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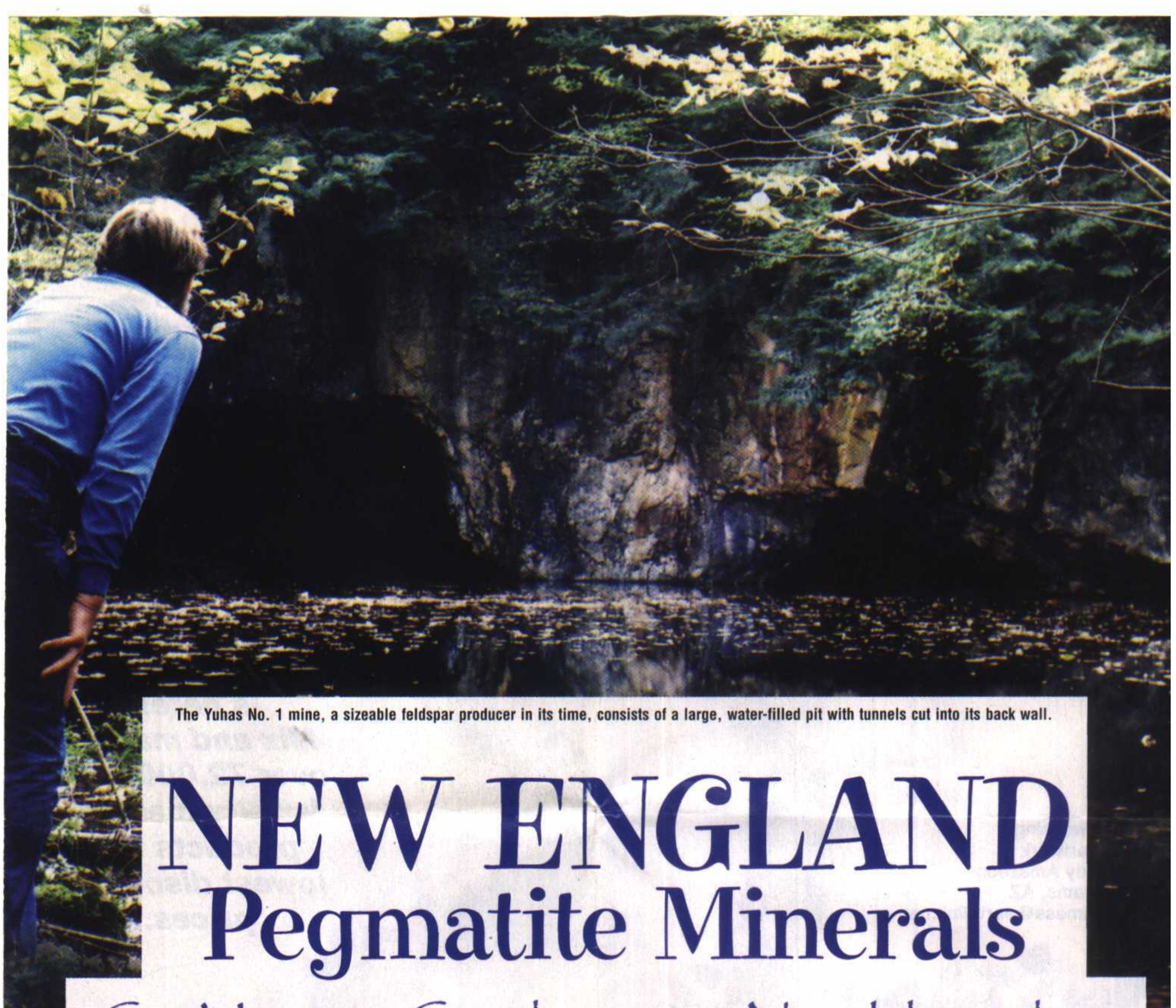

The Yuhas No. 1 mine, a sizeable feldspar producer in its time, consists of a large, water-filled pit with tunnels cut into its back wall.

NEW ENGLAND Pegmatite Minerals

Six Mines in Southwestern New Hampshire

Story and Photos by R. W. Ballou

New Hampshire is officially known as the "Granite State." It is an apt title, certainly, but it doesn't even hint at the mineralogical diversity of this beautiful, mountainous chunk of New England. According to Philip Morrill's *New Hampshire Mines and Mineral Localities,* 2nd Ed. (Montshire Museum, 1961), almost 300 different mineral types have been retrieved from or identified in New Hampshire over the years, including several commercially viable metallic ores, a wide range of strategic minerals, and almost the entire spectrum of exotic and beautiful collector minerals. Museums worldwide own New Hampshire specimens, some of them the finest examples of the species ever seen. (Reprints of *New Hampshire Mines and Mineral Localities* are available from http://barilbooks.com and elsewhere.)

Massive blue tourmaline on feldspar is commonly found at the Chickering Mine in Walpole, New Hampshire.

For the mineral collector, New Hampshire's mines—none of which are operating in an industrial sense—are a great venue in which to pursue the hobby. Accessibility is a big factor: in New Hampshire, hunters and snowmobilers wield considerable political influence, and as many of these old mines are in prime hunting and snowmobiling areas, the land they sit on has remained largely unposted against trespassing. There has also been a relative lack of residential or commercial development in rural New Hampshire in the last few decades. I estimate that at least half the mines listed in Morrill's book are still legally accessible to the casual mineral collector, usually without the necessity (and nuisance) of seeking landowner permission.

Of course, in consequence, the better, more easily accessed sites have been heavily worked over by collectors over the years. Good specimens are still to be found even at the popular sites, though, if you're willing to put some work into it. And for those adventurous souls who can read a compass and aren't averse to doing some hard walking, there are mines in the New Hampshire woods that haven't felt the thump of a shovel or the crack of a rock hammer in 50 years. Morrill's book lists quite a few of these.

For someone like me with a serious interest in industrial archaeology, these old mines can be fascinating places. Likewise, to the hobby geologist, the walls of many of the old mines tell a tale of over 400 million years of mountains being formed, of land masses rising and subsiding, of magma, and of sedimentation and metamorphism taking place. Interesting and beautiful geological specimens are abundant at New Hampshire mine sites, and can often be gathered by simply bending over to pick them up.

A FEW GOOD MINES

The number of New Hampshire mines suitable for mineral collecting is huge, so I'll concentrate this article on the southwestern corner of the state, particularly the Sullivan and Cheshire county districts, which experienced the heaviest concentration of mining activity in the 19th and early 20th centuries. With the exception of the Stoddard Mine in Westmoreland, a far too interesting and productive site to leave out, all these mines were originally worked for pegmatite and its associated minerals. All are on private—but unposted—land, and all are what I consider "safe" sites for mineral collecting, with no unstable tunnels or avalanche-prone dumps to tempt the unwary. I have visited them all in recent months to verify their current accessibility.

Beryl Mountain, Acworth: Originally opened for mica in the late 19th century, this mine was worked for beryl during the later years of World War II. A single, concentrated deposit yielded over 20 tons of the mineral. The mine's physical structure is classic pegmatite, a magmatic dome (part of the New Hampshire Plutonic Suite, Alstead Field) intruded upward into a layer of schist, which defines its outer perimeter. The main pit is approximately 100 feet long and 30 feet deep, and is cut right into the top of the dome. A vein of snow-white Clough quartzite passes through the middle of the deposit and is a common waste rock on the dumps. Morrill's book states that there's a tunnel at the site, but I've never been able to find it. I suspect this had something to do with early mica operations and was blasted away during the beryl-mining phase, or else it was buried under one of the dumps.

Minerals that have been found at the site include most of the accessory minerals likely to occur in a pegmatite mine, along with such rarities as schoepite, meta-autunite, rutherfordine, vandendriesscheite, and cyrtolite, some of which is quite radioactive. Beryl specimens taken from this mine have included all common colors other than pink (morganite). The site has also produced some truly big beryl crystals. One of these, retrieved by mineral collectors during a period when the mine was inactive, weighed somewhere around 5 tons!

On the west wall of the main pit is a rather dramatic juxtaposition of the original schist deposit from the Ordovician Period, the layer of Clough quartzite, and the thick vein of white quartz that dominates the Beryl Mountain pegmatite. The fact that the quartzite was once a deposit of sand on the ocean floor is interesting to ponder and shows just how much Earth's structure has changed in the last 500 million years or so.

From a collector's standpoint, Beryl Mountain has a reputation of being somewhat worked out, the good beryl specimens having disappeared into private collections long ago. However, the dumps at this mine are pretty deep (particularly the one at the base of the main pit), with a lot of boulder-sized chunks of quartzite and quartz mixed in with the smaller stuff. Some vigorous action with a crowbar and shovel could get the serious collector down into a level that hasn't been exposed since the mine was worked during the late days of World War II, when white or colorless beryl was being sought for industrial purposes. The colored varieties were generally tossed aside because they contained iron impu-

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Iron contamination gives these quartz crystals from the Stoddard Mine a golden color that's not unattractive.

The Yuhas No. 2 mine is noted for producing iron sulfide materials like the pyrite flakes covering this plagioclase feldspar.

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rities that made refining difficult.

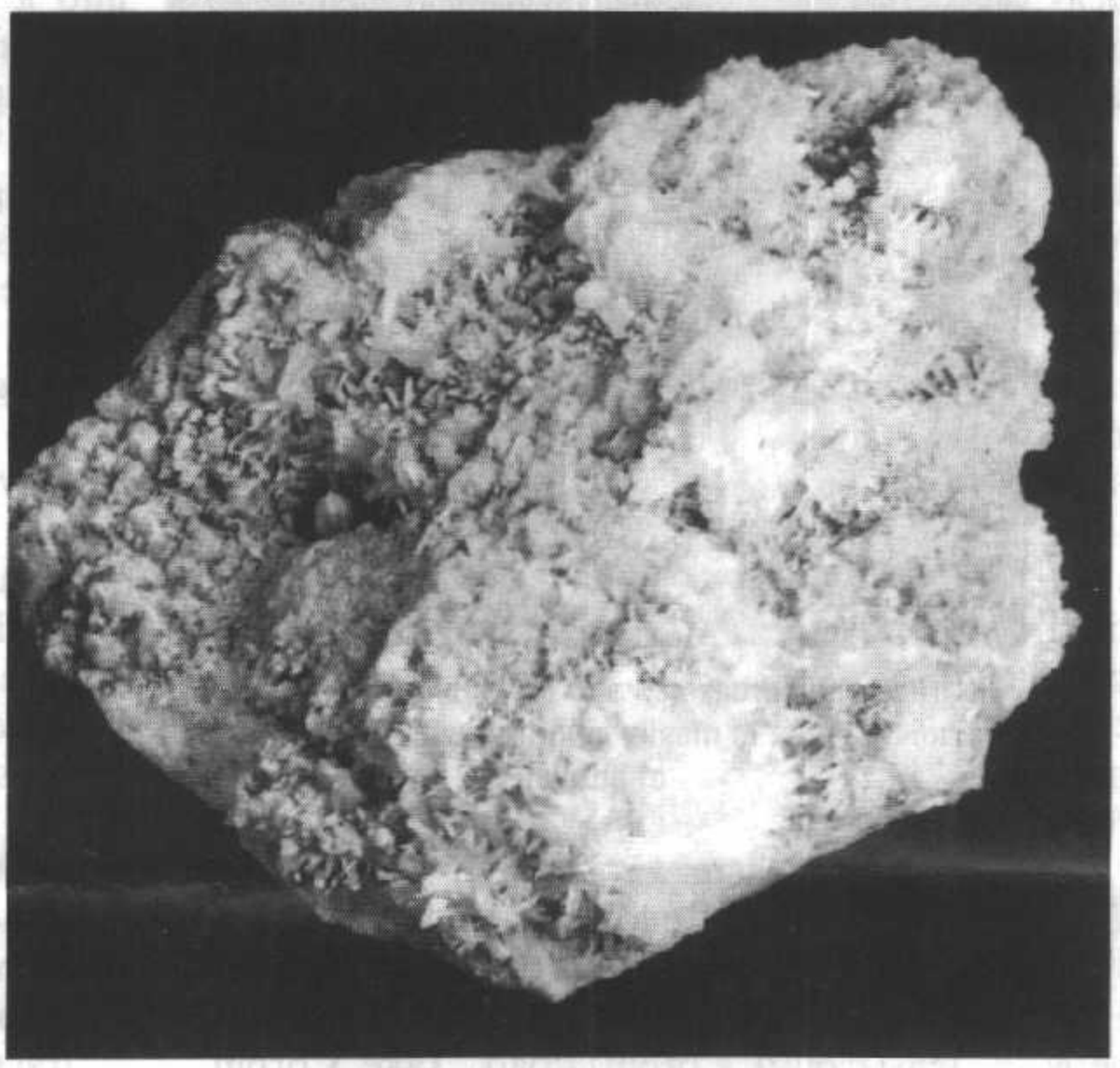
If you visit Beryl Mountain, you should also check out the Beryl Mountain Museum, located a mile south of the mine on Beryl Mountain Road. This is a sizeable collection of mining equipment, tools, and vehicles (mostly rusty) housed in two buildings. It's open by chance or appointment. The hulks of the old chain-driven Sterling dump trucks that ground their way up and down the steep, treacherous mine roads of the district are definitely worth a look and give an inkling of the difficulties, both economic and physical, of pegmatite mining in the state of New Hampshire.

To get there: From state Route 123A in South Acworth, turn south on Beryl Mountain Road. At approximately 0.75 mile, there's a town garage building on the right; McLaughlin Road enters from the left directly opposite. The mine road starts on the east side of this intersection. After passing the gate, walk uphill for 0.25 mile, then bear right at the fork. You'll reach the first dump and the lower pit in 100 yards or so. The upper pit is hidden behind a thick stand of small spruce trees.

Yuhas No. 1 and Yuhas No. 2 mines, Acworth: These were both sizeable feldspar producers in their time, and the No. 2 mine was worked right up into the 1960s. They both consist of large, water-filled pits with tunnels cut into their back walls. The tunnels, along with the murky, dark-green water of unknown depth, give these mines an eerie, fascinating "presence" that inspires curiosity and invites exploration. The location of the No. 1 mine, deep in a wooded glade beside a disused forest road, could be described as charming, while the location of the No. 2 mine, right at the top of a mountain with a 50-mile view of the surrounding countryside in three directions, is downright spectacular.

Because getting to these mines involves some pretty strenuous walking, they're not often visited by mineral collectors nowadays. Also, the list of minerals these mines have produced is not very long, although a sizeable number of good specimens of various kinds have come out of their dumps over the years.

The No. 2 mine is noted for producing iron sulfide materials, including good pyrite specimens. Also, some pretty strange iron ore can be found at this mine: hellfire-and-brimstone stuff that looks like hematite, but leaches powdery yellow sulfur from its pores if you soak it in water and then let it dry. One chunk I picked up on a recent trip was almost a dead ringer for a meteorite except for its color, and had a cavity in it that contained a cluster of almost microscopic pyrite crystals. Decent tourmaline specimens have also been found here, along with interesting examples of the feldspathic minerals—not surprising, since the mine was mainly a feldspar producer.



A 7-pound chunk of quartz crystals, ranging from needle size up to ¼ inch in diameter, was recovered from one of the Stoddard Mine dumps.

A huge amount of material came out of the No. 2 mine during its working life—as much as 80 tons a day, according to one account. The size of the main dump cascading down the mountainside bears testimony to the mining effort that went on here.

To get there: Take state Route 123A north from Alstead (heading toward South Acworth) for 3.2 miles to the intersection of Livermore Road by the Cold River bridge. Just before the intersection, there's a washed-out, mineral-covered road directly across from a wooden house with a conspicuous front gable. This is the mine road. Walk in 100 yards and bear right at the fork, then continue uphill for 200 yards to a second fork. Bear left here; this is a snowmobile trail that follows the western flank of the mountain. At approximately 0.75 mile, a very steep, mineral-covered road enters from the left; 0.33 mile up this pitch is the No. 2 mine. To get to the No. 1 mine, stay on the snowmobile trail a short distance past the No. 2 road; the dumps are obvious by the intersection. There's another small, but complete, working with its own dump about 100 yards up the No. 2 mine road.

Big Mine, Alstead: This started out as a mica mine in the 19th century. The deposit was discovered by a local farmer while searching for his lost sheep. Originally known as the Gilsum-Bowers Mine, its production switched over to mostly feldspar during World War I and right up into the late 1930s. Approximately 240,000 tons of feldspar were eventually blasted and hauled out of the Big Mine, making it probably the second biggest feldspar producer in the state. As the Big Mine grew in size, it swallowed up several smaller mines, including the Rhoda (an early mica mine), the Davis, and the Tripp No. 2.

When World War II started and the demand for mica drastically increased, the Golding-Keene Co. decided to put it back into operation for the extraction of mica only. It pumped out 13 million gallons of water, and sunk tunnels under the floor of the main pit and off its sidewalls to follow previously-ignored mica veins. The name of the mine was changed to "Victory" in honor of the war effort. In the single month of July 1944, 45 tons of mica were extracted, largely of a rum-colored variety occurring in books up to 5 inches thick.

Today, the Big Mine lies dark and silent, vegetation gradually concealing it from casual sight. With the exception of a part-open, part-underground "alcove" at the mine's northeast corner (this was originally the Tripp No. 2 mine), all the tunneling done during World War II now lies under almost 200 feet of cold, black water. And the once-huge dumps have been significantly reduced, with much of the material being hauled away for road fill by the local highway department. One can only wonder what kind of great mineral specimens lie hidden under Alstead asphalt!

Minerals found at the Big Mine have included all the usual pegmatite-related minerals, as well as autunite, gummite, montmorillonite, uraninite and uranophane. Gem-quality garnets and a lot of black tourmaline have come out of here. Despite the robbing of the Big Mine's dumps, there is still a huge amount of waste material scattered around the site, much of it hidden under topsoil or vegetation. The old Davis Mine, which forms the southwestern corner of the Big Mine, went very deep and served as access to two tunnels that went under the floor of the main pit. Its dumps would definitely be worth investigating.

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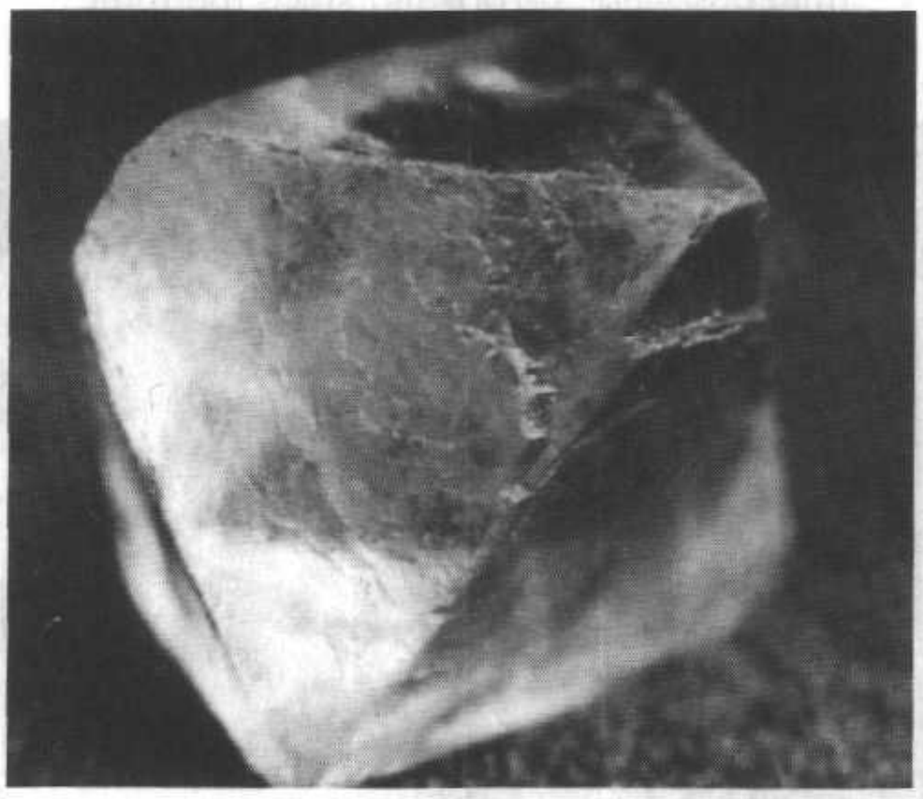
There are numerous other pegmatite mines within a short distance of the Big Mine. Several of these are still accessible to collectors and still capable of producing good specimens from time to time. If you're traveling in the vicinity, the Alstead town clerk has a hand-drawn map showing the locations of many of these mines that she'll photocopy for a small fee. The New Hampshire Rocks Web site, http://groups.msn.com/NewHampshireRocks, has a very detailed, but hard to read, map showing the location of virtually every mine in the area, as well as several site-specific maps, including one for the Big Mine.

An interesting industrial archaeology site nearby is the ruins of the Kidder Pond flotation mill, built by the Golding-Keene Co. in 1948 to produce pure-white ground feldspar for the Corning Glass Works in New York. Much of the mill's ironwork is still intact, as well as one of the huge silos used to store the finished product. On the shore of the pond in front of the ruins is a sizeable white sand "beach" comprised entirely of ground feldspar. The Osborne Mine, producer of truly giant beryl crystals at one time, is close to the mill, reached by a branch off the Kidder Pond road.

To get there: From state Route 123 in East Alstead, turn south on Gilsum Mine Road. At 3.1 miles, the entrance to the Big Mine will be on your right. The mine is near the road, hidden behind the trees. To reach the flotation mill ruins, continue south on Gilsum Mine Road for 0.25 mile, then turn left (east) onto Kidder Pond Road. This is a pretty rough road; don't try it in your Aunt Mildred's Buick Electra. The mill is at the east end of the pond where the road ends (approximately 0.5 mile).

The Lyman and Fitzgibbon mines, Alstead: These are directly across the road from one another and were at one time operated by the same company, the Fitzgibbon Mica Co. of Beverly, Massachusetts. Both were worked mainly for mica, the Fitzgibbon being a particularly spectacular producer for a mine of its size. The Fitzgibbon has also put a surprising variety of mineral specimens into the hands of rockhounds over the years: Morrill's book lists more than 20 different minerals collected here, including vivianite xanthoxenite, zircon, strengite, diadochite, pyrolusite, rockbridgeite and more common minerals like tourmaline and apatite. Obviously, this was a pegmatite formed from some extremely chemically diverse magma, and one can only wonder what other minerals it might have produced if the mine had been worked longer or gone deeper.

On a recent trip to the Fitzgibbon Mine, I found a 200-pound chunk of quartz with a 2-inch-thick slab of massive black tourmaline bisecting its entire width lying in the weeds. It's probably still there. I took home some pretty major-sized books of mica. Someone who'd gotten there before me took home a book of mica the size of the family Bible, judging by the depression in the rock out of which it had been pried.



Fluorite octahedrons can still be found at the Stoddard Mine. This one is mostly colorless with a slight trace of purple.

To get there: From the intersection of Gilsum Mine Road and state Route 123 in East Alstead, head north through the village, continue for 1 mile, then turn right (east) onto Corbin Road. Take Corbin Road 0.5 mile. The Fitzgibbon Mine will be on your left, its entrance right at the road's edge, but somewhat hidden by brush. The Lyman Mine is directly across the road.

The Chickering Mine, Walpole: This is a smallish mine, a half-circular cut in the face of a typical magma intrusion in the country rock. It's on the grounds of a Boy Scout camp, and the scouts use the mine as a natural amphitheater in which to hold their campfire singalongs or whatever. The mine's dump material is scattered over a surprisingly large area, making the dumps shallow and easy to dig. This is a good site for the casual mineral collector who isn't expecting to find museum-quality specimens.

The Chickering Mine is, however, noted as a good tourmaline producer. Blue and green tourmaline are the most common here, although on a recent visit I found a sizeable dravite crystal, the brown form of tourmaline. This came attached to a rather ugly chunk of quartz with mica "warts" sticking out of it.

There's also a sizeable vein of hematite ore in one wall of the pit, although I haven't heard of any great iron-related specimens coming out of here. A great deal of dump material, much of it boulder-sized, is lying in the main part of the pit, covered by an accumulation of duff and whatnot. A crowbar and shovel could be helpful in working the Chickering Mine. I suspect this layer of material is deeper than it looks.

To get there: From state Route 12 N., turn right onto state Route 123 E. at Cold River. Go 0.5 mile and take the right fork onto Walpole Valley Road. Continue for 3.1 miles to Eaton Road on your right. After 0.25 mile or so, Eaton Road turns into a one-lane, two-rut cow trail that's easily negotiated by an SUV or pickup, but might tear the muffler off the family sedan. Continue for 0.75 mile to an open clearing on your right with a granite signpost beside it; this is the parking area for the Boy Scout camp. The mine is a couple hundred yards uphill from the parking area.

The Stoddard Mine, Westmoreland: Strictly from a mineral-collecting standpoint, I've saved the best for last. The Stoddard is a fluorite mine that was first opened in 1906 when a vein of the mineral was discovered protruding from a cow pasture. H.M. Bannerman, the New Hampshire state geologist who visited the site in 1927, described the mine's geological structure thus:

"The fluorite deposits in Westmoreland, New Hampshire, occur as fissure fillings in a series of tension fractures in granite gneiss. The veins being worked are from 3 to 5 feet in width, and some of them have been traced laterally 500 to 600 feet. They dip approximately 70 degrees; the foliation of the gneiss in which they lie is generally quite flat. The veins are banded, crustified, and replete with open cavities. The fluorite is accompanied mainly by quartz, but considerable quantities of barite, calcite, dolomite, kaolin, and sericite are present, and streaks of such sulphides as chalcopyrite, pyrite, sphalerite, and a little galena appear throughout the deposits, together with some finely crystallized malachite and smithsonite ..." (*New Hampshire Minerals,* New Hampshire State Geologist, 1955, p. 28).

At first worked on a small scale, the deposit grew in importance with the outbreak of World War I. During this time, the mine was owned by the American Steel and Wire Co. of Worcester, Massachusetts, which used the fluorite as a fluxing agent in steel making. Production went on around the clock, with the mine producing 1,600 tons of fluorite during 1918. This was valued at $25 per ton during the war years.

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Originally worked entirely by hand, the mine went over to steam power, compressed-air drills, etc. in 1912. Fluorite was transported the half-mile from the mine to the town road by an overhead tramway consisting of buckets slung from a moving cable, with wooden uprights supporting the cable at intervals.

Three separate mines actually comprised the Stoddard operation. The earliest of these was the so-called Big Mine, a deep, narrow cut that followed the fluorite vein for several hundred feet. A later, smaller cut nearby proved to be a poor producer. The third opening was known as the Ox Pasture Mine, worked by a vertical shaft 130 feet deep with horizontal drifts heading east and west off its lowest depths. The longest of these was a tunnel 80 feet long, which at one point broke through into a vug that was described by those who saw it as a virtual "crystal cave." Much of the crystallized material found on the mine's dumps probably had its origins here.

Operations ceased, to all intents and purposes, in 1923. While the mine may have no further commercial value, the Stoddard can be a very productive site for the mineral collector. Quartz crystals abound, usually in large clusters of smaller crystals, although sizeable single specimens turn up from time to time. The fluorite here runs from colorless through green to purple; fluorite octahedrons can be found if you're patient enough to dig for them. Also, specimens of all the other minerals Bannerman described can still be found here, with barite being a fairly common occurrence. The dumps of the Ox Pasture Mine, which are generally shallow and scattered around the site, might be a good place to start your mineral search. Some wet and vigorous digging in the bottom of one of the side pits worked into the vein might prove more productive.

To get there: From the traffic circle at Interstate 91 Exit 3 in Brattleboro, Vermont, head east on state Route 9 for 4.2 miles, then turn left (north) on Poocham Road. Continue north for 3.2 miles until you see the sign for the VanZandt Williams Family Preserve on your left. Directly across from the preserve is an open field; the mine road starts on the northern edge of the field. A half-mile of easy walking will take you to the Ox Pasture Mine; continue up the road a short distance to reach the other two openings.

Happy hunting!