 73°19'02"). Two localities in Richmond where boulders are found are in the area of (51(42°24'15",73°22'35")(42°23'16",73°21'17"). Two other, more fragmentary, boulder trains lie to the southwest. The end of the

third train also lies in Stockbridge (74(42°20'36",73°18'54"). A minor boulder train lies to the northwest of the principal train. This minor boulder train terminates on the western slope of Prospect (Baldhead) Hill, Lenox, Berkshire County (74(42°21'38",73°18'58"). Reference 49 should be consulted for the map of these boulder trains. Iron Ore (Limonite with Goethite) Mines (52,74(see description)89,121,195)--Goethite-botryoidal and mammillary masses showing typical fibrous structure and suitable for cutting cabochons; at times exhibiting a cat's eye effect. Limonite--compact, botryoidal and mamillary masses suitable for cabochons. Branch Mine (52(42°23'57",73°18'55") or (42°24'01",73°19'02")--reported old workings known as the Stewart Mine, on the farm of F.J. Skates (1945), about one-quarter mile north of the Branch mine. Lovelace Mine (52(42°23'27",73°22'28"). Andrews Mine (52(42°24'04",73°19'55"). Bacon Mine (52(42°23'07",73°19'59")--1300 feet southwest of the Andrews Mine. Truman Andrews Mine (52(42°22'40",73°20'36"). Werden Mine (74(42°22'08",73°20'23"). Cheever Mine (74(42°22'07",73°20'58")(also reference 76)--filled with water (Crystal Lake). Contains Sepiolite (Meerschaum)--pure white pieces over an inch across of good quality. Also possible locality of Gibbsite--The original locality of gibbsite...present as radial fibrous stalactites and crusts (ref. 348,p.665). Supposed "Banks" mine is the southwestern part of the Cheever mine. Dixon Mine (74(42°21'54",73°21'33"). Reference 89 incorrectly states location in West Stockbridge. Cook Mine (74(42°21'29",73°20'21")--Reference 89 incorrectly states location in West Stockbridge. Carr Mine (74(42°21'25",73°22'03"). Cone Mine (74(42°21'15",73°22'19"). Klondike Mine (74(42°21'15",73°22'28")--Except for a very small open pit, all of the mining was done underground. Unnamed Iron Ore (Limonite) Mine (74(42°21'22",73°20'57"). Limestone Quarries (74(see description)89)--group of 7 limestone quarries (74(42°21'34",73°22'12"--Cone Hill)--One quarry at this location. Two quarries 260 feet west. One quarry 420 feet east. One quarry 370 feet northeast. One quarry 1160 feet southwest. One quarry 840 feet southeast. Group of two limestone quarries--one quarry just north and one quarry just south of point (74(42°23'56",73°20'13") on Summit Road. Other quarries: (74(42°22'21",73°21'05")(42°22'11",73°21'14")(42°22'51",73°21'21").

SANDISFIELD: Tourmaline Pegmatite (97(North of Town Hill--42°08'28",73°08'05")161,p.95)--Crushing has sheared the large tourmalines into a series of echeloned plates. Pyrite, etc.--see Otis, Berkshire County Mineral Localities. Epidote, Serpentine, Chlorite, Sulphides (121(area of 42°04'16",73°03'49"--banks of West Branch Farmington River)225).

SAVOY: Ultramafic Bodies (Talc, Carbonate, Serpentine) (32(42°32'49",73°00'09")(42°33'30",73°03'53")319). Graphite Prospect with Diopside, Pyrrhotite (32(42°33'44",73°03'23")319)--Graphite as disseminated flakes as much as 5 millimeters in diameter in calcsilicate gneisses. Also contains diopside knots as much as 6 inches in diameter and disseminated small grains of pyrrhotite. Quartzite Pit (32(42°34'52",73°03'46")319). Ornamental Stone (32(42°37'08",73°01'43"--Lewis Hill)319)--The albite schist of the Hoosac Formation was quarried for an ornamental stone or a construction stone in a small pit...The pit is completely overgrown. The rock is a calcareous quartz-albite-muscovite-chlorite-clinozoisite schist, and is unusually homogeneous with good splitting properties. Calcite comprises as much as 2% of the rock.

Porcelain Clay (9,10,32,33(locality uncertain)233,p.36)--It is said to constitute a layer three feet thick, and of unknow extent, several feet below the surface. Ley Talc Mine (32(42°32'52",73°00'23")85)

SHEFFIELD: Garnets (118(42°04'01",73°25'29")(42°03'12",73°25'58") Across State line in Salisbury, Connecticut--(118(42°02'35",73°25'34") (42°01'43",73°26'48"--Brassie Brook)(42°00'07",73°26'05")(42°00'05", 73°25'46")(42°00'24",73°22'36")240)(119(42°06'48",73°21'46"--Little Johnny Mountain(Barnards Ridge))(42°06'25",73°21'49")(42°03'57", 73°23'24")(42°03'00",73°23'31")(42°02'56",73°20'44")241,240,126, p.268-269). Across State line in Salisbury, Connecticut--(119(42° 00'32",73°22'12")(42°00'42",73°21'59")(42°01'01",73°21'57")(42°02'53", 73°20'44")240,241) Also see Mount Washington, Berkshire County Mineral Localities. Garnet and Staurolite--Across State line in Salisbury, Connecticut (118(42°02'10",73°26'19")(42°00'27",73°24'32")(42°00'42",73° 23'30"--extends 1 mile south-southeast from this point across Cave Hill (42°00'19",73°28'20")240)(119(42°01'50",73°21'47"--Toms Hill)(42°02' 25",73°21'24")(42°02'48",73°21'16"--Miles Mountain)(42°02'53",73°20' 51")240). In Sheffield, Connecticut (119(42°06'53",73°22'07"--Bear's Den Ridge)126,p.268-269)--The mica schist of Bear's Den is a coarse kind, full of translucent garnets, a tenth of an inch in diameter, and some layers abound in dark brown, slightly translucent crystals of staurolite. Also see Mount Washington, Berkshire County Mineral Localities. Marble Quarry (with Chalcopyrite, Phlogopite, Pyrite, Brown Tourmaline) (95(42°08'33",73°22'49")65). Chalcopyrite, Galena, Sphalerite, Rutile (118,119(locality uncertain)126,p.268-269)--In the limestone of West Sheffield. Some chalcopyrite, traces of galena, sphalerite, Rutile in crystals 1-3 inches long. Marble Quarries (95(42°09'05",73°23'02") (42°08'16",73°22'36")114)(118(42°06'41",73°24'04")(area of 42°06'59", 73°23'13")124)(119(42°07'07",73°21'49")(42°04'55",73°21'54")(42°03'00", 73°20'09"--Cathole Quarry)114). Across State line in North Canaan, Connecticut--(119(42°02'43",73°18'49")(42°02'20",73°18'18")(42°01'34", 73°17'24")(42°01'25",73°17'38")(42°01'22",73°17'51")(42°01'07",73°18' 52")(42°00'35",73°18'56")(42°01'35",73°19'07")(42°00'58",73°18'27") (42°00'54",73°17'10"). Marble Quarry (with Chalcopyrite, Pyrite, Phlogopite, Tremolite, Diopside)--Across State line in North Canaan, Connecticut (119(42°00'20",73°19'40")65). Tremolite Limestone with Quartz Veins (119(see description)241,map)--Extends in a southerly direction beginning at around (42°05'00",73°21'32") and continuing through (42°04'03",73°21'20")(42°03'49",73°21'23") and ending around (42°03'24",73°21'01"). Begins again across the State line in North Canaan, Connecticut at (42°01'47",73°20'42") and continues 4.1 miles south to a point 2 miles outside the Ashley Falls Quadrangle and ends there at Maltby's Quarry. Salite in Dolomite--To the east of this line of tremolite limestone is the Canaan Dolomite which contains salite crystals. Iron Ore (Limonite) Mines (with Pyrolusite) (118(see description)124,123,89,239,137,p.57) (42°05'01",73°24'37")--Little's or Spurr Prospect. Across State line in Salisbury, Connecticut-- (42°02'16",73°25'56")--Camp's, (42°00'54",73°26'22")--Scoville, (42°00'42",73°26'11")--Partial Opening, (42°00'17",73°26'23")--Clarke. The ore at Scoville is mostly pyrolusite, and accompanied sparingly by the mineral Scovillite (cerium-yttrium hydrous phosphate). Some form of zinc in the iron ore at Salisbury; forms a precipitate of zinc oxide on the inside of the furnace chimney. Specific mine not stated and there are other limonite pits further to the south, outside

the quadrangle. Opal, Rhodonite, Wad (95,96,118,119(locality unknown) 280). Porcelin Clay (119(Canaan, Connecticut)233,p.36)--large quantities; locality not specified.

STOCKBRIDGE: Galena (74(south part of Stockbridge)232,p.127) Limonite (74(0.5 kilometer south of Interlaken)371,484,232,p.126) Dolomite Quarry (74(42°19'41",73°17'21")114,131). Marl (74(locality uncertain) 232,p.53)--Bed 2½ feet thick, northwest part of Stockbridge, land of Mr. Burke (1838). Chlorite Schist Boulder Train (74(see Richmond, Berkshire County Mineral Localities)49). Phyllite Quarry (74(42°15' 59",73°22'12")375,p.64)

TYRINGHAM: Ilmenite with Smoky Quartz (97(42°14'36",73°12'41"--Cobble Hill)65). Graphite, Tourmaline-Biotite Pegmatite (97(42°14' 45",73°14'57"--Sky Hill)161,p.101). Allanite (97,75(locality uncertain) 161,p.103)--Opposite D. Clark's house (1899). Iron Ore (Limonite) (97(south part of Tyringham)161,p.112,232,p.126) Magnetite--see Lee, Berkshire County Mineral Localities. Salite, Sphaerostilbite, Jeffersite, Scolecite, Titanite, Heulandite, Laumontite, Kaolin, Pyroxene, Hornblende, Pink Calcite, Orthoclase, Microcline, Biotite, Phlogopite, Actinolite, Quartz Pseudomorphs after Albite and Pyroxene (97,75?(Hop Brook Valley, Sodom (42°12'54",73°10'00")161,p.106,p.111-113, p.117-118,p.124,p.126) Chalcedony, Jasper, Pyroxene (Salite?) (97,75 (locality uncertain)195)--Chalcedony-mammilary form. Jasper--outcrop or vein of yellow-brown color. Pyroxene--white, compact, fibrous form affording imperfect cat's eyes when cut as a cabochon. Washington Blue Quartz Gneiss (96(42°14'50",73°15'02")97(42°14'41",73°14'29"--knob east of Sky Hill)375,161,p.34)

WASHINGTON: Blue Quartz (53(area of 42°24'03",73°10'44")157,p.33)--Blue quartz gneiss; northwest corner of Washington. Weathered Quartzite (75(area of 42°22'08",73°10'04"--Sandwash Reservoir)(42°21'48", 73°08'47"--water-filled pit) and (53(area of 42°23'33",73°12'22"--water-filled pit?)10,p.79,121,map)--Dug as glass sands south of Ashley Lake, in the middle of Washington. Quartzite is everywhere characterized by fine tourmaline needles and generally muscovite in greater or less degree. Graphite Mine (54(just east of Muddy Pond--area of 42°23'12",73°06'36")161,p.27-29)--The mine contains very coarse calcite, graphite in broad hexagonal plates, coarse white salite, coarse green pyroxene, brown sphene, pericline, adularia, and garnets, followed paragenetically by coarse calcite with phlogopite, and this by quartz. This has been opened 6 rods along the strike and a shaft sunk 25 feet.

WEST STOCKBRIDGE: Galena (73(south part of West Stockbridge)232,p.127-128) Iron Ore (Limonite) Mines (with Pyrolusite, Siderite) (73(see description)89,154,153,p.335-342,484,348,p.564,372,371) Goodrich Mine--(42°20'25",73°23'26") Leet Mine--(42°20'19",73°23'38") Moffat Mine--(42°20'17",73°23'27") Hudson (Chauncey Leet) Mine--(42°20'06",73°23'45") Potter (Pomeroy) Mine--(42°19'46",73°23'52") Maple Hill Prospect--(42°19'25",73°23'39"). Lee and Hudson Mines filled by water, resulting ponds have names switched on the topographic map. Moffat mine shaft filled and nearly obliterated in 1945. Bradley pit is immediately to the east of the Leet mine and also filled with water. Siderite reportedly found in small quantities in the main part of the Leet mine and in considerable quantities in the Bradley pit. Exposure of low

grade iron ore mixed with schist on the east side of the Bradley pit. Only exposure of iron ore in place in Massachusetts seen by N.E. Chute (ref. 89). Chlorite Schist Boulder Train (73(see Richmond, Berkshire County Mineral Localities)49). Marble Quarries (73(42°19'08",73°22'32")(43°18'57",73°22'42")(42°18'36",73°22'48")~~114,131~~)74(42°20'29",73°21'54")(42°20'21",73°22'03")(42°20'10",73°21'53")(42°19'56",73°22'13")(42°19'52",73°21'48")(42°19'17",73°22'22")(42°18'54",73°22'27")(42°17'42",73°22'27"--Frodley's Quarry)114,131,128,p.49,225) Marl (73,74(various parts of West Stockbridge)19,p.53) French Cave (73(42°15'50",73°23'24"--near Williamsville)topographic map) Calcite, Pyrite, Marble (73(area of 42°17'39",73°22'33"--tunnels (New England Lime Plant)225) Toby Miller Limestone Quarry (73,74 (locality unknown)375)

WILLIAMSTOWN: Jasper (8,7(locality unknown)195)--Brown, red, black and striped pebbles. (Probably found along Hoosac River Valley.) Galena (8,7(locality unknown)137,p.57)--Small amounts. (Probably traces in limestone.) Iron Ore (Limonite) Pit (8(42°40'47",73°11'38")121) Marble Quarries (8(area of 42°40'37",73°11'02")114)--Two quarries about 850 feet apart in a northeasterly direction. Quarry (8(area of 42°42'12",73°13'23")97,p.9)

WILLIAMSVILLE--see West Stockbridge, Berkshire County Mineral Localities.

WINDSOR: Pyrite Mine (32(area of 42°31'48",73°01'13"--Windsor Bush) 473,p.34,Pearre--see General Reference)--Property opened in 1903. Deposit 17 feet thick. Rutile, Calcite, Chlorite (114(locality uncertain)383)--Small, dark red rutile crystals in white calcite on dark green chlorite. Calcite fluoresces pale red (shortwave). On road (Route 9) from West Cummington (Hampshire County) to Savoy (Berkshire County) in the town of Windsor. Rutile (55,54(locality uncertain)161, p.121,164,p.143)--Occurs with interlaminated or veins of feldspar (graphic granite) in chlorite schist. Near the most eastern soapstone quarry. Ultramafic Body (55(42°29'39",72°59'01")214,214,63?)--Predominately greenish-gray talc-carbonate rock containing lesser amounts of light greenish-gray steatite (talc and rock) and dark greenish-gray serpentine. Talc Mine with Chalcopyrite, Actinolite, Chlorite, Calcite (55(42°29'39",72°59'01"(?)65)--Located just over the line from the town of West Cummington. Talc Mine with Ferroan Magnesite (33(42°31'03",72°58'56")326,326,85)--The old workings consist of a steeply inclined shaft about 170 feet down, and one drift about 150 feet long extending south from the bottom of the shaft. The known production was one carload of talc that was considered to be of poor color. Chromite (55,33(locality uncertain)164,p.54)--In the east part of Windsor, near the soapstone quarry, in serpentine. Soapstone, Chlorite (54(42°29'18", 73°06'37"--Wahconah Falls)161,p.100)--A large amount of soapstone has been opened west of the old quarry and good, soft, slaty soapstone obtained. Along the same bed, a mile southwest, some work has been done on the hard, green, massive chlorite associated with the serpentine. Also see Hinsdale, Dalton (Berkshire County). Blue Quartz, Chalcedony with Jasper (32,33,54,55(locality uncertain)195)--Blue quartz in crystalline masses of good color. Chalcedony associated with jasper in rounded masses.

ZYLONITE--see Adams, Berkshire County Mineral Localities

BERKSHIRE COUNTY FOSSIL LOCALITIES

BERKSHIRE COUNTY (GENERAL): Scolithus (--(see description)118)--Cambrian (Cheshire) Quartzite boulders with annelid borings (Scolithus). Found as glacial erratics throughout the county. Found in situ ½ mile southeast of East Arlington, Vermont.

ALFORD: Across State line in Austerlitz, Columbia County, New York. Pelmatozoan Remains, Bryozoa, Algae (73(42°16'28",73°29'47")372)--Also see West Stockbridge.

CLARKSBURG: Trilobite (8(42°43'37",73°09'48"--(East Mountain, Clarksburg State Forest)365,p.10,121,p.415,464,p.236,285,map,364)--Casts of Olenullus--black slate layer in Cheshire Quartzite 100 feet above contact with Stamford Granite Gneiss.

HANCOCK: Rugose Corals, Fragmentary Brachiopods, Bryozoa, Crinoid Stems and Gastropods in Limestone (52(42°25'20",73°20'58")494)--By the gate to the Berkshire Downs Race Track. Crinoid Stems, Gastropods, Sponges in Limestone--Across State line in Stephentown, New York (30(area of 42°36'15",73°21'14")464,map)

NEW ASHFORD: Crinoid Stems in Limestone (31,30,8,7(locality uncertain --Quarry Hill)365,p.182)

RICHMOND: Crinoid Stems, Bryozoa, Gastropods, Corals, Sponges in Limestone--Across State line in Canaan, New York (51(42°25'18",73°26'48"--Railroad Tunnel)(area of 42°24'51",73°26'30")(area of 42°24'13",73°28'17")(area of 42°25'32",73°26'20")122,p.244-245,180,p.248-250,121,p.410-411,map)--The fossils have been collected from a cut along the railroad and the railroad tunnel and from ledges of limestone ½ mile south of the railroad (topographic map 73) in thick woods and a mile north of it. Also on the farm of E.S. Hall (1886) two miles east of Canaan Center (or 2 miles northeast of the tunnel). Narrow fossiliferous belt crosses the western roof of the tunnel. Sponges, Gastropods in Limestone (73(area of 42°22'26",73°25'45")464,map).

WEST STOCKBRIDGE: Crinoid Stems, Bryozoa, Gastropods, Corals, Sponges in Limestone--Across State line in Austerlitz, Columbia County, New York. (73(42°18'36",73°28'12")121,map) Conodonts, Bryozoa, Algae (73(42°20'50",73°27'51")372)--Also see Alford, Berkshire County.

WILLIAMSTOWN: Gastropods in Limestone (8(mouth of Hopper Brook--area of 42°39'55",73°12'37")(foot of Mount Prospect--area of 42°39'08",73°11'17"). Across State line in Pownal, Vermont (Just north of (8(42°45'07",73°12'37")464,p.237,map,365,p.163).

BRISTOL COUNTY MINERAL LOCALITIES

ASCUSHNET: Prehnite in Basalt? (164(41°40'26",70°54'20")65)--Bluestone Quarry.

ATTLEBORO: Copper Ore (145(locality unknown)306,p.129) Limestone in Red Slate (145(area of 41°54'19",71°21'53")420,p.149,233,map). Minerals --across State line in Cumberland, Rhode Island--see Wrentham, Norfolk County Mineral Localities.

BERKLEY: Coal (155(locality unknown)420,229,p.205,229)

DARTMOUTH: Granite Quarries (163(area of 41°38'17",71°01'57")116,65)--Alfred Denault Quarry just west of the Dartmouth Quarry. Both are in very light buff-gray gneissoid biotite-muscovite granite. Smoky quartz. Rutile (174(area of 41°33'54",71°00'26")383). Pyrite in Slate (163, 164(locality uncertain)383)--about 6 miles north of the village, west side of Acushnet River. Limonite (Bog Iron Ore) (175(area of 41°35'00", 70°59'27")233,map,232). Peat and Loam (137,147(Hockomock Swamp)212,p.D63) --See Taunton, Bristol County. Colonial Iron Works (174(area of 41°34' 19",71°00'21"--Russells Mills)314,vol.2,p.VI-10)

EASTON: Peat and Loam (137,147(Hockomock Swamp)212,D63)--see Taunton, Bristol County. Limonite (Bog Iron Ore) (137(area of 42°01'33",71°07' 30")233,map)

FAIRHAVEN: Agate, Chalcedony (164,165(locality uncertain)189)--see Plymouth County (General). Also see Fossil Section--Middleboro-Plympton, Plymouth County. Limonite (Bog Iron Ore) (165(area of 41° 39'30",70°51'11")233,map)

FALL RIVER: Granite Quarries (162(see description)116,65)--all quarries covered over? Beattie and Wilcox Quarry (41°41'00",71°07'53")--two types of granite: (1) medium pinkish-gray gneissoid biotite granite and (2) light buff-gray biotite gneiss. Calcite, chlorite, epidote, muscovite, sphene, garnet. Stinziano Quarry (41°42'10",71°08'01")--Granite similar to the previous. Corner of Locust and Oak Grove Avenues. Covered over. Savoie Quarry (41°41'37",71°08'09")--on Beauregard Street. Sears Quarry (41°42'09",71°08'20")--"granite" resembles buff-gray biotite gneiss found in the Beattie and Wilcox Quarry. Ross Quarry (at head of Barlow Street, near Watuppa Pond)--The granite here differs from the other Fall River gray granites in the absence of the large black micas (biotite). Unamed Granite Quarry?--Across State line in Tiverton, Rhode Island (41°41'46",71°08'34") Graphite (162,163(locality uncertain)348,p.153)--in metamorphosed carbonaceous bedded deposits. Limonite (Bog Iron Ore) (163(area of 41°40'51",71°05'23")233,map).

FREETOWN: Granite? Quarry (155(41°45'47",71°05'21")topographic map) Limonite (Bog Iron Ore) (155,156,163,164(area of 41°45'00",71°00'00") 233,map) Quarry (156(41°46'50",70°57'33")topographic map)

MANSFIELD: Coal Mines (--(see description)90,314,vol.2,p.xll-8 to p.xll-9, plate 40,18,420,229,233,map). Tremont Mine (135(42°00'45", 71°15'33") Sawyer Mine (135(42°00'32",71°15'10") Harden Mine (136

(42°00'26",71°14'51") Old Harden Mine (136(42°00'57",71°12'48") Unnamed Coal Mine (136(Grove's Lane)197,plate XVI)

NEW BEDFORD: Sullivan Granite Quarries (164(locality uncertain)116, p.253)--light pinkish-gray biotite-muscovite granite gneiss. Near Rockdale, two miles northwest of New Bedford. Minerals: garnet, magnetite, fluorite, apatite, zircon, kaolin, epidote, chlorite, limonite. Tourmaline in Gneiss (164,175(41°37'30",70°54'39"--Palmer Island)383) --not very good specimens. Garnet in Granite (164(41°38'27",70°54'56" --Pope's Island)383)--vary in size from large pea to smallest grains. Also Marsh Island (locality unknown). Colonial Metallurgical Industry (164,175(locality unknown)64)

NORTON: Colonial Metallurgical Industry (146(locality unknown)64, 314,vol.2,p.VI-13)

RAYNHAM: Coal (147(locality unknown)229)--An outcrop of coal appears in this town, about three feet (thick?), which has not been explored, except a few feet (1853). Strikes N50°E, dips 45°SE. Limonite (Bog Iron Ore) (147(locality unknown)390,p.328) Peat and Loam (147(Hockomock Swamp)212, p.D63)--See Taunton, Bristol County.

SEEKONK: Limonite (Bog Iron Ore) (153(locality uncertain)383)--On the left of the middle road (Route 114A?), 5 miles from Providence to Warren. On Dr. Hutchin's farm, also on the farm called the Peak place, south adjoining. and on Mr. Peter Wheaton's land, abundant. (Locality names as of 1825). Paracolumbite, Quartz Crystals (153(locality unknown)65)

SOMERSET: Beattie Granite Quarry (162(1½ miles west of the old steamboat wharf in Fall River (wharf?--41°42'44",71°09'32")116)--granite similar to that in Beattie and Wilcox Quarry--see Fall River, Bristol County.

TAUNTON: Sandstone Quarries (147(41°53'26",71°03'56")(41°53'01",71°04'16")(41°55'26",71°07'15")212,p.D5,D 63,map)--The first locality has drusy quartz and epidote present on fracture planes in the rock. A number of bedrock outcrops are note on the map of the reference. This is noteworthy for this area because of the paucity of bedrock exposures due to the great amount of surficial material. The third locality was reopened in 1955 (probably not worked now) and was used as aggregate in concrete. In the past it was used for railroad ballast and perhaps as a building stone. Clay Pits (147(see description)212,p.D64)--Varved clay and laminated sand and silt have been used as brick clay in several parts of the area. The Stiles and Hart clay pit, just north of Weir Village (41°53'21",71°04'52") is in varved clay overlain by 3 to 12 feet of sand and gravel. Apparently the area north and east of the present pits has been worked since colonial times. The old workings were shallow, probably because of the high water table, and covered the area south and west of County and Linden Streets. An abandoned clay pit, in which the material is mostly laminated sand and silt with minor amounts of clay, is located east of Williams Street along the Taunton River. Also--another abandoned clay pit (41°54'45",71°04'33"). The clay in many of the lacustrine deposits in the southern part of the quadrangle is suitable for brickmaking but is not being utilized at present

Peat and Loam (147(Hockomock Swamp)212,p.D63)--Peat was reportedly obtained from parts of the Hockomock Swamp in the latter part of the last century, but records of individual enterprises have not been found. The eolian material, oxidized and mixed with humus near the surface, forms an excellent loam. The loan is stripped from the fields and spread around new homes for growing lawns. Also see Bridgewater, West Bridgewater, Plymouth County. Colonial Metallurgical Industry (147(locality unknown)64). "Lead" Pencil Industry (147(locality unknown)336)--Graphite from Tantusques mine. See Sturbridge, Worcester County. Paracolumbite (147(locality unknown)65) Coal (146,147(localities uncertain)314,vol.2,p.xll-9,96,382)--Four hundred feet north of Danforth Street, bed of coal cut in sewer excavation. Some 500 feet northeast of this point is an old shaft from which a small production of coal was mined in the early 1800's. Two miles northwest of town, water well--traces of coal from digging. Four miles northwest of town, similar indications. Limonite (Bog Iron Ore) (146,147(locality unknown) 390,p.328).

BRISTOL COUNTY FOSSIL LOCALITIES

ATTLEBORO: Scolithus (worm burrows), Plant Fossils (146(41°55'21", 71°14'23")420,p.178)--Old quarry in knob of gray Carboniferous sandstone. Flattened stems of plants, traces of coal in 20 foot thick sandstone. Also 12 foot thick black argillite with Scolithus. Brachiopods (145,146(locality unknown)199,p.608)--Pebbles bearing Lingula in the conglomerate near Attleboro, and various points eastward and southward. Three species of linguoloid shells. Fossil Footprints (145(1½ miles southwest of the railroad station)289)--On slab of dark micaceous shale in quarry. Scolithus (145(area of 41°55'54",71°17'35")420,p.177) --in red sandstone. On land of Mr. Joseph Fisher (1899), Thatcher Road. Fossil Plants (145(41°56'08",71°21'00")270)--in red shale. Road cut along Route U.S. 1, South Attleboro. List of Fossil Plants (145(South Attleboro)173,270) Fossil Footprints (145(west of South Attleboro)479).

BERKLEY: Fossil Plants in Coal (155(locality unknown)229,420,229,p.205)

DIGHTON: Fossil Plants (154(area of 41°52'14",71°11'39")512)

FALL RIVER: Brachiopod (Lingula) and Scolithus (155,162,163(locality uncertain)461,Part I,p.469,p.613,199,p.608,109,p.417,385)--in pebbles. North of Fall River. Also siliceous slate boulders on beach, river banks.

MANSFIELD: Fossil Plants at Coal Mines--see Mineral Section for localities. Also glacial erratics. Fossil Plants (146(area of 41°59' 08",71°14'31")420)--1½ miles southeast of West Mansfield (railroad) station, in the road (Elm Street) on the west side of Hodges Brook--red slates in the drift south of this point (extending into Norton) afford plainly marked flattened impressions of Calamites. List of Fossil Plants--Reference 388,p.64

NORTH ATTLEBORO: Carbonaceous Casts of Calamites (145(area of 41° 58'45",71°19'40"--158 Elm Street)420,plate 3)--Outcrop of red Carboniferous shale with conglomerate bands, the former carrying plant fossils.

Trilobites,Pteropods, Brachiopods (145(see description)420,p.386-393, 147,95,157,p.36-37,173,p.7,p.12,p.14-15,p.17,map,461,p.259,179,416, 431,450)--Area first described by Foerste (ref. 420). Most of his locality I is flooded by the Hoppin Hill Reservoir with the possible exception of a small island (41°58'02",71°20'46") with exposures of red limestone and green shale (ref. 173,p.14-15,map). Foerste's locality II is north of the railroad tracks (41°58'15",71°20'48")(ref.173,p.17, map). Reference 147 (map) shows another another fossil locality approximately 260 feet southeast of this locality, on the other side of the railroad tracks. Reference 173 (p.7) also states that "Another locality on the other side of Hoppin Hill, a mile west of the outcrops north of the railroad tracks produced similar fossils". Most of the fossils collected by Foerste came from the red beds exposed north of the new reservoir.

NORTON: Fossil Plants in Glacial Erratics--See Mansfield, Bristol County.

PERRINS: A number of the older references refer to Perrins, Massachusetts as a Plant Fossil locality. It is thought that this area is now Perrins Crossing in Seekonk. (145(41°53'13",71°19'25").

SEEKONK: Fossil Plants (145(area of 41°53'47",71°18'50")420,p.169)--Between Perrins (Perrins Crossing?) and East Junction, in the cut on the railroad to Fox Point (1899--not shown on current topographic map) is an anticlinal exposure of the lowest beds seen in Seekonk. In shales. Fronds. List of Plant Fossils for Perrins--references 270,388,p.64. Fossil Plants--Across State line in East Providence, Rhode Island (153(area of (41°47'47",71°21'17")(41°47'53",71°20'49")(41°47'27", 71°20'56")228,map). Fossil Footprints (145(Perrins)479).

TAUNTON: Lingulus, Scolithus (147(locality unknown)109,p.417)--pebbles in conglomerate. Coal Mine (147(locality unknown)420).

DUKES COUNTY MINERAL LOCALITIES

CUTTYHUNK ISLAND: Epidote, Jasper (181(on beaches)195)--Epidote-massive, compact material of cabochon quality; as veins in gneiss, and as pebbles. Jasper--dark red pebbles.

ELIZABETH ISLAND, NAUSHON ISLAND: Clay, Ferruginous Concretions, Lignite (182,177(locality unknown)242,p.26)--see Martha's Vineyard, Gay Head--Fossil Section. Blue Clay (182,177(locality uncertain)421, p.984)--Two localities of limited exposure on south shore.

ELIZABETH ISLANDS, NONAMESSET ISLAND: Cretaceous Lignite, Miocene Greensand (Glauconite), Plastic and Lignitic Clay (177(south shore) 492,244,186). Dark Mineral Accumulation (177(41°30'23",70°42'05")456).

ELIZABETH ISLANDS, PENIKESE ISLAND: Clay (181(see description)495, p.433)--A ridge or dome of yellow-brown clay, at least 25 feet thick, is exposed at the base of a cliff on the western side of the island.

MARTHA'S VINEYARD, CHILMARK: Clay (185,182,186,183(see description) 418,p.356,421,p.977-978)--Reference 418 states that "A large number of borings have been made by Messrs Fiske and Coleman in the towns of Chilmark and Tisbury. It appears from these trials that the clays, especially those of a white color, are of rather better quality in that part of the island which lies directly east of Menemsha Pond (185(pond in area of 41°20'13",70°46'34") than in the Gay Head peninsula." Reference 421 states that "Horizontal deposits of rather ferruginous stratified clays and clayey sands form a well-defined terrace along the northern coast of Martha's Vineyard, being recognizable as far west as Gay Head. Their marked horizontality is strongly contrasted with the dislocated attitude of the beds in the outcrops of the older folded series which appear at intervals along the shore. The beds are particularly well exhibited in Chilmark and West Tisbury." Porcelain Clay (185,186,182,183(locality unknown)233,p.36)--a large proportion of mica is mixed with it. Brickyard (182,185(area of 41°22' 30",70°44'34"--Roaring Brook)8,p.1001)--found difficulty in producing products of satisfactory quality. Poor type of clay. Dark Mineral Accumulation (185(41°19'13",70°45'47"--Nashaquitsa Cliffs)265,418)--The heavy minerals are dominantly garnet, staurolite, magnetite, and ilmenite. The percentage of quartz, feldspar, and other light minerals varies, with the sample from 5 to 11 percent of the total weight. A semiquantitative spectrographic analysis on a small sample of the beach sand shows that the composition is relatively high in the rare-earth elements cerium and yttrium, and in vanadium, zirconium, and titanium. Unusual minerals present are magnetite and maghemite spherules (maximum 3 grains per million), blue corundum (sapphire)(average 25 grains per million), red corundum (ruby)(average 75 grains per million), gahnite (average 250 grains per million), gold (maximum 5 grains per million), native copper (with paratacumite, gerhardrite)(2 grains noted). Variegated Clay (185(41°19'13",70°45'47"--Nashaquitsa Cliffs)(41°20'04", 70°44'23"--Wiquobsque Cliffs)242,p.26) Ventifacts (185(area of 41°18'09", 70°46'45"--Squibnocket)132)

MARTHA'S VINEYARD, GAY HEAD: Minerals (185(area of 41°21'00",70°50'10"--Gay Head Cliff)418,p.229-330,382,415,p.357,195,396,262,266)--Varicolored clay, lignite, calcium phosphate (apatite?) nodules, marcasite nodules, selenite crystals, amber (small yellow gem masses), glauconite (greensand), pisolitic bauxite. Three bauxite pebbles found at Gay Head, one found in the interior of Martha's Vineyard (locality not stated). Also meteoric glass (tektite) found here. Also see Fossil Section. Collecting is currently prohibited in this area.

MARTHA'S VINEYARD, MATAKESET CREEK: Ventifacts (--(locality unknown)132)

MARTHA'S VINEYARD, TISBURY: Clay (183(locality unknown)418,p.356)--see Chilmark, Dukes County. Dark Mineral Accumulation (183(see description)418)--magnetite, ilmenite. On beaches from Vineyard Haven (41°27'43",70°36'03") to West Chop lighthouse (41°28'50",70°36'07").

MARTHA'S VINEYARD, WEST TISBURY: Ventifacts (183(41°24'20",70°40'29"--North Tisbury)132) Clay (183,186(locality unknown)421,p.977-978)--see Chilmark.

DUKES COUNTY FOSSIL LOCALITIES

MARTHA'S VINEYARD (GENERAL): Lower Ordovician Brachiopods (183,182(locality unknown)461,part I,p.464,p.613,plate 42(figures 2,2a-d)--in limestone pebbles on the north shore. Scolithus (worm burrows) (--(locality unknown)199,p.608)--in quartzite pebbles.

MARTHA'S VINEYARD, CHAPPAQUIDDICK ISLAND: Flora and Molluscs (184(locality unknown)157,p.133,73,243,plate 41). Eocene molluscs in ferruginous concretions in glacial drift. Cretaceous plants in ferruginous shaly erratics. Cretaceous Molluscs and Gastropods (184(southern part of the island)414)--single specimen in sandstone erratic.

MARTHA'S VINEYARD, CHILMARK: Cretaceous Plant Fossils (185(41°19'13",70°45'47"--Nashaquitsa Cliffs)242,p.26)--in clay nodules. Miocene and Cretaceous Invertebrate Fossils, Miocene Shark's Teeth and Fish Vertebrae (185(41°19'13",70°45'47"--Nashaquitsa Cliffs)(41°43'53",70°43'54"--Cape Higgon)492)--Fossils at Cape Higgon in red sandstone erratics.

MARTHA'S VINEYARD, GAY HEAD: Numerous Fossils (185(area of 41°21'00",70°50'10"--Gay Head Cliffs)418,p.229-330,415,157,p.132-134,488,231,242,p.26,113,389,492,489,488,119,407)--Lower Cretaceous leaf impressions found in arkosic sandstone cobbles on the beach, most common fossil found. See reference 242. Upper Cretaceous invertebrate fossil molds. Miocene forams, molluscs, whale bones, walrus tusk, horse bone, crabs, shark's teeth. Pleistocene rhinoceras tooth, camel bone. Also wood, gastroliths. Also see Mineral Section. Collecting currently not permitted.

MARTHA'S VINEYARD, HIGHLAND BLUFF: Cretaceous Invertebrate Fossils (--(locality unknown)492)

MARTHA'S VINEYARD, OAK BLUFFS: Cretaceous Invertebrate Fossils in Sandstone Erratics (184(41°27'19",70°34'52"--East shore of Lagoon Pond)414,492)

MARTHA'S VINEYARD, WEST TISBURY: Cretaceous Invertebrate Fossils in Sandstone (183(area of 41°25'43",70°42'08"--Cedar Tree Neck)(area of 41°24'54",70°40'38"--North Tisbury)(41°25'46",70°40'41"--Indian Hill) 414,492)--The most abundant fossil is Exogyra (oyster). The first locality shows "traces" of fossils. The most important locality is the second. This locality is a small area with a north--south extent of 200 feet and an east-west extent of 300 feet. The third locality is a red mound near Indian Hill.

NO MAN'S LAND ISLAND: Peat (185(area of 41°15'03",70°49'00")46)--note: This area is currently a Naval Gunnery Range.

ESSEX COUNTY MINERAL LOCALITIES

ESSEX COUNTY (GENERAL): Halite (--(locality uncertain)406,p.233)--found as incrustations and in acicular crystals on rocks and the borders of tide pools at the sea shore.

AMESBURY: Quarry (5(42°51'59",70°55'32")80)--formerly supplied crushed porphyritic gneiss. Semiprecious Stones, Galena "Mine" Hole (5(area of 42°51'57",70°56'18"--Powwow Hill)94,p.9)--stated to have existed when the first Englishmen came. The Indians said that it was made by French trappers and voyageurs. John Pettingill Mine (5(locality unknown)406,p.233) --sphalerite, arsenopyrite (occurs in thin sheets or veins). Lead-Silver Prospect (5(42°51'07",70°54'36")406,map) Galena, Chalcopyrite, Pyrite (5 (locality uncertain)401)--in the band of phyllite west of Lake Gardner. (Lake Gardner--area of 42°51'54",70°56'37").

ANDOVER: Steatite (24,25(locality unknown)231,p.157,232,p.36,106,p.125-126,232,p.136-137)--in hornblende gneiss. Strike northeast, steep dip. Bed not less than 50 feet thick; quarry. Large boulders of this rock are scattered over a considerable space around the quarry, in an east and west direction...East part of Andover, 4 miles from the Theological Seminary (Andover Prep?). Manganapatite, Beryl, Pyrite, Tourmaline (24(42° 38'03",71°10'53")65)--roadcut on Route 93 (side of road not known). Pegmatite Granite (48(42°36'18",71°06'18")(42°31'50",71°06'53")(42°37'12", 71°07'17")(42°36'19",71°06'58")(42°36'36",71°05'34")(42°36'50",71°05'40") (42°37'08",71°05'40")(42°37'14",71°06'31")80)--first 2 localities have an approximate northeast--southwest length of ½ mile; the third locality covers an area of 0.12 square mile and extends off the quadrangle. The next 3 localities cover a smaller area and the last 2 localities are small dikes. Quarry (48(42°37'03",71°05'28")80) Muscovite Pegmatites (48,24 (locality unknown)80,p.536-537)--pegmatites handpicked for mica during World War II. Triphylite Pegmatite (and other Pegmatites) (48(42°36'15", 71°07'16")205,206)--triphylite (altered masses in quartz), ferrosicklerite (after triphylite), heterosite (after triphylite), diadochite (in cavities left by triphylite), sphalerite, columbite, green apatite (in albite), beryl in quartz and feldspar. In other pegmatites: albite, ilmenite, pyroxene, amphibole, allanite and pyrrhotite in smoky quartz. Also epidote alterations on diorite. In roadcut, southeast part of cloverleaf intersection of Routes 125 and 28. Almandine Garnet, Lepidolite (48,24 (locality unknown)4206,p.241)--Garnet abundant in biotite-muscovite granite. Lepidolite in mica schist. Lepidolite (24(area of 42°37'36",71°09'37" --Ballardvale)406,p.241)--in mica schist. Pegmatite (24,47(42°37'30",71° 10'42"--roadcut at intersection of Route 93 and Dascomb Road)65)--manganoapatite, autunite, beryl, biotite, quartz crystals, tourmaline, bertrandite pseudomorphs after green beryl, uranophane. Beryl, Lepidolite (24 (42°38'08",71°09'05"--Pomps Pond)205)--piece found in glacial drift. Garnet in Pegmatite (48(area of 42°36'29",71°07'24")206)--found between north and south lanes of Route 28 with a telephone pole on top of the rocks. Pyrite (24(area of 42°39'52",71°08'47")206)--road cut on the east side of Route 28 (North Main Street) about 200 yards north of Osgood Street. Apatite, Autunite, Uranophane (24(see description)206)--dump 200 to 300 feet south of Tewksbury Street.

BEVERLY: Fluorite, Amazonite, Zircon Crystals (49,50(Town Common)383) --veins in syenite. Columbite, Cassiterite? (49,50(locality unknown) 435,348,p.785) Aegerite, Cancrinite, Hornblende, Nepheline, Zircon

(49,50(see description)65,406)--found in exposures of narrow belt of syenite along coast from Salem Neck (Salem) to Gale's Point in Manchester (Essex County). Quarries (50(42°33'18",70°52'10")(42°34'16",70°48'00") topographic map) Chalcedony (49,50(area of 42°33'26",70°52'30"--Prospect Hill)196) Polymignite (49,50(locality unknown)348,p.766,406,p.237) Pyrrhotite, Pentlandite (49,50(locality uncertain)406,p.233)--small vein exposed in the augite syenite at Poorhouse Hill. Amazonstone (49(42°32'57",70°52'35"--Briscoe Hill)406,p.245) Jeffersite (49,50(locality uncertain)406,p.246)--northwest side of Powder House hill. Diopside?, Brown Augite? (49,50(area of 42°33'02",70°51'09")406,p.238)--microscopic crystals in augite nepheline syenite. Pickman Estate (1905), Beverly Cove. Opal (variety Siliceous Sinter) (49,50(locality unknown)406,p.237)--found as segregated, granular, stalactitic masses at the contact of the augite syenite and granite. Turgite (Red Ochre) (50(area of 42°33'53",70°48'37")406,p.234)--hillside northwest of the old meetinghouse (1905). Micrographic Granite (49,50(locality uncertain--Coy's Pond)471) Bronzite (50(area of 42°32'55",70°47'58"--Great Misery Island)(Salem City)(42°32'41",70°47'53"--Little Misery Island (Salem City)406)--in coarse pegmatitic masses.

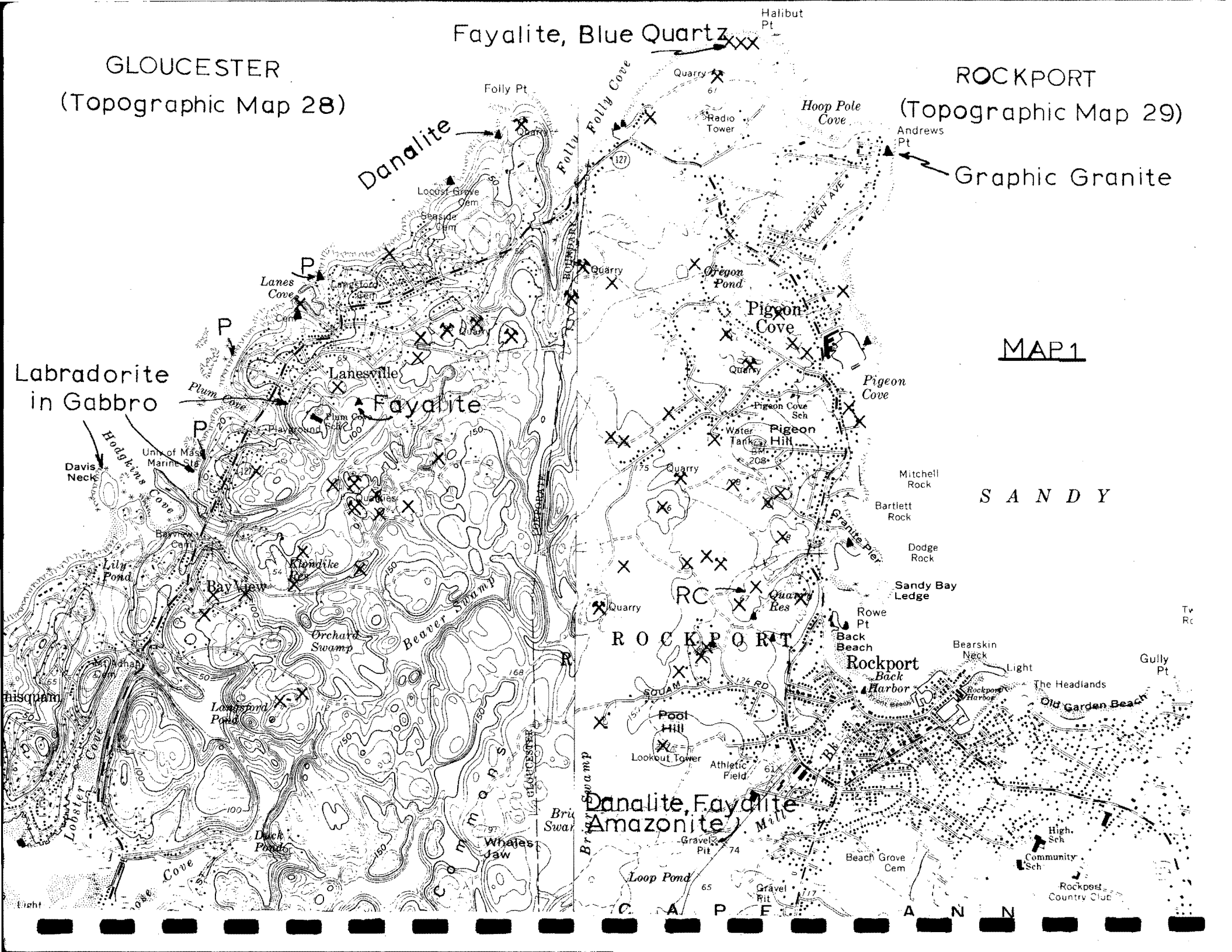
BOXFORD: Limestone (26(area of 42°41'00",70°59'52"--Steven's Pond)406,p.246,106,p.125)--Jeffersite in old lime pit near Steven's Pond. See Bolton, Worcester County for list of associated minerals. Opal (variety: Tripolite (Infusorial Earth) (25(area of 42°42'27",71°03'53"--West Boxford)--At West Boxford, beds occur 2 or more feet in thickness. Pyrite (25,26(locality unknown)53,p.233)--in large masses near the Harriman Mine. Colonial Iron Works (25,26(locality unknown)314,vol.2,p.VI-13) Andalusite (25(42°42'23",71°01'43")(42°42'55",71°03'58")81,p.B106,map)--2nd locality near Silver Mine Road.

DANVERS: Opal (variety: Tripolite (Infusorial Earth) (49(locality unknown)406,p.237)--Found in beds of brooks and meadows in Danvers. Clay Pits (49(42°33'39",70°55'31"--Edward Carr Clay Pit (see Fossil Section)(42°33'24",70°56'18"--Peabody Pottery Clay Pit)406,map)--9 other abandoned clay pits in this area. See reference 406, figure 193 (sketch map). Specularite, Calcite, Wad (Bog Manganese) (49(area of 42°35'10",70°56'16"--Putnamville)406,p.234,p.237,p.249)--Specularite in amphibolite. Calcite in rhombic crystals in amphibolite gneiss. Wad in large masses in a meadow and brook.

ESSEX: Acmite (27(locality unknown)406,p.238)--small acicular crystals in the augite syenite at Powder House Hill. Garnet (27(see description)406,p.238)--in garnet schist outcrop between White's Hill (41°39'01",70°47'04") and Powder House Hill.

GEORGETOWN: Turgite (Brown Ochre), Limonite (25,26(locality unknown)12,406,p.234)--used as paint pigment. Mineral Point Mine, Atwood's Hill. Tetrahedrite, Chalcopyrite, Azurite, Malachite (26(area of 42°42'31",70°59'27"--South Groveland)406,p.233,p.249)--Stephen Osgood Mine.

GLOUCESTER: Granite Quarries (X), Granite Prospect Pits (X), Pegmatites (P), Boulders (▲) (28,29(see Map 1, this book)115,466,65,57,196,188,302,406,54,224,222,348,466,68,199,333,117)--Collectively the minerals found are: microcline, sphene, pyrite, molybdenite, magnetite, goethite, fluorite, blue quartz, albite, anorthite, fayalite, danalite, hornblende, lepidomelane, epidote, smoky quartz, riebeckite, limonite, penninite, ankerite,


GLOUCESTER
(Topographic Map 28)
ROCKPORT
(Topographic Map 29)
MAP 1
Fayalite, Blue Quartz
Danalite
Graphic Granite
Labradorite in Gabbro
Fayalite
Danalite, Fayalite Amazonite
Halibut Pt
Folly Pt
Folly Cove
Hoop Pole Cove
Andrews Pt
Haven Ave
Lanes Cove
Lanesville
Plum Cove
Pigeon Cove
Pigeon Hill
Oregon Pond
Davis Neck
Hodgkins Cove
Univ of Mass Marine Sta
Bayview
Lily Pond
Klondike Res
Orchard Swamp
Beaver Swamp
Longford Pond
Duck Ponds
Lobster Cove
Whales Jaw
Cemeteries
Mitchell Rock
Bartlett Rock
Dodge Rock
Granite Pier
Sandy Bay Ledge
Quarry Res
Rowe Pt
Back Beach
Rockport
Back Harbor
Bearskin Neck
Gully Pt
The Headlands
Old Garden Beach
Pool Hill
Lookout Tower
Athletic Field
Gravel Pit
Loop Pond
Beach Grove Cem
High Sch
Community Sch
Rockport Country Club
SANDY
ROCKPORT
RC
CAPE ANN

siderite, zircon, kaolin, muscovite, sphalerite, hematite, hyalite, cryophyllite, biotite, amazonite (green microcline), fergusonite, orangite, cyrtolite, grunerite, labradorite, actinolite, astrophyllite, calcite, chlorite, gadolinite, galena, hedenbergite, phenacite, allanite, pyrrhotite, tantalite, yttrocerite, citrine quartz, thorite, ilmenite, ferroanthophyllite, xanthosiderite, chloritoid. Pegmatite Minerals (reference 302): Essential constituents: microcline, albite, quartz, lepidomelane. Accessory Minerals: hedenbergite, hornblende, fayalite, danalite(?). Auxillary minerals: fluorite, cryophyllite, cyrtolite, allanite, fergusonite, yttrocerite, tantalite, thorite, gadolinite, molybdenite, galena, pyrite, sphalerite, pyrrhotite, gedrite. Secondary minerals: grunerite, anthophyllite, chlorite, sphalerite, siderite, calcite, hematite, limonite, kaolin. Various Minerals (28(42°37'25",70°40'58")57)--roadcut on Route 128, Cherry Hill area. On north side of road, eastern end. Pyrite, psilomelane as coatings, limonite--pseudomorphs after siderite, crystals, fluorite, siderite, smoky quartz crystals up to 8 centimeters long, hyalite (fluorescent), microcline crystals (many of which have overgrowths of albite crystals), small crystals of rutile and crystals of rhodochrosite. Fayalite (29(42°37'25",70°37'17"--Brier Neck)466,p.342,465)--large crystals in pegmatite (pegmatites are 6 meters long, 3/4 meter thick). Molybdenite (28(42°37'26",70°39'44")(42°37'26",70°39'23")65)--roadcuts along Route 128, south side. Riebeckite (28(42°37'15",70°39'04")65)--south side of Route 128 roadcut. Riebeckite? (28(area of 42°35'41",70°41'41")60)--small granite quarry near Ravenswood Park. Danalite, Other Minerals (28(locality uncertain)345)--In 1903 an abundance of danalite in small grains and masses up to 8 centimeter diameter was found in a small ballast quarry opened in granite on the line of the railway, about halfway between Gloucester and Rockport, Massachusetts. The "decomposition" products found in this cavity comprise of phenacite, sphalerite, pyrite, manganiferous siderite, hematite, quartz, chlorite, albite and kaolin. Labradorite (28(area of 42°40'19",70°39'59")406,p.245)--occurs in large crystals, some of which are 3 inches long by 1½ inches wide, in the gabbro at Bay View, Davis Neck, and Lanesville. Acmite (28(Lanesville)406,p.238). Graphic Granite (29(42°41'16", 70°37'14"--Andrews Point)--pegmatite border zone of graphic granite, ½ meter wide containing a little biotite. Micrographic Granite (28(area of 42°35'04",70°39'31"--Easter Point)471)

GROVELAND: Black Tourmaline (25(area of 42°44'40",71°02'42"--South Groveland)406,p.246) Clay Pit (4(near Bates Bridge--42°45'50",71°02'05") 406,p.358)--may be in Haverhill. "Written Rock" (4,5(area of 42°45'57", 71°00'00")201)--known as the Groveland--West Newbury Written Rock. Norseman?, Indian? inscriptions. Search made in 1941 did not locate the rock. Reportedly no lines have been seen on the rock since 1890. Reference 201 shows pictures of the supposed inscriptions. Located at Seven Star--Quaker Hale cross roads and a ¼ mile into the woods. Discussion of other such finds in the reference.

HAVERHILL: Pyrite (4(42°46'45",71°06'59")200)--At the road cut on Route 495, about 500 yards west (south) of Route 97 in Haverhill, a large number of pyrite crystals were found when the road was being built. (Side of road not stated but probably east side of north bound lanes). Lepidolite, Kaolinite, Delessite (4(area of 42°46'06",71°04'49"--Bradford)406,p.241,p.246) --Lepidolite in mica schist. Kaolinite--Little Niagra River. Delessite--in diabase dike rock. Clay Pit--see Groveland.

IPSWICH: Jasper and other Quartz (27(42°42'12",70°46'22"--beach, Bar Head)(42°41'30",70°46'39"--beach, Steep Hill)65) Chiastolite (27(area of 42°41'05",70°46'45"--Castle Hill)65)--crystals are found in glacial drift near the Castle. Copper Prospect (27(42°41'46",70°52'12"--Bull Creek Reservoir. Second prospect 700 feet south-southeast of this locality 406,Map). Clay (6(42°42'25",70°48'43")(42°42'21",70°48'28")(42°42'30",70°47'50")92)--all localities in area of North Ridge, Great Neck. Peat (27 (42°41'39",70°50'50")233).

LAWRENCE: Chalcopyrite? (24(locality unknown)390,p.337)--It is said that prior to the raising of the waters of the Merrimack Rivery by the dam at Lawrence, a rich vein of copper ore was found in the bank of the river. (Dam not shown on current topographic map) Quarry (24(42°39'12",71°08'42" topographic map)

LYNN: Andalusite (71(area of 42°28'56",70°57'06"--Flax Pond)406,p.246) Sheehan Quarry (70,71,48,49(locality unknown)115)--Rock appears to be identical with the dark purplish rhyolite felsite porphyry of the Black Ann Hill quarry (Revere, Suffolk County). Den Granite Quarry (71(42°29'50" 70°57'44"?)115,p.288-289)--very dark olive-greenish hornblende-augite granite. About 2 and 3/4 miles north-northeast of the Lynn (railroad) station. Clay (71(locality unknown)406,p.369,fig.202)--Richard Graham clay pit. See Fossil Section. Limonite (Bog Iron Ore)--see Saugus, Essex County

LYNNFIELD: Tophet Hill Copper Mine (48(42°33'20",71°03'50")83,65,309,p.292 406,p.234,map,33)--Referred to as a gold mine, lead-silver mine. Stated to have produced a few bits of copper (chalcopyrite?) and specularite. Serpentine (48(see description)81,p.B106,map,80,232,p.137-138,231,map,65, 196,232,p.137-138,265,309,p.291,406,p.234,p.249,33)--Extends from around (42°32'23",71°02'58") to across Pine Hill (42°32'59",71°02'07") and into Peabody ending at (42°33'25",71°01'31"). The formation has an 0.8 mile width in Lynnfield Center and narrowing to the northeast. Brucite and Magnesite found associated with the serpentine. Chemical factory made epsom salts from the rock during World War I. In Lynnfield Center, at foot of hill opposite the cemetary on Underwood Road (42°32'24",71°02'32"?) Fluorite, Galena (48(Lynnfield Center)406,p.234) Robin Rock Granite Quarry (48,49 (locality uncertain)116)--Very dark greenish-gray and dark hornblende-augite granite. Four-fifths of a mile south-southeast of South Lynnfield (abandoned railroad) station. Quarries (48(42°30'56",71°01'31"--another quarry 400 feet northeast of this locality)(42°30'34",71°01'30")80)

MANCHESTER: Magnetite in Rocks (50(42°34'13",70°45'22"--Eagle Head)65) Hornblende, Nepheline, Zircon, Aegerine (50(42°33'34",70°46'43"--Gales Point)65,406,p.238)--Aegerine--typical bent crystals, sometimes 3 inches long, in aegerine syenite. See Beverly, Essex County. "Singing Beach" (50 (42°34'07",70°45'42")261)--"The phenomena...is confined to the portion of sand lying between the water-line and the loose sand above the reach of ordinary high tide...The sound is produced by pressure, and may be likened to a subdued crushing; it is of low intensity and pitch, is not metallic nor crackling. It occurs when the sand is pressed by ordinary walking, increases with sudden pressure of the foot upon the sand, and is perceptible upon mere stirring by the hand, or even plunging one finger and removing it suddenly. It can be intensified by dragging wood over the beach. Cancrinite (50(area of 42°33'30",70°46'53"--Ram Islands)547)

MARBLEHEAD: Cancrinite, Nepheline, Sodalite, Molybdenite (50(locality uncertain--exposures along sea coast?)196,406,p.233)--Sodalite and cancrinite present as small masses and veinlets in nepheline syenite. Some good molybdenite specimens found in diorite. Anorthoclase Crystals in Kertaphyre (50,72(area of 42°30'00",70°50'45"--Marblehead Harbor) 406,p.245) Labradorite, Glaucophane (50,72(area of 42°30'00",70°50'09" --Marblehead Neck)196,406,p.238)--Labradorite--two large glacial erratics exhibiting blue irridescence in part. Glaucophane in granite porphyry. Magnetite, Glaucophane (50(area of 42°30'46",70°48"57"--Cat Island (Salem City)65,470,p.287-288)--Magnetite in dike cutting rhyolite as skeletons assuming the form of small stout crosses with thickened ends, or with their ends joined by the sides of a hollow square, the cross in this case forming the diagonals. Orthoclase (50(42°31'15",70°51'47"--Naugus Head)72(42°29'54",70°50'35"--Boden Point)65)--Crystals in bostonite rock. Bog--Batter (Oxygenated Hydrocarbon) (71(area of 42°29'02",70° 52'50"--Clifton)488,p.250)--3 feet below the surface.

METHUEN: Lepidolite (24,3(locality unknown)406,p.241)--in mica schist. Quarries (24(42°40'24",71°14'19")(42°40'41",71°14'08")(42°40'47",71°14' 17")topographic map)

NAHANT: Hornblende Picrite Rock with Magnetite, Epidote, Bastite (71 (42°25'39",70°54'46"--Black Mine)278,65,277)--rock sold as an iron ore (flux?) in 1690 for 3 shillings a ton. Earthy Brown Coal (Lignite?) (71(locality uncertain)406,p.250)--near Black Mine. Actinolite, Actinolitic Quartz (Prase?), Asbestos, Calcite (Dogtooth Spar) (71(42°24'59", 70°56'12"--Bass Point)196,406,p.234,p.238,p.249)--Actinolite--long crystals. Vein of actinolitic quartz. Asbestos--pseudomorph of actinolite--vein 6 inches wide in diabasic norite. Calcite found near the Tri-Mountain House (1905), Bass Point. Chalcedony, Epidote, Jaspillite Pebbles (71(on beach)196). Grossularite Garnet, Prehnite, Andalusite, Bastite (71(locality uncertain)406,p.241,p.245,p.246)--Grossularite garnet found in an erratic boulder. The major portion of Nahant is made up of gabbro bedrock with the exception of the easternmost portion exposed on the shore from East Point to Great Ledge. (This area currently closed to collecting). The Weymouth Formation is the bedrock there (slates and limestone--see Fossil Section). Rare prehnite and bastite are reported for the gabbro while andalusite is reported in slate. Epidote, Anorthite, Ruby Spinel (71(42°25'12",70°54'09"--East Point) 406,p.241,p.245)--Ruby spinel--rose colored specimen in massive form found in limestone. Epidote (71(42°26'20",70°53'55"--Egg Rock)406,p.241) Olivine Pseudomorphs (71(42°24'58",70°54'37"--opposite Pea Island)277)

NEWBURY: Chipman Mine (5(42°47'08",70°54'30")406,map,94,200,54,p.9, 65,406,p.233)--Abundant brown (surficially oxidized) siderite and ankerite can be found on the dump. Waste quartz-siderite rocks contains several parts per million gold. Other minerals reported are: pyrite, bornite, argentiferous galena, covellite, tetrahedrite, chalcopyrite, gold, sphalerite, cerrusite, malachite, chlorite, stibnite, arsenopyrite, pyrrhotite, epidote, and serpentine. These other minerals are very hard to find. The mine was discovered in August, 1874 by tracing mineralized float to a vein of galena. This discovery set off prospecting activity throughout northern Essex County which produced nothing of consequence. The following references should be consulted for a history of this activity: 334,72,378,94,40,314,vol.2,p.VII-26&27, vol.3,p.XXIV-8&11¼. Lead-Silver Prospects (6(42°47'27",70°51'53")

(42°45'43",70°52'15")77,400,p.12,p.18,406,map)--The first locality is in volcanic breccia at the southeast tip of Kents Island. There the andesite...contains a patch of breccia made up of angular blocks of greenstone averaging 1.5 inches across, cemented by calcite and quartz veinlets with minor galena. The breccia is exposed in an old mine cut apparently in the contact between the andesite and rhyolite. Bornite and Chalcopyrite are reported for this locality (ref.406,p.233). Siderite is reported in this area at the northern edge of the salt marsh surrounding Kent's Island (reference 232,p.123). The second locality is in gabbro-diorite in the pasture east of Green Street. A third locality (location uncertain) is in granite in the marsh 0.4 mile southeast of the airway beacon. Lead-Silver Prospects (5(42°47'13",70°52'42")(42°46'34",70°52'38") 406,map,401)--The second reference states that galena, chalcopyrite and pyrite is present in lime silicate south of Boston Street. This may be the second locality noted. This reference also states that the "Beeslebub mine" is in minor sulfide mineralization in a similar rock found at Devil's Den, that is, lime silicate (see below). This "mine" is stated to be ½ mile south of the Boston--Newbury Turnpike (Route 1). Copper Prospects (5(42°46'41",70°53'58")(42°46'37",70°54'32")406,map)--The first prospect is just on the north edge of Downfall Street (jeep trail). Pyrite in siliceous limestone observed. The prospect pit is a small trench about 5 feet deep. This area is on what was Luther Noye's land. Mineralization at the Luther Noye's mine is reported to be bornite, chalcopyrite, pyrrhotite, pentlandite?, and marcasite. "Mines" (5(see description)94,72,map,406)--China Mine located near Downfall and Middle Streets next to a marsh (area of 42°46'51",70°53'11"). Supposedly this mine operated from 1875 to 1880 regularly employing about 40 miners. When the operation closed, the shaft was flooded. German Gilbery Mine located on the Gardner Farm near the old Newburyport Turnpike (Route 1). Old records indicate that the ore was in a number of small veins and veinlets rather than in a large ore shoot. Saratoga Mine near Downfall Street. Old mine on the Ambrose Farm on the north bank of the Parker River--reopened in 1897. In 1911 the Essex Mining and Development Company started operations southwest of the Chipman Mine...two miners tried to sink a shaft in the middle of a poorly drained marsh. They labored most of the summer at this without any success and finally brought in more men in and moved to a spot next to a ledge by the side of the marsh. The shaft was sunk over 100 feet and a crosscut driven 50 feet under the marsh. Little is known of the work or the results. It is reported that considerable ore was taken from a hole on the north adjoining the Coffin property (42°47'14",70°54'47"). Diamond drill supposedly cut ore (galena) at 97 feet on John Smith's land (42°47'30",70°53'32"). Filled--In Prospect Pit (6(42°45'00",70°51'21")202) Argentiferous Galena Occurrence (5,6(locality unknown)334)--pocket discovered in 1901 during road building. Bog Iron Ore Smelter, Placer Silver (5(42°45'01",70°55'46")94)--Smelter was located on south shore of the Parker River at Byfield Falls. Cinders in the river bed. Placer silver has reportedly been found in the flats below the falls in the 1870's and 1897. Devil's Den (5(42°46'49",70°52'35")401,231,map,65,196,40,406,p.234,p.237,p.238,p.241,p.246, 144,p.392-393,106,p.112-114,181,p.676,309)--Calcite marble streaked with serpentine. Some precious serpentine. The color ranges from a light olive green to deep greenish--black. It is translucent and takes a fine polish, often very slender veins of asbestos cut across specimens with an occasional small amounts of arsenopyrite. Another combination is yellow--green serpentine with essonite garnet on a background of white limestone. Good specimens of wollastonite may also be found on the dumps.

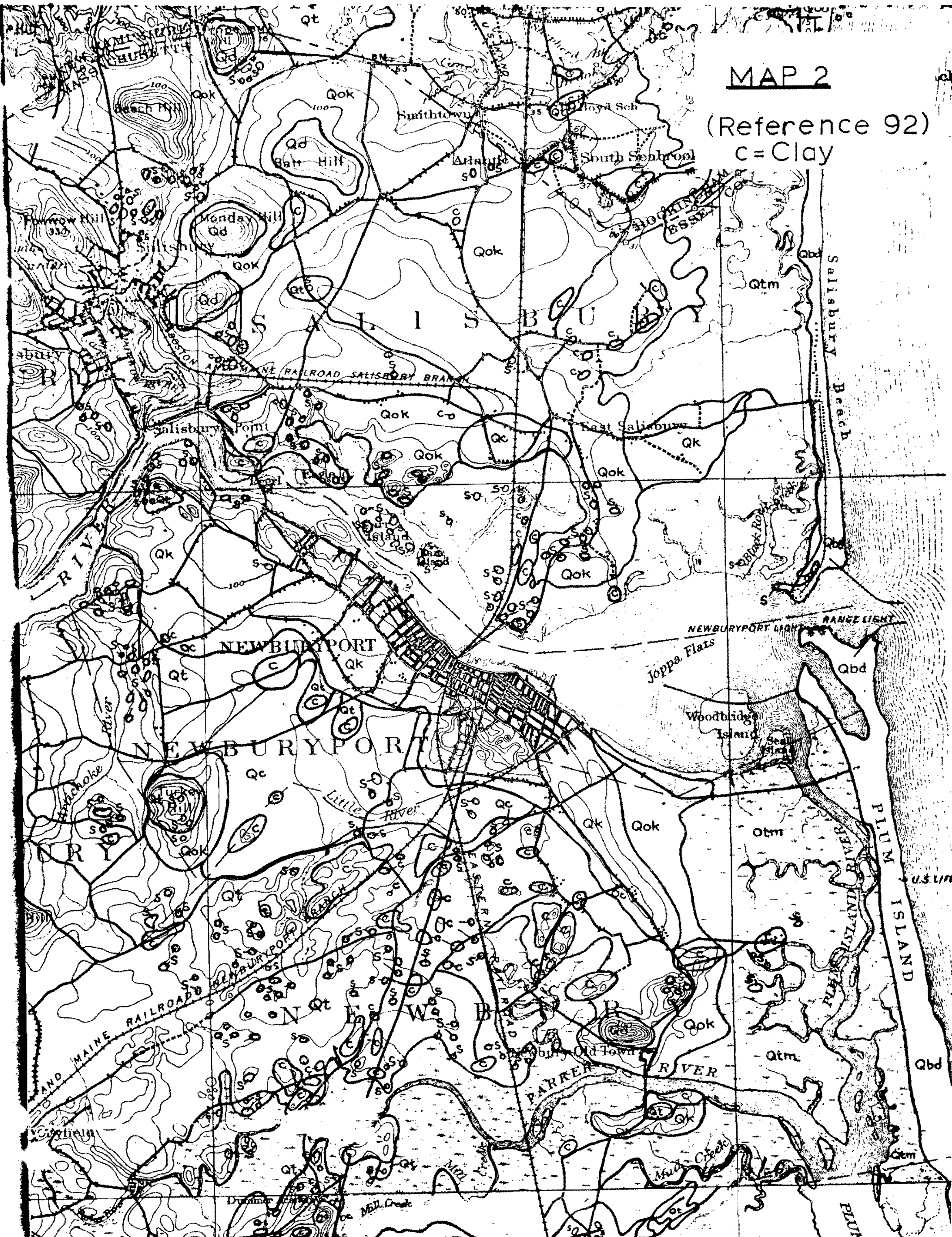
Other minerals found here are: grossularite, vesuvianite, tremolite, dolomite, pyrite, chrysotile, quartz casts after calcite crystals, sodalite, chromite, talc, marmolite, picrolite, picrosmine, baltimorite, calcite. Similar mineralogy at Devil's Basin (42°46'32",70° 52'48") 0.4 mile southwest of Devil's Den. Siderite also found at Devil's Basin. Limestone (5,6(locality unknown)106,p.112-114)--ledge of crystalline limestone 1/3 mile south of the city of Newburyport, and on general strike of Newbury deposits. About one mile from Devil's Basin. Epidote (6(area of 42°46'07",70°50'14")400,p.12)--in greenstone. "Spotted Rock" (6(locality uncertain)106,p.57-59)--South of Parker River and near Route 1A. Summit of a small hill rising from marshes of Mud Creek. At a place known as the Bartlett Mine. Concretionaly structure in felsite--quartzite (petrosilex). May be good cabochon material. Pinite,Kaolinite (6(42°45'52",70°52'25"--Kents Island)106, p.230,406,p.246,314,vol.3,p.xxxlf-16)--Conglomerate largely composed of soft material. Pinite pseudomorphs of orthoclase. Pinite (6(area of 42°45'59",70°51'42"--Little River)406,p.240)--pseudomorphs of orthoclase. Kaolin (5(area of 42°46'06",70°52'44"--west side of Kents Island)406, p.357)--weathered felsite. Crushed Stone Quarry (5(42°47'28",70°52'53") 65,401)--A mixture of hornblende gneiss, gabbrodiorite, and granitic rock. Clay (5,6(see Map 2, this book)92,map)

NEWBURYPORT: Galena, Chalcopyrite, Pyrite (5(42°47'41",70°55'25")401,94) --in porphyritic granite on the southwest side of Turkey Hill. Also ore was supposedly discovered on land owned by Asa T. Newhall north of Turkey Hill. "Watts Hole" (5(locality uncertain--near Angus Rocks)94, 72)--reportedly a source of silver. Located on the south shore of the Merrimack River about 3 miles upstream from the Newburyport business district. Soapstone (5(locality uncertain)232,p.136)--2 miles west of Newburyport on the banks of the Merrimack River. Garnet Accumulation (6(42°46'42",70°48'15"--Plum Island Beach)65)--number of garnet accumulations (seen as pinkish sand) on Plum Island extending south into topographic map 27. Quarry (5(locality uncertain)401)--Newburyport quartz diorite was once quarried in large blocks on the south bank of the Merrimack River 0.4 mile west of Carr Island. Limestone (5,6 (locality unknown)390,p.338-339)--Discovered in 1697 by Ensign Jame Noyes. North of Kents Island?

NORTH ANDOVER: Cordierite, Sillimanite (25(area of 42°41'02",71°06' 45"--North Andover Center)406,p.241,p.247)--in cordierite gneiss at Marble Ridge. Pegmatite Granite (25(42°36'14",71°03'57")(42°36'34", 71°03'47")80)--just south of Sudden Pond.

PEABODY: Granite Quarries (49(see description)115,p.287-288)--Linehan Quarry (42°30'35",70°57'35")--dark olive-green hornblende-augite granite. Carron Quarry (locality uncertain)--same rock. Quarter of a mile south--southeast of the town farm (1923) on Lynnfield Street. Crushed Stone Quarry (49(42°31'57",70°56'08")65)--prehnite. Quarry (48(42°33'45",71°00'35")80) Specularite, Wad (Bog Manganese) (48, 49(localities unknown)406,p.234,p.237)--Specularite in hornblende granite. Wad as rounded concretions in small ponds and spring-holes Chert, Limestone (48,49(Paper Mill Hill, West Peabody)406,p.384)-- see Fossil Section. Serpentine--see Lynnfield, Essex County.

ROCKPORT: Granite Quarries (⊠), Granite Prospect Pits (X), Pegmatites (P), Boulders (▲)--see Gloucester. Also, quartz crystal, inch wide, a


MAP 2
(Reference 92)
c=Clay
SALISBURY
NEWBURYPORT
NEWBURY
Salisbury Beach
PLUM ISLAND
PLUM ISLAND RIVER
Joppa Flats
Woodbridge Island
Salisbury Point
East Salisbury
South Seabrook
Smithtown
Beach Hill
Ram Hill
Monday Hill
Little River
PARKER RIVER
Mud Creek
Mill Creek
Newbury Old Town
BOSTON AND MAINE RAILROAD SALISBURY BRANCH
NEWBURYPORT LIGHT
RANGE LIGHT
Qok
Qd
Qc
Qk
Qt
Qtm
Qbd

pseudomorph of fluorite, deep scarlet color, was found at the Rockport Granite Company Quarry (RC--Map 1, this book).

ROWLEY: Lead--Silver Mine (26(42°43'33",70°53'53")406,map)--½ mile east of Dodge Corner, just north of Bennett Hill Road. Sphalerite, Arsenopyrite (26(locality uncertain)406,p.233)--Old "mine" near the Parker River. Natrolite (26,27(locality unknown)406,p.295)--amygdules in melaphyre. Ochre (26(locality uncertain)232,p.129)--Jewett farm (1838), north part of Rowley on road to Newbury. Chert--see Fossil Section.

SALEM: Aegerite, Cancrinite, Hornblende, Sodalite, Amazonite (Green Microcline), Hornblende, Nepheline, Zircon (49,50(see description)65, 25,181,406,196)--found in exposures of narrow belt of syenite (along coast) from Salem Neck (49(42°31'49",70°52'30") to Gale's Point (see Manchester, Essex County). Also at Salem Neck--Natrolite after Nepheline, Enstatite, Bronzite, Arfvedsonite, Chrysolite after Olivine, Molybdenite, Hydronephelite, Microcline Microperthite. Ainigmatite, Cancrinite, Sodalite, Apatite, Magnetite (50(42°31'05",70°50'34"--Great Haste Island)406) Bronzite--see Beverly, Essex County. Glaucophane--see Marblehead, Cat Island, Essex County. Orthoclase, Sanidine Crystals in Bostonite Porphyry, Arfvedsonite (50(42°31'49",70°50'14"--Coney Island)406) Glaucophane (50(42°31'35",70°52'02"--Fort Pickering (Pickering Point?)406)--in massive forms in augite--hornblende granite. Guano (Apatite) (50(42°30'09",70°46'32"--Halfway Rock)406). Jasper (49,50(locality doubtful)196) Specularite, Delessite (49,50(locality uncertain)406)--in diorite. Abandoned Quarry (49(42°30'39",70°54'10")65, topographic map)--pyrite crystals, dolomite crystals, limonite. Quarry (71(42°29'13",70°55'02")topographic map).

SALISBURY: Pinite (after Orthoclase) (5(area of 42°50'05",70°54'04" --Eagle Island)406,p.246) Clay (5,6(see Map 2, this book)92,map)-- An exposure of clay on the east side of highway Routes Nos. 1 & 1A, beside the garage of Louis A. Annacone (1941), about a quarter of a mile south of the center of East Salisbury. (East Salisbury)6(42°50'30", 70°51'39").

SAUGUS: Red Feldspar (Rhyolite?) (70,71(locality uncertain)106,p.76, 196,383,406,p.241)--called jasper in older literature. Contains sericite. Small area on the south side of the Saugus River, a few rods northeast of the (railroad) station in Saugus Center. Chalcedony (70,71(locality unknown)406,p.237,196)--amygdules in melaphyre. Limestone (70,71(locality unknown)144,p.392-393) Limonite (Bog Iron Ore) (70,71(see description) 314,vol.2,p.VI--11)--found in small lakes or ponds on the western bank of the Saugus River near Lynn. Colonial Metallurgical Industry (Saugus Ironworks) (70(42°28'08",71°00'36")64,314,vol.2,p.VI--11 to p.VI--14, 32,96)--presently a Federal Historic Museum. Quarry (70(42°26'59",71° 01'49"--Melrose-Saugus town line)topographic map) Clay (70,71(locality uncertain)421,p.996)--brickyard clay pits. 1,500 feet southwest of the railway station at East Saugus. Worked on the north face of the hill, just above the level of the salt marsh. Another pit about 200 feet southeasterly.

SWAMPSCOTT: Hume Quarry (71(42°29'04",70°55'09"--just east of Foster Pond)65,topographic map)--actinolite, calcite, chalcopyrite, fluorite, galena, heulandite, molybdenite, prehnite, pyrite, quartz, siderite, sphalerite. Scapolite (71(locality uncertain)406,p.241-242)--In 1890,

microscopic grains of scapolite were discovered in thin sections of the hornblende granite collected at a quarry on Humphrey Street.

TOPSFIELD: Copper Mine (49(42°36'45",70°58'28")10,406,p.233,295,p.53, 314,vol.2,p.VI-32,146,p.378-386)--in volcanic rocks. First attempt at mining in 1648 and again in 1839. Wad (Bog Manganese) (26,49 (localities unknown)406,p.237)--Rounded concretions in small ponds and spring--holes. Tremolite, Calcite, Pyrite (49(42°36'36",70°58'38") 453,p.20-21,map,145,178,453)--in siliceous limestone. See Fossil Section. Peat (26(area of 42°39'35",70°57'32")233,map)

WEST NEWBURY: Galena, Stibnite?, Pyrite? (4,5(locality uncertain--Rocky Hill)328,327,328)--vein found in diorite erratic. Red Siliceous Limestone (5(area of 42°47'48",70°57'24"--Archelaus Hill)406,p.249,p.384) --see Fossil Section. Galena, Chalcopyrite, Pyrite (5(42°46'58",70°58' 40")401)--in quartz-sericite schist along a diabse dike at the corner of Ash and Middle Streets.

ESSEX COUNTY FOSSIL LOCALITIES

DANVERS: Invertebrate Fossils (49(42°33'39",70°55'31"--Edward Carr Clay Pit)(bank of Crane River--south of Carr Pit)406,p.363)--molluscs, forams, bryozoa.

GLOUCESTER: Drowned Forest (29(area of 42°37'25",70°37'17"--Brier Neck)417,p.568)--on beach near Brier Neck between high and low tide levels. Number of tree stumps. Pleistocene Invertebrate and Crustacean Fossils (28(area of 42°36'18",70°40'33"--"cliff" face at Stage Fort) 157,p.143,419,446,159,map)

JEFFREY'S LEDGE: Salterella rugosa(?), hyalithids (--(area of 42°48' 21",70°16'29")199,p.606)--fishermen have pulled up large masses of the Olenellus Lower Cambrian chert and limestone identical with that of Nahant and Rowley. Tweny miles east--northeast of Thatcher's Island.

LAWRENCE: Cambrian Fossils (24(locality uncertain)406,p.384)--The city ledge in South Lawrence is also a fossiliferous Cambrian rock of metamorphosed limestone interstratified with quartzite and slate.

LYNN: Buried Forest (71(area of 42°27'02",70°56'48"--Lynn Harbor) 421,p.971-972)--See Natural Gas, Revere, Suffolk County.Mineral Localities. Fossil Starfish (71(locality unknown)406,p.369,fig.202)--Richard Graham clay pit.

LYNNFIELD: Annelids? Fucoids? (48(locality uncertain)406,p.384)-- Outcrops of white quartzite, blue slate, and limestone. South side of Chestnut Street.

METHUEN: Across State line in Salem, New Hampshire--PseudoCalamites (24(42°44'38",71°12'02"--east side of Route 28, Hampshire Road)52,p.102) --Foliation intersecting a slightly folded quartz vein, produces a ribbing suggestive of Calamites. The largest specimen was 2 feet long, 6 inches wide.

NAHANT: Cambrian Trilobites (71(42°25'12",70°54'09"--East Point) (42°25'04",70°54'14"--Pulpit Rock)(West of John's Peril---42°25'48", 70°55'32")(Lynn Harbor side of Bass Point (Bass Point--42°24'59", 70°56'12")157,p.37,461,part I,p.259-260,199,179,8,p.A73,406,p.384,450, 274,plate 6A)--in quartzite, calcareous slate, cherty limestone--cut by sills of gabbro. Boulder of fossiliferous red limestone found at Bass Point. Also reference 406, p.384 states that "...another outcrop occurs on the Lynn harbor side of Bass Point, where the beds are all below high tide or sea level. The horizon is about eighteen inches thick from top to bottom. This outcrop is near the causeway leading from Little Nahant to Bass Point in a bank by the roadside." Note: This part of Nahant is currently closed to collecting.

PEABODY: Cambrian Rocks (48,49(locality uncertain)406,p.384)--In a railroad cutting at the base of Paper Mill hill in West Peabody there are outcrops of chert, limestone, and slate, identical in character with the Cambrian fossiliferous rocks of Nahant, and although fossils have not as yet been discovered, without doubt the outcrops are of the Cambrian period.

ROWLEY: Invertebrate Fossils (26(area of 42°44'16",70°53'59"--Glen Mills)157,p.163-164,110,145,p.23-25,65)--Reference 157 states that "...the top of an amygdaloidal melaphyre flow is exposed in a small ledge. The surface of the flow is irregular and scoriaceous and shows some evidence of pillow structure, and a detached block of lava lies on the surface of the flow. Overlying the lava flow is a volcanic conglomerate or mud flow, probably at least 50 feet thick. Just at the base of the mud flow immediately overlying the lava and surrounding the detached block, is a few inches of calcareous shale in which abundant fossils were discovered by Mr. Keith in August, 1915...They are all of marine types and comprise one or more species of brachiopods, a specie of gastropod, fragments of crinoids, and probably a pelecypod. They are rather fragmentary...the mud flow overlying the fossiliferous bed appears to grade upward into clay shale, 200 feet or more thick, in which a few crinoid fragments have been found...late Silurian or early Devonian." Reference 110: Similar or same outcrop--fossils recovered from both a green fine-grained tuffaceous sandstone at least 0.5 meter thick and an overlying calcareous shale. Invertebrate Fossils (26(area of 42°41' 53",70°54'17")110,199,p.606,407,348,p.A73)--brachiopods, pelecypods, gastropods, ostracodes, crinoid stems, fragments of trilobites. Fossils are in a gray, fine--grained, impure limestone and a green tuffaceous siltstone which are intercalated with a succession of beds of purple, fine--grained volcanic conglomerate, greenstones and coarse volcanic conglomerate. The fossils are most readily detected in weathered parts of the rock. Invertebrate Fossils (26(area of 42°42'16",70°55'11")110, 8,p.A73)--Erratic boulders containing molds and casts--brachiopods, rhynchonellids, pelecypods, trilobites, ostracods. Northern flanks of Hunsley Hills. Ostracodal Shale (26(42°42'48",70°53'56"--Smith Hill)-- outcrops only in man--made exposures such as gravel pits and building excavations near Smith Hill. Faunal assemblages similar to that found in Topsfield (Essex County) in an excavation for a shopping center 300 meters west of Smith Hill. Trilobites in Chert (26(locality uncertain)406,p.384) --On the west bank of Batchelder's Brook, east of Clay Lane. Trilobite Fragments (27(locality uncertain)406,p.384)--Ledge of red slate interstratified with limestone. Found at well digging at Daniel's wagon

factory (1905) at Chaplinville (southeastern part of Rowley).

TOPSFIELD: Leperditiids, Ostracods (49(42°36'36",70°58'38")453, p.20-21,map,145,178,453)--siliceous limestone (tremolite, calcite, pyrite). Hyolithes (26,49(locality unknown)199,p.606)--in dark limestone. Annelid Casts, Lamellibranch Shells, Sponge (26,49(locality uncertain)406,p.384)--in slate and limestone. On Peterson farm (1905) beside the Rowley Bridge Road. Ostracod Shale - See Rowley, Essex Co

WEST NEWBURY: Cambrian Trilobites (5(area of 42°47'48",70°57'24") 406,p.384)--In the roadway east of Archelaus Hill, West Newbury, occurs a series of outcrops of red limestone, slate, and quartzite. The lime-- stone contains numerous fragments of Hyolithes and other Cambrian fossils.

FRANKLIN COUNTY MINERAL LOCALITIES

ASHFIELD: Spodumene (34,56(locality uncertain)310)--trending south into Goshen, Hampshire County.

BERNARDSTON: Garnet-Calcite-Magnetite-Biotite Granulite (13(42°41'06", 72°33'11")163,p.259-269,28,383,p.36,28,map,22,p.517-519,168,164,p.128, p.102,22,455)--Specularite, vesuvianite, tremolite (partly replaced by quartz), garnet (partially altered to chlorite), gypsum, bands of 70% siderite enclosing magnetite octahedrons, magnetite replacing fossils, pyrite, chalcopyrite, prehnite?, limonite. Also see Fossil Section. Reference 163 states that "Directly opposite the limestone across the brook to the north, the quartzite contains dodecahedral garnets a half inch across bordered by chlorite." Argillite Quarries (13(42°41'06",72° 33'11")(42°42'25",72°34'01")28,map) Quarry (13(42°41'04",72°34'29")28, map) Amphibolite Quarry (14(42°40'29",72°29'50")27,map)--also see Northfield, Franklin County. Quartz Veins and Combs (13(42°43'40",72°31'53") 163,p.275,168,p.265)--in argillite. Also see Northfield, Franklin County. Kaolinite after Garnet (13(locality uncertain)164,p.98)--in argillite, on the north border of Bernardston. Arsenopyrite (13(locality unknown) 164,p.30)--probably in erratic boulder. Gold (13(area of 42°43'20",72° 34'51"--Shattuck Brook)personal communication, Diana McLardy (1977) Amphibolite with Pyrite, Garnet and Pyroxene in Limestone (13(area of 42°40'27",72°30'25")163,p.278,plate 4) Staurolite (13,14(area of 42°40' 17",72°30'00")163,p.278,plate 4). Across State line in Vernon, Windham County, Vermont--Amphibolite and Garnetiferous Conglomerate Outcrop, Pyritiferous Magnetite Float (13(locality uncertain)163,p.275)

BUCKLAND: Biotite, Allanite, Soapstone (34,35(locality unknown)164,p.41) --biotite, allanite--on the hilltop a few rods south of Harris's soapstone quarry. Gneiss Quarries (35(42°36'56",72°44'33"--Luther Smith's Quarry)(42°36'32",72°44'39"--east side of West Mountain)409,map,164,p.32, p.49,p.163,172,349)--first locality--babingtonite, epidote, natrolite, chabazite, quartz, calcite, stilbite, axinite. Pyrite, Hornblende (34,35 (locality uncertain)164,p.88)--bed of pyritous amphibolite at house of H.W. Dodge. Promoted as a gold mine. Limestone (from 34(area of 42°36' 53",72°45'57") through (11(Charlemont) to (12(area of 42°40'31",72°44' 07"--West Branch North River, Colrain)231,map)

CHARLEMONT: Staurolite, Garnet (12(42°37'46",72°44'29")(42°37'38",72° 44'15"--in Deerfield River above mouth of North River)408)--first locality shows staurolite prisms up to 0.15 inch long in garnet schist. Second locality, garnets up to 0.1 inch in diameter in garnet schist. Hematite, Magnetite, Pyrite (10(42°39'05",72°52'57"--hematite)(42°38'51", 72°52'42"--magnetite)(42°38'34",72°53'29"--pyrite)11(42°39'53",72°52' 00")166,map,215) Hawks Mine (33(42°37'25",72°53'24"--area of Mt. Peak) 65,357,177,326,366)--pyrite lenses. Similar to but smaller than the Davis Mine, Rowe, Franklin County. Gahnite crystals, grossularite, pickeringite, sphalerite, melanterite, chalcopyrite, galena, chlorite, green mica, biotite, muscovite, quartz, garnet, apatite, calcite, ankerite. Reference 366 states that a hole in this area yielded a carload of 13% copper ore. Currently this area is closed to collecting. Bornite, Graphite, Magnetite, Malachite (10,11,33,34(localities unknown)164,p.42, p.89,p.104,p.170-171,163,p.175)--Bornite--(in Hawley?, Franklin County) --near C. Colby's house (1891). Large grains, and inch across, surrounded by malachite. One specimen in cubes. In quartz veins in chlorite schist. A pit has been dug, and the ore is said to assay $6 per ton gold, $2.50

silver. Graphite--excavation has been made on a quite large bed of impure graphite, about 5 feet wide, about 40 rods northeast of the house of Joseph Tinkham, in the Hawley Schist. Magnetite--in a considerable vein, in the south brow of the hill one mile north of the village (probably same as previously noted locality (10(42°38'51",72°52'42"), and in fine octahedra in hornblende chlorite schist near A.P. Maxwell's. Considerable work has also been done on Rice's Brook, a mile above Charlemont village (10(area of 42°38'28",72°52'54"), and an engine has been set up, but the enterprise did not prove remunerative. The most abundant and promising deposit after the Davis mine is in the high bluffs overlooking the road east of M.V. Creey's "second pasture", where for a long distance along the strike, in an area 29 rods in width, the chlorite schist is crowded with pyrite in large rough-faced cubes 2/3 inch across. One layer, nearly a foot thick, has been opened. Bornite--back of the house of G. Veber, on a blind road running north from the river road, bornite appears in masses an inch across. Scapolite (11(area of 42°37'38", 72°51'36")164,p.178)--very abundant by the roadside about a mile east of Hall's Tavern (1825). Fasiculite, Ankerite (10(42°38'18",72°54'31"--Zoar Road)(area of 42°37'36",72°53'27"--Route 8A)357)--road cuts in schist. Fasciculite--"bundles" of hornblende. Also chlorite, epidote. Ankerite (10,11(locality uncertain)164,p.25)--in chlorite schist. Hill a mile north of the hotel (1892) Almandine Garnet (10,11,33,34(locality unknown)439,p.474)--in chlorite schist. Copper Prospect (10(42°38'21", 72°54'34")366) Serpentine, Asbestos (10(Zoar)164,p.18,p.151)--southeast side of Deerfield River, near turnpike. Reference may refer to ultramafic bodies found in Rowe, Franklin County, and Florida, Berkshire County. Limestone--see Buckland, Franklin County.

COLRAIN: Zoisite (11,12(42°42'19",72°45'00"--Wilson Hill)(42°38'55",72°44'01"--Houghton Hill)408,164,p.180,30,p.138) Quartz (11,12(locality unknown)192)--yellow hyaline variety; blood red (jasper?) Fasiculite (12(42°38'39",72°39'47")(42°39'00",72°39'49")(42°40'02",72°40'15")408) Limestone--see Buckland, Franklin County. Across State line--Halifax, Windham County, Vermont--Tourmaline (12(42°44'15",72°41'30"--Borden Brook)408)--Black tourmaline prisms as thick as ½ inch were found in a quartz vein in the bed of Borden Brook, Guilford, Windham County, Vermont. Fasiculite, Garnet (12(42°44'22",72°40'57"--Olden Ledges)408) --Fasiculite containing bundles of hornblende several inches across and garnets as large as 1.8 inches in diameter. Pegmatites (12(42°40'30",72°43'29")30,p.137)--potash feldspar, muscovite. Lazulite--see Shelburne, Franklin County (Hinsdale Brook).

CONWAY: Pyrolusite, Quartz (57(area of 42°28'51",72°41'05"--Norton Hill) 310,map,164,p.131,230) Jasper, Chalcedony, Agate, Pyrolusite, Hematite (57(locality uncertain)164,p.131,p.137,348,p.564)--southeast part of Conway. Vein 6 to 8 thick of brown and yellow jasper and black, brown, white, red, and yellow chalcedony, rarely banded agate; whole often brecciated; with hematite and pyrolusite--probable source of boulders in Amherst, Hampshire County. Jasper pebbles found in Deerfield River. Strike N20°E, dip 90°. Galena, Barite (57(area of 42°28'39",72°40'36") 310,map) Pegmatite Pods (35(42°33'11",72°44'08"--Jones Road)(42°30'05", 72°42'29"--Cricket Hill--another pod 500 feet to the northeast)(42°30'54",72°42'19"--another pod 740 feet to the northeast)409,map) Zoisite in Marble (35(42°32'09",72°42'57"--Shelburne Falls Road)409,map) Marble Quarries (35(42°31'04",72°43'03")(42°32'12",72°42'10")409,map, 163,p.188)--first locality also shows pegmatite pod. Calcite, Epidote,

Siderite (rare) in Quartz Veins (35(cuts along the Boston and Maine Railroad and on highway 116 between Conway and Mill River)409) Kyanite (35(locality uncertain)164,p.64)--near line between Conway and Deerfield, a few miles east of the village of Conway.

DEERFIELD: Traprock Minerals (36(42°33'57",72°35'07"--Quarry)164,p.71, 163,p.444,349,65,169,489,192)--Known as the Cheapside Quarry although that area is across the Deerfield River in Greenfield, Franklin County. Datolite also found in railroad cut on Deerfield side of river just north of the quarry. In diabase. Quarry minerals--calcite, prehnite, diabanite, epidote, babingtonite, tourmaline, fluorite, pyrite, datolite, sphene, natrolite, stilbite, heulandite, analcite, chabazite, saponite, chlorite (variety chlorophaeite), kaolin, malachite, limonite, wad, aragonite, axinite, chalcopyrite, sphalerite, galenite, quartz, selenite, botryolite, hematite, bornite in dolomite, apophylite, chalcedony, cuprite, hyalite, agate, analcime, epidote. Prehnite also found 4 to 5 miles south of Cheapside Quarry at Pine Nook (locality unknown). Agate, Amethyst (36(see description)192,164,p.137)--Agate--1 mile east of Deerfield Academy (area of 42°32'47",72°35'08"). Loose nodular masses eroded from underlying basalt. Numerous references to this locality in early literature for choice agate of various types and colors including the record 23 pound (9 inches by 6 inches) amethyst lined agate geode described under another Deerfield listing. South part of township, 2 miles northeasterly of Bloody Brook meetinghouse (same as previous locality?). Amethyst--about 3 miles southeast, east of Bloody Brook (Bloody Brook--42°30'33",72°35'57"), 1 mile east of village--light-colored crystals in diabase. Jasper, Basanite, Limonite (35,36(banks of Deerfield River) 164,p.101,p.134,p.135)--limonite--one specimen found. Graphic Granite (36(locality unknown)235,p.16)--cobbles in arkose. Copper Staining (Malachite?), Hematite (35(area of 42°32'40",72°37'52"--copper staining)12, p.51,plate 7)--200 feet to the southeast of this locality in a roadcut is a hematitic paste, several inches thick lying on steeply dipping slate containing slate fragments and angular pieces of quartz (Triassic contact).

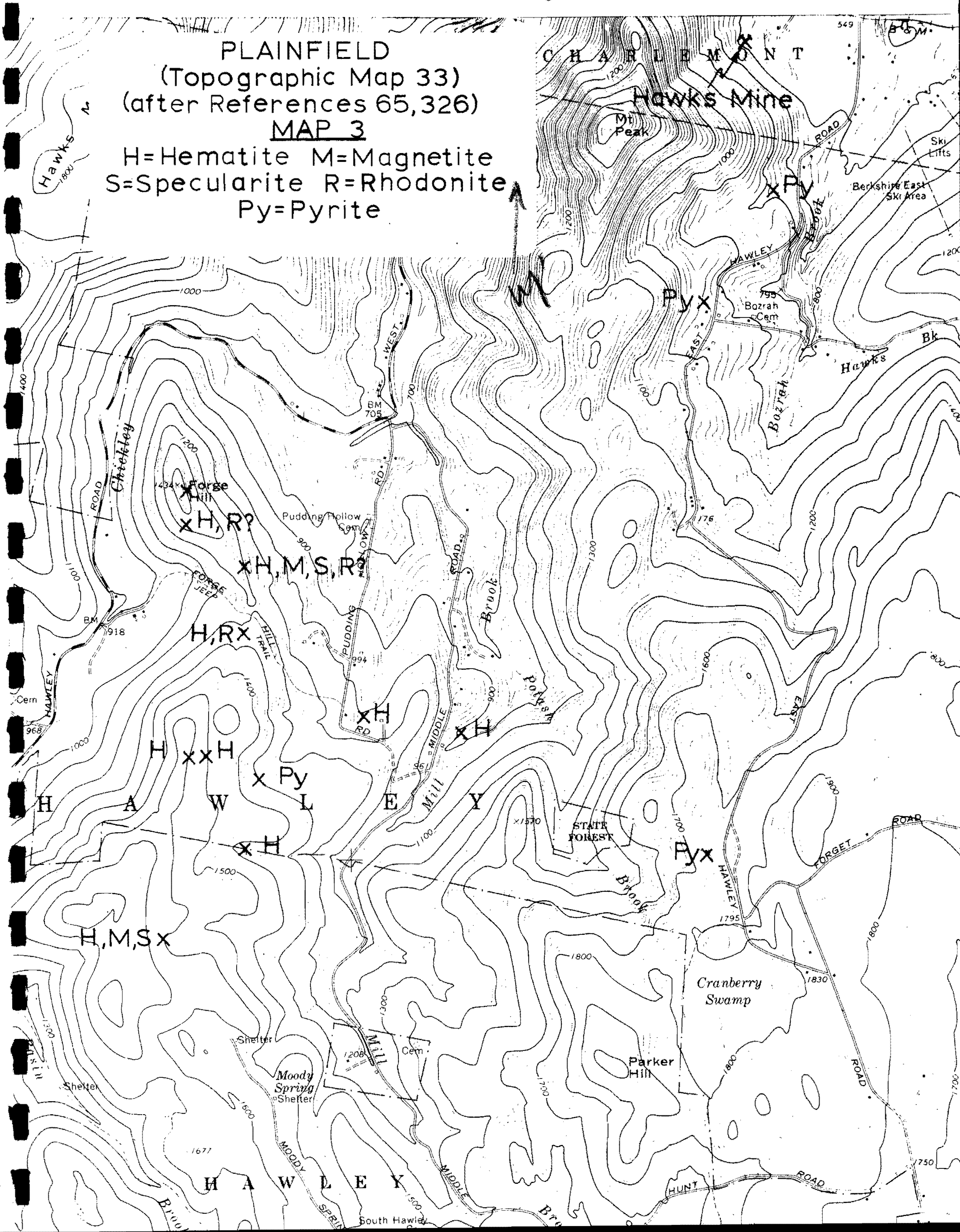
DELL: See Heath, Franklin County.

ERVING: Granite Quarry (14,37,38(locality unknown)157,p.248-249)--Fraley's Quarry in Pelham Granite. Most of the rock in the northern half of mass is blotted by distant black spots of hornblende a quarter inch square, and contains abundant brown crystals of titanite over a large area. Beryl --see Northfield, Franklin County. Hyalite (38(42°35'56",72°21'52"--road cut on Route 2)65)--whitish crust coating pinkish granite. The hyalite fluoresces green. Spodumene, Beryl--see Northfield, Franklin County.

GILL: Chlorite, Chlorophaeite (36(area of 42°36'51",72°33'09"--Fall River) 164,p.72-72,p.51,234,p.393-394)--in cavities in greenstone. Reference 234 states that "The chlorite consists of folia, disposed in a radiating manner; but the chlorophaeite exists in minute acicular prisms, and may thus be distinguished. It is not always so easy to distinguish between the rusty powder of this mineral and the green earth."--also prehnite, chalcopyrite, earthy chlorite (diabantite). "Coal", Nodular Limonite (36(near Turner Falls)164,p.27,p.101)--in Triassic slate. Abundant flattened egg-shaped concretions of pyrite (marcasite?) changed to limonite. Arsenopyrite (13,14,36,37(locality unknown)164,p.30)--boulder of several pounds. Quarry (13(locality unknown)28)--small quarry in diabase.

GREENFIELD: Red Diopside--Diabase with Secondary Albite, Amethyst, Heulandite, Cuprite (36(area of 42°34'20",72°35'20")163,p.443-444,p.96, p.64,p.759) Chalcopyrite, Malachite, Siderite, Barite (36(see description) 163,p.203,p.505)--A vein zone occurs at the junction of diabase and upper sandstone on the west bank of the Connecticut River, 100 rods below the mouth of Fall River (area of 42°36'46",72°32'21"). It goes north obliquesly into the diabase and south across the sandstone in the river. The principal vein is 5 to 6 feet wide. It strikes north-south, dips 90 degrees. Malachite is common, sulphuret is rare. There is a second vein in sandstone about a mile below, and narrow veins with fine slickensides occur in other places between. Barite gangue in both veins. A somewhat similar vein was also reported by Emerson to occur on the west side of the island at the falls; strikes north-south, dips 90 degrees, produced fine large masses of chalcopyrite and much siderite, is in brecciated sandstone. Albite, Diabanite, Axinite, Diopside, Cuprite, Calcite, Aegerine--Augite, Hematite (Specularite) (36(see description) 164,297,p.424-431)--in diabase (Rocky Mountain ridge). Albite, Diabantite, Axinite--opposite Turners Falls. For a thickness of 30 to 70 feet and for a distance of several miles in the vicinity of Greenfield the basal portion of the trap sheet is a mixture of sand, fragments of various sandstones, fragments of various kinds of diabase--some with glass base, some with hyaloplitic base, and some resembling andesites, all unlike the monotonous Triassic diabase--and abundant fragments of glass, all cemented by glass, and variously shattered and recemented, interstices filled by a water-deposited mixture of albite, diopside, calcite, aegerine --augite, and hematite. Quarry--beneath obseration tower east of Greenfield. Arkosic sandstone overlain by trap breccia. At the quarry is a more distinct basal bed of trap 7 or 8 feet thick; more or less shattered and displaced and the sand can be seen continuous with the underlying sandstones rising in rifts in this basal bed and frothing out into a scoriaceous sandstone, where it meets and blends with breccia above. This breccia is 60 feet thick--a greenish mass of shattered glass and trap, full of filaments of red sand shining with hematite scales (specularite?). Allophane (36(locality uncertain)--in sandstone quarry ½ mile east of Greenfield. Hyalite, Kaolinite (36(area of 42°36'23",72°34'13") 164,p.98,p.120)--roadcut in diabase. Hyalite forms botryoidal surface. Prehnite amygdules altered to kaolinite. Lazulite (35,36(Hinsdale Brook) 164,p.100)--erratic cobble. See Shelburne, Franklin County. Graphic Granite (36(locality uncertain)235,p.16)--cobbles in arkose.

HAWLEY: Bornite (33,34(locality unknown)164,p.42)--back of S.G. Turner's house (1891). In chlorite schist, disseminated in grains as large as a pea. Specularite, Magnetite, Pyrite, Menaccanite, Andradite Garnet, Rhodonite, Fluorite, Epidote (33(see Map 3, this book)163,p.172-175,330,367, p.35-36,326,164,p.139,p.104,p.82,p.108,357)--Fluorite--at the southern openings on the hematite vein, white cubes, 8 millimeters across. Menaccanite--in white quartz south of Forge Hill. Zoisite--(33(locality uncertain)164,p.178)--in veins of quartz in hornblende rock. Near Iron Works (Forge Hill?). Epidote (33(locality uncertain)164,p.801)-- large boulders full of large interlaced blades often much warped of deep-green epidote in sericite schist. M.V. Cressey's farm (1885) (area of 42°35'49",72°55'40"?) Ankerite (33(see description)164,p.25)--in chlorite schist. It is from a point just south of the road running over Forge Hill near the first mine in the pasture of M.V. Cressey. Also in the gorge near the mill, opposite the town hall (1892). Magnetite, Quartz,


PLAINFIELD
(Topographic Map 33)
(after References 65,326)
MAP 3
H=Hematite M=Magnetite
S=Specularite R=Rhodonite
Py=Pyrite
CHARLEMONT
Hawks Mine
Mt Peak
Berkshire East Ski Area
Ski Lifts
HAWLEY ROAD
Bozrah Cem
Hawks Bk
Bozrah
Forge Hill
H, R?
H,M,S,R?
Pudding Hollow Cem
FORGE HILL JEEP TRAIL
H,R
PUDDING HOLLOW RD
WEST RD
MIDDLE ROAD
Chickley
Potash Brook
Mill Brook
H
Py
H A W L E Y
STATE FOREST
H,M,S
Cranberry Swamp
Parker Hill
Moody Spring Shelter
Shelter
Cem
South Hawley
HUNT ROAD
FORGET ROAD
EAST HAWLEY ROAD
MOODY SPRING
H A W L E Y

Spessartite (33(42°33'51",72°52'41"--Hawley)367)--vein in small gorge below town hall.

HEATH: Pyrite (11(see description)164,p.130,366,map,215)--in stream bed on Chester Rice farm taken over by J.W. Tinkham (1887). Also (42°40'49", 72°51'22")(42°41'51",72°50'46"). Graphite, Pyrite (11(42°41'10",72°50' 14"--Dell)366,163,p.180,367,p.10,215)--Locality noted is at the base of the Goshen schist--15 foot wide graphitic bed; numerous small pyrite cubes. Graphite also noted near J.D. Tinkham's and well exposed at J. Loveridge's in northeast corner of town.

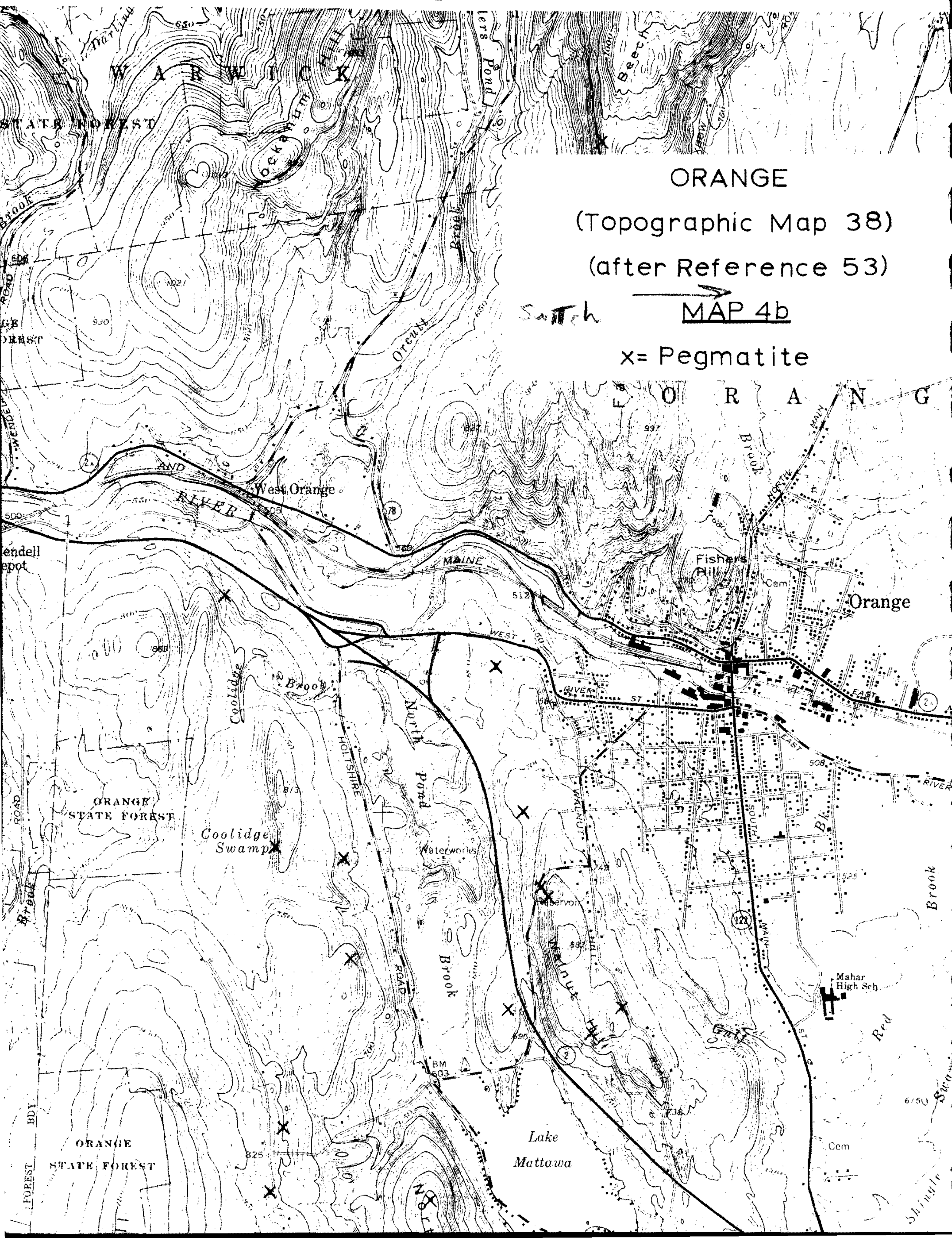
LEVERETT: Blue Feldspar (36,37,58,59(locality unknown)192) Galena, Chalcopyrite, Sphalerite, Barite, Hyalite (58(42°27'29",72°31'06") (42°26'15",72°31'17")(area of 42°26'07",72°31'03"--railroad cut)65,163, p.506,330,482,164,p.120,p.83,p.31,21,429)--first locality--under transmission line extending 200 to 300 feet to the west. Galena, chalcopyrite, sphalerite, barite, hyalite after barite, hollow quartz pseudomorphs after pyrophyllite, azurite, malachite, pyromorphite, limonite. Second locality--"White Rock quarry". Vein only a few inches wide at the surface, but widening below. Galena and chalcopyrite abundant at the surface but rare below; worked but a few feet down, there 1 foot wide, nearly pure barite. Locality may be built over. Third locality--narrow veins of barite, with little galena. Hyalite after Barite (58(locality unknown)164,p.120) Hematite (58(area of 42°29'21",72°31'04"--Long Plain Road (Route 63)--schist along the road east of Mount Toby is abundantly brecciated and cemented by hematite. Aplite (58(locality uncertain)158, p.214)--A few rods west of the highest point in the road east of Mt. Toby in Leverett, just south of which the road to Mt. Toby turns off, one can see the coarse pegmatite grade into a great mass of this coarse quartz rock or northfieldite. Epidozed Rocks (58(42°28'40",72°30'46"-- Long Plain Road)(Route 63)21) Pyritic Schist, Pegmatite (58(42°29'21", 72°31'04"--east side of Route 63)21) Actinolite (58,59(locality uncertain --South Leverett Mill)21)--in gneiss.

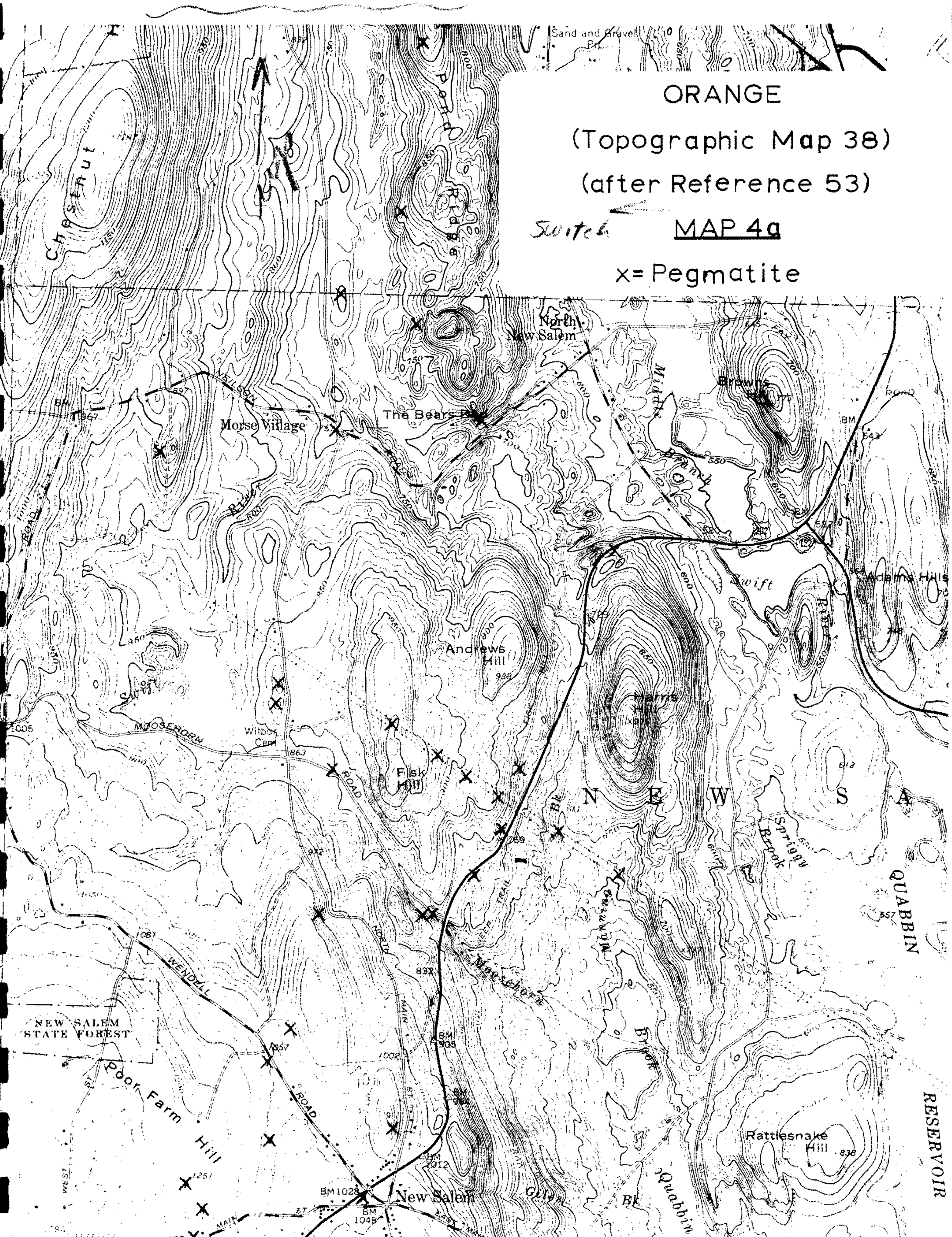
LEYDEN: Pyrite, Chalcopyrite (12(42°43'43",72°40'12")408)--dike exposed in abandoned prospect hole. Jasper, Serpentine (12,13(locality unknown) 192)--Jasper-red, yellow, and imperfectly striped as pebbles. Serpentine --rounded masses reported found as glacial erratics; no outcrops in the area are known. Zoisite (12,13(localities uncertain)164,p.177,p.179,287, 376)--north part of Leyden and west part of Leyden, near Green River. Granite Dike Quarry (13(area of 42°42'08",72°36'41"--west slope of East Hill)28)--local use for curbstones and retaining walls. Small Granite? Quarry (13(area of 42°42'50",72°37'01")28). Across State line in Guilford and Halifax, Windham County, Vermont--see Colrain, Franklin County.

MONTAGUE: Specularite, Magnetite (36(area of 42°35'18",72°30'21"--West and East Mineral Hills)163,164,p.92,383,233,p.53)--fault zone. Pyrite present. Limonite (Bog Iron Ore) (36,37(locality unknown)484) Clay Concretions (36(area of 42°31'36",72°34'01"--mouth of Sawmill River)433) Chalcopyrite, Bornite (36(localities uncertain)164,p.42,p.50)--Chalcopyrite--on southern island at Turners Falls. Bornite--sparingly disseminated in calcite in sandstone. Granite Gneiss Quarries (36,37(area of 42°33'08",72°30'00"--Quarry Hill)481,topographic map) Chalcopyrite, Calcite, Siderite, Limonite Pseudomorphs after Salt Crystals, "Coal" (36(locality uncertain)164,p.27,p.42,p.50,p.154,163,p.505,p.391)-- island at Turners Falls. Hornblendite (37(42°33'13",72°39'16")276)--with scapolite-bearing veins.

NEW SALEM: Cordierite, Hematite, Plagioclase, Rutile, Titanite (82(42° 20'12",72°19'45")65)--Roadside at Thurston Brook. May be under water. Olivine, Anthophyllite, Steatite (38(area of 42°30'19",72°18'34"--west slope of Rattlesnake Hill)163,p.55,164,p.166)--lenticular mass 300 yards northeast of A.A. Haskell's house (1898). Pegmatite (38(see description) 158)--just north of New Salem village (New Salem--42°30'13",72°20'02"). Cleavelandite (38,60,82(locality unknown)163,p.327) Pegmatites (38(see Map 4a, this book)53,map) Prehnite (60(42°27'23",72°20'40"--roadcut) 164,p.129)--fissures in diorite. Quartzite (60(locality uncertain)314, vol.3,p.xxlll-6)--Quabin and Felton Mountains. Used as hearthstones.

NORTHFIELD: Pegmatites (14(42°42'52",72°25'50"--northwest slope of Strobridge Hill)(42°41'46",72°24'39"--Great Hemlock (Mtn.))(42°40'57",72°24' 23"--Stratton Mountain)(42°40'20",72°24'41"--Upper Bald Hills)(42°39'37", 72°24'38")(42°38'56",72°24'34")(42°38'20",72°24'09")(42°38'06",72°23'59") --last 3 localities on First Bald Hills)(area of 42°42'43",72°24'45"--North Mtn.)(42°38'25",72°25'08"--Sky Farm)27,54,p.10,164,p.13)--Pegmatites vary in size from a foot to more than 100 feet in thickness, and some are several hundred feet long. Most of them are composed of a uniform mixture of quartz, potash feldspar, sodic plagioclase, muscovite, and biotite with small amounts of tourmaline, garnet, and pyrite. However some of the pegmatites in or near the Crag Mountain formation also contain beryl and tourmaline. Pegmatites containing these uncommon minerals are exposed on the northwest slope of Strobridge Hill. Cleavelandite at the top of Strobridge Hill with a little tourmaline. Diabase Quarries (14(42° 42'22",72°26'26"--may be built over)(area of 42°41'06",72°26'45")27) Amphibolite Quarry (14(42°39'22",72°29'22")27)--also see Bernardston, Franklin County. Graphite in Mica Schist (14(locality uncertain)164,p.89) --½ mile south of F.W. Piper's house (1866) on the Gulf Road (Gulf Road --area of 42°40'20",72°25'32") Garnet (14(localities uncertain)164,p.84, p.86)--on old Chapin farm (1886) on Northfield Mountain five minutes walk east of the black "lead" mine (probably graphite). Also C.A. Ware's pasture (1895), Gulf Road; boulder of coarse muscovite granite. Sulphur (14(locality uncertain)164,p.164)--in minute crystals in cavities caused by decomposing pyrite layers in hornblende gneiss on sharp east slope of Trowbridge (Strobridge?--see previous) Hill. Beryl, Tourmaline (14 (area of 42°39'08",72°24'25")(area of 42°39'40",72°25'32"--Brush Mountain) 164,p.38,p.170) Beryl, Garnet, Columbite, Albite and Spodumene Pegmatites, Zoisite, Hematite, Epidote, Sillimanite, Muscovite (14(see description) 157,p.258,164,p.38,p.57-58,p.13,181,p.696,163)--in Northfield, where the Gulf road crosses the south line of the town (area of 42°37'58",72°24'24"), large beryls occur in the pegmatite and garnet with complex paramorphic border of zoisite--hematite, epidote--fibrolite (sillimanite), and muscovite, and farther north, a mile west of the Moody homestead, is the interesting locality of columbite (with beryl) in a pegmatite dike in the mica schists. Columbite localities noted in pegmatite with beryl in lane ½ mile east of John Moody's house (1882) and in a pegmatite on Mr. Simeon Lyman's land (1866), 1 mile northeast of the village. Reference 163 states that the columbite locality is located ½ mile south of Strobridge Hill. May be reached by following the lane back of L.A. Moody's house, east through the woods nearly to the Warwick Road (area of 42°41'58",72° 25'51"). Farther south, Minot Section (Minot Brook--area of 42°41'26", 72°25'50")--beryl. Continuing, with the locality "a mile west...", still farther north, on the strike and therefore in the same schist, is a pegmatite dike that abounds in albite and spodumene and closely resembles


ORANGE
(Topographic Map 38)
(after Reference 53)
Smith
MAP 4b
x= Pegmatite
WARWICK
STATE FOREST
ORANGE
West Orange
RIVER
MAINE
Fishers Hill
Cem
Orange
Coolidge Brook
North Pond Brook
HOLTSHIRE ROAD
ORANGE STATE FOREST
Coolidge Swamp
Waterworks
Reservoir
Walnut Hill
Mahar High Sch
Red Brook
Lake Mattawa
Orcutt Brook
Cem


ORANGE
(Topographic Map 38)
(after Reference 53)
Switch
MAP 4a
x=Pegmatite
Sand and Gravel Pit
Chestnut
Pond
Ridge
North New Salem
Morse Village
The Bears Den
NEILSON
ROAD
Middle Branch
Browns Hill
Swift
River
Adams Hills
Andrews Hill
Harris Hill
MOOSEHORN
Wilbur Cem
Fisk Hill
N E W S A
Spriggy Brook
QUABBIN
RESERVOIR
NORTH MAIN ST
Moosehorn
Manning Brook
NEW SALEM STATE FOREST
WENDELL
Poor Farm Hill
Rattlesnake Hill
New Salem
Quabbin

the occurrence at the Manning farm (Goshen, Hampshire County). This dike lies just across the north line of Northfield, near the house of M.A. Brown, on the Winchester road (area of 42°43'34",72°25'46"--Winchester, Cheshire County, New Hampshire). Beryl--1 mile northeast of village on land of Simeon Lyman (1866). Spodumene, Beryl (14(42°38'09",72°24'14")224,p.43,164,p.38)--Angular chunks of a simple, white pegmatite that contains spodumene crystals two feet or more long... Besides the spodumene there are only quartz, some white feldspar and a few garnets (spessartite). Many other boulders were seen in a wall ¼ mile southeast (Erving, Franklin County),in which were some lustrous small beryls. The pegmatite is not known in place. Gneiss Quarry (14(locality unknown--Bassett's Quarry)163,p.44) Garnet (14(42°38'20", 72°25'03"--east of Sky Farm)(area of 42°39'40",72°25'32"--Brush Mtn.)158)--garnets an inch across in mica schist at Sky Farm locality. Aplite (14(42°38'36",72°25'07"--Crag Mtn.)--contact quartz rock called Northfieldite--over 300 feet thick. Also see Uxbridge, Worcester County. Also across State line in Winchester, Cheshire County, New Hampshire--along Ashuelot road skirting Perchog (Pauchaug) brook--(area of 42°43'56",72°25'06"). Barite, Dolomite, Galena?, Pyrite, Fluorite (14(locality uncertain)164,p.81,163,p.284)--purple fluorite in fissures in quartzite in Ross's lead mine (1882). Across State line in Winchester, Cheshire County, New Hampshire. Perchee (Pauchaug) Brook. Kyanite (14(locality uncertain) 164,p.66)--Deep rich blue in single crystals and fibrous gray. Top of Gulf Road, where it goes down to Erving (area of 42°37'58",72°24'23"). Chabazite (14(area of 42°43'30",72°27'44"--West Northfield)164,p.49,163, p.285)--wood road east of E.L. Holton's (1891). On fissures of mica schist. Also ½ mile below village (of Northfield), just opposite Grass Hill. The exact locality is by the brook crossing at a mill pond near the house of A. Billings. Quartz Combs and Veins (14(area of West Northfield)163, p.273)--in argillite. Well exposed on high, bare hill north of last house in West Northfield (M. Merrill's). Also see Bernardston, Franklin County. Hematite (14(area of 42°43'20",72°26'14")163,p.284)--extends north across State line. In quartzite. Outcrops are seen in all brook beds in the northern part of the town, and it approaches nearest to the older series in a lane running east from the L.A. Moody homestead and along the Winchester road. It is here greatly brecciated and full of quartz and hematite veins.

ORANGE: Pegmatites (38(see maps 4a,4b, this book)54,p.9,p.17,65,53,map) --also (15(42°38'11",72°18'36"--Pitt Hill Quarry)65,41,210)54,p.9,Fig.7) (15(from 42°37'37",72°19'03" to 42°38'40",72°17'58")210,map) Soapstone, Gedrite, Sillimanite (15(42°38'46",72°15'11"--Tully Mtn.)210,163,p.759, 164,p.57,p.86,p.154)--two small quarries--clinochlore, dolomite, talc. Gedrite and sillimanite 20 rods south of the quarry. Stilbite, Prehnite (38(area of 42°35'24",72°18'37")164,p.163)--in cutting east of railroad station. On surfaces of Monson gneiss. Monazite (38(area of South Orange) 331,p.166) Aplite (15,16(area of 42°39'10",72°15'00")158)--quartz rock (Northfieldite). Hill (Tully Mtn.?) mile north of Tully (Tullyville) where it occupies a circular area a mile across. Grunerite (15(42°39'39",72° 17'26")(42°38'58",72°16'04")247)--collectively also apatite, garnet, olivine, pyroxmangite, pyrrhotite.

PLAINFIELD: Chalcopyrite, Bornite (55(see description)163,p.170-171) --chalcopyrite--northwest of M. Stetson's, northeast of P. Packard. Bornite--pasture north of H. Barkers'. Hematite, Rhodonite (33(42°31'07", 72°56'33"--Prospect St.)166,map)

ROWE: Pyrite (11(42°40'58",72°51'53"--Davis Pyrite Mine)(42°42'37", 72°51'37")10(42°40'40",72°53'23"--Mary Louise Mine)(42°40'59",72°52' 33"--also chalcopyrite)166,366,473,314,vol.2,p.vii-12,p.xxv-6,215,301, 120,164,473,p.33-34,82,97,p.47-49)--David Pyrite Mine--pyrite, chalcopyrite, gahnite (automolite), ilmenite, rutile, apatite, sphalerite, garnet, calcite, feldspar, epidote, limonite, molybdenite, hornblende, sericite, pickeringite, chloritoid(?), galenite. Mary Louise Mine (also known as the Kork Mine, the Davenport Mine, Gray Mine)--veinlets of chalcopyrite, pyrite and quartz. Small amounts of fine-grained molybdenite. Ultramafic Body, Talc (10(42°40'36",72°57'34")(42°40'10",72°58'15")(42° 39'51",72°58'28")(42°42'17",72°55'33")(42°43'08",72°54'10")(42°43'24", 72°53'49")166,82,275,p.110--111,163,p.79-81,85)--last 4 localities--talc prospects. Also see Florida, Berkshire County.

SHELBURNE: Zoisite (35(42°37'22",72°42'09"--Patten Hill)(area of 42°36' 08",72°41'04")(42°35'06",72°42'28")12(42°37'47",72°42'44"--Patten Hill) 164,p.180,30,p.138)--second locality--erratic boulders. "Anvil" Rocks (35(area of 42°37'04",72°42'57")409)--differentially weathered calcareous quartzite. Pegmatites (35(42°36'42",72°43'00")(also area of Anvil Rocks) (42°34'58",72°41'14")409) Garnets (35(area of 42°37'01",72°39'56"--Peckville Road)409)--inch or more in diameter. Fasiculite (Hornblende) (12 (42°38'13",72°39'49")(42°38'18",72°39'17")408) Unusual Calcite and Pyrite Crystals (35(area of 42°35'21",72°41'30"--Route 2)428)--road cut made circa 1951. Three--eights mile long on south side of Route 2. Pyrite, Galena, Sphalerite, Malachite (35(area of 42°35'20",72°42'41")163,p.505, 409)--vein 2 feet wide at contact of mica schist and amphibolite. Contact extends north--south from locality point noted. Lazulite (12,35(Hinsdale Brook)164,p.100,350)--locality uncertain, may be in Colrain or Greenfield, Franklin County. Glacial erratic cobble found in bed of stream. Source locality may be Chittenden, Vermont. Albite (Periklin) (35(area of 42° 35'27",72°43'44")164,p.14)--at Ice Rock, mile below Shelburne Falls on the Deerfield River. Diopside (12,35(Bald Mt.)163,p.759)--in dark impure limestone. Hornblende, Chlorite, Magnetite, Garnet (35(see description) 30,p.130,409)--From U.S. Highway No. 2 (area of 42°37'15",72°44'42") to High Ledge (42°37'13",72°43'18"), the amphibolite contains chloritic phases, in which the proportions of hornblende and chlorite vary within wide limits. Some layers are almost pure chlorite, in coarse blades and branches. Others display magnetite metacrysts, up to quarter of an inch across, amidst irregular clusters of coarse chlorite. Garnet metacrysts reach half an inch in diameter in some layer groups, and in a brush pasture, 600 feet southeast of the summit of Massaemett Mountain (42°36'21",72°42' 55"), fresh garnets occur in the same ledge with partly or completely replaced garnets. The metacrysts are surrounded by shells of quartz and feldspar and have been altered to fine-grained aggregates of chlorite and quartz.

SHUTESBURY: Molybdenite (37,59(various localities)164,p.112-113,440,394, p.238)--land of Mr. Pratt (1895), in the extreme northern part of town, close by a mineral spring. This locality may be Mt. Mineral (59(42°29'43", 72°24'26")--old "silver" and mica mine--abandoned. Also Locks Pond (Lake Wyola). Steatite (59(area of 42°24'56",72°26'48")164,p.166,231,map) Glass Sand (37,59(area of 42°30'00",72°25'50"--shores of Lake Wyola)233,p.40) Aplite (Northfieldite) (59(locality uncertain)158,p.214-215)--2 miles north (northeast?) of Mt. Orient. See Pelham, Hampshire County.

SUNDERLAND: "Bituminous Coal", Sphalerite in Limestone (36(42°30'20", 72°33'27"--Whitmore's Ferry, North Sunderland)164,p.42,p.155,231,p.138, 466,75)--also see Fossil Section. Calcite (58(locality uncertain)164, p.44)--stalactites at Sunderland Cave, on the east side of Mt. Toby (Mt. Toby summit--42°29'16",72°32'18")--several inches thick. Clay Concretions (58(42°28'02",72°35'02"--east side of Connecticut River, Sunderland Bridge)433) Agate and Chalcedony in Basalt, Prase (36,58(localities uncertain)192)--Prase in north part of town, identification doubtful. "Sunderland Delta" (58(Gravel Quarries--(42°26'24",72°32'47")(42°26'07", 72°32'22")topographic map)--glacial delta.

TURNERS FALLS: See Montague, Franklin County.

WARWICK: Quartz, Epidote, Garnet (15(42°40'35",72°20'10"--Hastings Road (Crystal Hill)164,p.80,p.139,231,p.218,330,41) Quartz, Garnet, Magnetite (38(area of 42°36'49",72°20'21")163,p.229,p.80,164,p.103,p.139,232,p.124) --vertical bed of quartz--garnet rock (in amphibolite), very ferruginous, 1 foot wide at the north end and 3 feet wide at the south end, with a central layer of very compact, pure magnetite 4 to 6 inches thick. Pit opened 2 rods long and 10 feet deep. Garnet (38(area of 42°36'53",72° 19'44")15(North Mountain)(at D. Bacon's, northwest of town--year 1895) 164,p.85) Black Tourmaline (15(area of 42°41'29",72°21'20"--Mt. Grace) 65,330,164,p.169)--also epidote, epidote crystals, quartz, quartz crystals, magnetite, specularite. Limonite (Bog Iron Ore), Rhodonite (15(localities unknown)484,192) Gneiss Quarries (15(42°37'34",72°21'50")(42°39'30",72° 18'10")(42°39'36",72°18'11")(42°39'39",72°18'17")210,map)--first locality largest quarry. Pegmatites (15(42°37'32",72°20'02")(42°38'06",72°19'51") (42°39'42",72°20'05")(42°40'06",72°20'04")(42°41'34",72°20'47")(42°41' 51",72°20'18")(42°38'15",72°19'47")(42°38'07",72°18'53")(42°40'53",72° 20'19")14(42°42'27",72°23'59"--Bolster Hill)(42°43'07",72°24'13")(42°43' 11",72°24'23")210,27,53) Aplite (Northfieldite) (15(area of 42°42'38", 72°18'36"--Mallard Hill)158,p.213)--area over 3 miles long and in places 50 rods wide. Grunerite (15(42°39'05",72°18'11"--Beach Hill)(42°39'33", 72°18'09"--Iron Ridge)(42°41'12",72°18'10")(42°40'41",72°16'42")247,231, map,164,p.103,p.108,232,p.24)--collectively also olivine, magnetite, garnet. Across State line in Richmond, Cheshire County, New Hampshire-- Quarry? (15(area of 42°44'08",72°17'38")65)--chlorite pseudomorphs after cordierite, cordierite, grossularite, idocrase, soapstone. Anthophyllite --a few hundred feet south of the quarry.

WENDELL: Garnet (37(area of 42°33'14",72°22'36")29)--shallow pit. Whetstone (37,38(see description)163,p.218)--going up the Osgood Brook Road (Dirt Road)(Osgood Brook--area of 42°35'14",72°22'30") and turning onto the high hill north of S. Steven's house. Pegmatite (37,38(area of Osgood Brook)158,p.214)--oval stock. Steatite (37(area of 42°31'02",72° 25'27")164,p.166)--boulder northwest of Lake Wyola. See New Salem, Franklin County.

WHATELY: Marble (57(area of 42°27'27",72°38'08")(42°24'56",72°37'39") 62,480,480,63)--first locality, bed 100 feet thick. Galena Veins (57 (42°27'17",72°41'01")(42°26'58",72°40'55")(42°25'46",72°40'15")(42°24' 27",72°41'28"--Grass Hill)(area of 42°24'36",72°40'05"--Haydenville Road) 480,163,map,316,310,24,p.67)--collectively also chalcopyrite, sphalerite, pyrite. Native Copper (57(localities uncertain)21,p.52,164,p.58,230)--

glacial erratics probably derived from diabase. Seventeen ounce mass found in plowed field in area of contact between Triassic sedimentary rock and Paleozoic crystalline rock. Sixteen ounce mass found 2 miles to the west. Slight malachite and red oxide weathering. Albite (Periklin) (57(locality unknown)164)--in fissures in crushed argillite. Chiastolite, Staurolite (57(locality uncertain)164,p.22)--in Whately argillite (Garbenschieffer) at contact with Hatfield tonalite. Ochre and Sienna (Limonite) (58(locality uncertain--East Whately)164,p.101)--on land of Elihee Belden. Covers ½ acre 30 rods from the Connecticut River, in a long depression in the meadow extending from north to south. Immediately below turf, 10 to 30 inches thick; rests on loam.

ZOAR: See Charlemont, Franklin County.

FRANKLIN COUNTY FOSSIL LOCALITIES

BERNARDSTON: Brachiopods, Crinoids, Coral, Pelecypods (13(42°41'06",72° 33'11")168,463,163,p.259-269,476,28,22,455,31,66,476)--also see Mineral Section.

COLRAIN: Mastadon Tooth (11,12(locality unknown)157,p.149,163,p.738,226) --muck bed on farm of Elia Bardwell (1872).

DEERFIELD: Plant Fossils (35,36(area of 42°32'40",72°37'30"--Hoyt's Quarries(1898)163,p.394-395)

GILL: Dinosaur Tracks, Invertebrate Trails, Arthropod Tracks, Mollusca? Trails (36(area of 42°36'10",72°32'02"--Lily Pond)(area of 42°36'52", 72°33'07")37(area of 42°35'52",72°29'54")163,p.724,157,p.114,292,290,map) Dinosaur, Insect Fossils, Fossil Pine Cone (36(area of 42°36'20",72°30' 53"--Horse Race)290,292,404,290)--also see Montague, Franklin County. Dinosaur Tracks, Fossil Fern, Pine Cones, Invertebrate Trails, Arthropod Tracks, Mollusca? Trails (36(area of 42°37'04",72°32'25")228,237,163, p.395,290)--quarry on Roswell Field's farm (1856). Fossil Fish, Fossil Plants (36(at falls in Gill)137,p.80,304,p.40) Dinosaur Tracks (36,37 (Route 2)24,p.23) Plant Forms (36(area of 42°36'51",72°33'10"--mouth of Fall River)163,p.394) Fish Fossils--see Montague, Franklin County.

GREENFIELD: Fossils (36(localities unknown)163,p.394-406,365)--Triassic rocks. Recent Snake, Mammal, Snail "Fossils" (36(area of 42°34'47",72° 35'20")459)--found in diabase talus. Dinosaur? Bone (36(area of 42°35' 55",72°36'08")290,p.75)--sandstone quarry. Plant Fossils (36(area of 42° 34'36",72°34'41")163,p.375)--also a few rods south of the county jail, close by the stage road. And a mile north of Greenfield--Route 10.

MONTAGUE: Fern Fossil (36(locality uncertain)231,p.452,237)--in coarse gray sandstone quarry 100 rods northwest of the bridge over the Connecticut River leading to Greenfield. Also in arkose in bank of the Connecticut River 2 miles southwest of Montague. Insect Fossils (36 (locality unknown)290,404) Fish Egg Capsules, Dinosaur Tracks, Conifers, Algae (36(locality uncertain)63,24,p.23)--Hale's Farm (September,1949) Dinosaur Tracks, Bones (36(area of 42°36'12",72°30'56"--Horse Race (also see Gill, Franklin County)(area of 42°36'27",72°33'08"--Ferry above Turner's Falls(circa 1860)(area of 42°35'30",72°34'01")(area of 42°34' 56",72°34'20"--Marsh's quarry)(area of 42°36'36",72°33'23"--Montague

Canal)290,map) Fish Fossils (36(see description)163,p.399)--at Turners Falls on the east bank of Fall River (Gill), a few rods above the bridge, at the southeast corner of the island, a few few feet above the point where the dam abuts, and on the mainland directly north of this spot, in the line of strike at the foot of the bluffs and near the water's edge, many specimens can be obtained by digging in the black shales.

SHELBURNE: Mollusc Shells (12(area of 42°38'05",72°40'02"--East Shelburne)157,p.148,163,p.738)--in a marlpit at the farm of Fred. Conant (1872).

SUNDERLAND: Fish Fossils (36(42°30'20",72°33'27"--Whitmore's Ferry, North Sunderland)164,p.42,231,p.138,466,75,167,440,235,p.77,23,p.68, 149,151,163)--east bank of the Connecticut River. Also see Mineral Localities.

TURNERS FALLS: See Montague, Franklin County.

HAMPDEN COUNTY MINERAL LOCALITIES

HAMPDEN COUNTY (GENERAL): Mineralized Tubes--see Fossil Section Clay Concretions--in clay banks all along the Connecticut River. Agate--Occasional recoveries reported from river gravels as a result of weathering of nearby outcrops of basalt (reference 194). Gold--Panning and sluicing operations carried out during the 1930's on the Westfield River. (Gordon S. Fay, personal communication, 1975 (see reference 175).

AGAWAM: Diabase Quarries--see Southwick and West Springfield, Hampden County.

BLANDFORD: Soapstone (99(42°14'07",72°58'47"--Barthomolew Quarry)(42°09'27",72°55'42"--Osborn Quarry)85,218,163,p.85-90,p.754-755,115,p.761,63,330,268,231,map)--up to 25% chromite at Osborn Quarry. Ultramafic Bodies (99(42°13'36",72°58'44"--smaller body 1,000 feet to the northeast)(42°12'21",72°58'59"--adit)(42°11'27",72°58'55")(42°10'51",72°58'39")(42°09'34",72°56'19")218)--collective minerals: serpentine, talc, steatite, magnetite, tremolite, chlorite, opaque minerals (including chromite), carbonate. Gold (99(area of 42°14'05",72°56'03"--Goldmine Brook)225) Pegmatites (99(42°13'57",72°56'50")(42°14'15",72°56'11"--quarries)(42°11'06",72°57'10")(42°10'16",72°56'39")(42°10'27",72°55'11"--quarry)(42°09'30",72°56'44")(42°08'07",72°56'36")(42°08'26",72°57'12")(42°08'04",72°56'01")(42°07'55",72°56'14")(42°07'37",72°56'19")(42°10'00",72°54'47")(42°11'06",72°55'20"--quarry)(42°11'25",72°55'13")(42°13'40",72°55'44"--John Knox Road)(42°14'26",72°55'31")(42°13'10",72°52'44")(42°08'21",72°53'48")(42°08'41",72°53'49")218,53,157,p.258,163,p.322,330,472,472,p.122-123,252) Pegmatite Minerals (99,100(see description)402)--Following minerals reported from road cuts along a 4 mile stretch of Massachusetts Turnpike (Route 90) between Russel Stage Road, Blandford (99(42°10'57",72°55'17") and Route 20 at Woronoco (Russel, Hampden County (100(42°09'24",72°48'56")--actinolite, apatite, autunite, bertrandite, beryl, biotite, calcite, chalcopyrite, chlorite, columbite, epidote, fluorite, garnet, graphite, hornblende, ilmenite, kaolinite, manganoapatite, manganese dendrites, microcline, montmorillinite, muscovite, oligoclase, pyrite, pyrrhotite, quartz, stilbite, tourmaline, tremolite. Galena (98,99(area of 42°14'41", 73°00'00")231,map) Kaolin (99(42°10'37",72°55'11")218,163,p.33,314,vol. 3, p.xxxii-16,382,p.149-150,54,457,330,164,p.98)--weathered pegmatite. Quarry? (99(42°14'05",72°55'56")218) Gravel Pits (99(42°11'55",72°59'20")(42°10'04",72°56'56"--pit, gravel?)(42°08'28",72°58'59")topographic map) Staurolite (99(area of 42°10'37",72°58'40"--Blair Pond)163,p.75)--on road east of Blair Pond. Limonite (Bog Iron Ore) (99(area of 42°14'17",72°58'51"--Chester Road?)231,map)

BRIMFIELD: Cordierite, Adularia (105(see description)183,194,152,164,p.50)--1½ (½?) miles northeast of the village of Brimfield on road leading to Warren (Route 19?) near the entrance of Samuel Patrick (1838). Also? road cut north of village, near the town line at the west side of the road to Warren. One mile north of Elish Marsh's house (1886). Adularia in stone wall near house of Dr. Lincoln and widow of General Eaton (1820). Also near center of town. Sillimanite (128(area of 42°06'39",72°08'53"--East Brimfield)164,p.153)--near house of William Lombard (1885). Coarsest specimens found in fissures in calcareous pyroxenite, 45 millimeter long, 5 millimeters wide. Limonite (Bog Iron Ore) (105,128(locality uncertain) 164,p.102)--formerly worked to a considerable extent on farm of Charles Bugbee, since occupied by Michael Travers (1874).

CHESTER: Emery Prospects and Mines (77(42°18'11",72°59'22")(42°17'46", 72°59'33"--Snow Mine)(42°17'40",72°59'35")(42°17'25",72°59'33")(42°17' 11",72°59'31")(42°17'08",72°59'31"--Sacket Mine)(42°16'59",72°59'31") (42°16'50",72°59'27"--Macia Mine)(42°16'40",72°59'24" and 42°16'37",72° 59'23"--Old Mine)(42°16'35",72°59'22")(42°16'13",72°59'17"--Melvin Mine) (42°16'09",72°59'16")(42°15'53",72°59'08")(42°15'50",72°59'06"--Wright Mine)217,200,164,38,348,181,63,423,165,p.85-90,330,362,p.134-137,208,422, 71,p.165-167,17)--Reference 200 states that the best collecting dump is at the Wright mine (margarite). At Old Mine--diaspore. Sacket Mine-- magnetite. Collective minerals: corundum,(variety: emery), chromite, (trace of platinum in chromite), chlorite, paragonite, magnetite, margarite, sapphire, corundophilite, diaspore, amesite, ilmenite, rutile, tourmaline, jeffersite, epidote, talc, actinolite, sphene, calcite, malachite on epidote, aragonite (white rosettes), hornblende, pyrite, oligoclase, apatite, menaccanite, azurite, biotite, indianite (andesine--oligoclase), picrolite, chalcopyrite, meerschaum. Ultramafic Bodies (77(from 42°18'16",72°59'22" to 42°20'11",72°59'53"--Middlefield, Hampshire County)(42°15'06",72°58'58")217)--first body has a maximum width of 0.33 mile. Serpentine Pseudomorphs after Olivine (Hampshirite) (77 (area of 42°18'36",72°59'32")157,p.156,157,164,337)--also brucite. Pegmatites (77(42°15'00",72°56'50")(42°15'17",72°56'47")(42°15'00",72° 56'19")(42°16'01",72°56'20")99(42°14'39",72°56'14")224,p.44-45,55,53) Spodumene (77(locality unknown)54,p.12,260) Periklin (77(locality unknown) 164,p.14)--large crystals in cavities in sericite schist at various places in Chester. Jasper, Agate, Chalcedony (77(West Branch Westfield River)164,p.136-137) Garnet (77(locality uncertain)164,p.85)--at the "quartz mine" in the extreme east of town. Quartz Veins (77(area of 42° 15'18",72°58'05")63) Zoisite (77(locality uncertain)345)

CHICOPEE: Pisolites (102(Chicopee River)138,164,p.44)--composed of calcite, alumina, silica. Limestone (102(area of 42°09'30",72°34'16")231, map) Sandstone Quarry (102(area of 42°08'52",72°35'29")Peare,1956)-- built over?

EAST LONGMEADOW: Sandstone Quarries (125(42°11'41",72°30'22")63,163,p.391-393,Pearre,1956,topographic map)--inactive. Saulsbury and Kibbe quarries.

GRANVILLE: Kyanite--Sillimanite Schist (122,123(see Russell, Hampden County)397,163,p.75) Ultramafic Bodies (122(42°03'03",72°55'11"--steatite) (42°06'08",72°52'33")(42°05'06",72°55'50")(42°07'06",72°58'24")(42°04'20", 72°55'27")398,163,p.90-92,164,p.166,231,map,Peare,1956)--also glacial erratic boulders. (123(area of 42°06'04",72°50'17"--Drake Mtn.)(area of 42°03'49",72°50'19"--Sodom Mountain)(area of 42°03'12",72°51'41"--steatite)397,164,p.166,231,map,Peare,1956) Enstatite--Serpentine (122,123 (see description)164,p.77-78,63,163,p.90-92,p.757)--Area of Munn Brook (42°04'53",72°50'11"). Also large crystals of enstatite superficially altered to bastite and talc, which occur in boulders at the cemetary in Granville (Northeast Cemetary?--42°05'26",72°51'18") and just in the great ledge (20 feet wide, 24 feet high) in the densely wooded swamp 100 rods east of J. Downey's and also south of J.M. Cooley's in the northeast of Granville, where crystals 6 inches long can be obtained. Enstatite prisms a foot long with interstices filled with transparent dolomite, east of H. Cooley's in a pasture a mile southeast of Sweetman Mountain (Sweetman Mountain--122(42°06'23",72°53'20")Also rock in place southwest of the point where "Wildcat road" (Wildcat Gorge Road) bends south. Boulders of the same rock occur northwest, in the bed of the Westfield Little River at the great bend a mile below "Pothole Rock" (area of 123(42°07'01", 72°51'59").

Pegmatites (122(42°07'04",72°57'04")(42°07'23",72°55'08")(42°07'1[illegible] 72°55'03")(42°06'34",72°56'26")(42°05'01",72°55'10")(42°05'17",72°55' 13")(42°04'32",72°55'42")(42°04'12",72°55'16")(area of 42°06'14",72°54' 07")(42°04'04",72°55'16")(42°06'57",72°57'30"--Ripley Brook(trace beryl) (42°06'55",72°57'34"--Ripley Brook)(42°06'42",72°58'07")(42°04'51", 72°54'42"--Twining Hollow(Route 57)(trace beryl)(42°02'41",72°56'54") 123(42°06'47",72°51'50")(42°06'35",72°51'01")(42°06'15",72°50'27"-- Drake Mtn.)(42°06'02",72°50'39")(42°05'59",72°50'22"--Drake Mtn.) (42°05'57",72°52'05"--East Sweetman Mtn.)(42°05'28",72°52'27")(42°04' 46",72°51'46")(42°04'30",72°52'15")(42°04'27",72°50'17")(42°03'55", 72°50'25"--Sodom Mtn.)(42°03'10",72°52'08"--South Mtn.)(42°03'37",72°51'40") 53,398,397) Actinolite Limestone (122(42°04'11",72°53'14"--Woodland Cemetary)(area of 42°04'01",72°53'12"--Trumble Brook)163,p.90-92)-- erratic boulders at cemetary.

HAMPDEN: Pegmatites (126(42°05'53",72°23'56"--Glendale Road)(42°05'20", 72°25'00"--Mt. Vision)(42°05'29",72°24'22"--Big Brook)(from 42°04'09", 72°25'56" to 42°04'48",72°25'31"--Wilbraham Mtns.)354)

HOLLAND: Graphite (128(42°02'47",72°08'38"--Cozzens Prospect (flooded) (42°03'10",72°08'10"--H. Vinton Road)15,314,vol.3,p.xxii-14 to p.xxii-15, 410)--Also see Sturbridge, Worcester County. Fluorite (128(area of 42° 04'01",72°10'22")65)

HOLYOKE: Specularite, Anhydrite, Pyrite, Barite, Graphite (80(locality uncertain)157,p.269,164,p.26,p.34,p.89,p.94,63)--Larrabee's quarry beside the Connecticut River railroad at the north line of Holyoke. Contact of sandstone and diabase. Babingtonite (79(42°15'09",72°38'01"--quarry)269, topographic map,349)--with prehnite, chabazite, quartz, datolite, natrolite, calcite, pyrite. Babingtonite specimens found in 1929 donated to the nature museum of the Mt. Tom summit house. Agate, Amethyst Crystals, Opal, Quartz Crystals, Smoky Quartz Crystals (79,80(area of 42°16'09", 72°37'30"--Mt. Tom State Reservation)194,197,164,p.136)--eroded from diabase. "Coal", Pyrite, Siderite Pseudomorphs after Barite, Calcite Pseudomorphs after Salt (102(42°12'47",72°36'08"--below Holyoke dam) 163,p.755,36)--in shale. Also see Fossil Section. Calcite Pseudomorphs after Salt (101,102(locality unknown)165)--in shale boulder. Analcite (80(see description)330)--found in traprock near Smith's Ferry. (Smith's Ferry--42°15'29",72°36'52") Delaney's Quarry (80(area? of 42°16'22",72° 36'22")163,p.470,p.480,p.757,164,p.90)--section from bottom--diabase, sandstone, tuff. Fault in quarry. Pockets of datolite crystals along fault line; amygdules filled with anhydrite, and calcite. Calcite and specularite in sandstone. Volcanic bomb in tuff. Pyrite. Gypsum crystals. Calcite Crystal (80(see description)164,p.45)--scalenohedron in tuff. Half mile below Smith's Ferry. Limestone (101(area of 42°10'00",72°38'45") 231,map) Sandstone Quarry (101(area of 42°09'58",72°39'43")Pearre,1956)-- flooded?

MONSON: Gneiss Quarries (127(42°07'08",72°19'51"--Flynt Quarry)(42°05' 41",72°19'33")116,115,p.303-305,164,163,p.65,101,356,355,topographic map) --At Flynt Quarry--magnetite in muscovite, stilbite, chabazite, laumontite, prehnite, beryl. Moonstone (Orthoclase) (127(locality uncertain) 194)--east part of town. Lenses in Brimfield Schist. Across State line in Stafford, Tolland County, Connecticut: Pegmatite (127(42°00'23",72° 22'14")355) Quarries (127(42°00'16",72°22'07")(42°00'33",72°20'26")(42° 00'18",72°20'29")(42°00'07",72°20'37")355)

MONTGOMERY: Galena (100(area of 42°13'04",72°48'14")231,map) Pegmatites (100(42°13'37",72°50'20")(42°13'35",72°50'29")(42°13'16",72°50'20")(42°13'03",72°50'42")(42°12'32",72°50'37")(42°11'15",72°47'59"--Ball Mtn.)(42°09'37",72°48'35")(42°13'03",72°51'56")53,257,p.29-33,252)

PALMER: Tabular Citrine Quartz Crystals (104(area of 42°10'53",72°21'47"--Three Rivers)164,p.137)--found at factory site. Prehnite (104(Three Rivers)194)--in basalt. Oligoclase (104(locality uncertain)164,p.119)--found in a boulder at home of R. Printible (1887). Magnetite (104(locality unknown)101)--piece size of hen's egg found in field.

RUSSELL: Kyanite--Sillimanite Schist (123(from 42°06'27",72°52'30"--Granville, Hampden County to 42°07'16",72°51'14" to 42°06'18",72°49'40"--Westfield, Hampden County)397,164,p.65)--formation varies in apparent width from 0.1 to 0.4 mile. Pegmatites (123(42°07'26",72°52'17")(42°07'09",72°52'12")(42°06'58",72°51'29"--two other pegmatites--250 feet (trace beryl) to northeast and 500 feet to the northeast. (42°07'01",72°51'21")100(42°12'37",72°52'20"--Holiday Hill)(42°10'05",72°50'32")(42°09'56",72°50'00")(42°09'58",72°50'42"--Route 23)(42°09'30",72°49'03")397,53,257,p.29--33,65,54,p.11)--at Holiday Hill--hand-sized books of muscovite. Immediately adjacent to this outcrop, 1 to 1½ inch tourmaline crystals are developed on bedding surfaces on schist-gneiss. Manganesian Garnets (100(locality uncertain)163,p.327,157,p.258,439,p.180,181,p.596)--locality may be built over. Just south of the first house on the Westfield--Russell road (Route 20?) after entering Russel. Pegmatite Minerals--see Blandford, Hampden County. Galena (100(area of 42°10'20",72°51'59")231,map) Galena, Sphalerite, Chalcopyrite, Drusy Quartz (100(see description)232,p.127,163,p.507,164,p.50,p.155)--veins in Conway Schist. In northwest part of Russel. Farm of John Gould. Enstatite--Serpentine (100(42°09'47",72°49'50"--quarry)topographic map,225)--see Westfield, Hampden County.

SOUTHWICK: Pegmatites (123(42°04'59",72°49'57")(42°04'37",72°50'03")(42°04'13",72°49'48")(42°03'51",72°49'58")(42°03'51",72°49'27")(42°03'30",72°49'41")(42°03'20",72°50'02")53,397) Ultramafic Body (123(42°05'11",72°49'53")397) Diabase Quarry (124(42°03'58",72°42'31"--Provin Mountain) topographic map)--also see West Springfield and Agawam, Hampden County.

SPRINGFIELD: Sandstone Quarries (102(area of 42°09'27",72°30'45"--Indian Orchard (built over?)125,126(area of Sixteen Acres (Quarry Pond?--42°06'21",72°30'00")63,163,p.391-393,Pearre,1956)--Carlisle Quarry. Spinel (102,125(locality unknown)348,p.694)--in slate.

TOLLAND: Pegmatites (122(42°06'06",72°59'14")(42°05'09",72°58'33")(42°04'34",72°58'38")(42°04'27",72°58'37")(42°04'11",72°54'24")(42°02'46",72°59'00")(42°02'26",72°59'59"--Johnson Hill)(42°02'23",72°59'57"--Johnson Hill)398,399,p.56)--first pegmatite may be that containing poikilitic hornblende crystals, as much as 3 feet long. Sulfide zone 20 feet thick in boundary facies of post metamorphic diorite and pegmatite body. Ultramafic Body (122(42°04'54",72°58'38")398)

WALES: Calcite (Iceland Spar) (127,128(locality unknown)163,p.756,231,p.638)--in gneiss. Moonstone (Orthoclase) (127,128(locality unknown)194)--in Brimfield Schist. Across State line in Stafford, Tolland County, Connecticut--Gold Prospect (128(42°00'47",72°13'10"). In Union, Tolland County, Connecticut--Gold Prospect (128(42°01'26",72°12'05")410).

WESTFIELD: Potholes (123(42°06'32",72°49'40")286) Enstatite--Serpentine (100(42°07'53",72°49'49"--Atwater Quarry)65,301,p.90-92,63,163,p.92-95, p.152,130,330,194,74,164,157,225)--talc, chrysotile, tremolite-actinolite, rose quartz, black tourmaline, bastite (marmolite), epidote, fosterite, dolomite, margarite, antigorite, kyanite. Indian Workings. Also see Russel and Granville, Hampden County. Abandoned Marble Works (123(42° 08'05",72°49'37")65,330)--broken slabs of serpentine and marmolite. Pieces of marble containing tremolite and altered crystals of enstatite. Fibrous calcite. Diabase Quarries--see West Springfield, Hampden County. Calcite, Apatite, Epidote (123(42°07'45",72°49'43")65)

WEST SPRINGFIELD: Diabase (John S. Lane and Sons) Quarries (124(42°06'26", 72°41'40")(42°06'29",72°41'43")(42°07'06",72°41'31")101(42°07'33",72°41' 26")(42°07'39",72°41'25")(42°07'51",72°41'24")(42°08'19",72°41'03")--all quarries on East Mountain)topographic map,65,194,200,164,p.123,100,330, 200,343)--collective minerals: galena, sphalerite, chalcopyrite, pyrite, hematite, wad, limonite, calcite, malachite, quartz, amethyst, opal, heulandite, stilbite, laumontite, apophyllite, diabantite, chalcocite, stilpnomelane, prehnite, pigeonite, babingtonite, epidote, manganepidote, datolite, wurtzite, calamine, diabantite pseudomorphs after babingtonite, limonite pseudomorphs after babingtonite, glaubite casts, anhydrite casts, albite, barite, mesolite, thompsonite. Calcite Pseudomorphs after Salt Crystals (124(locality uncertain)164,p.46,p.123,165)--in black shale above (below?) dam on the south bank of the Westfield River. Also near bridge below the town. Sphalerite (101,102,124,125(localities unknown)164,p.154, 231,p.230)--rare in fetid limestone in Paine's quarry and Meacham's quarry (1835) "Coal", Gypsum, Calcite (101,124(Mitaneague Falls--north bank of Westfield River)130,36,164,p.42,p.44,231,p.43,298,75)--Coal with calcite and gypsum found between the layers of slate. The gypsum resembles fish scales, ½ inch in diameter. Also found bituminous marlite, pyritous copper (marcasite?) in irregular concretions. Calcite veins in red sandstone slate and greenstone and sometimes embedded in amethyst. Four miles north of this locality is a bed of bituminous limestone. Formerly burnt for lime (previous Sphalerite?, Paine's and/or Meacham's quarry) Flint (101,120,124,125(locality unknown)330,p.15)--gravel bank.

WILBRAHAM: Indian Soapstone Quarries (103(area of 42°07'32",72°24'39") 157,p.217,65)--1½ miles south of Ellis Mills. One common variety of rock there is full of remnants of olivine, another is a diallage rock passing into a hornblendite, a third is a light grass-green granular pyroxenite, and a fourth is a coarse massive biotite rock. The first-named and last-named varieties, in an altered state, furnished the soapstone for the Indian pots. Chalcopyrite (126(42°07'16",72°25'34"--Woodland Dell Cemetary) 354). Also across State line in Somerset, Tolland County, Connectiuct--(42°01'44",72°26'25"--sand pit). Chalcopyrite as disseminated grains in late quartz veins that cut mylonite and silicified protomylonite exposed on the east flank of the sandpit. Thin coatings of malachite occur in local patches in a few sandstone boulders in the pit. Pegmatites (126 (42°07'20",72°24'34"--Mt. Chapin)(42°07'19",72°24'24"--Mt. Chapin) (42°06'52",72°24'32")(42°06'23",72°24'59"--Wigwam Hill)(42°06'24",72° 23'47")354) Malachite--see Fossil Section.

HAMPDEN COUNTY FOSSIL LOCALITIES

HAMPDEN COUNTY (GENERAL): Plant Root Casts--as Mineralized Tubes (reference 421,p.993--994). See Mineral Section. Also Boston (Charlestown), Suffolk County.

AGAWAM: Carbonized Plant Stems (124(area of 42°04'01",72°40'45"--Feeding Hills)330)

CHICOPEE: Fossil Fish (102(area of 42°09'30",72°34'56"--Chicopee Falls) 290,p.73) Dinosaur Tracks (102(area of 42°09'47",72°34'53"--Route 33?) (area of 42°07'44",72°36'40"--near "Cabotville"(Route 16?)290,map)

EAST LONGMEADOW: Reptile Fossil (125,126(locality uncertain)290,p.102, 170,292,290,p.56)--in Hines sandstone quarry, about a mile east of East Longmeadow. See Mineral Section.

HOLYOKE: Fossil Plants (102(42°12'47",72°36'08"--below Holyoke Dam)304, p.40)--stems of conifers(?) altered to asphaltite. In Chicopee shale. See Mineral Section. Dinosaur Tracks (79(42°15'09",72°38'01"--quarry. See Mineral Section)(101(sandstone quarry in area of 42°10'19",72°39'47" --Ashley Pond)(area of 42°13'54",72°37'45"--Route 5?)(area of 42°10'02", 72°39'14"--Penn. Central R.R.)}102(42°14'32",72°37'23"--area of Smiths Ferry)440,329,24,p.23,290,map) Fossil Wood (102(locality uncertain)304, p.40)--by Connecticut River east of Mountain Park (Mountain Park--}101 (42°14'39",72°37'55"). Altered to coaly material. In Longmeadow sandstone.

SPRINGFIELD: Dinosaur Bones (125(area of 42°05'15",72°34'46")290,p.76) --blasting for well circa 1856. Plant Forms (125(area of 42°05'50", 72° 33'50")163,p.394)

WESTFIELD: Fossil Fish (100,101,123,124(locality unknown)235,p.76)-- in shale.

WILBRAHAM: Fossil Lamellibranchiata (103,126(locality unknown)290,p.54-55) --in sandstone stained by malachite.

HAMPSHIRE COUNTY MINERAL LOCALITIES

HAMPSHIRE COUNTY (GENERAL): Gold--Westfield River (Gordon S. Fay, Personal Communication, 1975 (see Reference 175) Clay Concretions--In clay banks all along the Connecticut River.

AMHERST: Jasper and Chalcedony Boulder (58,59(North Amherst)310,164, p.120,p.131,p.136,p.137)--with agate, hematite, pyrolusite. Glacial erratics probably derived from source area in Conway, Franklin County. Traprock Minerals--see Granby, Hampshire County. Heulandite, Graphite (58,80(see description)164,p.86,p.89)--"Pikes Peak" (blasted away) on north end of Prospect Street. In garnetiferous amphibolite. Sillimanite (58(from 42°23'03",72°31'13" to 42°23'44",72°31'22")164,p.153) Muscovite after Microcline (58(locality uncertain)164,p.117)--west of middle of long dike east of North Amherst (North Amherst--42°24'36",72°31'53") Pegmatites (80(42°20'31",72°30'30"--South Amherst)(42°20'35",72°30'24" --South Amherst)(42°20'59",72°30'29")(42°21'19",72°30'17")26)

BELCHERTOWN: Montmorillonite, Allophane (81(Kelley's Crossing)164,p.15, p.114)--in greenish coating on pink feldspar veins in hornblende schist. Fibrous Diallage, Hornblende (81(locality uncertain)65,164,p.133)--at T.S. Haskell's place (1951)--west of Belchertown Center. Diallage also at S. and A. Craft's (1887). Sillimanite (104(42°14'20",72°21'26")209,164,p.153) --crystals more than 1 inch long. Pegmatites (81(42°15'38",72°26'09"--second pegmatite 600 feet to the northeast)(42°15'06",72°24'33")(42°16' 34",72°15'52"--second pegmatite 530 feet to the east--southeast)(42°17' 07",72°24'51")(42°18'38",72°25'08"--second pegmatite 530 feet to the northwest)(82(42°17'02",72°22'27"--second pegmatite 500 feet to the east) 209) Hornblendite (81(area of 42°16'38",72°25'50")(area of 42°16'10", 72°23'26"--Route 181)(from 42°16'56",72°24'47" to 42°17'32",72°25'12") (81,82(area of 42°17'03",72°22'30")(82(area of 42°16'47",72°21'07")209)

CHESTERFIELD: Pegmatites (56(42°25'51",72°52'22"--MacComber ledge) (42°25'17",72°52'24"--Clark ledge)(42°24'08",72°52'21"--West Chesterfield ledge)(42°24'11",72°50'37")77(from 42°20'53",72°52'35" to 42°21'42", 72°52'31")217,54,p.12,p.16,157,p.255-257,219,p.26,460,448,181,164,p.158, 65,330,224,p.42-43)--collective minerals: albite, autunite, manganese garnet, biotite, cleavelandite, columbite, cookeite, lepidolite, microcline, zircon, beryl, uranite, muscovite, quartz, tourmaline, spodumene, microlite, rubellite, pyrochlore, cymatolite. Zoisite (78(42°22' 29",72°49'09"--Bisbee Mill)164)--The locality is found by following the brook which enters East Branch a mile south of Bisbee Mill, 5/8 mile east, and then going 30 rods south into a spur of the hill marked 1455 feet. "Copper Mine"? (56(area of 42°25'49",72°50'22")310,map) Kyanite (56(from area of 42°23'11",72°49'01" to 42°25'32",72°51'10" to 42°26'11", 72°50'28")310,map) Cummingtonite, Pyrite, Garnet (56,78(localities uncertain)164,p.12)--bluffs west of Bunnels Pond and large boulders down the hill a mile southeast of Chesterfield Church (1820). Hornblende, Garnet (56(locality uncertain)164,p.84)--mile northeast of the meetinghouse. Zoisite, Kyanite, Cummingtonite, Green Feldspar, Rhodonite (56(locality uncertain)164,p.178,197)--1 mile north of meetinghouse on old Searle farm (1828). Smoky Quartz (55(area of 42°24'31",72°53'29")197) --pegmatite in road cut, Route 143. Rose Quartz (56,78(locality uncertain) 197,164,p.134)--east edge of township. Basanite (55,56(bank of Westfield River)164)--in mica schist.

CUMMINGTON: Zoisite (55(locality uncertain)164,p.180)--land of Elisha Mason, some 3 miles west of the East Village in Cummington. Whetstone Quarry (55(42°27'24",72°54'20")56(area of 42°27'58",72°51'20"--B. Shaw's quarry)82,332,p.99,235,63,163,p.186-187,Pearre (see General References) Cummingtonite (55,56(locality uncertain)164,p.17,181,p.576)--lies by the roadside (Routes 9--112) a few miles east of the village. Talc in Steatite (55(locality uncertain)164,p.166)--½ mile north of Hubbard's leather manufactory. Rhodonite (55(locality uncertain)164,p.140)--in stone walls northeast of the meetinghouse (1841)--probably derived from deposits in Plainfield, Hampshire County. Red Jasper (55,56(banks of Westfield River)164,p.136) Spodumene (55(area of 42°26'22",72°52'49")224,p.42-43)--on Merryfield farm 2½ miles north of West Chesterfield.

EASTHAMPTON: Argentiferous Galena Prospects (79(42°16'59",72°43'55"--"Southampton Mine"(adit)(42°16'51",72°43'50"--dump)(42°16'50",72°43'49")(42°16'40",72°44'00")65,272,474,p.43-46,197,200,330,310,58,164,282,163,p.502-504,21,21,314,vol.3,p.xxiv-11,p.vi-24 to p.vi-26,347,p.258,p.893,p.1088,p.1085,182,p.544-597,44)--collective minerals: agate, albite, anglesite (fluoresces yellow), apatite, aragonite, arsenopyrite, aurichalcite, azurite, barite, biotite, bornite, brochantite, calcite, caledonite, cerussite, chalcanthite, chalcocite, chalcopyrite, chrysocolla, cotunnite, covellite, cuprite, djurleite, fluorite, galena, goethite, hemimorphite, hydrocerussite, langite, leadhillite, limonite, linarite, litharge, malachite, mendipite, mimetite, muscovite, opal, percylite, phosgenite, pyrite, pyrolusite, pyromorphite, quartz, silver, smithsonite, sphalerite, stolzite, witherite, wroewolfite, wulfenite, quartz pseudomorphs after fluorite, quartz pseudomorphs after calcite. Serpentine and "coal" in adit. Also see Southampton and Northampton, Hampshire County. Sandstone Quarry (101(area of 42°14'17",72°39'24") Pearre (see General References)--also see Fossil Section. Brownstone (Arkose) Quarry (101(northwest slope of Mount Tom)163,p.391)

GOSHEN: Pegmatites (56(42°28'19",72°48'40"--Manning Ledge)(42°28'10",72°49'41"--Taylor Ledge)(from 42°27'40",72°50'09" to 42°28'04",72°50'15"--Barrus Ledges)(42°25'53",72°48'31")(area of 42°27'52",72°49'30")(area of 42°26'43",72°49'59"--Lilly Pond)65,163,p.326-327,231,p.205,164,p.117,383,p.50-51,430,197,157,p.257-258,330,219,p.26,224,p.38-42,197,181,p.635,54,p.11,418,330,223,430)--collective minerals: albite, indicolite, garnet, spodumene, orthoclase, muscovite, beryl, cleavelandite, goshenite, columbite, cassiterite, lepidolite, cymatolite, smoky quartz, rubellite, zoisite, ilmenite, pyrite films on cleavelandite, pollucite. Galena (56(area of 42°26'11",72°48'08")163,p.504,164,310,map) Garnet Schist Quarry (56(locality uncertain)163,p.181)--J. Hawke's quarry, northwest of Goshen Center. Graphic Granite (56(locality uncertain)235,p.16)--northeast part of town. Flagstone Quarry (56(42°26'20",72°50'51")4)--shown as gravel pit on topographic map.

GRANBY: Traprock Minerals (80(42°18'07",72°31'33"--John S. Lane & Sons' Co. Quarry (The Notch)197,94,330,427,p.121,26,map,p.442-443,269,65)--apophyllite, anhydrite, stilbite, amethyst, datolite, prehnite, quartz crystals, babingtonite, calcite, albite, zeolite, fluorite, chlorite. Agate Veins (80(locality uncertain)197)--veins 20-25 millimeters thick. Bluish white hue in basalt, east of road (Route 116) running south from The Notch. Agate Nodules (80(see description)26)--south and southwest of Mt. Norwottock (Mt. Norwottock--42°18'19",72°30'38"). Outer coating of quartz and chlorite, about 3 millimeters thick and some of the inner

quartz crystals are amethystine. Sandstone Quarries (80(42°15'26", 72°30'31")(42°15'19",72°31'09")(42°15'15",72°32'06")(42°16'23",72° 32'46")(42°16'22",72°32'58")(42°17'01",72°32'49")26) Quarry (103(42° 14'18",72°29'03")topographic Map)

GREENWICH(town flooded by the Quabbin Reservoir): Magnetite, Garnet, Pyrite (82(under Quabbin Reservoir)163,p.43)--Power's "mine" on high hill overlooking house of S.B. Esty. Allanite--see Hardwick, Worcester County.

HADLEY: Sandstone Quarry (80(42°18'31",72°35'21"--Skinner State Park) 26) Pegmatite (Quarries) (80(area of 42°22'15",72°34'50")26) Augite, Quartz Pseudomorphs after Barite, Amethyst Crystals (80(42°18'01",72° 35'44"--Titan's Piazza)(Titan's Pier incorrectly shown as Titan's Piazza on topographic map)164,p.33,p.94,p.133,194,p.138)--also quartz crystals and hematite globules in diabase to south of Titan's Piazza locality in South Hadley. Vivianite (80(area of 42°19'58",72°34'51") 164,p.173)--see Fossil Section.

HATFIELD: Chiastolite Schist (57(locality uncertain)163,p.209-210,164, p.22)--southeast slope of Belmont Hill in the northwest corner of Hatfield. Galena, Barite (57(42°23'18",72°38'07")65,330,21,p.521,474,p.46-47,163,p.504)--also chalcopyrite, pyrite, sphalerite, fluorite, pyromorphite. Native Copper (57(localities uncertain)164,p.58,230)--two pieces--glacial erratics. (1) found in drift near contact between sandstone and crystalline rocks--mass 17 ounces. (2) mass 16 ounces found 2 miles west in crystalline rock hill.

HUNTINGTON: Pegmatites (78(42°19'56",72°52'07"--Walnut Hill)(42°18'12", 72°50'23"--McKinney's Ledge)(42°17'59",72°51'25")(42°18'59",72°51'36") (42°19'36",72°52'16")(42°16'30",72°51'52")(42°19'36",72°52'21"--Little River)(99(42°13'27",72°52'43")163,p.322,224,p.43-44,197,164,54,p.11,p.60, p.120,p.17,426,157,p.255-257,252)--spodumene, cleavelandite, beryl, triphyllite, biotite, garnet, staurolite, zoisite, quartz, feldspar, kyanite, rutile, calcite, aragonite, diopside, actinolite, siderite, ankerite, tourmaline, perthite, apatite (fluorescent), columbite, beryl, lithiophilite, zircon, heterosite pseudomorphs after triphylite, pyrolusite dendrites, autunite, kaolinite, cymatolite, rose quartz. Quarry (100 (42°13'58",72°52'28")topographic map) Kyanite, Smoky Quartz, Garnet (99(area of 42°14'07",72°53'30"--south side of Route 20)65) Whetstone (78(area of 42°19'58",72°52'18")163,p.186-187,457) Sphalerite (78(42° 17'21",72°50'22"--Norwich)163,242,231,p.204,164,p.155)--"Quartus Angell's Mine". One mile northeast of the meetinghouse (Norwich). Drusy quartz pseudomorphs after barite and calcite, galena, rutile, Epidote (Zoisite?) (78(locality uncertain)164,p.80)--½ mile south of the East Branch. Emery (77,78(locality unknown)362,p.137)

MIDDLEFIELD: Talc-Serpentine (77(42°22'20",72°59'08")(42°22'06",72°59' 08")163,p.81-85,164,p.166,217,85,Pearre--(see General References) Chondrodite (76(area of 42°19'13",72°02'28"--Coles Brook railroad cut) 164,p.54,p.27,161,p.108) Ultramafic Rock (55(42°23'09",72°58'42")214,217) --predominantly greenish-gray talc-carbonate rock containing lesser amounts of light greenish-gray steatite and dark greenish-gray serpentinite. Also see Chester, Hampden County. Meerschaum (77(locality unknown) 164,p.149)--weathered portions of the Middlefield serpentine bed.

see next page

Porphyritic Biotite Granite (77(from 42°19'26",72°59'06"--Colline Hill to 42°21'39",72°58'55"--Bear Mountain)63)--averages a ¼ mile width.

NORTHAMPTON: "Granite" (Tonalite) Quarry (79(42°20'25",72°39'41")(42°20'50",72°38'39")44,182,topographic map,164,p.14,p.34,p.128,p.160,p.82,440,163,p.506-507,21,21,p.52,474,p.46)--second quarry best known for allanite crystals on southwest wall. Also barite, fluorite, prehnite, calcite, argentine, laumontite, albite. Clay Pits (79(area of 42°29'51",72°39'27")163,p.708,314,vol.3,p.xxif-16,233,p.37,44)--south of the insane asylum. Clay used in place of fullers earth. Sphalerite, Galena, Chalcopyrite, Wulfenite (79(42°17'48",72°44'10")(42°17'45",72°43'34"--dump)182,429,164,44)--vein at top of hill 1,000 feet to the north-northwest of the dump noted. Galena? (79(area of 42°21'12",72°44'05"--Marble Brook)310)--large quartz veins observed but no galena as reported. See Williamsburg, Hampshire County.

PELHAM: Asbestos (Anthophyllite) (81(42°21'24",72°26'52"--Smiths Pasture)65,200,165,164,157,p.215-217,330,163,p.47-55,424,194,85)--also olivine, hornblende, actinolite, biotite, corundum, feldspar, rutile, apatite, zoisite, allanite, vermiculite, tourmaline, margarite, villarsite, anorthite, gummite, "pelhamine" (lapidary material--serpentine containing numerous grains of bronzite). Serpentine 325 feet west of asbestos locality --small flat on west side of hill (Indian soapstone quarry in this area). Another exposure of the same a little to the south. Contains chromite and superficially altered to talc. Epidote and calcite in fragments of large boulder to the west of this locality. Titanite (59(locality uncertain 164,p.167)--in gneiss 2 miles north of the asbestos locality. Amethyst Crystals (59(Amethyst Brook)163,p.5) Granite Gneiss Quarry (59(42°23'34",72°26'31"--Wards' Quarry)115,p.305,116,p.261-263,163,p.43)--scolecite, prehnite, hyalite, epidote, calcite. Sand (59,60,81,82(localities unknown) 157,p.141)--sand from Pelham lakes, was sold for brass casting. Aplite (Northfieldite) (59(42°23'35",72°27'42"--Mt. Orient)158,p.214)

PLAINFIELD: Rhodonite (55(area of 42°29'40",72°56'50"--Betts Manganese Mine(two waterfilled pits)33(42°30'20",72°56'40"--Packard Prospect)(42°31'05",72°56'29"--Frizzel Prospect)326,166,214,70,p.12,200,348,p.564,357,330,308,439,p.479,164,p.25,65,182,163,p.171-172,367)--collective minerals: psilomelane, pyrite, rhodocrosite, spessartite, tephroite, wad, pyrrhotite, pyrolusite, calcite, bementite, neotocite, quartz, augite, zoisite, chalcopyrite, magnetite, biotite, ankerite. Talc with Pyrite (Quarry) (33(42°30'24",72°57'39"--Deer Hill)182)--quarry. Pyrite, Chalcopyrite, Bornite (33,55(localities unknown)473,p.34,163,p.171) Whetstone (33,55(locality unknown)163,p.186-187) Porcelain Clay (35,55(locality unknown)233,p.36)

SOUTH HADLEY: Quartz Crystals, Hematite Globules--see Hadley, Hampshire County. Hematite (80(42°16'57",72°35'15"--Elmer Brook and Route 47)163, p.491)--outcrop of diabase--brecciated and fissures filled with druses of small rhombohedra of hematite. Bituminous "Coal" (80(locality uncertain) 164,p.42)--north part of South Hadley. In coarse, gray micacous sandstone and in bituminous shale and marlite. Natrolite (80(area of 42°17'26", 72°35'27"--Dry Brook)164,p.118) Albite Crystals (80(locality uncertain) 164,p.13)--in diabase on Route 116. Sandstone Quarries (80(42°15'40", 72°34'20"--Silver Street)(42°16'06",72°34'36")(42°16'43",72°33'56")(42°16'54",72°34'06")(42°16'08",72°35'35")26,163,plate X,63)

SOUTHAMPTON: Quartz Veins with Pyrite (100(area of 42°12'26",72°45'57") 474,p.43) Argentiferous Galena Prospects (79(42°16'27",72°44'03")(42°16' 32",72°44'02")474,fig. 30)--see Easthampton, Hampshire County for mineral list.

WARE: Road Metal Quarry (83(locality uncertain)163,p.501)--in 1897 the city of Ware operated a quarry on the Coys Hills dike on the mountain side east of the railroad station. The dike here is 5 rods wide... Cordierite (83(42°15'04",72°14'37"--railroad cut)65,197,164,p.59)

WESTHAMPTON: Rutile (78(locality uncertain)164,p.144)--inch long crystals. North part of Westhampton, at residence of Mr. James Howard.

WILLIAMSBURG: Staurolite (57(area of 42°24'08",72°44'27"--north of Village Road480) Kyanite (57(area of 42°25'00",72°43'43"--south slope Carey Hill) 480) Muscovite (46(42°23'41",72°45'06"--Gere Hill)164,p.117)--plumose mica. Found in area of few hundred acres. Limonite (Bog Iron Ore) (57(area of 42°23'18",72°43'37")310,164,p.10) Dendritic Tourmaline (Granite Quarry?) (57(area of 42°22'30",72°42'09"--Haydenville)163,p.761,233,p.18) Galena (79(area of 42°21'48",72°44'30")57(area of 42°25'44",72°43'32"--Walnut Hill)163,map,310,map)

WORTHINGTON: Epidote Crystals (55(area of 42°23'36",72°57'18")164,p.79)-- below Cushing's gate, 1 mile west of Center. In chlorite schist. Pyrite (55(area of 42°25'24",72°59'14"--West Worthington)164,p.87-88)--farm of Austin Geer (1886). Reported as a "gold" prospect. Kyanite (55,77(localities uncertain)164,p.66)--On the old Rufus Smith farm, now owned by Spencer Steward, 3 miles southwest of center. Also in ledge, where Rev. Mr. P.W. Lyman has blasted it out, 40 rods southeast of R. Smith's house; also ½ mile west of this house in boulders (1882). Pegmatite (77(from 42°20'47",72°53'31" to 42°21'17",72°53'36"--Eagle Nest Ridge)(42°19'55", 72°53'27")217)

HAMPSHIRE COUNTY FOSSIL LOCALITIES

HAMPSHIRE COUNTY (GENERAL): Mineralized Tubes--In clay banks all along the Connecticut River. Tubes may be casts of plant roots. See Boston (Charlestown), Suffolk County. Reference 421,p.993-994.

AMHERST: Pleistocene Leaves (80(42°22'02",72°31'07"--railroad cut)163, p.719,157,p.45-146)--also east of the Fair Grounds.

BELCHERTOWN: Dinosaur Bones (81(area of 42°18'43",72°25'56")290,map)

EASTHAMPTON: Fossil Fern, Mollusc Shells, Dinosaur Tracks (101(area of 42°14'17",72°39'24")237,227,304,p.40,163,p.395,236,290,p.54)--west side of Mount Tom--Bassett's Quarry.

GRANBY: Dinosaur Tracks (80(42°17'02",72°32'24"--area of Aldrich Mills) 102(42°14'32",72°32'59"--Granby Dinosaur Museum)26,p.497,map,225)

HADLEY: Pleistocene Plants, Leaves, Larvae Burrows, Larvae Case, Fish Bone, Beetles (80(area of 42°19'58",72°34'51")157,p.145-148,163,p.718, 163,p.740-746,plate XXIII, 232,p.718-721,164,p.173)--also vivianite. Bank of Connecticut River, mile below Hadley. Fish bone found in clay 20 rods above the old oxbow of the Fort River below Hadley Street.

Fern Fossils (80(locality uncertain)304,p.40)--west side of Mount Holyoke (Mt. Holyoke--42°18'02",72°35'44")--in arkose. Dinosaur Bones (80(area of 42°18'02",72°35'44"--Titan's Piazza)290,map)

SOUTH HADLEY: Fossil Fish, Mollusca Trails (102(area of 42°12'56",72°35'59"--South Hadley Falls)163,p.399)--found in digging of South Hadley Falls Canal. Dinosaur Bones (80(area of 42°15'23",72°34'32"--Mt. Holyoke College)445,290,p.156,163,p.405-406)--in glacial erratic boulder found near Mt. Holyoke College. Dinosaur Tracks and/or Bones (80(42°16'04",72°34'26"--Dickinson Quarry(tracks)(area of 42°16'49",72°33'33"--Moody Corner)(42°15'45"72°34'18"--Nash Dinosaur Land)102(area of 42°14'23",72°37'17"--opposite Holyoke, Hampden County locality)(42°12'47",72°36'08"--Holyoke Dam)26,p.498,map,290,map,163,p.404,225)--also stream near Pliny Moody's, north of Moodys Corner (Elmer Brook?). And Dickinson's Quarry south of Moodys Corner. Two other localities further south.

MIDDLESEX COUNTY MINERAL LOCALITIES

ACTON: Harris Granite Quarry (45(42°31'06",71°25'05")65)--albite, garnet, muscovite, malachite. Quarries (45(42°30'53",71°25'05"--McCarthy Quarry) (42°31'28",71°24'51"--Harris Quarry)116,p.262-264,255,map)--light bluish-gray biotite-muscovite-quartz monzonite gneiss. Pegmatites (67(42°28'57" 71°27'21")(42°29'37",71°26'36")(42°29'34",71°26'23")(42°29'41",71°26'26") (42°29'44",71°26'06")(42°27'16",71°27'26")(From 42°27'32",71°27'15" to 42°27'42",71°26'40")(From 42°27'50",71°26'28" to 42°28'06",71°25'43")211) Limestone (67(area of 42°28'39",71°26'49")(area of 42°28'52",71°28'24")231)

ASHBY: Pegmatites (19(42°38'46",71°47'30")(42°40'17",71°49'02")(42°41'41", 71°46'44")(42°42'00",71°47'16")(42°40'21",71°51'22"--Blood Hill)(42°40'42", 71°50'57"--Whitney Road)(42°40'51",71°51'14")(42°41'35",71°50'43")53,map) Across State line in Mason, Hillsborough County, New Hampshire (19(42° 42'39" 71°46'18"). Also see Townsend, Middlesex County.

ASHLAND: Bayer and Mingolla Traprock Quarry (111(42°13'59",71°28'39") 65,57,200,topographic map)--ilmenite and albite crystals, chalcopyrite, pyrrhotite, pyrite, hematite, ilmenite, pyrolusite, goethite, calcite, malachite, aurichalcite, quartz, hyalite, albite, heulandite, stilbite, an acicular zeolite (possibly natrolite), laumontite, chlorite, prehnite, muscovite, biotite, actinolite, hornblende, chrysocolla, clinozisite, epidote, sphene, magnetite, orthoclase, microcline, monmorillonite, pickeringite. Part of the rock found here is an actinolite greenstone. Quarry currently operated for crushed rock.

AYER: Monazite (44(locality unknown)331,p.166,135)--in gneiss. Granite Quarries (44(42°34'15",71°31'41")253)--3 quarries north part of hill, 3 quarries west part, 1 quarry in northeast part over townline in Groton. Marble (44(42°33'42",71°33'51"--Sandy Pond)300)--0.5 mile southwest of Sandy Pond. See Framingham, Middlesex County.

BEDFORD: Pegmatite Granite (from 168(42°29'37",71°16'01") to 146(42° 30'06",71°15'11") to 147(42°30'33",71°14'39"). (46(42°30'06",71°15'56") (46(42°31'10",71°16'23") (from 46(42°31'10",71°15'0" to 47(42°30'58", 71°14'56")(from 46(42°31'08",71°16'21" to 42°31'15",71°16'09")(46(42° 31'08",71°15'19")(46(42°31'10",71°15'24")(from 46(42°31'14",71°15'41" to 42°31'25",71°15'25" to 42°31'37",71°15'0"--Billerica)80,map)

BELMONT: Brick Clay Pit (69(42°23'37",71°09'53"--Claypit Pond)87,p.205) --Abandoned claypit on the north side of Concord Avenue; 3,000 feet northwest of Fresh Pond.

BILLERICA: Pegmatite Granite (46(42°31'38",71°16'27")(42°31'37",71°15' 53")(42°31'34",71°15'46")(from 46(42°31'31",71°16'28"--Bedford to 42° 31'34",71°16'18" to 42°31'47",71°15'45").(42°32'18",71°16'29")(42°32' 23",71°16'33")(42°32'31",71°16'04")(42°33'04",71°16'18")(42°30'08",71° 15'33")(from 42°32'23",71°15'23" to (47(42°32'50",71°14'57") and (42° 33'02",71°14'49")(47(42°33'52",71°13'32")(47(42°33'28",71°12'50"-- Billerica-Wilmington town line)255)

BOXBOROUGH: Limestone Quarry (66(42°29'26",71°32'01")65)--calcite, actinolite, grossularite. On Livermore Farm, owner Mrs. Steele (circa 1950). Location to be checked. Lime Kiln, Scapolite (66(locality

uncertain)358,p.104)--near center of Boxborough. Marble (66(42°29'58",71°31'23")211) Minerals found at some marble occurrences include essonite garnet, spinel (ruby, pleonaste)--reference 231, Also see Bolton, Worcester County for collective list of minerals.

BURLINGTON: Peat (69(area of 42°28'20",71°12'36")233,map)

CAMBRIDGE: Clay (69(42°23'40",71°08'23"--Jerrys Pond)(42°23'23",71°08'07")(42°23'16",71°07'54")(42°23'13",71°07'53")87,p.203,map,65)--pits operated circa 1946. Latter three pits now covered. (69(locality uncertain)421,p.990)--section exposed in grading a road on the west side of Fresh Pond (Fresh Pond--42°23'06",71°09'01"). (69,70(locality unknown)421,p.990)--fold in clay visible in April, 1891 on the west side of Dublin Street, North Cambridge (not shown on current street maps). (69,70(see description)--In many places in Cambridge, the clays have been seen within the last few years (circa 1890) in excavations for sewers. The clays are in all cases overlain by a bed of stratified sand of varying thickness. They are know to occur under the Harvard University Museum of Comparative Zoology (70(42°22'38",71°06'58") overlain by about 10 feet of stratified sand. These clays are on the south side in the ridge running from Cambridge Station (70(42°23'11",71°07'24") westward to the south side of Fresh Pond (69(area of 42°22'39",71°08'46") are evidently a part of the same ridge, and which enter into the formation of the ridge itself. Kaolinized Bedrock (92(42°21'15",71°05'42"--Memorial Drive)(42°21'43",71°04'54"--Broad Canal)(42°21'33",71°04'58"--Green Bldg., Mass. Inst. Tech.)(Memorial Hall, Harvard University)263)--localities 3,6,7,21 respectively in reference 263). None occur as outcrops.

CARLISLE: Limestone (46(locality uncertain)231,map,233,map)--with essonite garnet, actinolite, scapolite. Close by Groton--Concord turnpike. Reference map shows limestone just to the west of Carlisle Center (area of 42°31'44",71°21'12"). Also see Bolton, Worcester County for collective list of minerals. Copper Mine (71(locality uncertain)390,p.335-336)--land of Captain Frank Wilson. Ore outcrops on hill near mine. One mile southwesterly from Carlisle Center. Granite Quarries (45(42°32'06",71°23'20")(42°32'09",71°23'34")255,map) Sphagnum Peat (46(42°32'45",71°20'33"--Tophet Swamp)314,vol.3,p.xx-10)

CHELMSFORD: Scheelite Prospect (46(42°35'38",71°22'02")36,p.103,p.105-106,map)--in marble lense. The marble lense is in part highly silicated, containing abundant actinolite, scapolite, diopside, and quartz as well as smaller amounts of spinel, fluorite, sphene, hornblende, pyrite, pyrrhotite, chalcopyrite, and scheelite. The lense is cut by a 2 foot wide dike of almost pure quartz. A quarry 150 by 20 by 20 feet deep had been excavated prior to the Civil War, in a marble lense enclosed in gneiss of the Nashoba Formation. The rock was burned for lime in a small kiln 0.5 mile to the southsoutheast (42°35'12",71°22'06"--kiln ruins). Limestone (46(area of 42°34'17",71°20'00")231,map) Rose Quartz, Serpentine (45,46,22,23(localities unknown)190,106,p.125,14,p.341)--Rose Quartz-type of occurrence unknown. Serpentine--small black masses in limestone. Granite Quarries (22(42°38'07",71°24'05")(42°39'27",71°23'36")255,map) Limonite (Bog Iron Ore) (22(locality uncertain)390,p.325-326)--Redshire meadows, North Chelmsford. Joseph P. Proctor farm. "Copperas Mine" (46(area of 42°35'00",71°21'57")390,p.336)--weathered pyrite. Worked to a depth of

50 feet. Southerly slope of Robbins Hill. Limestone Quarries (46(see description)390,p.339)--The principal quarries were on the westerly slope of Robins hill (area of 42°35'12",71°22'07"--Robbins Hill) and on the other side of the valley of Beaver Brook westerly of the Littleton road, southwest part of town (probably scheelite prospect previously noted).

CONCORD: Chalcopyrite (68(42°25'14",71°21'56")248,p.83-85,106,p.116)--nodules of copper-iron-sulfide are common in schist. Unit is interbedded with lenses of impure marble. Pegmatite (67(42°28'22",71°23'35")(42°28'11",71°24'19")211)

DRACUT: Nickel Mine (24(42°40'33",71°14'50")12,p.2-3,314,vol.3,p.xlx-4 to 5,80,390,p.329-335,174,134,65)--in norite. Polydmite, pentlandite, violarite, pyrrhotite, marcasite, chalcopyrite, magnetite, ilmenite. Last attempt to exploit the deposit was made in 1883. Two filled shafts about 10 feet square, a trench-like cut 200 feet long, 5 feet wide, and 15 feet deep at its southern end, and scattered piles of waste. Active crushed stone quarry 0.1 mile to the south of this locality which may have obliterated the nickel mine. Quarries (24(42°40'47",71°14'30")(42°40'28",71°14'46")(42°40'02",71°14'45"--other quarries relative to this are 900 feet NNE, 400 feet ESE, 850 feet SE, 1200 feet SSW, 850 feet NW) topographic map,14,p.341)--also see Methuen, Essex County. Sheridanite (White Chlorite) (23(42°39'58",71°16'40"--Loon Hill)65) Gneiss Quarry (23(42°41'42",71°19'00")65,topographic map)--calcite, prehnite. Partially in Pelham, Hillsborough County, New Hampshire.

DUNSTABLE: Limonite (Bog Iron Ore) (22(locality uncertain)390,p.325-326) --One-half mile southeast of the Center of Dunstable.

FRAMINGHAM: Diatomite (Infusorial Earth), Jade, Jasper, Marble (89 (localities uncertain)300,190,314,vol.2,p.xlv--4)--Diatomite reported to have been mined in Framingham and to occur near South Framingham. Jade--possibly williamsite (form of serpentine) and not true jade. Marble --0.5 mile southwest of Sandy Pond (Ayer?, Middlesex County), several small quarry openings. Jasper--type of occurrence not known. Chalcopyrite, Dolomite (Pearl Spar), Chlorite (89(locality uncertain)447,p.30)--in chlorite rock. At Fisher's Cutting on the Lowell Railroad. Pumice, Native Sulphur, Limonite (Bog Iron Ore), Silver, Galena, Pyrolusite, Chalcopyrite, (89(locality uncertain)447,p.30)--On Badger Farm in Salem End (southwest part of Framingham, presumably near Salem End Road and Badger Road--area of 42°17'05",71°27'49"). Bog Iron Ore on elevated ground. Vein of silver reported in argillaceous schist. Building Stone Quarries (89(localities uncertain)447,p.31)--in all parts of the town. Rugg farm in the west part of town, on Fenton's farm in Salem End, and near Park's Corner (Coburnville?--area of 42°16'27",71°26'14"). The main drawback to their commercial value is discoloration due to weathered pyrite.

GROTON: Soapstone (Steatite) (21(area of 42°38'52",71°32'09")14,106,p.125 -126,231)--Occurs as a bed ten or twelve feet thick, in mica slate. One quarry. Limonite (Bog Iron Ore) (44(area of 42°36'50",71°33'55")390,p.325-326,231) Granite Gneiss Quarries (44(localities uncertain--see description) 115,p.308-309,116,p.264-265)--Rafferty quarry is 4 miles eastsoutheast of Groton village and 1.5 miles northwest of West Graniteville station. Shaker quarry is on an 80 foot hillock 0.75 mile northnorthwest of Littleton station and 4 miles southeast of Groton village. Rafferty quarry

(44(see description)253,p.77)--Eastsoutheast of Cow Pond (Whitney Pond? --42°36'18",71°30'51") Granite Quarries (44(42°34'34",71°30'58"--Fletcher Hill)(42°34'19",71°31'37")(42°34'46",71°31'52")253,253)--Four quarries on the west side of Fletcher Hill. Second locality a group of seven quarries on the northern part of the hill. Rest of quarries over town line in Ayer. Quarries here are probably among the quarries noted previously.

HOLLISTON: Quartz Diorite Quarry (111(42°11'45",71°27'22"--Miller Hill) 310,65,topographic map)--Jursek's Crushstone Quarry--ilmenite, sphene, allanite, quartz, pyrite, chalcopyrite, chlorite, hematite, microcline, albite, biotite, fluorite, carbonated apatite, rutile pseudomorphs after ilmenite, limonite psuedomorphs after pyrite, magnetite, pyrolusite, muscovite, vermiform chlorite, stilbite?, chabazite?, calcite, columbite, barite, milky quartz crystals, quartz crystal casts after calcite, blue quartz, tourmaline, hyalite, epidote, hornblende, sphene, molybdenite. Quarry (111(42°14'04",71°26'06")65)

HOPKINTON: Milford Granite Quarries (110(see description--also Map 5, this book)117,115,65,topographic map)--Maguire Quarry (42°11'30",71°31' 33") Hopkinton Quarry (42°11'26",71°30'27") New Bay State Quarry (location uncertain)--a little northeast of the Bay State Quarry (see Milford, Worcester County) Quarry (110(42°14'44",71°34'22")topographic map) Iron Phosphate (Vivianite?) (110(locality uncertain)231,383,p.54,233,p.51)-- Iron phosphate passed through in excavating a hole 6 feet deep for a medicinal spring, in the northwest part of town, on the south side of a small meadow, at the base of an alluvial hill. Forms a bed 1 or 2 feet below the surface, and has been employed as a pigment. Limonite (Bog Iron Ore) (110(area of 42°12'56",71°31'19")231,map)

HUDSON: Orthoclase, Epidote (66(42°23'53",71°36'10"--road cut)65) Pegmatites (66(42°22'36",71°34'27")211)

LEXINGTON: Essonite Garnet, Epidote Crystals, Pyroxene Crystals (69 (locality uncertain)36)--Epidote in imperfect crystals. On top of Bull Meadow Hill, North Lexington. Near Lexington--Burlington town line.

LITTLETON: Beryl? (45(area of 42°31'19",71°27'03")65) Marble (45(42°31' 31",71°29'58")255,106,p.125) Andalusite (44(42°32'20",71°31'35"--Oak Hill)254,map)--also see Harvard, Worcester County, Serpentine (44,45 (locality uncertain)190) Limestone (45(area of 42°30'05",71°28'32")231) Sphagnum Peat (44,45(locality uncertain)314,vol.3,p.xx-10)--Littleton Bog.

MALDEN: Hematite (Specularite) (70(locality unknown)233,p.54)--thin veins in porphyry, graywacke, greenstone. Novaculite (70(locality unknown)65)--in argillaceous slate. Limonite (Bog Iron Ore) (70(area of 42°25'24",71°05'15")231,map)--locality built over.

MARLBOROUGH: Apatite, Calcite, Dolomite, Pyrite, Smoky Quartz (88(42° 21'49",71°35'04")6,1)--in crystals. Found at eastern extension of road-building on Route 290. Similar minerals found at roadcuts at intersection of Routes 290 and 495. Cordierite, Muscovite Pseudomorphs after Cordierite (88(42°20'08",71°32'35")65)--cordierite as green crystals. Near abandoned railroad grade. Biotite, Cordierite, Epidote, Wollastonite (88(42°20'54", 71°32'54")7)--in wall north of Main Street. Rutile in Biotite, Titanite

(88(42°20'53",71°30'19"--Indian Head Hill)65)--titanite in large crystals. Quarries (89(42°20'51",71°29'17")(42°21'05",71°29'37")topographic map)

MEDFORD: Medford Diabase Dike (70(in a southsoutheasterly direction from 42°26'17",71°06'24" to 42°24'04",71°07'02"--Powder House Square, Somerville)274) Silver (70(locality uncertain)274,p.88)--small mine among the hills in the northern part of Medford from which silver ore was taken in paying quantities for a few years. Calcite, Barite (70(locality uncertain) 338,361)--vein in inactive felsite quarry on southern margin of Middlesex Fells Reservation. Quarry (70(area of 42°26'00",71°06'34"--west slope of Pine Hill)483) Quarry (70(locality uncertain)483)--in Medford diabase dike. Pasture Hill. Clay (70(localities uncertain)421,p.997)--till overlying stratified clay. On the east side of Winchester Street, near no. 30, and south of Marion street, on the east side of the Boston and Lowell Railroad, and near old clay pits. The sand flat extending over a considerable area south of Medford and northeast of Wellington Station (Wellington--area of 42°24'40",71°04'58") is underlain apparently everywhere by the clay formation. In all the clay pits in this vicinity the sand varies from 3 to 10 feet in thickness. Sphagnum Peat (69(locality uncertain) 314,vol.3,p.xx-10)--West Medford marsh.

MELROSE: Quarry (70(42°26'59",71°01'49"--Melrose-Saugus town line)topographic map) Quarry? (70(area of 42°26'33",71°04'38"--Black Rock)65)

NATICK: Limestone (90(area of 42°18'24",71°22'57")232,p.74,106,p.116, 231,map)--0.75 mile northeast of the Boston and Worcester railroad depot.

NEWTON: Amygdule Minerals (91(see description)144)--in amygdaloidal diorite. Amygdules contain quartz, calcite, anhydrite, chlorite, epidote, prehnite, zeolites, apatite, copper and pyrite. Occasional galena. Cuprite and malachite. Between Otis, Murray, Holmer, Fuller, Maple, and Auburn Streets. Silver? Mine (91(locality uncertain)288)--near Thompsonville. (Thompsonville--42°18'55",71°11'18") Infusorial Earth, Peat (91(locality uncertain)288)--Infusorial earth below 6 feet of peat--occurs in a cut for sewer to the right of the road along which runs the Boston and Worcester trolley car line. Kaolinized Bedrock, Siderite, Magnetite (91(area of 42°19'07",71°14'07"--intersection of Routes 9 and 128)262)--kaolinized argillite lens in massive arkosic conglomerate. Other kaolin zones known at depth in Boston and Cambridge. A few hundred feet to the east of this locality, in another roadcut across a small street intersection is a porphyritic felsite with minute magnetite crystals and patches of microcrystalline siderite. Quarry (91(42°20'28",71°12'50"--Claflin School)65) Piedmontite, Barite, Talc, Hematite, Crystals, Albite Crystals (91(42°18' 43",71°10'37")65,190) Felsite Quarries (91(area of 42°18'57",71°13'18") 65)--calcite, Highland Avenue, Quarry (91(42°20'20",71°12'35"--Lowell Avenue)65) Quarries or Sand and Gravel Pits (90(42°20'09",71°15'14")(42° 20'02",71°15'17")65)--type of occurrences uncertain. If quarries, in Brighton Melaphyre. Now covered over--MBTA Riverside Station. Piedmontite, Epidote (91(area of 42°18'28",71°10'14")191,37,65)--See Brookline, Norfolk County. Azurite, Malachite, Prochlorite (91(42°19'00",71°13'42")65)

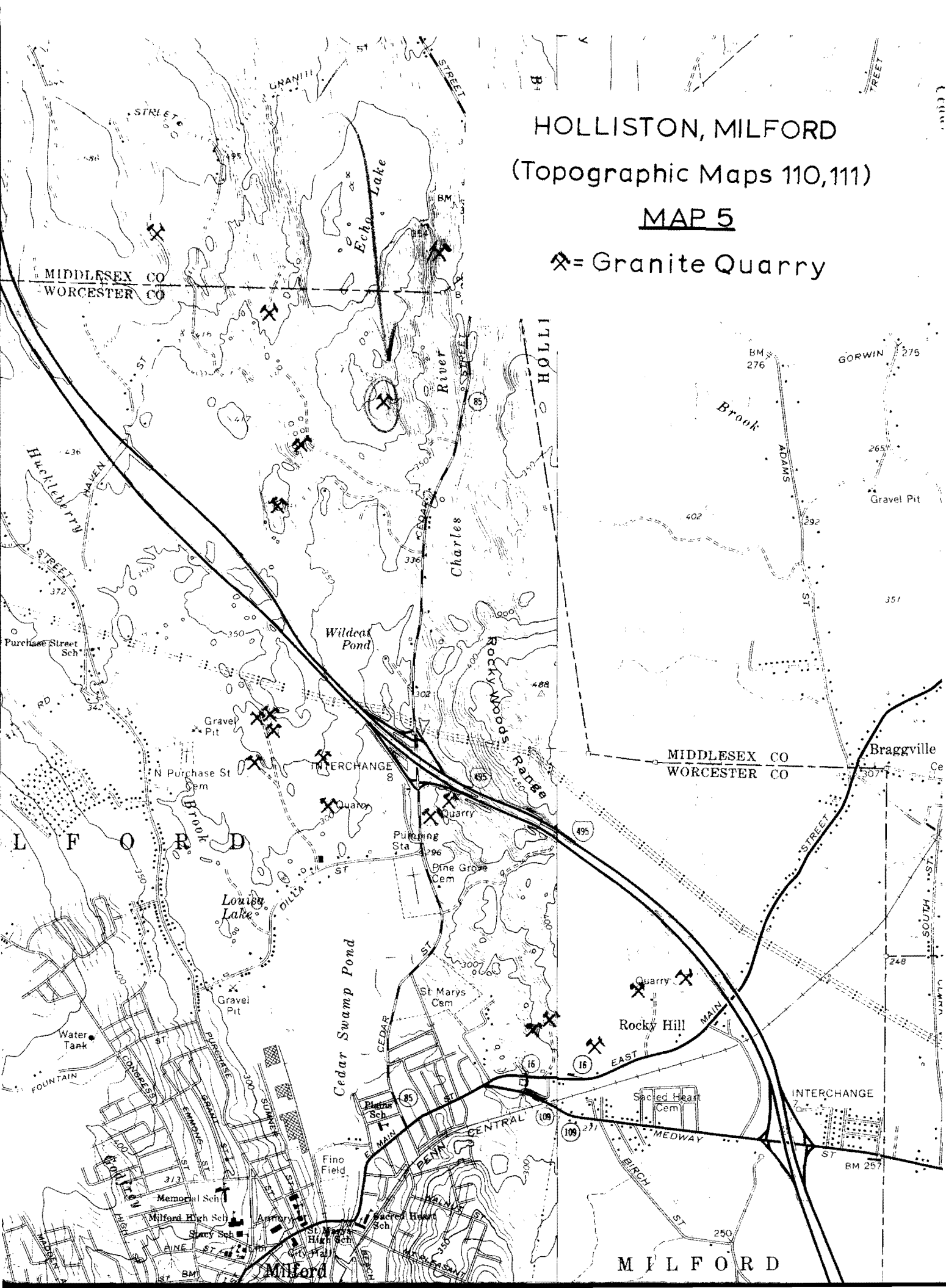
NORTH READING: Pegmatite Granite (48(42°34'31",71°07'11")(42°34'44",71° 03'41")(42°36'00",71°04'23")80)

HOLLISTON, MILFORD

(Topographic Maps 110,111)

MAP 5

⚒ = Granite Quarry



READING: Pegmatite Granite (48(42°33'29",71°06'45")80) Babingtonite (48(42°30'08",71°07'10")50)--fissures in roadcuts at intersection of Routes 93 and 128.

SHERBORN: Quarry (89,90(42°15'34",71°22'30"--southwest side of Peters Hill)148)--hornblende schist of the Marlborough Formation.

SOMERVILLE: Kaolinized Bedrock (70(42°22'44",71°05'05" and 42°22'28", 71°05'18"--Inner Belt Route)(42°22'35",71°04'49"--Boston and Maine Railroad Yard)(42°22'37",71°06'15"--City Tunnel Extension)263)--At the City Tunnel Extension, at a depth of about 300 feet below the bedrock surface, a section about 150 feet thick, consisting of soft light purplish-gray kaolinized argillite and interbedded sandstone, was found underlain by a soft sidertized magnetite-bearing fine-grained tuffaceous rock. Similar to that found in Newton. First two localities are locality 4 and third locality is locality 5 respectively in the reference. Quarries (70(42° 22'58",71°06'13"--Granite St.)(42°23'43",71°05'48"--Heath St., Winter Hill)(locality uncertain--near the Alms House on Elm St.--area of 42°23' 33",71°07'13")(locality uncertain--Milk St. near Lowell St.--area of 42° 23'12",71°06'39")(Mystic Quarries--42°23'46",71°05'39"--Winter Hill) (69(42°24'12",71°07'40"--Holland St. Quarry)274,p.48,57,349,150,106,p.256, 348,65,342,341,185,349,150,274)--Granite St. Quarry (previously known as the Milk Row Quarry when this part of Somerville was Charlestown) in Medford diabase--prehnite, calcite, babingtonite, laumontite, stilbite, chabazite, bronzy altered chlorite (so-called melanolite or delessite). Quarry "near the Alms House" in slate. Heath St. Quarry in Cambridge slate--babingtonite, drusy quartz with tabular and butterscotch colored brookite crystals, pale yellow crystals of anatase, rutile and rutile pseudomorphs after brookite crystals. Slate quarry near Lowell and Milk Streets not present at this location on current maps. Mystic Quarry--slate intruded by diabase dikes. Quartz, pyrite, calcite, brookite and anatase revealed by etching calcite. Holland St. Quarry--small pit in diabase dike intruded into slate. Quartz, calcite, anatase, brookite, brookite altered to rutile, sphene, rare sphalerite and chalcopyrite. Originally Mystic and Holland St. quarries were separate but eventually coalesced into one. City Quarry (69,70(locality unknown)369)--octahedrite, brookite, calcite, titanite, secondary rutile. Quarries (69,70 (see description)65)--as of 1870. (1) midway Somerville Avenue--Summer St. (2) Triangle--Broadway, Holland, and James St. (3) Newbury St. near Broadway St. (4) Argillite quarry northwest side of Elm St. (5) Chandler St. (6) between Elm--Willow Sts. and Appleton St. (7) near old Powder House, Elm--Broadway Sts. (8) Fremont or Tremont St. (9) Mystic Ave.--Temple--Bond--Heath--Brook Sts. (lots of quarries) (10) between Bond--Heath Sts. (11) near center of Vernon St. (12) Adams ledge on School St. opposite Howe St. (13) corner of Marshall and Pearl Sts. (14) west corner of Walnut and Pearl Sts. (15) Wigglesworth St. opposite Everett Avenue. (16) on Wigglesworth St. near Bonair St. (17) near Walnut St. between Bonair St. and Broadway. (18) corner of Crescent and Washington Sts. Adams Ledge (70(area of 42°23'15",71°05'56"--School St.)65)--apatite, magnetite, biotite, graphite, quartz, olivine, pyrite. Medford Diabase Dike--see Medford, Middlesex County. Clay (70(Convent Hill?--42°23'38",71°05' 08")(42°23'48",71°05'13"--Ten Hill)421,p.995-996,figs.40-42)--foot of the northern slope of Convent Hill, a drumlin now largely removed, about 300 feet east of the junction of the Wellington Road with that from Charlestown to Medford. A shaft sunk in 1894 putting in a sewer went to

33 feet and was still in clay at the bottom. Clay till in the road cut in road to Wellington at Ten Pound Hill (Ten Hill). The clays have been excavated beneath the salt marsh just south of the drumlin. In the drumlin itself the clays rise 20 feet above the top of the clay in the neighboring marsh.

STONEHAM: Nephrite, Serpentine, Limestone with Bowenite (70(localities uncertain)190,144,p.392-393,106,p.115-116,231,map,233map)--Nephrite-type of occurrence unknown. Serpentine--outcrops of deep green color. Reported to be unsuited for commerical use due to numerous cracks and other imperfections. Limestone with bowenite--bed a few feet wide, much broken and contorted. In diorite, hornblende granite, and felsite. Limestone in area of 42°28'12",71°06'29"--near Marble Street.

STOWE: Southern Quarry (66(locality uncertain)65)--west of Marble Hill (area of 42°26'29",71°31'20"?) Augite Monchiquite (66(locality uncertain --near Southern Quarry)157,p.204-205)--Dike, three feet thick, of dull brownish rock showing spots of altered olivine and red biotite. The oldest constituents are apatite in abundant needles and magnetite evenly distributed and commonly surrounded by red biotite. The whole interspace between the earlier porphyritic pyroxene is taken up by long needles of a paler diopside, projecting into cavities and having blue-green ends of aegerite. They lie in a colorless, faintly polarizing groundmass which is apparently nephelite. Barkevikite, Magnetite, Pyrite (66(locality uncertain)65)--in glacial boulder erratic on J.W. Stow's farm. Barkevikite in doubly terminated crystals 0.25 to 0.5 inch in length. Limestone (66(locality unknown) 231) see Bolton, Worcester County Mineral Localities

SUDBURY: Marble (67(area of 42°25'17",71°24'25")211,p.8)--Just east of Dakin Road, North Sudbury, and well within an area of gabbro-diorite outcrops, in a mass (not shown on the reference map) of the Marlborough Formation that contains strongly contorted beds of marble. Peat (67(42°23'31", 71°24'57")(42°23'16",71°22'48")68(42°21'58",71°25'33")233) Quarry (67(42° 22'18",71°26'00")topographic map)

TOWNSEND: "Granite" Quarry (20(42°41'51",71°44'45")116,p.273-274,65,40, 190,225,topographic map)--rock type is actually monzonite. Microcline, amazonstone, moonstone (transparent microcline), magnetite octahedrons, autnite. Granite quarry also 4.4 miles east-northeast of this quarry in South Brookline, Hillsborough County, New Hampshire. Pegmatite--Across State line in Mason, Hillsborough County, New Hampshire--see Ashby, Middlesex County.

WALTHAM: Quarry (68(42°22'54",71°16'04"--Bear Hill)65)--pink calcite, epidote, hematite, hyalite, siderite crystals, quartz crystals. Massachusetts Broken Stone Co. Quarry. Presently covered over although perhaps rock can be seen at cut in hill. Prehnite (68(area of 42°23'42",71°15'05") 65)--location uncertain. Locality reported as a roadcut. Quarry (90(42°21' 30",71°15'59")65,364)--hyalite. In Dedham Granodiorite. Barite,Galena (68,90,69,91(locality unknown)361,p.88)--in a vein.

WESTFORD: Andalusite, Chiastolite (45(locality unknown)157,p.68,190,234, p.394,181,p.616)--reference 234 states that andalusite was present in a stone wall near the bottom of a hill east of the village on the road leading to Chelmsford. Reference 190 states that an early gemological note

describes andalusite crystals of fair pink color up to about 2 inches in length by 0.25 inch across which are said to be not entirely perfect but are of a quality to afford small gems. Monazite (45(locality unknown)331, p.166)--in gneiss. Marble (45(42°32'25",71°27'27"--old railroad grade)255, map) Colonial Metallurgical Industry? (45(42°34'50",71°29'15"--Forge Village)topographic map) Granite Quarries (45(42°36'07",71°28'33"--Snake Meadow Hill)(42°36'50",71°26'54")(42°37'37",71°25'54")(42°38'14",71°26'41")(42°38'20",71°26'37")(42°38'42",71°26'01"--Oak Hill)(42°37'57",71°25'05"--Fletcher Quarry)(42°38'24",71°25'24")(42°38'25",71°25'29")(42°38'33",71°25'24")(42°38'31",71°25'06")(42°38'46",71°25'17")255,topographic map, 253,116,p.265-273,111,253)--at least 11 quarries on the eastern half of Snake Meadow Hill. More than 50 quarries have been opened on Oak Hill and on the more reduced hills immediately to the east and southeast. Ward Granite Quarry (22(see description)253)--0.5 mile west of Flushing Hill (Flushing Hill--42°37'38",71°26'44") Quarry (45(small quarry west of Forge Village)253)

WESTON: Quarries (90(42°22'22",71°16'36")5,311,65,topographic map)--there are 3 quarries in this area. The locality noted is a large quarry (0.15 mile long). Another large quarry (0.12 mile in diameter) is 0.2 mile to the southeast of this locality. A small quarry is 0.15 mile to the west of the noted locality. These quarries are currently worked by the Massachusetts Broken Stone Company. The first quarry is in Westboro quartzite. Minerals found here are amethystine quartz crystals, calcite, epidote, hematite, hyalite, ilmenite, pyrite, quartz crystals, siderite crystals. The second quarry noted is in quartz diorite. The third quarry is in Westborough quartzite and quartz diorite (only diorite quarried). At one of these quarries siderite is found at the rear of the quarry, particularly in the road fill near the railroad tracks. The siderite occurs as light to dark brown microcrystals in vugs and seams in an altered rock badly stained brown. Also a little prehnite.

WILMINGTON: Pegmatite Granite (47(42°33'28",71°12'50"--Billerica-Wilmington town line)255)

WINCHESTER: Quarries (69(42°27'22",71°08'27")(42°27'27",71°08'53")186)--first locality built over. Limonite (Bog Iron Ore) (69(42°26'43",71°07'53")231,map)--locality built over.

WOBURN: Quarry (69(42°28'18",71°08'48"--Blueberry Mountain)54,p.4-5,59, 37,380,200,380,156,349)--Principal rock is Dedham granodiorite with pegmatite dikes. Also graphic granite. Minerals found associated with pegmatites are: microcline, orthoclase, cleavelandite, biotite, hornblende, quartz, magnetite, sphene (titanite), allanite, orangite, thorite, zircon, cyrtolite, epidote, tourmaline, chlorite, pyrite, molybdenite, adularia, tremolite, chalcopyrite, andradite garnet, calcite, prehnite, babingtonite, sphalerite, heulandite, stilbite, laumontite, analcite, hematite and limonite. Also red chalcotrichite, chalcocite, albite, chlorite, cuprite, malachite, arsenopyrite, bornite, hyalite and stilpnomelane. Industrial park built in this abandoned quarry. Ilmenite (69,47,48(locality uncertain) 59)--in tabular rough crystals found in a roadcut on route 128 near North Woburn.

MIDDLESEX COUNTY FOSSIL LOCALITIES

LOWELL: PsuedoCalamites(23,46(locality unknown)52,p.102,157,p.59)--see Methuen, Essex County.

MALDEN: Annelid? Fossil Trails (70(locality unknown)491)--in black shaly slate.

MEDFORD: Cedar or Pine Tree Stumps (70(locality uncertain)421,p.997)--salt marsh 0.5 mile west of Wellington Station (Wellington--area of 42° 24'40",71°04'58")

NEWTON: Fossil Mold (91(area of 42°19'52",71°11'02")491)--A cup-shaped depression resembling the form known as Monocraterion with a central vertical tube in the slate of Beacon Street in Newton Centre.

SOMERVILLE: Annelid? Fossil Trails (70(Mystic Quarry--see Mineral Section) (Clarendon Hill Quarry)(West Somerville)491)--in slates.

NANTUCKET COUNTY MINERAL LOCALITIES

NANTUCKET(GENERAL): Amber,Clay,Peat (185,188,189,190(on sea beaches) 189,8,p.982,413,p.297-307)--small yellow gem masses eroded from Tertiary greensand and marl. Clay on the eastern shore of the island and beneath the kame moraine which forms the northern belt of glacial hills running the length of the island. Peat--see Fossil Section.

NANTUCKET VILLAGE: Jasper, Clay (189(area of 42°17'00",70°06'08")189, 8,p.982)--a few jasper pebbles found. Probably on sea beach. Folded clay in western part of town.

SANKATY HEAD: Clay, Limonite, Ferruginous Sand, Peat, Ventifacts (190 (42°16'59",69°57'52")132,413,p.30-42,405)--clay at base of cliff. Also see Fossil Section.

SIASCONSET: Epidote, Jasper, Peat (190(41°15°52",69°57'46")189,413, p.297--307)--on sea shore.

NANTUCKET COUNTY FOSSIL LOCALITIES

NANTUCKET(GENERAL): Worm Borings (185,188,189,190(locality unknown)199, p.608)--Quartzite pebbles carrying Scolithus (S. linearis?) Insect-Bearing Peat (190(see description)413,p.297-307)--on the east coast of Nantucket from Tom Never's Head (41°14'37",69°59'27") to Squam Head (41°19'11",69° 59'24"). Below high tide level. The largest fragments are found on the beach a little south of Siasconset but they may be observed at any time of storm activity along the whole of this eastern shore. Also one mile west of Nantucket Harbor (topographic map 189).

SANKATY HEAD: Invertebrate Fossils (190(42°16'59",69°57'52")413,p.30-42, 405,136,485,457)--in sea cliff.

NORFOLK COUNTY MINERAL LOCALITIES

NORFOLK COUNTY (GENERAL): Jasper Pebbles (92,93(shore of Boston Bay)191) Diatomite, Peat (113(Neponset River--Norwood, Walpole, Sharon, Canton, Westwood, Dedham)314,vol.2,p.XIV-3)--Diatomite lenses along the Neponset River. The lenses average 30 inches in thickness and were overlain by about 1 to 1.5 feet of peat.

BELLINGHAM: Whetstone Quarries (134(see description)403,p.162)--extensive whetstone quarries in the northeast part of town. Amethyst Crystals (134 (locality unknown)--in a bulldozer excavation.

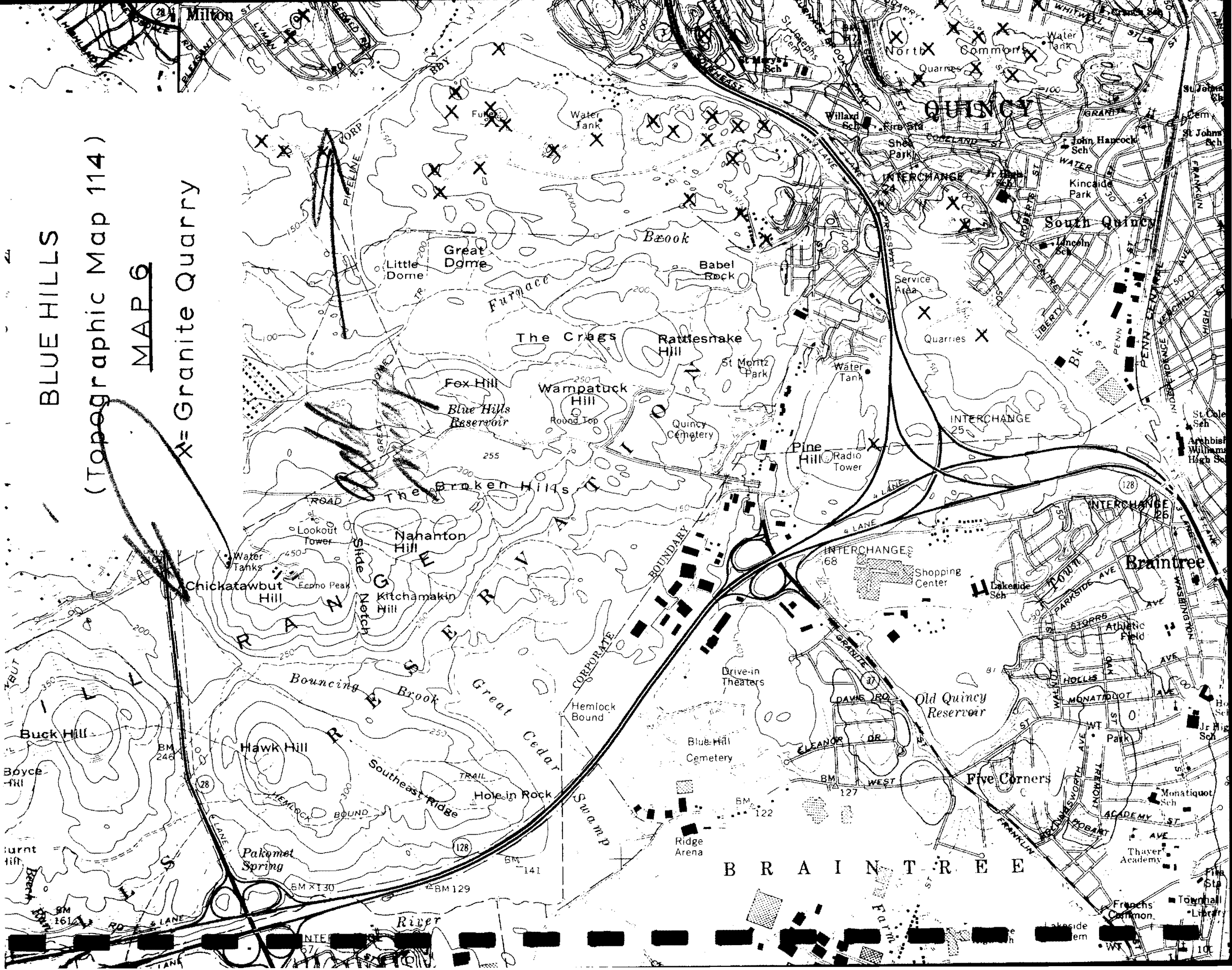
BRAINTREE: Colonial Metallurgical Industry (114,115(locality unknown)64, 314,vol.2,p.vi-11 and 12)--bog iron ore furnaces from 1643 to 1691. Wendell Granite Quarry (115(42°14'03",70°59'28")65)--water-filled. On Quincy-Braintree City line. Stacy Granite Quarry (114(locality uncertain) 115,p.335)--just beyond the Quincy-Braintree City line, a mile south of the Quincy station. Pyrite, Limonite, Aporhyolite, Granite Quarries (114 (see description)91,p.94)--The largest area of aporhyolite (devitrified rhyolite) is at the eastern end of the Blue Hills Range between the Great Cedar Swamp (42°12'46",71°02'44") and Pine Hill (42°13'39",71°01'41"). The aporhyolite has been impregnated by pyrite near a fault zone that extends northeast from Great Pond (located just south of Great Cedar Swamp) along the west side of Pine Hill. Because of this, the road cuts along Route 128 northeast of Great Cedar Swamp are heavily limonite stained. Half-dozen quarries on the southeast side of Pine Hill. Garnet, Epidote (114,115(see description)157,p.38-39,287,fig.2,map)--Calcareous and epidote layers and nodules in Braintree slate. Near the contact with Quincy granite, the slate has been metamorphosed to schist with microscopic garnet. See reference 287, figure 2 (map). Pyrite, Halotrichite, Melanterite (114(42° 13'11",71°02'28"--Quincy-Braintree City line)65)--gravel pit.

BROOKLINE: Hammond St. Quarry (91(42°18'49",71°09'40")361,p.88,65,369)-- Barite occurs with secondary orthoclase in fissure in greenstone. Also azurite, chlorite, chrysotile, actinolite, dolomite, epidote, malachite, octahedrite on quartz crystals associated with chlorite, chalcocite with bornite in quartz. Hammond Woods--reference 57--many ledges--quartz crystals with inclusions of chlorite, azurite, malachite, hematite, piedmontite, epidote and talc. Piedmontite, Epidote (91(area of 42°18'28",71°10'14") 191,37,65)--with chlorite, hematite, talc. Piedmontite and epidote discovered while blasting for a pipeline in 1943. On county line between Brookline, Norfolk County and Newton, Middlesex County. Chlorite, Quartz Crystals (91(42°18'55",71°10'38")65)--area of Craftsland Road. Built over. "Silver" Mine (91(42°18'52",71°10'42")65)--hematite crystals, albite crystals.

CANTON: Colonial Metallurgical Industry (113,114(location uncertain)64) --see Saugus, Essex County. Diatomite, Peat--see Norfolk County (General). Granodiorite Quarry (113(42°08'16",71°08'49"--Canton-Stoughton line)86,p.68)

COHASSET: Malachite, Chrysocolla (94(42°15'14",70°48'27")65) Granite Quarry (94(42°15'13",70°47'24"--Quarry Point)65,104,p.16) Tiffany Granite Quarry (116(area of 42°12'38",70°49'03"--Beachwood Street)115) Magnetic Dike (94(area of 42°15'45",70°49'00")104,p.129-131)--9 feet wide, exposed for 300 feet. Potholes (94(Cooper Island--Little Harbor)104,p.148-159,67)

BLUE HILLS
(Topographic Map 114)
MAP 6
X = Granite Quarry



Limonite (Bog Iron Ore) (94,116(locality unknown)314,vol.2) Epidote Pebbles (94,116(shore of Massachusetts Bay)191)--cabochon quality.

DEDHAM: Monazite (91,113(locality unknown)331,p.166) Gold, Galena, Chalcopyrite (91,113(locality unknown)61)--numerous small particles of gold, some of them weighing from 0.2 to 0.8 grain. The average width of this vein is about 4 inches, strikes N10°E, dips 76° South. Chalcopyrite, chalcocite, malachite and argentiferous galena occurs in the same vein. Another vein containing galena has been exposed 5 feet south of this vein with similar strike and dip. Galena (91(locality unknown)231)--boulder of quartz containing galena found in the south part of Dedham. Granite Quarry (113(42°14'09",71°11'09")86,p.B68) Diatomite, Peat--see Norfolk County (General).

DOVER: Prase? (112,90,69,91(locality unknown)191)--in drift boulders of graywacke.

FOXBORO: Epidote, Chalcedony (135,136(locality unknown)191)--epidote--cabochon quality pebbles in gravel banks. Chalcedony--cabochon quality. See Fossil Section (Petrified Wood). Coal (135,136(locality unknown)420, 229,p.205,229)--mine and pits mentioned separately. Mines may have been rediscovered by exploratory drilling (James Skehan, Boston Globe, 1976). Also two pits excavated and filled up in 1853 two miles from the Mansfield coal mines.

FRANKLIN: Amethyst (134,135,111(locality unknown)191)--in gneiss.

MILTON: Granite Quarries (114(see map 6, this book)115,65) Pinite, Kaolinite (92(area of 42°15'50",71°04'45"--Central Street)(42°15'42",71°05'48"--Blue Hill Avenue)106,p.230,p.271,42,p.146)--altered conglomerate. Prase? Chrysotile? (92,114(locality unknown)191)--pale green prase associated with thin veins of green asbestos. Jasper? (114(Blue Hill Range)191) Quarry (92(Blue Hill Avenue)369)--may be in Mattapan (Boston, Suffolk County)--sphene crystals. Limestone (92,114(locality unknown)157,p.38-39)--Middle Cambrian limestone. Garnet, epidote. See Braintree, Norfolk County.

NEEDHAM: Anthophyllite, Barite, Calcite, Chlorite, Galena (91(42°18'41", 71°13'58"--road cut--Route 128)65) Quarry (91(42°18'09",71°13'09"--Radio Tower)65) Quarry (90(42°16'30",71°15'31")311)--small abandoned quarry in pyroclastics.

NORWOOD: Diatomite, Peat--see Norfolk County (General) Peat (113(Norwood Bog)314,vol.3,p.xx-10)--low-grade fibrous peat (sphagnum), Norwood Bog largely covered by Norwood Memorial Airport (42°11'30",71°10'37") Quarry (113(42°12'09",71°12'09")86,p.B68)

PLAINVILLE: Slate Quarry (135(42°00'50",71°21'23")438,p.22,139)--calcite, coal, graphite, limonite, pyrite, quartz. Also see Fossil Section. Limestone (135(area of 42°01'23",71°21'45")231). Minerals across State line in Cumberland, Rhode Island--see Wrentham, Norfolk County.

QUINCY: Granite Quarries (114(see Map 6, this book)115(42°14'03",70°59'28"--Quincy-Braintree town line)(42°14'09",70°59'23")92(42°15'04",71°01'22"--Mt. Ararat)65,467,465,p.292,102,p.519,p.336,181,p.577,348,p.586,468, 91,p.28,54,p.3-4,314,vol.2,142,39,37,60,352,117,topographic map)--minerals found include galena, sphalerite, chalcopyrite, pyrite, molybdenite, hema-

tite,anatase, goethite, magnetite, ilmenite, fluorite, calcite, siderite, parisite, roentgenite, wulfenite, halotrichite, melanterite, quartz, microcline, albite, orthoclase, aegirite, riebeckite, enigmatite, heulandite, stilbite, biotite, dickite, chlorite, astrophyllite, zircon, epidote, chalcodite (especially Swingle Quarry), octahedrite, crocidolite, limonite, pickeringite, zircon, beckelite. Pegmatites at Fallon and Ballou quarries (see reference 467). Riebeckite (114(42°13'45",71°03'00"--roadcut--Chickatawbut Road)65) Quartz (114(42°12'22",71°03'58"--intersection Routes 128 and 28)65) Pyrite, Halotrichite, Melanterite (114(42°13'11",71°02'28")--Quincy-Braintree City line)65)--gravel pit. Quartz Crystals (92(42°17'54",71°00'35"--Squantum)--on beach. Tillite Quarry (92(42°17'55",71°00'41"--Squantum)281) Granite Quarry (114(42°13'57",71°02'20"--Rattlesnake Hill)102,p.331-333)--small quarry on the eastern end of Rattlesnake Hill. Slate Quarries (92,93,114,115(localities unknown) 106,p.214)--in North Quincy, near the harbor and north of Sachem's Creek. Goethite, Gypsum, Pyrite, Quartz (115(42°14'16",70°58'54")65)--excavation for Home for Aged (1965). Also see Fossil Section. Jasper? (114(Blue Hills Range)191)

SHARON: Granite Quarry (136(42°04'59",71°09'47")293,map) Limonite (Bog Iron Ore (136(area of 42°07'04",71°08'30")231)

STOUGHTON: Granite Quarries (137(42°06'11",71°06'22")(42°06'24",71°06'36")(42°06'16",71°06'51")88,115) Granodiorite Quarry (113(42°08'16",71°08'49"--Canton-Stoughton line)86,p.68) Clay (113,114,136,137(locality unknown)314,vol.3,p.xxxif-17)--clay worked near Stoughton. Quarry (114 (42°08'08",71°04'32")topographic map)

WALPOLE: Flagstone Quarry (112(42°08'10",71°16'34")148) Peat (135(probably Cedar Swamp--area of 42°06'44",71°16'28")314,vol.3,p.xx-10) Limestone (112 (area of 42°08'54",71°16'18")144,p.392-393,231,233)

WELLESLEY: Amethyst (90(locality unknown)191)--pale lavender hued crystals found loose and imbedded in fine mud which filled cavities in quartz veins. Many gems were said to have been cut from these crystals and were sold under the name "lavendine". Siliceous Slate ("Wabanite") (90(locality unknown)191)--Very fine-grained siliceous slate, possible altered from rhyolite or similar type of volcanic rock and nicknamed "wabanite" by its finder who made some use of it as a lapidary material. Basically, it has a purplish chocolate-brown color with creamed-hued markings and roughly banded with black and gray layers.

WESTWOOD: Granite Quarries (113(area of 42°14'38",71°12'15")86,65,467)--During the latter half of the 19th century, pink granite quarried for dimension stone in three small quarries that are now filled. One, 15 to 20 feet deep and about 75 feet long, was located at the intersection of Route 109 and the southeast bound lanes of Route 128. Another smaller quarry was located at the intersection of Route 109 and the northwestbound lanes of Route 128. The third quarry was about 900 feet southwest of the first... This pink granite occurs in a small area and is no longer available for quarrying because of highway construction. Riebeckite, aegirite.

WEYMOUTH: Seamfaced Granite Quarry (115(42°11'14",70°55'26")86,102,p.328-329,103,p.192-193) Monazite (93,115(locality unknown)344)--single crystal found in a quartz vein cavity.

WRENTHAM: Mineralized Quartz Vein (134(42°02'13",71°23'49"--Sheldonville) 469,p.473-474,203,map,361,p.93-94,314,vol.3,p.xxiv-8)--pyrite, tetrahedrite, galena, chalcopyrite, pyrrhotite, sphalerite, siderite, bornite, hematite, limonite, turgite, epidote. Assays performed on dump material (reference 203) showed 0.87 ounce/ton silver and trace ounce/ton gold. A similar quartz vein 2 miles east of Sheldonville has been exploited for gold and silver (reference 469). Hematite,Magnetite (134(42°01'53",71°24'01"--Bucks Hill(Joes Rock)361,p.23-24)--Also see Fossil Section. "Gold Mine" (135(42°01'41",71°21'14")139,438)--salted with gold dust. Coal (134, 135(locality unknown)420,p.182,230)--southern part of town. Found digging a well on land of Mr. Charles P. Simpson (1890). Granite Quarry (135(42°03'18",71°17'32")116,p.274-275,topographic map) Across State line in Cumberland, Rhode Island--Inactive Quarry (134(42°00'17",71°27'24")65,469) --cumberlandite, bornite, magnetite, allophane?, hornblende, hortonolite, ilmenite. Quartz with Riebeckite Fibers (134(42°00'06",71°26'49"--Catamint Hill)65) Road Cut (134(42°00'26",71°25'21"--Route 114, north side) 65)--aegerite, anatase, astrophyllite, biotite, bornite, brookite, chalcopyrite, chlorite, columbite, cryophillite, danalite, fluorite, galena, goethite, greenockite, hematite, hornblende, hyalite, ilmenite, magnetite, malachite, parisite, pyrite, quartz, riebeckite, siderite, sphalerite, zircon. Quartz Crystals, Agate, Limonite (from 134(42°00'00",71°24'53") to 146(41°59'44",71°24'49")--along west side of Diamond Hill)65,469)--quarry at south end of hill also. Quartz Vein in Cumberland Dike (144 (41°58'37",71°27'23"--road cut, Route 120)469,p.468)--quartz vein, a foot wide, exposed for 50 feet in a north--south direction. Part of the quartz is filled with long, slender needles of blue riebeckite (crocidolite). Fluorite is often abundant as dark purple masses up to 1½ centimeters in diameter. With the fluorite are a dark sphalerite, galena, and chalcopyrite, the latter crusted with covellite. "Copper Mine" (144(41°59'05", 71°26'56")368)--in limestone. Most abundant mineral is magnetite found in the waste rock. Also tremolite, epidote, actinolite, garnet, chlorite, molybdenite, pyrite and chalcopyrite. A fragment of the ore from the dump at the main mine contains opal filling the spaces between the fragments of a piece of brecciated chalcopyrite. The characteristic weathering products, limonite, malachite, and azurite are present at many places in the area. Quarries, Limestone (144(41°59'03",71°26'56")(41°59'02",71°26'54") 368)--known as quarries 1 and 2 respectively in the reference. Both are immediately to the southeast of the "Copper Mine". Quarried for green schist. The second quarry exhibits garnet rock, quartz-epidote-adularia veins, pyroxene crystals altered to amphibole, bornite veins, and one specimen from a bornite vein contained considerable dark sphalerite. Polished sections of the bornite revealed covellite and chalcocite. A thin coating of botryoidal, white opal was observed on a few joint planes and lineing small cavities in the garnet rock at the second quarry. Molybdenite associated with garnet at the second quarry. A limestone bed (560 feet long, striking WNW, 60°NE dip) is located 200 feet to the southeast of the second quarry. A white, crystalline, somewhat dolomitic limestone with numerous crystals of tremolite. Along the contact of this limestone with the schist are alternating bands of brown garnet and actinolite. Most of the limestone contains some talc and a serpentiferous mineral which resembles the "bowenite" of other limestone bodies in Rhode Island (see further, Lincoln, Rhode Island). According to Selfridge (reference 411) this should be called antigorite. Much of this bed has been removed, presumably for lime. Copper Prospects (144(41°59'34",71°26'49")(41°59'33",71°26'45")(41°59'18",71°26'55")(41°59'17",71°26'50")368)--in limestone beds. All located within

3,000 feet of the "Copper Mine". Known as Prospects 1,2,3, and 4 respectively in the reference. Prospects 1 and 3 contain white diopside occurring in radial groups with the individual crystals up to an inch in length. Brillant black crystals of hornblende occur with calcite in veins at Prospect No. 3. Bornite found at Prospect No. 2. Small Veins (144(41°58'55",71°27'09"--Sneech Pond)368)--small veins west of Sneech Pond which contain galena, sphalerite, chalcopyrite, smoky quartz, white fluorite and bright purple fluorite. Manganese Oxides (144(area of 41°58'39",71°26'25")368). At Lincoln, Rhode Island--Limestone Quarry (144(41°55'28",71°22'23")65,topographic map)--bowenite, agate.

NORFOLK COUNTY FOSSIL LOCALITIES

BRAINTREE--WEYMOUTH--QUINCY: Trilobites (115(42°14'45",70°58'47"--Hayward Creek Quarry)(42°13'57",70°57'48"--Wyman's Hill)(42°14'30",70°57'19")(42°14'12",70°56'49"--near Pearl Street)(42°13'49",70°56'15"--in glacial drift)(42°14'16",70°59'00")(42°14'16",70°58'53"--excavation (1965) Home for the Aged--also see Mineral Section)(area of 42°13'12",70°58'39"--valley of Ruggles Creek, Quincy)78,157,p.37-39,461,p.259,179,199,102,287, map,475,246,386,436,450,65,431)--also below high tide about 100 feet east of the Hayward Creek Quarry. Note The Hayward Creek Quarry was covered over due to the expansion of the Fore River Shipyard during World War II. It is supposed that fossiliferous boulders may be found in the wharfs around Boston as stone from the Hayward Creek Quarry was used for this purpose (reference 13,p.28). Fossiliferous glacial drift boulder found during driveway excavation on Quincy Avenue, East Braintree. Algae, Inorganic Markings? (115(42°14'12",70°56'49"--near Pearl Street)245) Brachiopod (115(42°14'30",70°57'19")12) Worm Trails (92(area of 42°16'23",71°01'30"--Norfolk Downs, Quincy)491) Fossil Shells (115(42°13'18",70°59'50")108,457)

CANTON: Plant Fossils (113(42°10'29",71°09'18"--railroad cut)88,p.31-32, 490,102,p.469,490). Also found in glacial erratic pebble (locality unknown).

COHASSET: Trilobites (94(42°15'41",70°48'45"--Pleasant Beach)94,116 (42°15'00",70°47'30")102,66,199,p.606,104,p.138)--in glacial erratics. Molluscs, Pelecypods (116(42°13'50",70°49'05"--James Hill)108,457)

DEDHAM: See Westwood, Norfolk County.

FOXBORO: Petrified Wood (135,136(Union St., Chestnut St.)191)--one small specimen with a center of chalcedony. Both finds believed to have been found in soil derieved from an abandoned gravel pit on Chestnut Street. Coal Mine (135,136(locality unknown)197)--thought to have been rediscovered in recent exploratory drilling for coal (James Skehan, Boston Globe,1976) Fossil Plants (136(42°02'34",71°14'45")293,p.230-238)--Plants in thinly bedded siltstones below a gravel conglomerate. Ramp cuts on the western side of the ramp leading from Route 140 to Route 95 southbound.

NORFOLK: Plant Fossils (135(area of 42°05'25",71°17'28"--Pondville)109,490)

PLAINVILLE: Plant Fossils (135(42°00'50",71°21'23"--Slate Quarry)139,487, 438)--also see Mineral Section. Amphibian Foot Prints (135(42°00'07",71°20'30")(42°00'04",71°20'29")(42°00'37",71°21'20")487,361,p.29,479)--third locality also exhibits raindrop imprints. Plant Fossils, Raindrop Imprints

(135(42°00'36",71°22'05")487) Plant Fossils (135(locality uncertain)420, p.180-181)--glacial erratics in the vicinity of Goat Rock (ridge in Blake Hill) Worm Burrows, Worm Trails, Raindrop Imprints (135(locality uncertain) 420,p.178)--exposed in a quarry.

QUINCY: Worm? Trails (92(area of 42°16'24",71°01'30")491)--in slate. Also see Braintree--Weymouth--Quincy. Molluscs, Pelecypods (93(42°16'47",70° 57'15"--Nut Island)(42°16'32",70°57'05"--Quincy Great Hill)(42°18'27", 70°59'29"--Moon Island)108)

WALPOLE: Plant Fossils (113(area of 42°09'37",71°11'40")490)--erratic boulders on the south side of Traphole Brook near the western end of the Neponset swamp.

WESTWOOD: Brachiopod? Fossils (113(42°12'46",71°09'12")376,86)--in quartzite. Original reference incorrectly places locality in Dedham.

WEYMOUTH: See Braintree--Weymouth--Quincy

WRENTHAM: Trilobite (134(area of 42°01'53",71°24'01"--Joes Rock)361,p.23-24,420,p.393)--reference 420 reported fossiliferous limestone erratic boulders but reference 361 could not find them. Brachiopods, Pteropods, Trilobites (134(42°01'15",71°24'45"--roadcut, route 121)65) Fossil "Tree Trunk" (Calamites?) (134(area of 42°01'55",71°23'44")361,p.28)--outcrop just north of Route 121.

PLYMOUTH COUNTY MINERAL LOCALITIES

PLYMOUTH COUNTY (GENERAL): Agate, Chalcedony--Reference 189--formation (probably glacial erratics) traced in a northerly direction from Rochester (topographic map 165) to Middleboro (topographic map 148) and southeasterly to Fairhaven, Bristol County (topographic map 164). Sometimes called agatized quartz. It is composed of variously colored quartz, chert, chalcedony, etc. Agate of brecciated variety and chalcedony noticed as cementing agent. Also see Middleboro--Plympton, Fossil Section. Epidote--Reference 189--on many sea beaches of the county. Clay--Burgess Point--eastern side of Buzzards Bay, head of the bay (Barnstable County?)

ABINGTON: Amethyst (138(locality unknown)189)--one fine crystal reported found. Smoky Quartz (138(locality unknown)189)--good quality crystals reported found in excavation for a water well.

BRIDGEWATER: Coal Mine (148(locality unknown)420,229)--found in digging a well. Peat and Loam (147(Hockomock Swamp)212,p.D63)--see Taunton, Bristol County. Limonite (Bog Iron Ore) (148(locality unknown)390,p.328) Clay (148(41°56'10",70°56'49")421,p.986,topographic map)--see Taunton, Bristol County

BROCKTON: Granite Quarry (137(area of 42°05'21",71°03'54"--Pearl Street, Brockton Heights)116,p.275-276)

CARVER: Limonite (Bog Iron Ore) (149(area of 41°53'34",70°47'42")390,p.328, 231,map)--lake in Carver. 500 tons iron ore in a year.

DUXBURY: Glauconite (Green Sand) (140(area of 42°05'14",70°44'10"--South River)232,p.76,492)--also see Marshfield, Plymouth County.

EAST BRIDGEWATER: Clay (138(area of 42°00'50",70°57'44"--Elmwood)421,p.986)

HINGHAM: Granodiorite Quarry (94(42°15'12",70°51'52")147) Granite Quarries (115(42°11'29",70°54'53"--Plymouth Quarries)(42°11'23",70°54'56"--Eastern Quarries)(area of 42°10'43",70°55'12"--Miller Quarries)(locality unknown--Hamilton Quarry)116,115,103,p.192,102,p.328-329,topographic map) Amethyst Crystals (94(locality uncertain)189)--in soil and veins in granite. Red Jasper, Chalcedony (94(42°16'01",70°52'13"--Rocky Neck)104,p.29-30,103, map)--segregations in melaphyre and conglomerate. Slate Quarry (93(area of 42°15'28",70°54'53"--Hewitts (Huits) Cove)103,p.245,plate II, map)

HULL: Red Jasper, Chalcedony (94(42°15'53",70°51'52"--Granite Point) (42°15'51",70°51'29"--Conglomerate Hill)(42°15'45",70°51'33"--Great Hill) 104,map,379)--segregations in conglomerate.

LAKEVILLE: Limonite (Bog Iron Ore) (156(area of 42°49'21",70°55'08")231,map)

MARSHFIELD: Glauconite (Greensand), Lignite (140(area of 42°05'27",70°44' 03"--South River)232,p.76,249,492)--also clay marls. See Fossil Section. Jasper (117,140(shore of Massachusetts Bay)189)--red and dark colored pebbles. Blue Corundum (140(42°06'24",70°39'48"--Fieldston)265)--in beach sand.

MATTAPOISETT: Jasper Pebbles (165,176(41°37'30",70°49'09"--Brant Beach (Brant Island?)65)

MIDDLEBOROUGH: Agate, Chalcedony--see Plymouth County (General) Limonite (Bog Iron Ore) (148(area of 41°54'49",70°55'59")398,p.328) Clay (148(1½ miles northeast of Middleborough)421,p.985) Coal (148(area of 41°55'35",70°56'11")231,map)

PEMBROKE: Blue Quartz (139(locality unknown)189)--in crystalline masses. Black Clay ((139(area of 42°04'44",70°49'24"--West Elm Street)420,p.194) Limonite (Bog Iron Ore) (139(locality uncertain)314,vol.2,p.VI-14)--Pembroke swamps. Coal (139(area of 42°06'24",70°49'25")420,p.194)--also see Fossil Section.

PLYMOUTH: Iron Phosphate (150(near Plymouth)231,233,p.51) Agate (151(41°55'53",70°33'28"--White Horse Beach)189) Epidote, Red Jasper (150,151,159(sea beaches)189)--pebbles. Pegmatite Minerals (150(area of 41°57'41",70°38'25"--Long Beach)65)--Rockport, Essex County and Quincy, Norfolk County minerals in boulders in sea wall. Clay (150,151,159(locality uncertain)421,p.962)--exposed along the marine bench--cliffs of material 20 feet or more. Ventifacts (159(41°49'19",70°32'38"--Nameloc Heights)298,p.1164)--in cliffs, 8 to 20 feet below the surface. Dark Mineral Accumulations (159(41°48'50",70°32'26")(41°50'50",70°31'54")456)--on sea beach. Clay (151(41°52'56",70°32'02"--Indian Hill)(Spooners Pond)(41°53'55",70°34'08"--east side of Beaver Dam Pond)186,421,p.985)

ROCHESTER: See Plymouth County (General)

SCITUATE: Small Granite Quarry (116(see description)104,p.16)--on the Scituate shore, near the Osher Rocks (Ledge) (42°14'54",70°45'40") Clay, Glauconite, Yellow and Red Sands, Lignite (117(42°10'46",70°43'00"--Third Cliff)157,p.132,69,458)--also? First Cliff (42°11'55",70°42'54"), Second Cliff (42°11'30",70°43'01") and Fourth Cliff (42°09'39",70°42'20"). Also see Fossil Section.

WEST BRIDGEWATER: Peat and Loam (147(area of 41°59'25",71°03'03"--Hockomock Swamp)212,p.64)--see Taunton, Bristol County. Botryoidal Limonite (137(area of 42°01'11",71°01'27")420,p.192)--railway cut a mile east of Cochesett Station--small vertical quartz veins containing cavities lined with botryoidal limonite. Coal (137,147(area of 42°00'00",71°01'56")420,p.192,229,p.205,229)--in the area between Hockomock and Town Brooks.

PLYMOUTH COUNTY FOSSIL LOCALITIES

BRIDGEWATER: Fossil Plant (148(locality unknown)251)--Calamites--1 foot long, 9 inch circumference at base.

BROCKTON: Fossil Plants (137(area of 42°05'16",71°00'50")187,293)--Calamites, Sigillaria. In gray sandstone and conglomerate, outcrop ¼ mile northeast of the railroad station.

DUXBURY: Worm Burrows (Scolithus linearis(?)) (140(locality unknown)199,p.608) Foraminifera, Gastropods, Pelecypod, Crustacea, Fishes, Mammal Vertebrate, Sharks Teeth, Gastroliths--see Glauconite (Green Sand), Mineral Section.

HINGHAM: Aspidella Markings (93(42°15'42",70°53'39")462)--beach at Crow Point. Near the wharf at the foot of the drumlin.

HULL: Brachiopod (93,94(on sea beach)--in quartzite boulder, Molluscs, Pelecypods (93(42°17'25",70°57'00")(42°17'36",70°56'19")(42°18'03",70°56'09")(42°18'09",70°55'46")(42°17'08",70°56'20"--Prince Head)--these previous 5 localities on Peddocks Island)(42°18'15",70°54'19"--Telegraph Hill)(42°18'27",70°53'03"--Allerton Hill)(42°17'22",70°52'46"--Strawberry Hill)(42°16'24",70°51'41"--Sagamore Hill)108,278,457,104)

MARSHFIELD: Foraminifera, Gastropods, Pelecypods, Crustacea, Fishes, Mammal Vertebrae, Gastroliths, Tellins--in clay marl over green sand, thirty feet from the surface. See Mineral Section.

MIDDLEBORO--PLYMPTON: Silicified Fossil Wood (148,149(locality uncertain) 264)--thought to be source area of glacial boulder fan of silicified wood extending to lower Cape Cod.

PEMBROKE: Fossil Plants (139(area of 42°06'24",70°49'25")420,p.194)--in coaly seam.

SCITUATE: Fossil Tree (Pine?), Pollen, Sponge Spicules (117(42°10'46", 70°43'00"--Third Cliff)157,p.132,69,256,393)--Probably also First, Second, and Fourth Cliffs. See Mineral Section.

SUFFOLK COUNTY MINERAL LOCALITIES

Boston: Grove Street Quarry (91(42°16'02",71°09'30")65)--anthophyllite, calcite (orange), chalcopyrite, epidote, galena, hematite, hyalite, kaolin, limonite pseudomorphs after pyrite, pyrite, quartz crystals. Quarry (91(42°16'07",71°09'17")65) Traprock Quarry (91(42°16'05",71°09'06")65)--hyalite Quarries (91(42°15'23",71°08'00"--built over)(42°15'25",71°07'58")(42°15'27",71°07'49"--built over)65)--last locality known as the Center Street Puddingstone Quarry--amethyst, kaolin , limonite, quartz crystals. Gravel Pit (Abandoned) (91(42°16'12",71°07'37"--Monterey Hill)65) Quarries (Abandoned) (91(42°20'34",71°09'26")(42°20'30",71°09'07")(42°21'00",71°09'35")(42°21'06",71°08'40")65) "Asbestos" (91(42°20'37",71°09'16")(42°21'03",71°08'40")65)--second locality obliterated. Also calcite, epidote. Prase (70,92(locality unknown)190)--in boulders of graywacke. Identification doubtful. Appears to be colored by epidote. Slate Quarry (92(area of 42°20'09",71°02'45"--Nook Hill)144,p.411,143,p.203-204)--now levelled and built over. Worked in the 1700's. Pyrite (92(area of 42°16'19",71°06'58")106,p.82)--present as disseminated grains in quartzite. Deep weathering and yellow limonite stain. Banded Jasper (92(42°15'36",71°07'02"--intersection of Arlington and River Street, Hyde Park)106,p.83,p.172) Amygdaloid (91(area of 42°21'09",71°07'56"--southeast of the intersection of Harvard and Brighton Streets)(area of 42°20'59",71°08'15"--Allston Street)(42°20'22",71°09'23")(area of 42°21'06",71°08'34"--Cambridge St. between Union Square and Warren St.)(42°21'08",71°08'37"--built over quarry)(42°21'03",71°08'16"--built over quarry)(42°20'57",71°08'44"--built over quarry)(42°21'07",71°07'48"--built over quarry)65,106,p.172,143,p.206,48,133)--Generally all in the Brighton--Allston area. Stated to be amygdaloidal diorite. Amygdules of uniform size ranging from 2 to 5 millimeters in diameter. The minerals most commonly found in these are epidote, quartz, chlorite, calcite, barite, gypsum, chalcopyrite, hematite, orthoclase; several minerals, especially the first two named are frequently concentrically arranged in the same kernal. Besides the proper amygdules, these minerals form many exceedingly irregular and veinlike masses, traversing the rock, sometimes for a distance of several feet. The Brighton amygdaloid also contains numerous minute segregated masses of jasper. These are usually marked by various shades of lighter and darker red, brown and yellow in parallel, horizontal bands, after the manner of onyx. (Similar to banded jasper noted previously at Hyde Park). Epidozed Traprock (91(area of 42°21'00",71°09'35"--Brighton--locality uncertain)190)--ledge in district, near Roxbury Puddingstone formation. Rock composed of epidote grains, altered plagioclase, secondary quartz, probably some zeolite, pale greenish actinolite needles and sheafs of fiber, very fine grains of hematite, and calcite present as tiny seams. In appearance it is essentially purplish gray or brown marked with dark red spots and yellowish green epidote as spots and streaks with or without gray or white quartz and calcite. It is said to accept a good polish which greatly enhances the color and pattern of the material which has seen some use in the past by local collectors. Warren Street Quarry (91(42°21'00",71°08'51"--intersection of Warren and Cambridge Streets)361,339,369)--locality built over. Worked for road metal (amygdaloid). Amygdules containing epidote, barite and chalcedony. Gash veins of actinolite, prehnite, and/or calcite, albite crystals commonly with specularite and barite. Sparse chalcocite and bornite with oxidation products of malachite and chrysocolla. Rare titanium oxides. Diabase Dike (91(42°20'53",71°08'21")133)--"Briar Patch" Quarry. Built over. Specularite, Mineralized Tubes in Clay (70,92(locality unknown--Charlestown)233,p.54,421,p.993-994)--see

Hampden County (General), Fossil Section. Volcanic Necks or Vents (91 (area of 42°15'40",71°09'44"--West Roxbury)(42°15'28",71°08'04"--Bald Knob and Grew's Woods Hyde Park)42,p.133) Grove Street Quarry (91(42° 16'02",71°09'28"--West Roxbury)42,p.134,57,40,topographic map)--felsite quarry divided into two by trap dike. Pyrite, orange-colored calcite (cleavage material), anthophyllite, chalcopyrite, galena, colorless hyalite, kaolin, epidote, zoisite, allanite, serpentine. Pyrite--very fine groups of sparkling microcrystals are common in small cavities. Superb groups of large crystals have been found in a calcite vein. After the calcite is removed, there remains groups of brillant crystals of pyrite some of which are very perfect cubes with groups of quartz crystals. Currently operated. Spherulitic Aporhyolite (91(area of 42°15'58",71°08'06"--High Rock, Grew's Woods--Hyde Park)42,p.141,p.143)--vesicles filled with cryptocrystalline silica. Brecciated Porphyry (91(area of 42°15'20",71°07'33")42,p.150)-- railroad cut. Porphyry exhibits a purple color. Cabochon material? Green Hornblende (91(area of 42°15'45",71°09'49"--Stimson Street)42,p.158)--in diabase dike. Barre Quarry (92(42°16'19",71°06'51"--Sally Rock)65)--felsite, hematite, pinite. Small quarries in aporhyolite 950 feet to the southwest and 1000 feet to the north-northeast. Also see pyrite previously stated. Small Puddingstone Quarries (92(42°18'12",71°05'50"--Franklin Park)(42°16' 41",71°03'50")(42°19'58",71°06'17")65)--all abandoned. Quarry (92(locality unknown--area of 42°16'13",71°05'39"--Blue Hills Avenue, Mattapan)369)-- sphene. May be in Milton, Norfolk County. Pinite (92(area of 42°16'22", 71°05'39")(area of 42°17'09",71°04'50"--Norfolk Street)113(area of 42°14' 54",71°07'39"--Hyde Park)(area of 42°14'28",71°08'20"--Readville)91(area of 42°15'53",71°08'27"--Stony Brook Reservation)42,p.146) Kaolinite (92 (Fenway, in front of the Sears Roebuck store)(Boston Common)(South Station Postal Annex)(Gillette Safety Razor plant)(Pier 2)(Castle Square)(former site of Stone and Webster Building, and the New England Telephone and Telegraph Building)(west side of Washington Street at the intersection of Water Street)(Atlantic Avenue)(Government Center)(Beacon and Clarendon Streets)(area of 42°20'09",71°05'28"--subsurface, Main Drainage Tunnel) 70(Charlestown Naval Yard)(area of 42°22'52",71°02'27"--East Boston)(sub- surface borings for North Metropolitan Relief Tunnel--in a southeasterly direction from (70(42°23'07",71°01'39") to (70,92(42°22'30",71°00'38") to (92,93(42°22'08",71°00'00")(through Winthrop) to (93(42°20'55",70°57'34" --Deer Island)(92(42°19'58",71°06'17"--Quarry)263,map,106,p.272)

REVERE: Marsh Gas (71(42°24'27",70°59'31"--Crescent Beach)421,p.971-972) --A boring made to obtain water passed through the clays which lie at about tide level and entered the zone of the buried forest which is exposed below low-tide level in Lynn Bay. From this level came a considerable discharge of marsh gas which was fired and burned for weeks with a tall flame, and was extinguished only when, the curiousity of the people being satisfied, the tube was artificially stopped. Black Ann Hill Quarry (70(42°26'24", 71°01'18"--Franklin Park)116,p.279-280,topographic map)--rhyolitic felsite porphyry. Clay (70,71(localities unknown)421,p.996-997)

WINTHROP: Kaolinite--see Boston, Suffolk County. North Metropolitan Relief Tunnel.

SUFFOLK COUNTY FOSSIL LOCALITIES

BOSTON: Fossil "Tree" Trunks (92(42°17'29",71°06'40"--Forest Hill Cemetary) 79,274,p.41,360)--in Roxbury Conglomerate. Brachiopod (92(42°16'25",71° 05'33"--Babson Street, Mattapan)360)--in green rhyolite (quarry). Fossil Plants (92(42°16'08",71°05'55")360)--in argillite interbedded with lava flows. Molluscs, Pelecypods (92(area of 42°18'43",71°07'20"--well in Jamaica Plain)(area of 42°22'02",71°02'46"--well in East Boston)93(42°21' 19",70°57'34"--Deer Island)(42°18'38",70°58'37"--West Head, Long Island) (42°19'48",70°57'18"--Long Island Head, Long Island)(42°19'52",70°55'42"-- Lovell Island)(42°19'14",70°55'35"--Georges Island)(42°20'02",70°53'43"-- Great Brewster Island)108,65,157,p.143,108,457) Trilobites (93(42°19'14", 70°55'35"--Georges Island)187)--Paradoxides in glacial erratic. Fossil Plant Molds--see Mineralized Tubes in Clay, Charlestown. Also Hampden County (General)--both Mineral and Fossil Sections. Molluscs (92(area of 42°21'00",71°04'40"--Copley Square)93)--excavation for Boylston Street subway. Pollen, Peat, Molluscs, Diatoms, Forams, Barnacles (92(42°20'57", 71°04'21"--Stuart Street)34,47,98,259,271,283,284,312,486)--Boylston Street Fishweir.

REVERE: Buried Forest--see Marsh Gas, Mineral Section. Trilobite (71(area of 42°24'27",70°59'51"--Crescent Beach)95,431)--found in glacial erratics of red limestone pebbles.

WINTHROP: Molluscs, Pelecypods (71(42°23'23",70°58'09"--Grovers Cliff)93 (42°22'03",70°58'04"--Winthrop Head)(42°21'35",70°58'23"--Point Shirley) 108,457,444,140,317)

WORCESTER COUNTY MINERAL LOCALITIES

WORCESTER COUNTY (GENERAL): Quartzite (see description)314,vol.3,p.xxiii-5)--exposed from Westboro southwest to Grafton and from Milford southwest to Uxbridge. The reference states that "There is no record of this quartzite having been used as a high-grade silica raw material, though it might be usable for pebble mill liner material."

ASHBURNHAM: Pegmatites (18(42°38'08",71°54'05")(42°38'51",71°54'20"--Ashby Road)(42°38'56",71°56'00"--Ashburnham State Forest)(42°41'44",71°53'29"--Mount Watatic)(42°42'17",71°54'03"--Nutting Hill)(42°42'12",71°54'18")53)

ATHOL: Muscovite, Microcline, Beryl (39(area of 42°35'35",72°14'58")53,p.13,75)--pit is 30 feet by 20 feet and about 10 feet deep. Books of muscovite up to 4 inches in diameter and ½ inch thick occur on the dumps; larger sheets are said to have been found. Microcline up to 2 feet long was seen. Babingtonite (16,38,39(locality unknown)349)--veins in chloritic gneiss. Associated minerals: epidote, prehnite, pyrite. Limonite (Ochre) (16,39(north part of Athol)232,p.129) Steatite (39(area of 42°32'51",72°12'27")231,map) Pegmatites (16(area of 42°38'12",72°11'36")(area of 42°38'18",72°11'36")53,fig.6)

BARRE: Rutile (61(area of 42°25'24",72°11'26"--Dana Roads)65) Beryl Pegmatite (61(see description)231,p.104)--extreme west part of town, near the road to Dana. (town of Dana flooded by the Quabbin Reservoir). Quabbin Aqueduct (62(42°23'21",72°06'27"--Shaft #9)(42°23'29",72°04'50"--Shaft #8,(White Valley)65)--shown as air shafts on current topographic map. Shaft #8--ankerite, apatite, goethite, pyrite, quartz. Dump? at Shaft #9.

BERLIN: Quarries (66(42°23'43",71°37'18")(42°23'48",71°36'20"(?)65,topographic map) Pegmatite (66(42°23'06",71°35'51")211,map) Marble (66(42°23'28",71°36'55")211) Limonite (Bog Iron Ore) (65(area of 42°23'16",71°38'13")231,map)

BOLTON: West Pond Limestone Prospect? (66(42°25'49",71°34'54")65) Limestone Quarry (66(42°26'19",71°33'58")65,193,248,p.61-64,231,map,181,p.535,p.599-600,52,p.104,348,p.694,219,p.26-27,351,200,106,p.125)--well known locality. Marble lense extends 1,000 feet to the northeast. Kiln ruins 100 feet south. Actinolite, allanite, apatite, calcite, chondrodite, dolomite, fosterite (boltonite), grossularite, magnetite, muscovite (pink)--lepidolite?, also zoned red-green muscovite, petalite, phlogopite, pyrite, scapolite (wernerite), sphene, spinel, titanite, tremolite, vermiculite, yttrocerite, nuttalite, graphite, pyrrhotite, talc, coccolite, pargasite, arsenopyrite, chalcopyrite, fluorite, cerium ochre. Pegmatite (66(42°27'35",71°36'17")65)--beryl, apatite. Garnet (66(42°25'06",71°36'04"--Pine Hill)211,p.33)--occurs as massive beds associated with amphibolite in biotite gneiss and can be traced for several hundred feet. Andalusite (66(42°27'21",71°36'21")211,p.27)--clear, pink crystals in irregular knots as large as 6 inches across locally. Amphibolite (66(from 42°26'23",71°33'20" to 42°26'37",71°32'56"--Stowe, Middlesex County)211,p.36)--Contains interlocking poikilitic black hornblende crystals nearly half an inch long and sphene and apatite in subhedral grains. The hornblende crystals are partly replaced by biotite and contain small grains of andesine and diopside, the latter mineral being replaced by actinolite. Pegmatite (66(from

42°25'00",71°35'51" to 42°25'41",71°35'17")(42°26'00",71°34'43")(42°26'30",71°34'26")(42°27'20",71°34'46")(42°27'09",71°36'01")(42°27'20",71°36'28")(42°27'39",71°36'11"--Harvard-Bolton Road)211,p.28,map)--The pegmatites in the mica schist...contain few unusual minerals. Microperthite is common, and garnet is a usual accessory mineral. Some of the pegmatites also contain crystals of black tourmaline as much as half an inch in length, and, more rarely, small prisms of pale-green beryl. Marble (66(42°26'12",71°34'10"--also see limestone quarry)(from 42°25'52",71°36'08" to 42°25'59",71°35'58")(42°26'27",71°35'40")

BOYLSTON: Staurolite (86,87(area of 42°21'23",71°45'00"--Wachusetts Reservoir)157,p.681)--staurolite twins in schist along shore of reservoir a mile west of Boylston Center. Chiastolite (64,65,86,87(locality unknown)451)--in glacial drift. Limonite (Red Ochre) (64,65,86,87(locality unknown)233,p.561)--in a bed 4 or 5 inches thick mixed with clay.

BROOKFIELD: Pyrite (105,106(locality unknown)306,p.129)--large bed of rocks.

DUDLEY: Graphite? (130(locality unknown)233,p.44)

FITCHBURG: Rollstone Hill Granite Quarries (42(42°34'55",71°48'51"--McAuliff Quarry)65,topographic map,193,248,p.65-66,335,238,116,p.280-282,54,p.15-16)--Litchfield Quarry on southwest side and Godbeer Quarry on the northeast side of Rollstone Hill. Allanite (variety: orthite crystals), almandite, apatite, arsenopyrite, beryl (some gem quality), calcite, chalcopyrite, fluorite, titanite, ilmenite, molybdenite, pyrrhotite, spessartite, sphene, black tourmaline crystals (most common mineral), columbite, feldspar, biotite, muscovite. All pegmatite minerals. Hill received its name from a large glacial erratic boulder which originally was perched at the top of the hill but was moved to the Upper Common of Fitchburg on Main Street in 1929--1930. Talc (42(locality unknown)232,p.136)--bed 4 feet thick. Spodumene Pegmatite (42(42°33'36",71°47'54"--Pine Hill, Coggshall Park)224,p.37-38,54,p.15-16)--north strike, 10 feet thick and more than 300 feet long. Also contains beryl (crystals up to 8 inches long), purpurite. Microcline intergrown with spodumene at the north end of the pegmatite was found to contain 2% cerium oxide. Pegmatites (42(42°32'45",71°48'07")(42°36'26",71°46'53")(42°36'43",71°47'52")(42°37'20",71°47'01"--Pearl Hill)(42°36'49",71°48'10")19(42°37'56",71°46'31"--on Fitchburg-Lunenburg town line)(42°37'55",71°46'59")(42°37'58",71°47'44")54,p.5-8,p.15-16,53,238)--first locality is probably that mention in reference 224 as containing triphyllite and purpurite. Also tourmaline. Reference 238, p.11-12 states that "In his appendix to his "Catalogue of American Minerals", published in 1825 (reference 383), Robinson mentions quartz, mica, schorl (tourmaline), beryl, and sulphuret of molybenda, as occuring at Pearl Hill, five miles northeast of the "village" of Fitchburg." Heulandite (42(locality uncertain)164,p.96)--from the Fitchburg railroad cutting. Steatite (42(area of 42°36'51",71°47'35")231,map)

GARDNER: Pegmatite (41(42°35'17",71°59'01")53)

HARDWICK: Quabbin Aqueduct (61(42°22'59",72°09'34"--Shaft #10)65,200,51,427)--Dump of rock fragments from construction of water tunnel. Albite, anglesite, apophyllite, babingtonite, calcite, chlorite, epidote, fluorite, galena, goethite, gypsum, heulandite, hyalite, ilmenite, laumontite, magnetite, orthoclase (variety: adularia), prehnite, pyrite, quartz, rutile, selenite, sphalerite, sphene, stilbite, thomsonite, fibrous tremolite, zircon.

Allanite, Menaccanite, Pegmatite (83(area of 42°18'45",72°12'29"--Gilbertville)164,p.14,p.108,157,p.239)--allanite-flattened prisms 2 inches long and ½ inch wide. Menaccanite in dull-black flat crystals up to 1 inch long near the railroad cut. Pegmatite--in the railroad cut. Pegmatite 10 feet wide composed chiefly of orthoclase a foot square showing rods of quartz an inch wide and an inch apart and sheets of biotite a foot square. Limonite (Bog Iron Ore) (83(area of 42°19'22",72°11'22")231, map) Allanite (60(area of 42°23'00",72°16'12"--Den Hill)296)--quarry underwater. Quarry (84(42°22'19",72°13'44")topographic map)

HARVARD: Andalusite (66(area of 42°29'33",71°34'59")(area of 42°28'32", 71°35'21"--Harvard-Bolton Road)(42°31'16",71°32'29"--Oak Hill)(42°31'46", 71°32'22")(42°31'55",71°32'16")(42°31'36",71°32'55"--Littleton-Harvard Road)157,p.68,65,211,p.27,254,map)--Also see Littleton, Middlesex County. Quartz Veins (66(from 42°29'19",71°36'25" to 42°29'58",71°35'53")211,p.21, map) Pegmatites (66(42°29'41",71°33'07")(42°28'51",71°34'59"--intersection of Oak Hill and Woodchuck Hill Roads)(42°29'30",71°34'26"--Slough Road) (42°29'52",71°34'31")211,p.39,map) Desmond Road Prospect (66(42°27'53",71° 35'11")65) Brick Clay (44(42°30'10",71°36'59")2)

HOLDEN: Quabbin Aqueduct (64(42°22'53",71°50'20"--Shaft #2)(42°22'58", 71°52'23"--Shaft #3)65)--At shaft #2--gneiss, pyrite, ilmenite, purple fluorite, calcite, chlorite, bertrandite, fluorite, quartz, albite, magnetite, limonite, siderite, apatite (green), microcline, muscovite, biotite, tourmaline, almandite, epidote, pickeringite, bertrandite. Quarry (85(42°21'53",71°54'24")topographic map)

HUBBARDSTON: Pegmatite (63(42°28'48",71°58'51"--East Simmonds Hill Road) (42°28'57",71°58'46"--New Westminister Road)54,map). Copperas--see Templeton, Worcester County. Limonite (Bog Iron Ore) (40,62(area of 42°30'00", 72°01'23")231,map)

LANCASTER: Chiastolite (65(42°27'42",71°43'05"--intersection of Hill and Brockelman Roads)(42°29'00",71°42'40"--ledge near transmission line)(area of 42°27'51",71°42'11"--Ballard Hill)(area of 42°26'42",71°42'05"--George Hill)248,p.64,65,451,193,181,p.616)--also found in stonewalls along George Hill Road, Hilltop Road and Brockelman Road. Kyanite, Staurolite (65(localities unknown)193)--staurolite in garnet schist. Fuller's Earth (65(42° 28'10",71°39'16"--Pine Hill Road)314,vol.3,p.xxxif--16,2)--glacial silt. Shown as two gravel pits on current topographic map. Brick Clay (65(area of 42°29'25",71°38'02")(area of 42°28'52",71°39'07"--Fort Devens Military Reservation)2) Slate Quarry (65(area of 42°27'10",71°40'51")Pearre (General Reference, 1956),303,p.186)

LEOMINISTER: Granite Quarries (42(area of 42°31'28",71°47'00"--Sheldon Hill)(42°31'30",71°47'41"--Leavitt Quarry?)157,p.230,116,p.283) Pegmatites (42(42°32'01",71°48'31"--under transmission line)(42°32'54",71°47'57"-- north slope of North Monoosnoc Hill)65) Spodumene Pegmatites (42(from 42° 30'26",71°46'57" to 42°30'47",71°46'50"--east slope of Long Hill)15,224, p.35-37,222,381,p.788,54,p.17)--also contains pollucite associated with green tourmaline, amblygonite, cassiterite, columbite, microcline and albite feldspars, quartz, topaz, pyrite, purpurite, and arsenopyrite. Spodumene Pegmatite Boulders (42(area of 42°29'23",71°47'09")15)--also see Sterling, Worcester County. Vein Quartz (42(42°29'12",71°46'49"--Bee Hill) 15)

LUNENBURG: Pegmatite--on Lunenburg--Fitchburg town line. See Fitchburg, Worcester County.

MENDON: Specularite in Quartz (110,133(locality unknown)383)--Some of the plates are ¼ inch in thickness about a mile from the Blackstone factory, on Peter Gaskill's land, at a shaft which was run upwards of 40 years since, with the delusive prospect of finding silver.

MILBURY: Talc--Steatite (108(area of 42°10'51",71°46'16"--Bramanville) 250,157,p.85,106,p.125-126,231,map)--thick selvage of tremolitic steatite in gneiss. Also vermiculite (altered biotite) Scapolite Limestone (108 (42°11'05",71°47'15"--Old Common)157,p.84,358,p.101-104)--in Brimfield schist. Locality at first rise in road, rock along the east side of the road. Also graphite, actinolite.

MILFORD: Granite Quarries (110,111(see Map 5, this book)115,85,65,184, p.191,117,115)--collectively contain allanite, blue quartz, calcite, chlorite, epidote, hematite, ilmenite, kaolin, orthoclase crystals, pyrite, zircon, zoisite. Also see Hopkinton, Middlesex County. Steatite (110 (locality unknown)106,p.125-126)--glacial boulder erratic. Monzite? (110 (locality unknown)331,p.166,135)

MILLVILLE: Calcite and Actinolite (133(north side of Route 122)--calcite colored green by actinolite and/or chlorite. In chlorite schist.

NEW BRAINTREE: Limonite (Bog Iron Ore) (84(area of 42°18'30",72°07'10") 231,map) Serpentine (84(area of 42°17'46",72°08'26"--Meadow Brook)279) Hornblendite (83(42°17'58",72°08'06"--Brookfield Road)178)--with phlogopite, olivine.

NORTHBOROUGH: Limestone and Lime Kiln (near ~~Ghost Hill~~(Ghost Hill--42° 20'06",71°39'13")358,p.104)

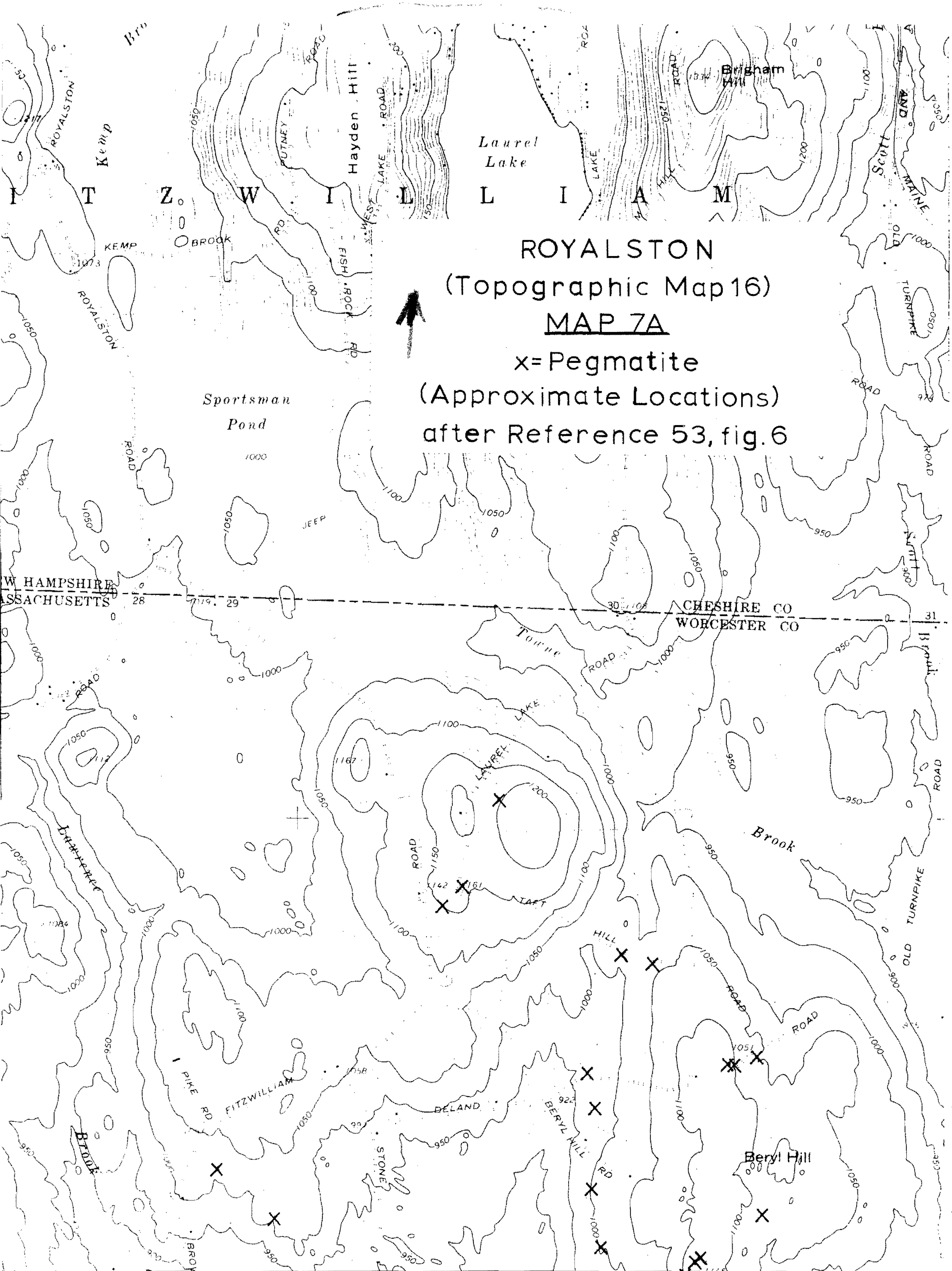
NORTH BROOKFIELD: Garnet Rock (84,116(locality unknown)231,p.218,233,p.48) --used as polishing material.

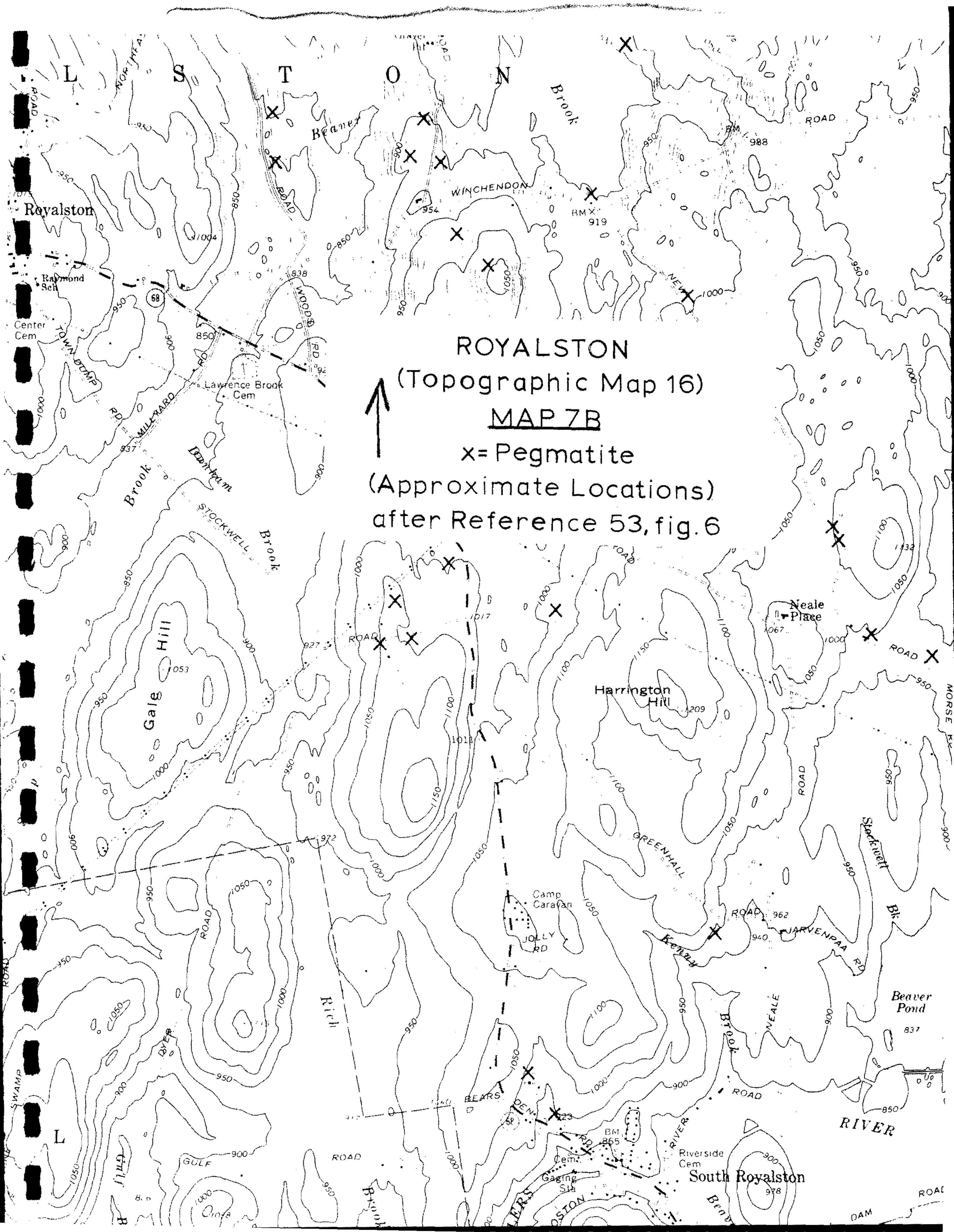
OAKHAM: Limonite (Bog Iron Ore) (84(area of 42°19'34",72°03'26")231,map)

PETERSHAM: Soapstone Quarries (60(42°28'24",72°15'45"--southeast slope of Soapstone Hill)(area of 42°30'55",72°13'09")409,65,231,map,85,279)

PRINCETON: Pegmatites (63(42°29'30",71°53'32")(42°29'32",71°53'33")(42° 29'38",71°53'16")54,65)--Wachusett Mountain State Reservation.

ROYALSTON: Ilmenite or Rutile Crystals in Pegmatite (16(42°41'33",72°13' 40"--Route 52, West Royalston)65)---road cut. Beryl Pegmatites (16(area of 42°40'44",72°11'39")(see Maps 7A,7B (adjoining maps), this book)53,p.13-15,map,193,181,p.661,p.581,54,p.8-9,p.17)--Collectively the pegmatites contain almandite, autnite, gem beryl, biotite, magnetite, manganapatite, microperthite, muscovite, quartz, uraninite, uranophane. Olivine, Magnetite (16(42°41'17",72°14'52"--Collar Brook)247). Steatite (16(locality unknown) 164,p.166)--Harris Quarry. In coarse radiated masses derived from the alteration of anthophyllite (gedrite).


ROYALSTON
(Topographic Map 16)
MAP 7A
x= Pegmatite
(Approximate Locations)
after Reference 53, fig. 6
Laurel Lake
Hayden Hill
Brigham Hill
Sportsman Pond
Kemp
Scott
F I T Z W I L L I A M
NEW HAMPSHIRE
MASSACHUSETTS
CHESHIRE CO
WORCESTER CO
Towne
Brook
Beryl Hill
ROYALSTON
KEMP
BROOK
FISH ROCK RD
LAUREL LAKE
TAFT HILL
FITZWILLIAM PIKE RD
DELAND
STONE
BERYL HILL RD
TURNPIKE
OLD TURNPIKE
ROAD


ROYALSTON
(Topographic Map 16)
MAP 7B
x= Pegmatite
(Approximate Locations)
after Reference 53, fig. 6
Royalston
Raymond Sch
Center Cem
Lawrence Brook Cem
Gale Hill
Harrington Hill
Neale Place
Camp Caravan
JOLLY RD
Beaver Pond
South Royalston
Riverside Cem
Gaging Sta
WINCHENDON
STOCKWELL
GREENHALL
JARVENPAA RD
MILLARD RD
TOWN DUMP RD
WOODS RD
RIVER
Brook
Rich
Kenny
Stockwell Bk
ROAD

RUTLAND: Quabbin Aqueduct (63(42°23'03",71°53'19"--Shaft #4)(42°23'09", 71°56'55"--Shaft #5)(42°23'16",71°59'23"--Shaft #6)62(42°23'21",72°01'23" --Shaft #7)65)--Shaft #7 shown as airshaft on current topographic map. Shaft #4--almandine garnet, feldspar, hornblende, rose quartz, siderite, tourmaline. Shaft #6--calcite, feldspar, hornblende, quartz, siderite. Pegmatites (63(42°25'46",71°58'27"--North Rutland)(42°24'50",71°58'05"-- intersection of Bigelow Street and Route 68)65,54)

SHREWSBURY: "Shrewsbury Dike" (87(localities uncertain--West Shrewsbury) 358,p.105,157,p.85)--Reference 358: "On leaving the eastern side of Lake Quinsigamond, we pass the cemetary on the right (42°16'28",71°44'57"(?), and then, somewhat beyond come to a road on the left. At this corner, we pass into the field at the northwest--outcrop, 2nd outcrop--100 feet northwest, 3rd outcrop--at short distance--under two large oak trees, large outcrop (diorite)--actinolite, pyrrhotite, chalcopyrite, scapolite (white coatings on joint surfaces), magnetite. 4th outcrops--adjacent road to the north, a few hundred feet, talc, serpentine?, magnetite, olivine, hornblende, dolomite, tremolite--fibrous, 5th outcrop--going easterly across one field and into the next, under a large oak tree, a little to the south--diorite. 6th outcrop--Then we go to another oak tree somewhat northeasterly, in the same field, and but a short distance, and then more of the hornblende rock appears, and a little further on, still more, crossing a small brook and going towards the Shrewsbury road still more; then going on the Shrewsbury road and starting up the hill, perhaps one-fourth the distance up; we come to an excellent cutting in the ledge made when the electric road was built--diorite--scapolite (white coatings on joint surfaces)." Reference 14--At H.H. Mason's place--boss of rock--antigorite, serpentine, boltonite, tremolite.

SOUTHBORO: Granite Quarries (88(area of 42°17'40",71°30'21"--Fayville) (area of 42°16'04",71°31'24"--Cordaville)65)

SOUTHBRIDGE: Thorium (129(locality unknown)331,258,p.11-14,267)--local biotite-rich pegmatite in hornblende gneiss contains up to 0.03% ThO_2. Moonstone (Orthoclase) (129(locality uncertain)194,193)--translucent light green, lenticular shaped masses up to several feet across in gneiss (schistose?). Near the center of town.

STERLING: Siderite, Smithsonite (64(42°25'13",71°45'36")231,p.189-190,233) --look for break in stone wall on east side of Newell Hill Road. Follow path in for a few hundred feet. Twenty foot adit on the other side of the ridge on the right hand side; dump on left. Chalcopyrite?, arsenopyrite?, sphalerite? Spodumene Pegmatites (64(42°28'57",71°47'36")(42°28'57",71°47' 16")15,map,224,p.35-37,83,222)--also see Leominister, Worcester County. Spodumene Pegmatite Boulders (64(42°28'44",71°47'25")(42°28'53",71°47'32") (42°29'00",71°47'12")(42°27'42",71°47'11"--boulder, spodumene?)15,map,224, p.35-37,248,223,p.65,65)--first 3 localities are areas of maximum concentrations. See Leominister, Worcester County (source area). Pegmatites (64 (42°28'37",71°47'16")(42°28'15",71°48'21")(42°26'50",71°48'07")65) Chiastolite (64,65(localities unknown)193) Peat (64(area of 42°23'17",71°46'09" --Sterling Junction)99)--reed sedge peat mined by the Sterling Peat Co. Quarries (64(42°25'42",71°46'14")65(42°24'41",71°43'11")topographic maps) Limonite (Bog Iron Ore) (64(area of 42°24'44",71°46'22")231,map)

STURBRIDGE: Graphite (128(42°03'34",72°07'47"--Tantisques Graphite Mine) 15,314,vol.3,p.xxii-14 to 15,410,336)--specimens found in earth around pit. Also see Holland, Hampden County. Pyrope Garnet(129(lost locality) 198,231,193)--farm of Mr. Morse, 1½ miles south of the meetinghouse. Facetable gem quality garnet found in thin layers of graphite. Corundum (Iolite), Moonstone (Orthoclase), Cordierite (105,106,128,129(locality uncertain--top of Shumway Hill)193,164,p.59) Limonite (Bog Iron Ore) (106 (area of 42°08'21",72°06'24")129(area of 42°02'14",72°06'13")231,map)

SUTTON: Purgatory Chasm (109(42°07'38",71°42'59")441,478)--amethystine quartz, feldspar, beryl, garnet.

TEMPLETON: "Copperas" (Iron Sulphate) (40(42°31'40",72°02'08"--Mine Hill) 232,p.126,65)--also marcasite, melanterite, pyrrhotite, pyrite. Reference 232 reported locality as Hubbardston, Worcester County.

UXBRIDGE: Argentiferous Galena (132(area of 42°02'00",71°39'01")232,p.127, 231,map,Peare (General Reference, 1956) Granite Gneiss Quarries (132(42° 05'08",71°39'34"--Quarry Hill(Blanchard Quarries)116,p.283-284) Aplite (133(locality uncertain)158)--A similar (Northfieldite) highly acid aplite rock has been found in the border of the Milford granite around Uxbridge. An occurrence 1½ miles north of Millville contained 87.51% SiO_2. It forms a layer of considerable thickness between the normal Milford granite which contains 78% SiO_2 and an outer border of diorite schist. Also see Northfield, Franklin County. Babingtonite (132,133(locality unknown)349)--pegmatitic granite. Associated minerals: microcline, adularia, epidote, biotite, hornblende, quartz, heulandite, pyrite. Limonite (Bog Iron Ore) (132(area of 42°01'26",71°40'19"--Cedar Swamp)231,map)

WARREN: Cordierite, Adularia (105(area of 42°10'56",72°13'07"--roadcut, Massachusetts Turnpike (Route 90)77) Pegmatites (104(area of 42°11'11", 72°15'42")53,p.15)--second pegmatite 1200 feet to north 8° east.

WEBSTER: Limestone (Dolomite Quarries?) (130,131(locality uncertain)358, p.104,131)--mile or so west of Lake Chaubunagungamaug. Mine Brook (131 (area of 42°04'05",71°50'20")topographic map)

WESTBORO: Amethyst (87,88,109,110(locality unknown)193)--light colored crystals. Found loose in soil in plowing field during early part of the 19th century.

WEST BOYLSTON: Quabbin Aqueduct (64(42°23'12",71°48'11"--Shaft #1)topographic map) Andalusite, Staurolite (64,86(area of 42°22'30",71°48'43"--Malden Hill)157,p.68)--Andalusite on Malden Hill. Generally small but some are an inch square and 4 to 8 inches long. Staurolite crystals farther north.

WEST BROOKFIELD: Limonite (Bog Iron Ore) (84(area of 42°16'30",72°08'29") 231,map). Serpentine (84(area of 42°17'15",72°11'04"--Ragged Hill)279)

WESTMINISTER: Pegmatite (63(42°29'36",71°53'58"--Wachusett Mountain State Reservation)65)

WINCHENDON: Pegmatites (17(area of 42°37'42",72°06'43")(area of 42°37'59", 72°05'50")(2 pegmatites in area of 42°37'55",72°05'44")(area of 42°37'51", 72°05'22"--flooded)53,fig.6)

WORCESTER: Granite Quarries (86(42°16'42",71°46'52"--Millstone Hill) 36,p.107-108,map,157,p.228,65,358,p.56,p.59,193)--abandoned. Probably filled in. Reference 157, p.228: "In the northern quarry a broad, thin sheet of limestone is bordered on both sides by layers a foot thick of calcite-albite-microcline rock, containing sphalerite, essonite, apatite, and purple fluorite. Masses of calcite grains are separated from the central layer and are inclosed in feldspar grains and bordered by a thick continuous selvage of granular titanite. An irregular selvage of dark-blue, very quartzose albite-microcline granite separates this layer from the normal granite...Purple fluorite is disseminated in grains in the calciferous granite and green or white fluorite appears as thin sheets in secondary fissures in the adjacent rock, accompanied by crystals of quartz and pyrite and large aggregates of molybdenite scales. In a rather large area in the southern part of the quarry the granite is so full of a calcium-iron-manganes carbonate that the weathered rock has the appearance of a black cinder." Reference 36 states that "Two small patches of granite in the northeast face of the quarry contained abundant small, unoriented green beryl crystals and associated with molybdenite." Other minerals found in the quarry include apatite, grossularite, pyrite, sphalerite, sphene, quartz (smoky, blue, amethystine), ankerite. Garnet, Staurolite, Tourmaline (108(locality uncertain)157,p.68)--South of Worcester, the Worcester phyllite grades along the strike into a lead-gray mica schist, full of large black crystals of garnet and staurolite and containing tourmaline dereived from the granite. Scapolite--Hornblende Rock (86 (Winthrop Street)157,p.85)--on Dr. Hayward's place. Rusty boulders containing salite, biotite, magnetite, and leucoxene. Thorium (108(see description)331,258,267)--In biotite-garnet gneiss and biotite schist exposed 3 miles south of Worcester. Contain up to 0.032% ThO_2. Stone Quarry (86(42°16'17",71°46'53")65) "Coal Mine"--see Fossil Section. Galena, Silver (86,108(locality unknown)314,vol.2,p.vi-26)--in the town of Worcester about the year 1754, a vein of galena was discovered in association with silver and considerable money was expended in mining operations. Arsenopyrite, Siderite, Galena (86,108(locality unknown)233,p.50)--excavation in mica slate, now filled up (1832). Ballard Quarry (86(locality uncertain--near Lake Quinsigamond)358,p.93-100,370)--abandoned. Gneiss with garnet, calcite, quartz crystals, chabazite (variety: haydenite), stilbite, prehnite, pyrrhotite, epidote, vermiculite, prochlorite, pyrite, chalcopyrite, malachite, azurite, actinolite. Granite with zircon, allanite, garnet. Mica schist with hornblende and garnet. Sillimanite Schist (86 (locality uncertain)358,p.100-101)--Boston and Albany Railroad (now New York Central)--to the east from the deep cut at Bloomingdale (Bloomingdale --area of 42°15'48",71°46'22")--bridge--each end on sillimanite schist. Tatnuck Hill Quarry (86(area of 42°16'39",71°51'52")358,p.131)--On the south side of the road, and a short distance west of the road leading from Paxton round to the Tatnuck Country Clubhouse--mica schist--tourmaline, granite--some garnet, pyrite, stilbite. Brick Clay Pit (86(42°15' 35",71°46'30")--abandoned. Folded Phyllite (86(42°17'00",71°45'40"--south end Wigwam Hill)--crenulated anticlinal structures with secreted quartz in weathered relief. Limonite (Bog Iron Ore) (86(area of 42°18'35",71°48' 44"--Indian Hill)231,map) Steatite (108(area of 42°14'01",71°46'21"--Broad Meadow Brook)231,map)

WORCESTER COUNTY FOSSIL LOCALITIES

HARVARD: Bison Horn (44(see description)387)--horn core of Bison crassicornis. Town sand and gravel pit about one mile northwest of the center of town. (Harvard Center--42°30'03",71°35'03").

NORTHBORO: Mastadon Remains (87(see description)157,p.149,377)--Nine teeth, with numerous parts of the skull and parts of the tusks, of Mastodon gigantius were found in 1884 on the farm of William U. Maynard, in Northboro, near the Shrewsbury line...

WORCESTER: Fossil Plants (86(42°17'16",71°45'59"--Worcester "Coal Mine") 161,p.63-64,204,207)

BIBLIOGRAPHY

GENERAL REFERENCES

Cassidy, Martin, October 1962, A Partial Bibliography of the Geology of Massachusetts through 1958. Harvard University, 90 pages

Gannett, Henry, 1894, A Geographic Dictionary of Massachusetts. U.S. Geological Survey Bulletin 116, 126 pages

Johansson, Warren I., 1952, A Bibliography to the Paleontology of Massachusetts 1821--1949. Mass. Univ. Dept. Geology and Mineralogy Spec. Dept. Pub. No.3, 28 pages

----------, 1950, A Bibliography of Massachusetts Minerals 1796--1948. Dept. of Geology and Mineralogy, University of Massachusetts, Amherst, Mass. Spec. Dept. Pub. No. 2, 34 pages

Mass. Coop. Geologic Program, U.S. Dept. Interior, U.S. Geol. Survey--Mass. Dept. Public Works, Partial List of Publications and Open-File Reports through June 30, 1973 with Supplements for June 1973--June 1975. 33 pages, also pages 1a,b; 2a,b. Boston

McIntosh, Willard L. and Margaret F. Eister, 1973, U.S. Geological Survey Geologic Map Index of Massachusetts--Rhode Island--Connecticut, 1952--1971. Map scale 1:500,000

Pearre, Nancy C., 1956, Mineral Deposits and Occurrences in Massachusetts and Rhode Island, Exclusive of Clay, Sand and Gravel, and Peat. U.S. Geological Survey Mineral Investigation Resources Map MR4. Scale 1:500,000

U.S. Geological Survey Geologic and Water Supply Reports and Maps, October 1975, Massachusetts--Rhode Island--Connecticut. 56 pages

NUMBERED REFERENCES

(1) Agos, Theodore L., June 1969, The Notebook. Rocks and Minerals, vol.44, no.6, p.428-429
(2) Alden, William C., 1910, Fuller's Earth and Brick Clays near Clinton, Massachusetts, p.402-404 in Contributions to Economic Geology (Short Papers and Preliminary Reports), C.W. Hayes and Waldemar Lindgren, Geologists in Charge, U.S. Geological Survey Bulletin 430, 653p.
(3) Allen, Glover M., August 1920, Bison Remains from New England. Journal of Mammalogy, vol.1, no.4, p.161-164
(4) Anderson, Allen E., 1959, Bedrock Geology of part of the Goshen Quadrangle, Massachusetts. Univ. Mass. M.S. Thesis, 78p., map
(5) Anderson, Carl, May-June 1958, World News on Mineral Occurrences--Massachusetts. Rocks and Minerals, vol.33, nos.5-6, p.198-199
(6) Anderson, John, Collecting at the I-495 and I-290 Roadcut, Marlborough, Massachusetts, p.27-31 in Anonymous, 1976, Program for the Annual Greater Boston Gem and Mineral Show, Boston Mineral Club, Inc. and the Southeastern Massachusetts Mineral Club Inc. (Publishers), 64p.
(7) Anonymous, 1968, U.S. Geological Survey Heavy Metals Program Progress Report, 1966 and 1967, U.S. Geological Survey Circular 560, 24p.
(8) ----------, 1965, Geological Survey Research for 1965. U.S. Geological Survey Professional Paper 525-A, 376p.

(9) --------, November-December 1957, World News of Mineral Occurrences. Rocks and Minerals, vol.32, nos.11-12, p.556
(10) --------, 1868, Field Meeting at Topsfield, Proc. Essex Inst., vol.6, p.45-53
(11) --------, 1866, Copper Mines of Topsfield, Communications to the Essex Institute. Proc. Essex Institute, vol.6, p.47
(12) --------, 1866, Mineral Point Mine, Georgetown. Proc. Essex Institute, vol.4, p.CLII
(13) --------, 1856-1859, Hayward Quarry--Meeting Note. Proc. Boston Soc. Nat. Hist., vol.4, p.27-30, p.40-44
(14) --------, January 1835, Lowell--Geological Facts. Am. Journal of Science (Silliman's Journal), 1st series, vol.27, no.2, art.22, p.340-347
(15) Apfel, Earl T., May 1944, Graphite Deposits near Sturbridge, Massachusetts. U.S. Geol. Survey--Mass. Dept. Public Works Info. Circ. 6, U.S. Geol. Survey Open File Report, 16p., 6 maps, Boston.
(16) ----------, May 1944, Dolomite in the Vicinity of Lee, Massachusetts as an available source of metallic magnesium. U.S. Geol. Survey --Mass. Dept. Public Works Coop. Geol. Project, Inf. Circ. 4, Open File Report, 34p., 1 fig., map, scale 1:12,000, 3 sections. Boston.
(17) ----------, 1945, Emery Deposits near Chester, Massachusetts. Mass. Dept. Public Works--U.S. Geol. Survey Coop. Geol. Project, Info. Circ. 5, U.S. Geol. Survey Open File Report, 15p., 4 maps, 4 figs. Boston.
(18) Ashley, G.H., 1915, Rhode Island Coal, U.S. Geol. Survey Bulletin 615, 62p.
(19) Ashley, Gail Mowry, 1972, Rhythmic Sedimentation in Glacial Lake Hitchcock, Univ. Mass. Dept. of Geology Contr. No. 10, 148p., 44 figs., 6 tables, 1 plate
(20) Atwater, William, 1821, Hill of Serpentine (Westfield). American Journal of Science, vol.3, p.238-239
(21) Bain, George W., 1957, The Eastern Border Excursion, p.27-33 in Bain, George (Editor), Geology of the Northern Part--Connecticut Valley, 49th New England Intercollegiate Geologic Conference Guidebook, 56p.
(22) ----------, August 1936, Mechanics of Metasomatism, Am. Min., vol.3, no.5, p.505-526
(23) ----------, 1932, The Northern Area of the Connecticut Valley Triassic, Am. Jour.Sci., 5th series, vol.23, no.133, p.57-77
(24) ---------- and Howard A. Meyerhoff, 1963, The Flow of Time in the Connecticut Valley, 143p., 26 figs., 10 plates
(25) Balch, D.M., 1864-1865, On the Sodalite at Salem, Massachusetts. Essex Inst. Proc., vol.IV, p.3-6
(26) Balk, Robert, April 1957, Geology of the Mount Holyoke Quadrangle, Massachusetts. Bull. Geol. Soc. Am., vol.68, p.481-504, 6 figs., 3 plates
(27) ----------, 1956, Northfield, Mass.-Vermont, Bedrock Geology of the Massachusetts portion. U.S. Geol. Survey Geologic Quadrangle Map GQ92. Scale 1:31,680
(28) ----------, 1956, Bernardston, Massachusetts-Vermont, Bedrock Geology of the Massachusetts portion. U.S. Geol. Survey Geologic Quadrangle Map GQ90. Scale 1:31,680
(29) ----------, 1956, Millers Falls, Massachusetts. Bedrock Geology. U.S. Geol. Survey Geologic Quadrangle Map GQ93. Scale 1:31,680
(30) ----------, February 1946, Gneiss Dome at Shelburne Falls, Massachusetts. Bull. Geol. Soc. Am., vol.57, no.2, p.125-129
(31) ----------, 1941, Devonian Bernardston Formation of Massachusetts Restudied (Abstract). Bull. Geol. Soc. Am., vol.52, part 2, no.12, p.2009-2010

(32) Barden, S., 1864-1865, Field Meeting at East Saugus. Proc. Essex Institute, vol.4, p.43-46
(33) ----------, 1863, Serpentine in Lynnfield. Proc. Essex Institute, vol.3, p.89
(34) Barghoorn, Elso S., 1949, The Boylston Street II, A study of a site on Stuart Street in the Back Bay district of Boston, Massachusetts. Peabody Foundation for Archeology Papers, vol.4, no.1, p.1-133
(35) Bartels, Otto G., 1941, Rediscovery of so-called coal in fissure veins near West Springfield, Massachusetts. Rocks and Minerals, vol.26, nos. 11-12, p.600
(36) Barton, R. William and Carl E. Goldsmith, 1968, New England Beryllium Investigations. U.S. Bu. Mines Rept. of Investigation 7070, 177p., 64 figs.
(37) Bartsch, Rudolf C.B., August 1944, New England Notes--South Quincy, Woburn, Newton-Brookline, Massachusetts. Rocks and Minerals, vol.19, no.8, p.244-245
(38) ----------, November 1943, New England Notes--Chester, Massachusetts. Rocks and Minerals, vol.18, no.1, p.330
(39) ----------, July 1941, New England Notes--Quincy, Massachusetts. Rocks and Minerals, vol.16, no.7, p.255
(40) ----------, February 1941, New England Notes--West Roxbury, Massachusetts. Townsend, Massachusetts. Rocks and Minerals, vol.16, no.2, p.56
(41) ----------, September 1940, New England Notes. Rocks and Minerals, vol.15, no.9, p.383
(42) Bascom, F., 1912, The Petrographic Province of the Neponset Valley, Massachusetts. Journal of the Academy of Sciences, 2nd series, vol.15, p.129-161
(43) Bastin, Edson S., 1910, Economic Geology of the Feldspar Deposits of the U.S. U.S. Geol. Survey Bulletin 420, 85p.
(44) Bazakas, Peter C., 1960, Bedrock Geology of the Easthampton Quadrangle, Massachusetts. Univ. Mass. M.S. Thesis, 132p., map
(45) Bell, K.G., 1948, Geology of the Boston Metropolitan Area. Mass. Inst. Tech. Ph.D. Thesis, 390 pages, 20 maps, 2 cross-sections
(46) Benninghoff, William S., November 1950, Late Quaternary Vegetation on No Mans Land Island, Massachusetts (Abstract). Bull. Geol. Soc. Am., vol.61, part 2, no. 12, p.1443-1444
(47) ----------, 1942, Pollen analysis of the lower peat in the Boylston Street Fishweir (Boston, Mass.) Peabody Foundation for Archeology Papers, vol.2, p.96-104, 3 figs.
(48) Benton, E.R., 1878--1880, The Amygdaloidal Melaphyre of Brighton, Massachusetts. Proc. Boston Soc. Nat. Hist., vol. 20, p.415-426
(49) ----------, 1878, The Richmond Boulder Trains. Bull. Mus.. Comp. Zool., Harvard College, vol.5, no. 3, p.17-42, map, scale 2½" equals 1 mile
(50) Biggart, Norman, 1976, Massachusetts State Gem? Mineral? Fossil? Rock?, p.20-26 in Anonymous, 1976, Program for Annual Greater Boston Gem and Mineral Show, Boston Mineral Club, Inc. and Southeastern Massachusetts Mineral Club, Inc. (Publishers), 64p.
(51) ----------, July 20, 1975, Boston Mineral Club Special Bicentennial Day Trip, Shaft #10, Hardwick, Massachusetts
(52) Billings, Marland P., 1956, The Geology of New Hampshire, Part II--Bedrock Geology. New Hampshire State Planning and Development Commission, Concord, New Hampshire
(53) ----------, 1942, Pegmatites of Massachusetts, Progress Report for Work Done in Summer of 1942, U.S. Geol. Survey Open File Report, Boston, 18p., 7 figs., 4 tables
(54) ----------, 1941, Pegmatites of Massachusetts. U.S. Geol.

Survey--Mass. Coop. Geol. Proj. Bulletin No. 5, U.S. Geol. Survey Open File Report, 19p., 11 figures, Boston
(55) ---------- with W.B. Allen, 1944, Mica Deposits in the Chester--Blandford State Forest. U.S. Geol. Survey--Mass. Dept. Public Works Inf. Circ. 2, U.S. Geol. Survey Open File Report, 6p., 1 map, scale 1:960, Boston.
(56) ---------- and C.W. Wolfe, February 1944, Spodumene Deposits in the Leominister--Sterling Area, Massachusetts. U.S. Geol. Survey--Mass. Dept. Public Works Coop. Geol. Project Info. Circ. 3, U.S. Geol. Survey Open File Report, Boston
(57) Bjarby, Gunnar, Jan.--Feb. 1960, Fifty Years of Mineral Collecting. Rocks and Minerals, vol.35, nos.1-2, p.3-8
(58) ----------, Jan.--Feb. 1958,, World News on Mineral Occurrences --Massachusetts. Rocks and Minerals, vol.39, nos.1-2, p.13
(59) ----------, Sept.--Oct. 1952, World News of Mineral Occurrences --Massachusetts. Rocks and Minerals, vol.27, no.9-10, p.489
(60) ----------, June 1945, Riebeckite from West Quincy, Massachusetts. Rocks and Minerals, vol.20, no.6, p.266-268
(61) Blake, J.H., 1846, Gold at Dedham, Mass. Am. Journal of Science (Silliman's Journal), 2nd series, vol.22, art.2, Mineralogy and Geology, no.233, p.419
(62) Blake, William P., 1860, The Whately Silver-Lead Mines. Mining Magazine and Journal of Geology, p.411-418
(63) Bock, Wilhelm, September 1949, Triassic Chimaeroid Egg Capsules from the Connecticut Valley. Journal of Paleontology, vol.23, no.5, p.515-517, 1 plate
(64) Bogard, M.D., May 1945, The Metallurgist "Paul Revere". Rocks and Minerals, vol.20, no.5, p.203-206
(65) Boston Mineral Club, 1948--1952, Mineral Localities (Plotted on Topographic Maps) and Minerals Found. Contributors: Gunnar Bjarby with R. Bartsch, A. Carpenter, G. Ehrenfried, H.T. Evans, G. Hill, W. Howe, Irvin, G. Krumm, G. Stanwood
(66) Boucot, Arthur J., Gordon J.F. MacDonald, Charles Milton and James B. Thompson Jr., July 1958, Metamorphosed Middle Paleozoic Fossils from Central Massachusetts, Eastern Vermont, and Western New Hampshire. Bull. Geol. Soc. Am., p.855-870, 1 fig., 6 plates
(67) Bouve, T.T., 1870, Indian Pot Holes, or Giant's Kettles of Foreign Writers. Proc. Boston Soc. Nat. Hist., vol.24, p.218-223
(68) Bowen, N.L. and J.F. Schairer, August 1935, Grunerite from Rockport, Massachusetts and a Series of Synthetic Fluor-Amphiboles, Am. Mineralogist, vol.20, no.8, p.543-551
(69) Bowman, Isaiah, October 1906, Northward Extension of the Atlantic Preglacial Deposits. Am. Jour. of Science, 4th series, art.29, vol.226, no.130, p.313-315
(70) Brashears Jr., M.L., 1933, Manganese Veins at West Cummington, Massachusetts. Mass. Inst. Tech. B.S. Thesis, 20p., 2 maps
(71) Bray, Joseph M., March 1939, Ilmenite-Hematite-Magnetite Relations in some Emery Ores. Am. Min., vol.24, no.3, p.162-170
(72) Brockway, Charles J., 1875, Mineral Deposits in Essex County, Massachusetts. W. Huse and Co. (Pub.), Newburyport, 60p., map
(73) Brown, T.C., 1905, A New Lower Tertiary Fauna from Chappaquidick Island, Martha's Vineyard. Am. Jour. of Science, 4th series, vol.20, no.117, art.26, p.229-239; also in Science, vol.21, no.548, p.990-991
(74) Brownlow, Arthur Hume, 1960, Serpentine and associated rocks and contact minerals near Westfield, Massachusetts. Mass. Inst. Tech. Ph.D. Thesis, 177p., 21 figs., 3 tables, 2 maps

(75) Burbank, L.S., 1874, Minerals from Athol, Massachusetts. Proc. Boston Soc. Nat. History, vol.17, p.181-182
(76) Burgess, R.J. and Robert S. Sanford, 1949, Investigation of the Cheever Limonite Deposit, Berkshire County, Massachusetts. U.S. Bureau of Mines Report of Investigation 4423, 13p., 7 figures
(77) Burke, James, May-June 1956, World News of Mineral Occurrences--Cordierite in Brimfield, Massachusetts. Rocks and Minerals, vol.31, no.5-6, p.251
(78) Burr, Henry T., January 1900, A New Lower Cambrian Fauna from Eastern Massachusetts. The American Geologist, vol.25, p.41-50
(79) ---------- and Robert E. Burke, 1900, The Occurrence of Fossils in the Roxbury Conglomerate. Proc. Boston Soc. Nat. Hist., vol.29, no.9, p.179-184
(80) Castle, R.O., 1964, Geology of the Andover Granite and surrounding rocks, Massachusetts. U.S. Geol. Survey Open File Report, 550p., 50 pls., 30 figures. Boston
(81) ---------- and T.G. Theodore, 1972, Some genetic implications of the phase composition of a simple New England pegmatite. U.S. Geologic Survey Prof. Paper 800-B, p.B105-B117, illus. (incl. geol. sketch map)
(82) Chidester, A.H., N.L. Hatch Jr. and S.A. Norton, 1967, Geologic Map of the Plainfield Quadrangle, Franklin, Hampshire, and Berkshire Counties, Massachusetts and Bennington and Windham Counties, Vermont. U.S. Geol. Survey Geologic Quadrangle Map GQ642, scale 1:24,000
(83) Chute, A.P., 1856, Minerals of Lynnfield, Essex County, Massachusetts Proc. Essex Institute, vol.2, p.47
(84) Chute, Newton E., 1972, Cheshire Glass Sand Deposits in the Cheshire Area, Massachusetts. U.S. Geol. Survey Open File Report, 11p.
(85) ----------, 1969, The talc, soapstone, and asbestos deposits of Massachusetts. U.S. Geol. Survey Open File Report, 42p., 12 plates, Boston
(86) ----------, 1966 (1967), Geology of the Norwood Quadrangle, Norfolk and Suffolk Counties, Massachusetts. U.S. Geol. Survey Bulletin 1163-B, p.B1-B78
(87) ----------, 1959 (1960), Glacial Geology of the Mystic Lakes--Fresh Pond Area, Massachusetts. U.S. Geol. Survey Bull. 1061-F, p.187-216
(88) ----------, 1950, Brockton, Massachusetts. Bedrock Geology. U.S. Geol. Survey Geologic Quadrangle Map GQ5, scale 1:31,680
(89) ----------, May 15, 1945, The Brown Iron Ore District of Berkshire County, Massachusetts. U.S. Geol. Survey--Mass. Dept. Public Works Coop. Geol. Project, U.S. Geol. Survey Open File Report, 60p., 2 plates, 9 figures, Boston
(90) ----------, 1942, Coal Resources of Southeastern Massachusetts. U.S. Geol. Survey--Mass. Dept. of Public Works Coop. Geologic Project, Special File Report, U.S. Geologic Survey Open File, 25p., 1 map. Boston
(91) ----------, 1940, Preliminary report on the geology of the Blue Hills Quadrangle, Massachusetts. U.S. Geologic Survey--Mass. Dept. of Public Works Coop. Geol. Proj. Bulletin 1, map, scale 1:31,680
(92) ---------- and R.L. Nichols, 1941, The Geology of the Coast of Northeastern Massachusetts. U.S. Geol. Survey--Mass. Dept. Public Works Proj. Bull. 7, U.S. Geologic Survey Open File Report
(93) Clapp, William F., 1914--1915, A New Fossil Vitrinell from Boston, Massachusetts. Nautilus, vol.28, p.38-40
(94) Clark, Robert Bucknam and Peter David Engels, 1956, Studies of the Newbury Mining Area. Mass. Inst. Tech. B.S. Thesis, 48p.
(95) Clark, Thomas H., 1923, New Fossils from the vicinity of Boston. Proc. Boston Soc. Nat. Hist., vol.36, no.8, p.473-485

(96) Clauser, Betty, May 1976, Iron in the New World. Lapidary Journal, vol.30, no.2, p.504-512
(97) Cleland, Herdman F., 1924, Geological Excursions in the vicinity of Williams College, 3rd edition, 83p.
(98) Clench, William James, 1942, The Boylston Street Fish Weir. Peabody Foundation for Archeology Papers
(99) Clifton, Robert A., 1970, The Mineral Industry of Massachusetts, p.353-358 in Area Reports, Domestic, U.S. Bureau of Mines Mineral Yearbook, vol.2
(100) Colton, R.B. and J.H. Hartshorn, 1966, Bedrock Geologic Map of the West Springfield Quadrangle, Massachusetts and Connecticut. U.S. Geol. Survey Geologic Quadrangle Map GQ537, scale 1:24,000
(101) Colton, Simeon, 1826, Miscellaneous Localities of Minerals., American Journal of Science (Silliman's Journal), 1st series, vol.10, art.3, no.3, p.12-14
(102) Crosby, W.P., 1900, Geology of the Boston Basin, the Blue Hills Complex. Boston Soc. Nat. Hist. Occ. Papers, no.4, vol.1, part 3, p.289-563
(103) ----------, 1894, Geology of the Boston Basin, Hingham. Boston Soc. Nat. Hist. Occ. Papers, no.4, vol.1, pt.2, p.179-288
(104) ----------, 1893, Geology of the Boston Basin, Nantasket and Cohassett. Boston Soc. Nat. Hist. Occ. Papers, no.4, vol.1, pt.1, p.1-177
(105) ----------, 1890, The Kaolin in Blandford, Massachusetts. Boston Technology Quarterly, vol.3, no.3, p.228-237
(106) ----------, 1880, Contributions to the geology of Eastern Massachusetts. Boston Soc. Nat. Hist. Occ. Papers, vol.3, pocket map inset, scale 1:312,500; pocket map, scale 1:62,500
(107) ----------, 1879, On the Occurrence of Fossiliferous Boulders of the Drift of Truro, on Cape Cod, Massachusetts. Proc. Boston Soc. Nat. Hist., vol.20, p.136-141
(108) ---------- and Hetty O. Ballard, 1894, Distribution and Probable Ages of the Fossil Shells in the Drumlins of the Boston Basin. Am. Journal of Science, 3rd series, vol. 48, no.288, art.65, p.486-496
(109) ---------- and G.H. Barton, November 1880, Extension of the Carboniferous Formation in Massachusetts. Am. Journal of Science, 3rd series, vol.20, no.119, art.43, p.416-420
(110) Cuppels, Norman P. and Jean M. Berdan, November 16, 1966, Geologic implications of the non-foliated, fossilferous New Formation of Pre-Acadian age in Northeastern Massachusetts. U.S. Geol. Survey Open File Paper, 21p., Boston
(111) Currier, L.W. and R.H. Jahns, November 1952, Geology of the "Chelmsford Granite" Area (Field Trip No.3), p.105-117 in Guidebook for Field Trips in New England, 142p.
(112) Cushman, Joseph Augustine, February 1906, The Pleistocene Deposit of Sankaty Head, Nantucket and their Fossils. Nantucket Maria Mitchell Publication, vol.1, no.1, 21p., 2 plates, 1 figure
(113) ----------, 1905, Fossil Crabs of the Gay Head Miocene. American Naturalist, vol.39, p.381-387, Peabody Academy of Science (Publisher), Salem, Massachusetts
(114) Dale, T. Nelson, 1923, The Lime Belt of Massachusetts and parts of Eastern New York and Western Connecticut. U.S. Geol. Survey Bulletin 744, 71p.
(115) ----------, 1923, The Commercial Granites of New England. U.S. Geological Survey Bulletin 738, 488p.
(116) ----------, 1910, Supplementary Notes on the Commercial Granite

of Massachusetts, p.240-288 in contributions to Economic Geology (Short Papers and Preliminary Reports), Part I--Metals and Nonmetals Except Fuels. C.W. Hayes and Waldemar Lindgren, Geologists in Charge. U.S. Geological Survey Bulletin 470, 558p.
(117) ----------, 1908, The Chief Commercial Granites of Massachusetts, New Hampshire, and Rhode Island. U.S. Geological Survey Bulletin 354, 228p.
(118) ----------, 1902, Structural details in the Green Mountain region and in eastern New York. U.S. Geological Survey Bulletin 195, 22p. (also Sixteenth Annual Report, Part 1e)
(119) Dall, W.H., 1894, Notes on the Miocene and Pliocene of Gay Head, Martha's Vineyard, Massachusetts, and on the "Land phosphate" of the Ashley River district, South Carolina. Am. Journal of Science, 3rd series, vol.48, no.286, art.42, p.296-300
(120) Dana, Arnold Guyot, January--June 1885, On the Gahnite of Rowe, Massachusetts. Am. Journal of Science, 3rd series, vol.29, no.174, art.58, p.455-456
(121) Dana, James D., January--June 1887, On Taconic Rocks and Stratigraphy, with a Geologic Map of the Taconic Regions. Am. Journal of Science, 3rd series, vol.33, no.196, art.30, p.270-276 and no.197, art.43, p.393-419 with map, scale ½ inch equals 1 mile
(122) ----------, April 1886, On Lower Silurian fossils from a limestone of the original Taconic of Emmons. Am. Journal of Science, 3rd series, vol.31, no.184, art.22, p.241-255
(123) ----------, January--June 1885, Taconic Rocks and Stratigraphy, Am. Journal of Science, 3rd series, vol.29, no.174, art.55, p.437-442
(124) ----------, January--June 1885, On Taconic Rocks and Stratigraphy with a Geological Map of the Taconic region. Am. Journal of Science, 3rd series, vol.29, no.171, art.27, p.205-222
(125) ----------, January--June 1873, On the Quartzite, Limestone and associated rocks of the vicinity of Great Barrington, Berkshire County, Massachusetts. Am. Journal of Science, 3rd series, vol.5, no.25, art.6, p.47-53, map, scale 5/8 inch equals 1 mile; and no.26, art.10, p.84-91
(126) ----------, July--December 1873, On the Quartzite, Limestone and associated rocks of the vicinity of Great Barrington, Berkshire County, Massachusetts. Am. Journal of Science, 3rd series, vol.6, no.34, art.28, p.257-278
(127) ----------, 1873, On Staurolite Crystals and Green Mountain Gneisses of the Silurian Age. American Naturalist, vol.7, p.658-660, Peabody Academy of Science (Publisher), Salem, Massachusetts
(128) ----------, 1872, On the Quartzite, Limestone and associated rocks of the vicinity of Great Barrington, Berkshire County, Massachusetts. Am. Journal of Science, 3rd series, vol.4, no.23, art.42, p.362-370, map, scale 1 inch equals one mile; and no.24, art.54, p.450-453
(129) Dana, J.F. and S.L. Dana, 1818, Outlines of the mineralogy and geology of Boston and its vicinity with map, 108p., Boston. Also in Am. Acad. Arts. and Sci. Memoir, 1818, vol.4, p.129-223
(130) Davis, Emerson, 1826, Notice of Rocks and Minerals in Westfield, Massachusetts. Am. Journal of Science (Silliman's Journal), 1st series, vol.10, art.2, p.213-215
(131) Davis, R.E., 1957, Magnesium Resources of the United States--a geologic summary and annotated bibliography to 1953. U.S. Geological Survey Bulletin 1019-E, p.373-515
(132) Davis, William Morris, 1893, Facetted Pebbles on Cape Cod, Massachusetts. Proc. Boston Soc. Nat. History, vol.26, p.166-175

(133) ----------, 1878-1880, Banded Amygdules of the Brighton Amygdaloid, Proc. Boston Soc. Nat. Hist., vol.20, p.426-429
(134) Dennen, William H., 1943, A Nickel Deposit near Dracut, Massachusetts. Economic Geology, vol.38, p.25-39
(135) Derby, O.A., 1891a, On the Separation and Study of the Heavy Accessories of Rocks. Rochester Acad. Sci. Proc., vol. I, Brochure 2, p.198-206
(136) Dessor, E., November 1848, Fossils found at Nantucket. Proc. Boston Soc. Nat. Hist., vol.3, p.79-80
(137) Dewey, Chester, August 1824, A Sketch of the Geology and Mineralogy of the western part of Massachusetts, and a small part of the adjoining States. Am. Jour. Sci., 1st series, vol.8, no.1, art.1, p.1-60
(138) ----------, 1820, Localities of Minerals, Am. Jour. Sci. (Silliman's Journal), 1st series, vol.2, no.2, art.4, p.236-238
(139) Dixon, A.M., November 1946, Two Localities near Plainville, Massachusetts. Rocks and Minerals, vol.21, no.11, p.754-755
(140) Dodge, Richard E., 1894, Additional Species of Pleistocene Fossils from Winthrop, Massachusetts. Am. Jour. of Science, 3rd ser., vol.47, p.238-239
(141) Dodge, W.W., 1888, Some Localities of Post-Tertiary and Tertiary Fossils in Massachusetts. Am. Jour. of Science, 3rd ser., vol.36, no.211, art.8, p.56-57
(142) ----------, 1883, On the relations of the Menevian argillites and associated rocks at Braintree and vicinity, in Massachusetts. Am. Journal of Science, 3rd ser., vol.25, no.145, art.5, p.65-71
(143) ----------, 1881, Notes on the Geology of Eastern Massachusetts. Proc. Boston Soc. Nat. Hist., vol.21, p.197-216
(144) ----------, 1875, Notes on the Geology of Eastern Massachusetts. Boston Soc. Nat. Hist. Proc., vol.17, p.388-419
(145) Dos Santos, E.R., 1960, The Newbury Volcanics. Mass. Inst. Tech. M.S. Thesis, 55p., 8 plates, map, scale 1 inch equals 1 mile
(146) Dow, G.F., 1940, History of Topsfield, Massachusetts. The Topsfield Historical Society (Publishers), 517p.
(147) Dowse, Alice M., 1950, New Evidence on the Cambrian Contact at Hoppin Hill, North Attleboro, Massachusetts. Am. Jour. of Science, vol. 248, no.2, p.95-99
(148) ----------, 1948, Geology of the Medfield--Holliston area, Massachusetts. Harvard University Ph.D. Thesis, 133p., 7 tables, 22 plates, 12 figures, 2 maps, scale 1:31,680
(149) Dunkle, David H., September 1940, Fishing for Fossils. New England Naturalist, no.9, p.6-9
(150) Earle, R.B., 1899, Mineral veins of the Mystic Quarries, Somerville, Massachusetts. Science, New Series, vol.9, p.752 (abstract)
(151) Eastman, Charles Rochester, 1911, Triassic Fishes of Connecticut. Conn. State Geological and Natural History Survey Bulletin 18, 75p., 8 figures, 11 plates
(152) Eaton, Amos, 1820, Localities, Am. Jour. of Science (Silliman's Journal), 1st series, vol.2, no.2, art.4, p.238-239
(153) Eckel, Edwin C., 1905, Limonite Deposits of Eastern New York and Western New England in Contributions to Economic Geology. U.S. Geological Survey Bulletin 260, p.335-342
(154) ----------, September 1904, Brown Hematite Deposits of Eastern New York and Western New England. Engineering and Mining Journal, vol.78, no.11, p.432-484
(155) Edwards, Arthur M., 1860, On Some Sub-Peat Deposits of Diatomaceae. Proc. Boston Soc. Nat. Hist., vol.7, p.283-287

(156) Eisenberg, Jerome M., February 1946, The Minerals of the Blueberry Mountain Quarry, Woburn, Massachusetts. Rocks and Minerals, vol.21, no.2, p.75-79
(157) Emerson, Benjamin Kendall, 1917, Geology of Massachusetts and Rhode Island. U.S. Geological Survey Bulletin 597, 289p.
(158) ----------, 1915, Northfieldite, Pegmatite, and Pegmatite Schist. American Journal of Science, 4th series, vol.40, no.236, article 19, p.212-217
(159) ----------, March 1905, Plumose Diabase and Palagonite from the Holyoke Trap Sheet. Bulletin of the Geological Society of America, vol.16, p.91-130, 9 plates
(160) ----------, 1904, Note on a Calcite--Prehnite Cement Rock in the Tuff of the Holyoke Range. American Journal of Science, 4th Series, vol.17, no.100, art.25, p.277-278
(161) ----------, 1899, The Geology of Eastern Berkshire County, Massachusetts. U.S. Geological Survey Bulletin 159, 139p.
(162) ----------, 1898, Holyoke, Massachusetts--Connecticut. U.S. Geological Survey Folio No. 50 of the Geologic Atlas of the United States, 8p., 5 maps
(163) ----------, 1898, Geology of Old Hampshire County, Massachusetts, comprising Franklin, Hampshire, and Hampden Counties. U.S. Geological Survey Monograph 29, 790p.
(164) ----------, 1895, A Mineralogical Lexicon of Franklin, Hampshire, and Hampden Counties, Massachusetts. U.S. Geological Survey Bulletin 126, 180p.
(165) ----------, 1894, Illustrations of Peculiar Mineral Transformations. Bull. Geol. Soc. America, vol.6, p.473-474
(166) ----------, 1892, Outlines on Geology of the Green Mountain region in Massachusetts; Hawley sheet, descriptive text. U.S. Geological Survey Geologic Atlas, Hawley sheet, 3 pages
(167) ----------, 1891, On the Triassic of Massachusetts. Bulletin of the Geological Society of America, vol.2, p.451-456, 17 plates
(168) ----------, October 1890, A Description of the "Bernardston Series" of metamorphic Upper Devonian Rocks. Am. Journal of Science, 3rd series, vol.40, no.238, art.35, p.263-275
(169) ----------, 1882, The Deerfield dyke and its minerals. American Journal of Science, 3rd series, vol.24, no.141, art.22, p.195-202; no.142, art.30, p.270-278; no.143, art.39, p.349-359
(170) ---------- and F.B. Loomis, 1904, On Stegomus longipes, A New Reptile from the Triassic Sandstones of the Connecticut Valley. American Journal of Science, 4th series, vol.17, no.101, art.34, p.377-380, 1 plate
(171) Emery, K.O., R.L. Wigley, Alexandra S. Bartlett, Myer Rubin, and E.S. Barghoorn, December 1967, Fresh Water Peat on the Continental Shelf. Science, vol.158, no.3806, p.1301-1307
(172) Emmons, Eben, 1826, Miscellaneous Localities of Minerals. American Journal of Science (Silliman's Journal), vol.10, art.111, no.2, p.11
(173) Erickson, M.R., 1940, The Geology of the Lower Cambrian Sediments at Hoppin Hill, Massachusetts. Mass. Inst. Tech. B.S. Thesis, 24p., map, scale 1 inch equals 100 feet
(174) Fairbanks, E.E., 1927, A Geological Reconnaissance of the Dracut Norite Stock of Massachusetts. Boston Soc. Nat. History Proc., vol.38, no.8, p.398-412
(175) Fay, Gordon S., 1972, The Rockhound, Harper & Row Pub. Inc., New York
(176) Field, Michael T., 1975, Bedrock Geology of the Ware area, Central Massachusetts. Univ. Massachusetts Ph.D. Thesis, 186p., map
(177) Flint, George M., 1908, Gahnite from Charlemont, Massachusetts. Am. Journal of Science, 4th series, vol.26, no.156, Sci. Int. note No.8, p.584

(178) Foerste, Augustus F., 1920, Presence of Upper Silurian Sandstone in Essex County, Northeastern Massachusetts. Bulletin Geological Society of America, vol.31, p.206-207
(179) ----------, May 1889, The Paleontological Horizon of the Limestone at Nahant, Massachusetts. Proc. Boston Soc., Nat. Hist., vol.24, p.261-263
(180) Ford, S.W. and W.B. Dwight, April 1886, Preliminary Report of S.W. Ford and W.B. Dwight upon fossil obtained in 1885 from Metamorphic Limestones of the Taconic Series of Emmons at Canaan, New York. Am. Journal of Science, 3rd series, vol.31, no.184, art.23, p.248-255
(181) Ford, William E., 1949, Dana's Textbook of Mineralogy, 851p., John Wiley and Sons, Inc., New York
(182) Foster, Edward C., July 1948, The Lead Mines of Hampshire County, Massachusetts. Rocks and Minerals, vol.23, no.7, p.594-597
(183) Foster, J.W., 1838, New Locality of Iolite (Brimfield) with other minerals associated. Am. Jour. of Science (Silliman's Journal), 1st series, vol.33, no.II, Miscellaneous no.4, p.399-400
(184) Frondell, Clifford, 1962, Dana's System of Mineralogy, vol.III, 334p., John Wiley and Sons, Inc., New York
(185) ----------, November--December 1955, Two Chlorites: Gonyerite and Melanolite. Am. Min., vol.40, nos.11-12, p.1090-1094
(186) Fuller, Myron L., 1906, Clays of Cape Cod, Massachusetts in Clays, U.S. Geological Survey Bulletin 285-L, p.432-441
(187) ----------, 1896, A New Occurrence of Carboniferous Fossils in the Narragansett Basin. Proc. Boston Soc. Nat. Hist., vol.2, no.11, p.195-199
(188) Glass, Jewell J., Richard H. Jahns, and Rollin E. Stevens, May--June 1944, Helvite and Danalite from New Mexico and the Helvite Group. Am. Min., vol.29, no.5-6, p.163-191
(189) Gosse, Ralph, November 1969, A Catalogue of Massachusetts Gemstones--Barnstable, Dukes, Nantucket, Plymouth Counties (Part Nine). Rocks and Minerals, vol.44, no.11, p.758-759
(190) ----------, September--October 1969, A Catalogue of Massachusetts Gemstones--Bristol, Middlesex, Suffolk Counties (Part Eight). Rocks and Minerals, vol.44, no.9-10, p.678-679
(191) ----------, August 1969, A Catalogue of Massachusetts Gemstones--Norfolk County (Part Seven). Rocks and Minerals, vol.44, no.8, p.598-599
(192) ----------, July 1969, A Catalogue of Massachusetts Gemstones--Franklin County (Part Six). Rocks and Minerals, vol.44, no.7, p.516-519
(193) ----------, June 1969, A Catalogue of Massachusetts Gemstones--Worcester County (Part Five). Rocks and Minerals, vol.44, no.6, p.436-437
(194) ----------, May 1969, A Catalogue of Massachusetts Gemstones--Hampden County (Part Four). Rocks and Minerals, vol.44, no.5, p.356-360
(195) ----------, April 1969, A Catalogue of Massachusetts Gemstones--Essex County (should be Berkshire County) (Part Three). Rocks and Minerals, vol.44, no.4, p.276-277
(196) ----------, March 1969, A Catalogue of Massachusetts Gemstones--Essex County (Part Two). Rocks and Minerals, vol.44, no.3, p.196-198
(197) ----------, January 1969, A Catalogue of Massachusetts Gemstones--Hampshire County (Part One). Rocks and Minerals, vol.44, no.1, p.24-28
(198) ----------, June 1968, Two Lost Gem Garnet Localities in Massachusetts. Rocks and Minerals, vol.43, no.6, p.422
(199) ----------, 1900, Paleontology of the Cambrian Terranes of the Boston Basin. Boston Soc. Nat. Hist., Occ. Papers 4, pt.3, p.601-604
(200) Grant, Raymond W., ----, Massachusetts Mineral Localities, Museum of Comparative Zoology, Harvard University, 9 pages

(201) Green, Frederick E., 1944, Groveland--West Newbury Written Rocks, A real antiquity despite uncertainty of origin of marks on it. Newspaper clipping 4 pages. Unknown Newspaper--in possession of Essex Institute, Salem, Massachusetts
(202) ----------, March 1923, Vicissitudes of Silver Mining at Newburyport, Massachusetts. Engineering and Mining Journal, vol.115, no.11, p.483-484
(203) Gregory, Newman Ballard and Paul Burton Lord, 1909, Examination of Mining Property at Sheldonville, Massachusetts, with a Report on the Local Geology. Mass. Inst. Tech. Undergraduate Thesis, 51p. and map
(204) Grew, Edward S., 1970, Geology of the Pennsylvanian and Pre-Pennsylvanian Rocks of the Worcester Area, Massachusetts. Harvard University Ph.D. Thesis, 263p., maps
(205) ----------, January--February 1962, World News on Mineral Occurrences--Massachusetts. Rocks and Minerals, vol.37, nos.1-2, p.42-43
(206) ----------, July--August 1960, World News on Mineral Occurrences --Massachusetts. Rocks and Minerals, vol.35, nos.7-8, p.343
(207) ----------, Sergius H. Mamay and Elso S. Barghoorn, February 1970, Age of Plant Fossils from the Worcester Coal Mine, Worcester, Massachusetts. Am. Journal of Science, vol.268, no.2, p.113-126
(208) Gruner, John W., November--December 1944, The Kaolinite Structure of Amesite, $(OH)_8(Mg,Fe)Al_2(Si_2Al_2)O_{10}$, and Additional Data on Chlorites American Mineralogist, volume 29, no.11-12, p.422-430
(209) Guthrie, James Owen, 1972, The Geology of the Northern Portion of the Belchertown Intrusive Complex, West-Cental Massachusetts. University of Massachusetts M.S. Thesis, 110p.
(210) Hadley, Jarvis B., 1949, Bedrock Geology of the Mt. Grace Quadrangle, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ3, scale 1:31,680
(211) Hansen, W.R., 1956, Geology and Mineral Resources of the Hudson and Maynard Quadrangles, Massachusetts. U.S. Geological Survey Bulletin 1038, 104p.
(212) Hartshorn, Joseph H., 1967, Geology of the Taunton Quadrangle, Bristol and Plymouth Counties, Massachusetts. U.S. Geological Survey Bulletin 1163-D, p.D1-D67
(213) Hartwell, E. Adams, April 1892, The Pearl Hill Pot Hole. Proceedings of the Boston Society of Natural History, vol.25, p.421-425
(214) Hatch Jr., Norman, 1969 (1970), Geologic Map of the Worthington Quadrangle, Hampshire and Berkshire Counties, Massachusetts. U.S. Geologic Survey Geologic Quadrangle Map GQ857, scale 1:24,000
(215) ---------- and J.H. Hartshorn, 1969, Geologic Map of the Heath Quadrangle, Massachusetts and Vermont. U.S. Geologic Survey Geologic Quadrangle Map GQ735, scale 1:24,000
(216) ---------- and Stephen A. Norton, 1969, The Middlefield Massachusetts Talc--Serpentine Body. U.S. Geological Survey Open File Report, 7p., map, scale 1 inch equals 50 feet. Boston
(217) ----------, Stephen A. Norton, and R.G. Clark Jr., 1970 (1971), Geologic Map of the Chester Quadrangle, Hampden and Hampshire Counties, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ858, scale 1:24,000
(218) ---------- and R.S. Stanley, 1973, Preliminary Geologic Map of the Blandford Quadrangle, Hampden and Hampshire Counties, Massachusetts U.S. Geological Survey Open File Report, map, scale 1:24,000, 2 cross-sections, 24 page explanation
(219) Heinrich, E. William and Alfred A. Levinson, January--February

1953, Studies in Mica Group: Mineralogy of the Rose Muscovites. Am. Min., vol.38, nos.1-2, p.25-49
(220) Herz, Norman, 1961, Bedrock Geology of the North Adams Quadrangle, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ139, scale 1:24,000 1958
(221) ----------, Cheshire, Massachusetts. Bedrock Geology. U.S. Geological Survey Geologic Quadrangle Map GQ108, scale 1:31,680
(222) Hess, Frank L., August 1942, Proceedings of Societies--New York Mineralogical Club, Inc., Meeting of January 21, 1942 (Abstract), Am. Mineralogist, vol.27, no.8, p.593
(223) ---------- and Oliver C. Ralston, June 1938, Lithium in New England, Engineering and Mining Journal, vol.139, no.6, p.48-49
(224) ----------, Roscoe J. Whitney, Joseph Trefethen and Morris Slavin, 1943, The Rare Alkalies in New England. U.S. Bureau of Mines Information Circular 7232, 51p., 13 figures
(225) Hiller Jr., John, 1974, Massachusetts Mines and Minerals, Privately Published, 51p.
(226) Hitchcock, Edward, January--June 1872, Discovery of a tooth of a Mastodon in Massachusetts. Am. Journal of Science, 3rd series, vol.3, no.14, Scientific Intelligence, note no.5, p.146
(227) ----------, 1860, Additional Facts Respecting the Clathropteris of Easthampton, Massachusetts. Proc. Am. Assoc. Adv. Science, volume 14, p.158-159
(228) ----------, May 1856, On a new Fossil Fish, and new Fossil Footmarks. American Journal of Science, 2nd series, vol.21, no.6, part 11, p.96-100
(229) ----------, November 1853, The Coal Field of Bristol County and of Rhode Island. Am. Journal of Science, 2nd series, vol.16, no.48, art.32, p.327-336
(230) ----------, October 1844, Discovery of more Native Copper in the town of Whately in Massachusetts. Am. Journal of Science, 1st series, vol.47, no.11, art.8, p.322-323
(231) ----------, 1841, Final Report on the Geology of Massachusetts, vol. 1, 831p., 40 plates, 275 woodcuts, pocket map, scale 1:500,000
(232) ----------, 1838, Report on a re-examination of the economical geology of Massachusetts, 139p.
(233) ----------, July 1832, Prof. Hitchcock's Report to the Government of Massachusetts on the Geology of that State. Am. Journal of Science, 1st series, no.1, p.1-70, map, scale 3/4 inch equals 5 miles
(234) ----------, 1826, 1. Chlorophoeite, 2. Andalusite. Am. Jour. of Science (Silliman's Journal), 1st series, vol.10, p.393-394
(235) ----------, 1823, Geology, Mineralogy, and Scenery of the Connecticut, with a geological map and drawings of organic matter, Part 1. Am. Journal of Science, 1st series, vol.6, no.1, art.1, p.1-86, p.201-236. Also American Journal of Science, 1824, vol.7, no.1, art.1, p.1-30
(236) Hitchcock Jr., Edward, November 1856, A New Fossil Shell in the Connecticut River Sandstone. Am. Journal of Science, 2nd series, vol.22, no.65, art.19, p.239-240
(237) ----------, 1851-1855, Description of a new species of Clathropteris, discovered in the Connecticut Valley Sandstone. Am. Jour. of Science, 2nd series, vol.20, no.58, art.2, p.22-25
(238) Hitchin, Charles Stanfield, January 1935, The Pegmatites of Fitchburg, Massachusetts. Am. Min., vol.20, no.1, p.1-24, 7 figs., 1 plate
(239) Hobbs, William Herbert, 1907, The Iron Ores of the Salisbury District of Connecticut, New York and Massachusetts. Economic Geology, vol. 2, no.2, p.153-181
(240) ----------, 1893, On the Geological Structure of the

Mount Washington Mass of the Taconic Range. Journal of Geology, vol.1, p.717-736, map, scale 1 inch equals 1 mile
(241) ----------, 1893, The Geological Structure of the Housatonic Valley Lying East of Mount Washington. Journal of Geology, vol. 1, p.780-802, map, scale 7/8 inch equals 1 mile.
(242) Hollick, Charles Arthur, 1906, The Cretaceous Flora of Southern New York and New England. U.S. Geological Survey Monograph 50, 219p.
(243) ----------, 1902, Geological and Botanical Notes: Cape Cod and Chappaquidick Island, Massachusetts. Bulletin of the New York Botanical Garden, vol.2, p.381-406, 2 plates
(244) ----------, June 1899, A Reconnaissance of the Elizabeth Islands, Massachusetts. Science, New Series, volume 9, no.232, p.818-819
(245) Howell, B.F., March 1922, Oldhamia in the Lower Cambrian of Massachusetts. Geol. Soc. America Bull., vol.33, no.1, p.198-199 (abstract)
(246) ----------, H.W. Shimer, and G.S. Lord, 1936, New Cambrian Paradoxies Fauna from Eastern Massachusetts (Abstract). Proc. Geol. Soc. of America, vol.48, p.382 p.385
(247) Huntington, J. Craig, 1975, Mineralogy and Petrology of Metamorphosed Iron-Rich Beds in the Lower Devonian Littleton Formation. Univ. Mass. M.S. Thesis, 106p.
(248) Hurlbut Jr., C.S., 1964, Some Mineral Localities West of Boston--Trip D, p.61-85 in 56th New England Intercollegiate Geologic Conference Guidebook, 120p.
(249) Jackson, Charles T., 1850, On Tertiary Fossils from Marshfield, Massachusetts. Boston Soc. Nat. Hist. Proc., vol.3, p.323-324, p.329
(250) ----------, 1850, Analysis of Vermiculite from Milbury, Massachusetts. Proc. Boston Soc. Nat. Hist., vol.3, p.243-246
(251) ----------, 1850, Fossil Calamites from Bridgewater, Massachusetts. Proc. Boston Soc. Nat. History, vol.3, p.223
(252) Jackson, Richard A., 1975, Structural Geology and Stratigraphy of the Huntington area, Massachusetts. Univ. Massachusetts M.S. Thesis, 92p.
(253) Jahns, R.H., 1943, Sheet structures in granites; its origin and use as a measure of glacial erosion in New England. Journal of Geology, vol. 51, no.2, p.71-98. Also in U.S. Geological Survey--Mass. Dept. of Public Works Coop. Geologic Project Contribution 5
(254) ----------, 1942, Occurrence of Andalusite in Massachusetts. U.S. Geological Survey--Mass. Dept. of Public Works Coop. Geologic Project Information Circular 1
(255) ----------, M.E. Willard and W.S. White, 1959, Preliminary bedrock geologic map of the Lowell--Westford area, Massachusetts. U.S. Geologic Survey open file map, scale 1:28,800
(256) Jeffrey, E.C. and M.A. Chrysler, 1906, On Cretaceous Pitoxyla. Botanical Gazette, vol.24, p.1-15
(257) Jenks III, Maurice L., June 1967, Bedrock Geology and Garnet Analysis of the Northwestern Portion of the Woronoc Quadrangle, Massachusetts. Univ. Mass. M.S. Thesis, 81p., 5 tables, 21 figures (including geologic map, scale 1:24,000)
(258) Johnson, D.H., 1951, Reconnaissance of Radioactive Rocks of Massachusetts. U.S. Geological Survey TEI-69, p.3-18, U.S. Atomic Energy Commission Technical Information Service, Oak Ridge, Tennessee
(259) Johnson, Frederick, 1942, The Boylston Street fishweir; a study of the archeology, biology, and geology of a site on Boylston Street in the Back Bay District of Boston, Massachusetts. Robert S. Peabody for Archeology Papers, vol.2, p.1-212, 17 pls., 15 figs., incl. index map, 13 tables
(260) Julien, A.A., 1879, On Spodumene and its Alterations, from the Granite Veins of Hampshire County, Massachusetts. Annals New York Academy of Sciences, vol. 1, p.318-354

(261) ---------- and H.C. Bolton, September 1883, The singing beach of Manchester, Massachusetts. Science, vol.2, no.31, p.325
(262) Kaye, Clifford A., 1967, Fossiliferous Bauxite in Glacial Drift, Martha's Vineyard, Massachusetts. Science, vol.157, p.1035-1037
(263) ----------, 1967, Kaolinization of Bedrock of the Boston, Massachusetts Area. U.S. Geological Survey Prof. Paper 575-C, p.C165-C172
(264) ----------, March 1964, Boulder Train of Silicified Paleozoic Wood, Southeastern Massachusetts (Short Note). Geological Society of America Bulletin, volume 75, p.233-236, 1 fig., 2 plates
(265) ---------- and Mary E. Mrose, 1965, Magnetic Spherules, Colored Corundum, and other unusual constituents of a Heavy Beach Sand, Martha's Vineyard, Massachusetts, p.D37-D43 in U.S. Geological Survey Professional Paper 525-D
(266) ----------, C.C. Schnetzler and J.N. Chase, February 1961, Tektite from Martha's Vineyard, Massachusetts (Short Note). Bulletin of the Geological Society of America, vol.72, p.339-340, 2 plates
(267) Keevil, N.B., E.S. Larsen and F.J. Wank, 1944, The Ayer Granite Migmatite at Chelmsford, Massachusetts, p.350 in Part 6 of the Distribution of Helium and Radioactivity in Rocks. Am. Journal of Science, vol.242, no.7, p.345-353
(268) Killius, Drey Raymond, 1974, Petrology of a Talc-Serpentine Complex near Blandford, Massachusetts. Boston University M.A. Thesis, 80p., 20 figures, 6 tables, map, scale 1 inch equals 30 feet
(269) Kitson, John E., August 1936, Two Occurrences of Babingtonite in Massachusetts. Rocks and Minerals, vol.11, no.8, p.124
(270) Knox, Arthur S., 1944, A Carboniferous Flora from the Wamsutta Formation of Southeastern Massachusetts. Am. Journal of Science, vol.242, no.3, p.130-138
(271) ----------, 1942, The Boylston Street (Boston, Massachusetts) fish weir; the pollen analysis of the silt and the tentative datings of the deposits. Robert S. Peabody Foundation for Archeology Papers, vol.2, p.105-129, 4 figures
(272) Krueger, Dana, August 17, 1975, Manhan Lead-Silver Mine Field Trip. Boston Mineral Club
(273) Kulp, J. Laurence, Herbert L. Volchok, and H.D. Holland, September --October 1952, Age from Metamict Minerals. American Mineralogist, vol.37, no.9-10, p.709-718
(274) LaForge, Laurence, 1932, Geology of the Boston area, Massachusetts. U.S. Geological Survey Bulletin 839, 105p.
(275) Ladoo, Raymond B., 1923, Talc and Soapstone--Their Mining, Milling, Production and Uses. U.S. Bureau of Mines Bulletin 213, 133p.
(276) Laird, H. Scott, 1974, Geology of the Pelham Dome near Montague, West-Central, Massachusetts. Univ. Mass. M.S. Thesis, 84p., map
(277) Lane, Alfred C., 1888, The Geology of Nahant. Proc. Boston Society Natural History, vol.24, p.91-95
(278) ----------, 1888, The Geology of Nahant, Massachusetts. Harvard University Undergraduate Honor Thesis
(279) Larrabee, D.M., 1971, Map showing distribution of ultramafic and intrusive mafic rocks from New York to Maine. U.S. Geological Survey Miscellaneous Geologic Investigations Map I-676, two sheets: scale 1:500,000
(280) Lee, Charles A., 1827, Localities of Minerals. Am. Journal of Science, 1st series, vol.12, no.1, art.13, p.169-170
(281) Lee, R.E., 1950, Geology of Squantum Head, Mass. Inst. Tech. Geology Course XII Thesis
(282) Lincks, G. Fred, July 1967, Revitalizing Loudville, Massachusetts Lead-Silver Mines. Rocks and Minerals, vol.42, no.7, p.578-582

(283) Linden, David Hunt, 1942, The Diatoms in the Boylston Street (Boston, Massachusetts) Fishweir. Robert S. Peabody Foundation for Archeology Papers, vol.2, p.67-81, 1 plate
(284) Lindquist, Ruth L., 1942, Notes of Balanus eburneus Gould, in the Boylston Street (Boston, Massachusetts) Fish Weir. Robert S. Peabody Foundation for Archeology Papers, vol.2, p.65-66
(285) Longwell, Chester R., 1933, Burlington, Vermont to Amherst, Massachusetts (Geologic Excursion A-1). Int. Geol. Congrees XVI Session, Guidebook 1, p.90-93
(286) Lougee, Richard J., 1946, Time Measurements of Pothole Development at Westfield, Massachusetts (Abstract). Geological Society of America Bulletin, vol.57, p.1282-1283
(287) Loughlin, G.F., 1911, I. The Structural Relations between the Quincy Granite and the Adjacent Sedimentary Formations in Contributions to the Geology of the Boston and Norfolk Basins, Massachusetts. Am. Jour. of Science, 4th series, vol.32, no.187, art.3, p.17-32, 2 figures, map, scale 1:220,000
(288) Low, W.F., 1907, A Reconnaissance of a Portion of the Western Part of the Boston Basin. Harvard University Undergraduate Honor Thesis, 41p., 2 figures, sketch map
(289) Lull, Richard Swann, September 1920, An Upper Carboniferous Footprint from Attleboro, Massachusetts. American Journal of Science, 4th series, volume 50, article XVII, p.234-236
(290) ----------, 1915, Triassic Life of the Connecticut Valley. Connecticut State Bulletin No.24, 285p., 3 maps, 12 plates, 126 figures
(291) ----------, April 1904, Fossil Footprints of the Jura-Trias of North America. Memoirs of the Boston. Soc. Nat. Hist., vol.5, no.11, p.461-554
(292) ----------, 1904, Note on the probable footprints of Stegomus longpipes. American Journal of Science, 4th series, vol.17, no. 101, art.35, p.381-382
(293) Lyons, Paul C., 1969, Bedrock Geology of the Mansfield Quadrangle, Massachusetts. Boston University Ph.D. Thesis, 283p., 18 tables, 18 plates, 29 figures, map
(294) MacKenzie, J.D., 1911, The dikes of West Manchester, Essex County, Massachusetts. Mass. Inst. Tech. B.S. Thesis, 61p., 8 plates, map, scale 1:5,000
(295) Mackenzie, S.S., 1860-1863, The Local Geology of Topsfield. Proc. Essex Institute, vol.3, p.49-55
(296) Marble, John Putnam, September-October 1950, Lead Uranium Ratio and Possible Geologic Age of Allanite from Greenwich, Massachusetts. American Mineralogist, vol.35, nos.9-10, p.845-852
(297) Martin, G.C., 1898, Dunite in Western Massachusetts. Am. Journal of Science, 4th series, vol.6, no.6, art.XXV, p.244-248
(298) Mather, Kirtley F., Richard P. Goldthwait, and Lincoln R. Thiesmeyer, 1942, Pleistocene Geology of Western Cape Cod, Massachusetts. Geol. Soc. Am. Bull., vol.53, p.1127-1174, 2 figs., map, scale 1:250,000. Also in U.S. Geological Survey--Mass. Dept. of Public Works Coop. Geol. Project Contribution 4
(299) ----------
-----, 1940, Preliminary Report on the Geology of Western Cape Cod, Massachusetts. U.S. Geological Survey--Mass. Dept. of Public Works Coop. Geological Project Bulletin 2, 2 plates, map, scale 1:50,000
(300) Matthes, F.E., 1905, General Geology of Section VIII of the Abington Quadrangle, Massachusetts including parts of the towns of Hingham and South Scituate. Harvard University Undergraduate Honors Thesis, 32p., map, scale 2 inches equal 1 mile

(301) McCarthy, Helen, 1967, The Story of the Davis Mine, Rowe, Massachusetts. The Rowe Historical Society Inc., 29p.
(302) McKinstry, H.E., 1921, Petrology of the Granites and Associated Pegmatites of Rockport, Massachusetts. Mass. Inst. Tech. M.S. Thesis, 91p. and bibliography
(303) Merrill, George Perkin, 1908, Stones for Building and Decoration, 3rd edition, John Wiley and Sons Publishers, New York, 453p.
(304) Miller, William J., 1921, The Geological History of the Connecticut Valley of Massachusetts. 74p.
(305) Morse, E.S., 1920, On certain fossil shells in the boulder clay of the Boston Basin. Am. Journal of Science, 4th series, vol.49, art.10, p.157-165
(306) Morse, J.D.D., 1816, Geography Made Easy: Abridgement of the American Universal Geography. Thomas and Andrews (Pub.), 18th ed., Boston
(307) ----------, 1796, American Universal Geography, 3rd ed., 410p., Boston
(308) Mosier, McHenry and M.L. Thomas, 1949, Investigation of the Anson Betts Manganese Mine, Hampshire County, Massachusetts. U.S. Bureau of Mines Report of Investigation 4443, 8p., 6 figures
(309) Mudge, B.F., 1856-1860, Meeting Notes--Lynnfield Serpentine, Tophet Hill Copper Mine, Other Minerals, "Sienite" Quarries. Proc. Essex Inst., vol. II, p.291-293
(310) Nash, Alanson J., 1827, Notices of the Lead Mines and Veins of Hampshire County, Massachusetts and of the Geology and Mineralogy of that Region. Am. Journal of Science (Sillimans Journal), 1st series, vol. 12, art.9, p.238-270, map, scale 1 inch equals 3 miles
(311) Nelson, Arthur E., 1973, Preliminary Bedrock Geologic Map of the Natick Quadrangle, Massachusetts. U.S. Geological Survey Open File Report, 10p., 2 sheets, map, scale 1:24,000
(312) Nelson, Thurlow Christian, 1942, The Oysters in the Boylston Street (Boston, Mass.) Fish Weir. Robert S. Peabody Foundation for Archeology Papers, vol.2, p.49-64, 1 plate
(313) Newberry, John S., 1888, Fossil Fishes and Fossil Plants of the Triassic Rocks of New Jersey and the Connecticut Valley. U.S. Geological Survey Monograph 14, 152p.
(314) New England--New York Inter-Agency Committee, 1954, The Resources of the New England--New York Region, Part 2, Chapter XXXIX
(315) Nichols, Robert L., 1964, Greater Boston Geomorphology--Trip A, p.3-40 in 56th New England Intercollegiate Geologic Conference Guidebook, 120p.
(316) ---------- and G. Stinson Lord, June 1938, Fossiliferous Eskers and Outwash Plains (Abstract), Geological Society of America Proceedings for 1937, p.324-325
(317) Niles, W.H., 1869, Fossils under Drumlin at Fort Warren (Note), Boston Society of Natural History Proceedings, vol.12, p.244
(318) Norton, Stephen Allen, 1974, Geologic Map of the Becket Quadrangle, Berkshire, Hampshire, and Hampden Counties, Massachusetts. U.S. Geological Survey Open File Report 74-92, 17p., 2 sheets, map, scale 1:24,000
(319) ----------, 1967, Geology of the Windsor Quadrangle, Massachusetts. Harvard University Ph.D. Thesis, 210p., 26 figs., 18 tables, 5 plates, map, scale 1:24,000
(320) Oldale, Robert N., 1976, Generalized Geologic Map of Cape Cod. U.S. Geological Survey Open File Report 76-765, map, scale 1:125,000
(321) ----------, 1975, Geologic Map of the Cotuit Quadrangle, Barnstable County, Cape Cod, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ1213, map scale 1:24,000

(322) ----------, 1975, Geologic Map of the Sandwich Quadrangle, Barnstable County, Cape Cod, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ1222, map scale 1:24,000
(323) ----------, 1974, Geologic Map of the Dennis Quadrangle, Barnstable County, Cape Cod, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ1114, map scale 1:24,000
(324) ----------, 1974, Geologic Map of the Hyannis Quadrangle, Barnstable County, Cape Cod, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ1158, map scale 1:24,000
(325) Ordway, Albert, 1862, On the occurrence of other Fossil Forms at Braintree, Massachusetts. Proc. Boston Soc. Nat. Hist., vol.8, p.5-6
(326) Osberg, P.H., N.L. Hatch Jr., and S.A. Norton, 1971, Geologic Map of the Plainfield Quadrangle, Franklin, Hampshire, and Berkshire Counties, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ877, map scale 1:24,000
(327) Osgood, Alfred, 1874, "Lead Mine" at Rocky Hill, West Newbury. Essex Institute Bulletin, vol.6, no.8, p.142-143
(328) ----------, 1874, Remarks on the Lead Ore of West Newbury. Essex Institute Bulletin, vol.6, p.205
(329) Ostrom, John H., 1972, Were some dinosaurs gregarious?, Palaeogeography, Palaeoclimatology, Palaeoecology, vol.11, no.4, p.287-301, illus. (incl. sketch maps)
(330) Otis, Leo Derwood, 1952, Minerals and Rocks of Springfield and Vicinity, 50p. The Museum of Natural History, Springfield, Massachusetts
(331) Overstreet, W.C., 1967, The Geologic Occurrence of Monazite. U.S. Geological Survey Professional Paper 530, 327p.
(332) Paine, P.M., 1905, Areal and Economic Geology of Fitchburg and Vicinity. Mass. Inst. Tech. B.S. Thesis, 101p., 28 figs.
(333) Palache, Charles, Sept.-Oct. 1950, Fayalite at Rockport, Massachusetts. American Mineralogist, vol.35, nos.9-10, p.877-881
(334) ----------, May-June 1950, The Chipman Lead-Silver Mine in Newburyport, Massachusetts. Rocks and Minerals, vol.25, nos.2-6, p.247-249
(335) ----------, May-June 1949, The Fitchburg Rollstone. Rocks and Minerals, vol.24, nos.5-6, p.347-349
(336) ----------, June 1947, The Sturbridge Graphite Mine. Rocks and Minerals, vol.22, no.6, p.503-505
(337) ----------, May 1947, Some Lost Mineral Localities of New England--VI. Olivine of Chester, Massachusetts. Rocks and Minerals, vol.22, no.5, p.412-413
(338) ----------, April 1947, Some Lost Mineral Localities of New England--V. Calcite and Barite from Medford, Massachusetts. Rocks and Minerals, vol.22, no.4, p.302
(339) ----------, March 1947, Some Lost Mineral Localities of New England--IV. Warren St. Quarry, Brighton, Massachusetts. Rocks and Minerals, vol.22, no.3, p.209
(340) ----------, February 1947, Some Lost Mineral Localities of New England--III. The Mystic Quarries, Somerville, Massachusetts. Rocks and Minerals, vol.22, no.2, p.111, p.138
(341) ----------, January 1947, The Lost Mineral Localities of New England--II. Holland St. Quarry, Somerville, Massachusetts. Rocks and Minerals, vol.22, no.1, p.11-12
(342) ----------, December 1946, Some Lost Mineral Localities of New England--I. Granite St. Quarry, Somerville, Massachusetts. Rocks and Minerals, vol.21, no.12, p.849
(343) ----------, October 1936, Babingtonite and Epidote from Westfield, Massachusetts. Am. Min., vol.21, no.10, p.652-655

(344) ----------, October 1920, The Goldschmidth Two-Circle Method. Calculations in the Monoclinic System, illustrated by Monazite from Weymouth, Massachusetts. American Mineralogist, vol.5, no.10, p.173-182
(345) ----------, 1907, Mineralogical Notes: 1. Zoisite Crystal from Chester, Massachusetts; 2. Phenacite as an Alteration Product of Danalite from Gloucester, Massachusetts; 3. Crystal Form of Chalmersite. American Journal of Science, 4th series, vol.24, no.141, art.XXV, p.249-258
(346) ----------, 1906, On Octahedrite, Brookite, and Titanite from Somerville, Massachusetts. Rosenbusch Festschrift, 311
(347) ----------, Harry Berman, and Clifford Frondel, 1951, Dana's System of Mineralogy. Vol. II, 1124p., John Wiley and Sons Inc. (Pub.), New York
(348) ----------, 1944, Dana's System of Mineralogy. Vol. I, 834p., John Wiley and Sons, Inc. (Pub.), New York
(349) ---------- and F.A. Gonyer, July 1932, On Babingtonite. Am. Mineralogist, vol.17, no.7, p.295-303
(350) ----------, August 1930, Lazulite from Chittenden, Vermont. Am. Mineralogist, vol.15, no.8, p.338-339
(351) ---------- and A.W. Pinger, September 1923, The Scapolite Deposit of Bolton, Massachusetts. Am. Min., vol.8, no.9, p.153-157
(352) ---------- and Charles H. Warren, 1911, The Chemical Composition and Crystallization of Parisite and a new occurrence of it in the Granite Pegmatites at Quincy, Massachusetts, with notes of Microcline, Riebeckite, Aegirite, Ilmenite, Octahedrite, Fluorite and Wulfenite from the same locality. Am. Journal of Science, 4th series, vol.31, no.186, article XLV, p.533-577
(353) Pelke, Paul A., 1972, Petrology and Geochemistry of Granite Rocks, Cape Ann, Massachusetts. Mass. Inst. Tech. M.S. Thesis, 72p., 8 tables, 8 figures
(354) Peper, J.D., 1974, Bedrock Geologic Map of the Hampden Quadrangle, Massachusetts and Connecticut. U.S. Geological Survey Open File Report 74-61, 11p., 3 sheets, map scale 1:24,000
(355) ----------, 1974, Bedrock Geologic Map of the Monson Quadrangle, Massachusetts and Connecticut. U.S. Geological Survey Open File Report 74-103, 16p., 2 sheets, map scale 1:24,000
(356) ----------, October 1967, Stratigraphy and Structure of the Monson Area, Massachusetts and Connecticut, p.105-113 in New England Intercollegiate Geologic Conference Guidebook, 59th Meeting, 194p.
(357) Perry, Elwyn L., July 1934, The Hawley Mineral Belt, Massachusetts. Rocks and Minerals, vol.9, no.7, p.93-99
(358) Perry, Joseph and Benjamin K. Emerson, 1903, The Geology of Worcester, Massachusetts. 166p.
(359) Pirsson, L.V., 1910, Note on the Occurrence of Astrophyllite in the Granite at Quincy, Massachusetts. American Journal of Science, 4th series, vol.29, no.171, art.XVI, p.215-216
(360) Pollard, Melvin, September 1965, Age, Origin, and Structure of the Post-Cambrian Boston Strata, Massachusetts. Geological Survey of America Bulletin, vol.76, p.1065-1068, 3 plates
(361) Powers, Sidney, 1913, Geology of the Diamond Hill, Cumberland District, Massachusetts--Rhode Island. Mass. Inst. Tech. M.S. Thesis, 105p., map, scale 1 inch equals ½ mile
(362) Pratt, Joseph Hyde, 1906, Corundum and its occurrence and distribution in the United States. U.S. Geological Survey Bulletin 269, 175p.
(362) ----------, 1901, The occurrence and distribution of Corundum in the United States. U.S. Geological Survey Bulletin 180, 98p.

(364) Prindle, Louis M. and Eleanora Bliss Knopf, October 1932, Geology of the Taconic Quadrangle. Am. Jour. of Science, 5th series, vol.29, no.142, p.257-302, 2 maps, 3 cross-sections
(365) Pumpelly, J.E. Wolff and T.N. Dale, 1894, Geology of the Green Mountains in Massachusetts. U.S. Geological Survey Monograph 23, 206p.
(366) Quinn, Alonzo W., March 15, 1945, Geology of the Charlemont--Heath Area (with special reference to Pyrite and Copper Deposits). U.S. Geological Survey--Mass. Dept. Public Works Coop. Geol. Project Open File Report, 25p., 4 figs., 1 plate, map, scale 1:24,000
(367) ----------, 1945, Geology of the Plainfield--Hawley area, Massachusetts (with special reference to Deposits of Manganese and Iron Minerals). U.S. Geological Survey--Mass. Dept. Public Works Coop. Geol. Project Open File Report, 35p., 8 figs., 2 plates
(368) ---------- and John A. Young Jr., April 1937, Minerals and Associated Rocks at Copper Mine Hill, Rhode Island. American Mineralogist, volume 4, number 22, p.279-289
(369) Rand, J.C., June 1908, Notes on Some Minerals Occurring near Boston, Massachusetts. The Mineral Collector, vol.15, no.4, p.57-58
(370) ----------, January 1906, Some Minerals occurring at Worcester, Massachusetts. The Mineral Collector, vol.12, no.11, p.165-166
(371) Ratcliffe, Nicholas M., 1975, Geologic Map of the Stockbridge, Massachusetts Quadrangle. U.S. Geological Survey Geologic Quadrangle Map GQ1143, scale 1:24,000
(372) ----------, 1974, Geologic Map of the State Line Quadrangle, Columbia County, New York and Berkshire County, Massachusetts. U.S. Geological Survey Geologic Quadrangle Map GQ1142, scale 1:24,000
(373) ----------, 1974, Geologic Map of the Great Barrington, Massachusetts Quadrangle. U.S. Geological Survey Geologic Quadrangle Map GQ1141, scale 1:24,000
(374) ----------, 1972, Layered Magnetite, Western Massachusetts, p.A20 in Geological Survey Research 1972, U.S. Geological Survey Professional Paper 800-A, chapter A, 320p.
(375) ----------, 1965, Bedrock Geology of the Great Barrington area, Massachusetts. Penn. State Univ. Ph.D. Thesis, 213p., 12 tables, 21 figures, 22 plates, map, scale 1:24,000.
(376) Rhodes, Edward J. and William H. Graves Jr., 1931, A New Cambrian Locality in Massachusetts. Am. Journal of Science, 5th series, vol.22, no.130, p.364-372
(377) Rice, F.P., An Account of the Discovery of a Mastadon's Remains in Northboro, 8p., Worcester, Massachusetts cited in U.S. Geological Survey Bulletin 597, p.14
(378) Richards, Robert H., 1874-1875, On a Newly-Discovered Lead Vein in Newburyport, Massachusetts. Boston Soc. Nat. Hist. Proc., vol.17, p.200-204
(379) Richardson, Steven McAfee, 1970, Some Volcanic Rock Types in a portion of Hull, Massachusetts. Boston University M.A. Thesis, 53p., 19 figures, map, scale 1.4 inches equals 100 feet
(380) Richmond Jr., W.E., April 1937, Paragenesis of the Minerals from Blueberry Mountain, Woburn, Massachusetts. American Mineralogist, vol.22, no.4, p.290-300
(381) ---------- and F.A. Gonyer, November 1938, On Pollucite. American Mineralogist, vol.23, no.11, p.783-789
(382) Ries, Henry, 1903, The Clays of the United States east of the Mississippi River. U.S. Geol. Survey Professional Paper 11, 298p.
(383) Robinson, Samuel, 1825, Catalogue of American Minerals with their localities, Cummings, Hilliard and Co. (Pub.), 316p.

(384) Rogers, William B., 1861, No Title (Fossils from Fall River, Massachusetts). Proc. Boston Soc. Nat. History, vol.7, p.389-391
(385) ----------, 1860, Fossil Shells in Fall River, Massachusetts. Proc. Boston Soc. Nat. Hist., vol.7, p.389-391
(386) ----------, November 1856, Discovery of Paleozoic Fossils In Eastern Massachusetts. Am. Journal of Science, 2nd series, vol.22, no.65, V. Misc. Intelligence, note no.3, p.296-298
(387) Romer, Alfred Sherwood, 1951, Bison crassicornis in the Late Pleistocene of New England. Journal of Mammalogy, vol.32, no.2, p.230-231
(388) Round, Eola M., March 1927, Correlation of Coal Floras in Henry County, Missouri and the Narragansett Basin. Botanical Gazette, vol.83, p.61-69
(389) Sanford, S.N.F., April 1934, Fossils of Colorful Gay Head. Bulletin of the New England Museum of Natural History, no.71, p.3-5
(390) Sawyer, Alfred P., 1911, Early Mining Operations near Lowell. Contr. Lowell Historical Society, vol.1, no.2, p.316-342
(391) Sawyer, G.C., 1932, Atlantic Coast Subsidence or A Rise in Sea Level --A Review of the Evidence, 14p., Report of the Dept. of Geology, Dartmouth College, Hanover, New Hampshire
(392) Sayles, Robert W., December 1939, Upper Till, Two Boulder Clays, and Interglacial Flora on Cape Cod (Abstract). Geological Society of America Bulletin, vol.50, p.1867-1884
(393) ---------- and Arthur S. Knox, October 1943, Fossiliferous Tills and Intertill Beds of Cape Cod, Massachusetts. Bulletin of the Geological Society of America, vol.54, no.10, p.1569-1612, 4 plates, 1 fig.
(394) Schaeffer, F.C., 1819, Localities of Minerals, Am. Journal of Science (Silliman's Journal), 1st series, vol. 1, art.V, p.236-243
(395) Schaller, Waldemar T., 1917, Gems and Precious Stones. Chapter bb in Mineral Resources of the United States, Part II, Nonmetals, p.843-858, U.S. Geological Survey Publication
(396) Schlegel, D.M., 1957, Gemstones of the United States. U.S. Geological Survey Bulletin 1042-G, p.203-253
(397) Schnabel, R.W., 1974, Bedrock Geologic Map of the Southwick Quadrangle, Massachusetts and Connecticut. U.S. Geological Survey Geologic Quadrangle Map GQ1170, scale 1:24,000
(398) ----------, 1973, Preliminary Geologic Map of the West Granville Quadrangle, Massachusetts and Connecticut. U.S. Geological Survey Open File Report, 4 sheets, scale 1:24,000
(399) ----------, 1967, Postmetamorphic Diorite and Pegmatite in Western Massachusetts (Abstract). Program 1967 Annual Meeting, Geological Society of American, Northeastern Section, 69p., Boston
(400) Schneer, Cecil J., 1951, Bedrock Geology of the Newbury East Quadrangle, Massachusetts and New Hampshire. U.S. Geological Survey Open File Report, 20p., map, scale 1:24,000, Boston
(401) ----------, 1951, Bedrock Geology of the Newburyport West Quadrangle, Massachusetts and New Hampshire. U.S. Geological Survey Open File Report, 25 pages, map, scale 1:24,000, cross-sections, Boston
(402) Schoppee, Mrs. Lawrence W., July-August 1957, World News of Mineral Occurrences--Massachusetts. Rocks and Minerals, vol.32, nos.7-8, p.355
(403) Schrader, F.C., R.W. Stone and Samuel Sanford (compilers), 1917, Useful Minerals of the United States. U.S. Geological Survey Bulletin 624 (revision of U.S. Geol. Survey Bulletin 585), 412p.
(404) Scudder, Samuel H., February 1884, The Oldest Known Insect--Larva Mormolucoides Articulatus, from the Connecticut River Rocks. Memoir Boston Soc. Nat. History, vol.3, p.431-438

(405) ----------, 1875--1876, Geology of Sankoty Head, Nantucket. Proc. Boston Soc. Nat. Hist., vol.18, p.182-185
(406) Sears, John H., 1905, The Physical Geography, Geology, Mineralogy, and Paleontology of Essex County, Massachusetts. Essex Institute (Publ.), 418p., 209 figures, map, scale 1:62,500
(407) ----------, 1890, The Stratified Rocks of Essex County, Bulletin of the Essex Institute, vol.22, nos.1-3, p.31-47
(408) Segerstrom, Kenneth, 1956, Colrain, Massachusetts--Vermont, Bedrock Geology. U.S. Geological Survey Geologic Quadrangle Map GQ86, map scale 1:31,680
(409) ----------, 1956, Shelburne Falls, Massachusetts. Bedrock Geology. U.S. Geological Survey Geologic Quadrangle Map GQ87, map scale 1:31,680
(410) Seiders, Victor M., 1974, Bedrock Geologic Map of the Wales Quadrangle. U.S. Geological Survey Open File Geologic Map 74-300, map scale 1:24,000
(411) Selfridge Jr., George C., 1936, An X-ray and Optical Investigation of the Serpentine Minerals. American Mineralogist, vol.21, p.500-501
(412) Shaler, Nathaniel Southgate, 1897, Geology of the Cape Cod District. U.S. Geological Survey 18th Annual Report, vol.2, p.497-593
(413) ----------, 1889, The Geology of Nantucket. U.S. Geological Survey Bulletin 53, 54p., 10 plates, map, scale 1:130,000
(414) ----------, 1889, On the Occurrence of Fossils of the Cretaceous Age on the Island of Martha's Vineyard, Massachusetts. Bulletin of the Museum of Comparative Zoology, Harvard College, vol.16, Geological Series 2, no.5, p.89-97, 2 plates, 1 map
(415) ----------, 1888, Report on the Geology of Martha's Vineyard. Seventh Annual Report of the U.S. Geological Survey, Part D, p.297-363, plates 20,21, map, scale 1:160,000
(416) ----------, October 1888, On the Geology of the Cambrian District of Bristol County, Massachusetts. Bulletin of the Museum of Comparative Zoology, Harvard College, vol.XVI, no.2, p.13-41, map, 2 plates. With A.F. Foerste, Preliminary Descriptions of North Attleboro fossils, p.27-41
(417) ----------, 1887--1888, The Geology of Cape Ann, Massachusetts. U.S. Geological Survey 9th Annual Report, Part C, p.529-611, plates 75,76,77, map, scale 1:62,5000
(418) ----------, 1885-1886, Report on the Geology of Martha's Vineyard. U.S. Geological Survey 7th Annual Report, p.297-363, plates 20,21
(419) ----------, 1868, Notes on the Position and Character of Some Glacial Beds Containing Fossils at Gloucester, Massachusetts. Boston Soc. Nat. Hist. Proc., vol.11, p.27-30
(420) ----------, J.B. Woodworth and A.F. Foerste, 1899, Geology of the Narragansett Basin, U.S. Geological Survey Monograph 33, 402p., 31 plates, 30 figures
(421) ---------- and C.F. Marbut, 1896, Glacial Brick Clays of Rhode Island and Southeastern Massachusetts. U.S. Geological Survey 17th Annual Report, part 1, p.951-1004
(422) Shannon, Earl V., 1921, Analysis and Optical Properties of Amesite and Corundophilite from Chester, Massachusetts...Proc. U.S. Nat. Museum 58, p.371-378
(423) ----------, June 1919, Famous Mineral Localities: The Chester Emery Mine. American Mineralogist, vol.4, no.6, p.69-72
(424) ----------, April 1919, Famous Mineral Localities: The Pelham Asbestus Mine, Massachusetts. Am. Min., vol.4, no.4, p.37-39

(425) ----------, January 1919, Famous Mineral Localities: The Datolite Locality near Westfield, Massachusetts. American Mineralogist, vol.4, no.1, p.5-6
(426) Shaub, B.M., July--August 1954, The Walnut Hill Spodumene Ledge near South Worthington, Massachusetts. Rocks and Minerals, vol.29, nos. 7-8, p.339-343
(427) ----------, February 1941, Occurrence and Origin of Babingtonite and Other Minerals from Quabbin Aqueduct, Massachusetts. American Mineralogist, vol.2, no.26, p.121-129
(428) ---------- and William E. Bernier, January--February 1954, Unusual Calcite and Pyrite Crystals from Shelburne, Massachusetts. Rocks and Minerals, volume 29, nos.1-2, p.3-13
(429) ---------- and Albert B. Nelson, 1957, Mineral Occurrences Trip, p.50-53 in Bain, George (editor), Geology of the Northern Part--Connecticut Valley. 49th New England Intercollegiate Geologic Conference Guidebook, 56 pages
(430) ---------- and B.J. Schenck, July--August 1954, Pollucite from Lithia, Massachusetts. American Mineralogist, vol.39, no.7-8, p.661-664
(431) Shaw, Alan B., September 1950, A Revision of Several Early Cambrian Trilobites from Eastern Massachusetts. Journal of Paleontology, vol.24, no.5, p.577-590
(432) Shaw Jr., Charles Ernest, 1967, Geology and Petrochemistry of the Milford area, Massachusetts. Brown University Ph.D. Thesis, 121p., 28 figures, 9 tables, map, scale 1:24,000
(433) Sheldon, J.M. Arms, 1900, Concretions from the Champlain Clays of the Connecticut Valley, 45p., 14 plates
(434) Shepard, Charles U., 1852, A Treatise on Mineralogy, 3rd edition, 451p., B.L. Hamlen (Publ.), New Haven, Connecticut
(435) ----------, 1838, Columbite and Tin Ore at Beverly, Massachusetts (Notice of Discovery). American Journal of Science, 1st series, vol.34, no.2, art.21, p.402
(436) Shimer, H.W., 1907, A Lower--Middle Cambrian Transition Fauna from Braintree, Massachusetts. American Journal of Science, 4th series, vol. 24, no.140, art.18, p.176-178
(437) ----------, 1907, An almost complete specimen of Strenuella strenus (Billings): American Journal of Science, 4th series, vol.173, no.23, p.199-201, p.319
(438) Shumway Jr., G.A., 1951, Geology in the Northwest Corner of the Narragansett Basin. Mass. Inst. Tech. B.S. Thesis, 39p., 12 figs., map, scale 3/4 inch equals 1000 feet
(439) Smith, F.G., May--June 1952, Decrepitation Characteristics of Garnet. American Mineralogist, vol.5, part 5, nos.5-6, p.470-491
(440) Smith, M.E., L.M. Bartlett, E.P. Dickinson, H. Mosher, Mrs. H.L. Sweetman, C.H. Thayer and 13 contributors, 1947, Let's Get Out-of-Doors (A Guidebook to the Region around Amherst, Massachusetts). The Amherst Nature Club (Publishers), 32p., 3 maps
(441) Stachura, Joseph, April 1945, Purgatory Chasm in Massachusetts. Rocks and Minerals, vol.24, no.4, p.166
(442) Stanley, Daniel J., Donald J.P. Swift, and Horace G. Richards, 1967, Fossiliferous Concretions on Georges Bank. Journal of Sedimentary Petrology, vol.37, no.4, p.1070-1083
(443) Stevens, H.J., 1906, Copper Handbook, volume 6
(444) Stimpson, William, 1851, A List of Fossils found in the Post-Pleistocene Deposit in Chelsea, Massachusetts. Proc. Boston Soc. Nat. History, vol.4, p.19-20 p. 9-10
(445) Talbot, Mignon, June 1911, Podokesaurus holyokensis, a New Dinosaur

from the Triassic of the Connecticut Valley. American Journal of Science, 4th series, vol.31, no.186, art.38, p.469-479
(446) Tarr, R.S., September 1903, Postglacial and Interglacial(?) Changes of Level at Cape Ann, Massachusetts with a Note on the Elevated Beaches by J.B. Woodworth. Bulletin of the Museum of Comparative Zoology, Harvard University, vol.6, p.181-196
(447) Temple, J.H., 1887, History of Framingham, Massachusetts. Published by the Town of Framingham, 794p.
(448) Teschemacher, J.E., 1843, Description of the oxide of tin found at the Tourmaline locality, Chesterfield, Massachusetts. Assoc. Am. Geologists Meeting, 1-3, 1840-1842, Report, p.67, p.296-297
(449) ----------, March 1842, Fossil Ferns at the Mansfield Coal Mine, Massachusetts. Proc. Boston Soc. Nat. Hist., vol. 1, p.61-62
(450) Theokritoff, George, 1968, Cambrian biogeography and biostratigraphy in New England, p.9-22 in Zen, E-an, W.S. White, J.B. Hadley, and J.B. Thompson Jr. (Editors), Studies of Appalachian Geology--Northern and Maritime, Interscience Publishers, John Wiley and Sons, 475p.
(451) Thurston, Anthony, May 1966, Unusual Chiastolite from Massachusetts. Rocks and Minerals, vol.41, no.5, p.346
(452) Toulmin III, Priestly, 1964, Bedrock Geology of the Salem Quadrangle and vicinity, Massachusetts. U.S. Geological Survey Bulletin 1163-A, 79p.
(453) ----------, 1958, Bedrock Geology of the Salem Area, Massachusetts. Harvard University Ph.D. Thesis, 167p., 2 maps
(454) Towe, Kenneth M., December 1959, Petrology and Source of Sediments in the Narragansett Basin of Rhode Island. Journal of Sedimentary Petrology, vol.29, no.4, p.503-512
(455) Trask, N.J., Stratigraphy and Structure in the Vernon--Chesterfield area, Massachusetts--New Hampshire--Vermont. Harvard University Ph.D. Thesis, 99p., 7 plates, 33 figures, 16 tables, map, scale 1:62,500, 3 cross-sections.
(456) Trumbull, James V.A. and John C. Hathaway, 1968, Dark--Mineral Accumulations in Beach and Dune Sands of Cape Cod and Vicinity, U.S. Geological Survey Professional Paper 600-B, p.B178-B184
(457) Upham, Warren, 1894, Marine Shell Fragments in Drumlins near Boston. American Journal of Science, 3rd series, vol.47, p.238-239
(458) ----------, 1889, The Structure of Drumlins. Proc. Boston Soc. Nat. History, vol.24, p.223-241
(459) Van Frank, Richard and Max K. Hecht, 1954, Fossil Rattlesnakes of the Genus Crotalus from Northern Massachusetts. Copeia, no.2, p.158-159
(460) Von Haideingen, A.W., 1825, Translation of Frederik Moh's Treatise on Mineralogy, Edinburgh
(461) Walcott, C.D., 1912, Cambrian Brachiopoda. U.S. Geological Survey Monograph 51 in two parts. Part I, 872p., Part II, 363p.
(462) ----------, April 1899, Pre-Cambrian Fossiliferous Formations. Bulletin of the Geological Society of America, vol.10, p.200-244, 7 plates
(463) ----------, March 1892, Note on Lower Cambrian Fossil from Cohasset, Massachusetts. Proc. Biol. Soc. Washington, vol.7, p.155
(464) ----------, March 1888, The Taconic System of Emmons, and the use of the name Taconic in Geologic Nomenclature. American Journal of Science, 3rd series, vol.35, no.207, p.229-242
(465) Warren, Charles H., September 1913, Petrology of the Alkali-Granites and Porphyries of Quincy and the Blue Hills, Massachusetts, U.S.A. Proc. Am. Acad. Arts and Sciences, vol.49, no.5, p.203-331
(466) ---------- and Hugh E. McKinstry, 1924, The Granites and Pegmatites of Cape Ann, Massachusetts. Proc. Am. Acad. Arts and Science, vol.59, no.14, p.315-357, 5 plates

(467) ---------- and Charles Palache, July 1911, The Pegmatites of the Riebeckite--Aegirite Granite of Quincy, Massachusetts, U.S.A.; Their Structure, Minerals, and Origin. Proc. Am. Acad. Arts and Science, vol.47, no.4, p.125-168, 3 plates
(468) ---------- and Charles Palache, 1910, Pegmatite in the Granite of Quincy, Massachusetts. Geological Society of America Bulletin, vol.21, p.784-785
(469) ---------- and Sidney Powers, September 1914, Geology of the Diamond Hill--Cumberland District in Rhode Island--Massachusetts. Geological Society of America Bulletin, vol.25, p.435-476
(470) Washington, Henry S., 1899, The Petrographical Province of Essex County. Journal of Geology, vol.7, p.53-64, p.105-121, p.284-294, p.463-480
(471) ----------, 1898, The Petrographical Province of Essex County. Journal of Geology, vol.6, p.787-808
(472) Watts, A.S., 1916, The Feldspars of the New England and North Appalachian States. U.S. Bureau of Mines Bulletin 92, 181p., 8 plates, 22 figures
(473) Weed, W.H., 1911, Copper Deposits of the Appalachian States. U.S. Geological Survey Bulletin 455, 166p.
(474) Wheeler, Girard, 1937, The West Wall of the New England Triassic Lowland. Connecticut State Geological and Natural History Survey Bulletin, no.58, 73p., 43 figs., 7 plates
(475) Wheeler, Robert R., 1942, New Mid-Cambrian Ptychoparid. American Journal of Science, vol.240, no.8, p.567-570, 1 plate
(476) Whitfield, R.P., 1883, Observations on the fossils of the Metamorphic Rocks of Bernardston, Massachusetts with Note by J.D. Dana. American Journal of Science, 3rd series, vol.25, no.149, art.38, p.368-369
(477) Whitmore Jr., Frank C., K.O. Emery, H.B.S. Cooke, and Donald J.P. Swift, June 1967, Elephant Teeth from the Atlantic Continental Shelf. Science, vol.156, no.3781, p.1477-1480
(478) Wiley, John, March 1947, A Further Note on Purgatory Chasm, Massachusetts. Rocks and Minerals, vol.22, no.3, p.213
(479) Willard, Bradford and Arthur B. Cleaves, June 1930, Amphibian Footprints from the Pennsylvanian of the Narragansett Basin. Bulletin of the Geological Society of America, vol.41, p.321-327, 4 plates, 3 figures
(480) Willard, M.E., 1956, Williamsburg, Massachusetts. Bedrock Geology. U.S. Geological Survey Quadrangle Map GQ85, scale 1:31,680
(481) ----------, 1952, Greenfield, Massachusetts. Bedrock Geology. U.S. Geological Survey Geologic Quadrangle Map GQ20, scale 1:31,680
(482) ----------, 1951, Mount Toby, Massachusetts. Bedrock Geology. U.S. Geological Survey Geologic Quadrangle Map GQ8, scale 1:31,680
(483) Wilson, Alfred W.G., 1901, The Medford Dike Area. Proc. Boston Soc. Nat. History, vol.30, no.2, p.353-374
(484) Wilson, Hewitt, 1933, Iron Oxide Mineral Pigments of the United States. U.S. Bureau of Mines Bulletin 370, 198p., 34 figures
(485) Wilson, J. Howard, 1905, Pleistocene Formations of Sankaty Head, Nantucket. Journal of Geology, vol.13, p.713-734
(486) Wilson, L.R., 1949, A Microfossil Analysis of the Lower Peat and Associated Sediments at the John Hancock Fish Weir Site, Boston, Massachusetts. Peabody Foundation for Archeology Papers, vol.401, p.84-98
(487) Woodworth, J.B., 1900, Vertebrate Footprints on Carboniferous Shales of Plainville, Massachusetts. Geological Society of America Bulletin, vol.11, p.449-454
(488) ----------, 1900, Glacial Origin of Older Pleistocene in Gay Head Cliffs, with Note on Fossil Horse of that Section. Geological Society of America Bulletin, vol.11, p.455-460

(489) ----------, March 1897, Unconformities of Martha's Vineyard and of Block Island. Bulletin of the Geological Society of America, vol. 8, p.197-212, 16 plates
(490) ----------, 1894, Carboniferous Fossils in the Norfolk County Basin. American Journal of Science, vol.48, no.284, art.19, p.145-148
(491) ----------, 1893, On Traces of a Fauna in the Cambridge Slates. Proc. Boston Soc. Nat. History, vol.26, p.125-126
(492) ---------- and Edward Wigglesworth, 1934, Geography and Geology of the Region including Cape Cod, the Elizabeth Islands, Nantucket, Martha's Vineyard, No Mans Land and Block Island. Harvard College Museum of Comparative Zoology Memoir, vol.52, 322p., 38 plates
(493) Woolner, Frank (byline), September 27, 1970, "Deep, dark and damp --Sterling's underground: Caving visit to an "old mine, old iron mine or old silver mine", by Woolner, Joseph A. Sinnott and four others. Feature Parade Magazine, p.14-15, Worcester Sunday Telegram, Worcester, Massachusetts
(494) Zen, E-An and Joseph H. Hartshorn, 1966, Geologic Map of the Bashbish Falls Quadrangle, Massachusetts, Connecticut and New York. U.S. Geological Survey Geologic Quadrangle Map GQ507, scale 1:24,000
(495) Zinn, Donald J. and J. Steven Kahn, December 1972, Geology and Geography of Penikese Island, p.429-436 in Transactions of the Connecticut Academy of Arts and Science, vol.44